



ForestPaths

Co-designing holistic forest-based policy pathways for climate change mitigation

D6.2 Policy mapping: Synthesis of policy and stakeholder requirements at EU level relevant for the forestry sector

08/09/2023

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Funded by
the European Union

This project receives funding from the European Union's Horizon Europe Research and Innovation Programme (ID No 101056755), as well as from the United Kingdom Research and Innovation Council (UKRI). Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the EU nor the EC can be held responsible for them.

Prepared under contract from the European Commission and the United Kingdom Research and Innovation Council.

Grant agreement No. 101056755

EU Horizon Europe Research and Innovation Action

Project acronym: ForestPaths

Project full title: Co-designing Holistic Forest-based Policy Pathways for Climate Change Mitigation

Project duration: 01.09.2022 – 28.02.2027 (54 months)

Project coordinator: Dr. Hans Verkerk, European Forest Institute (EFI)

Call: HORIZON-CL5-2021-D1-01

Deliverable title: Policy mapping: Climate and biodiversity relevant policies in relation to forests and forestry

Deliverable n°: D6.2

WP responsible: WP 6

Nature of the deliverable: Report

Dissemination level: Public

Lead partner: OEKO

Recommended citation: Böttcher, H., Wolff, F., von Vittorelli, L., Peltoniemi, M., Lehtonen, Viitala, E.-J., Marras, S., Bacciu, V., Menini, A., Schelhaas, M.-J., Wiersma, H., Roest, E., Stancioiu, T., Nita, M. D., Dutca, I. (2023). ***D6.2 Policy mapping: Synthesis of policy and stakeholder requirements at EU level relevant for the forestry sector.*** ForestPaths project deliverable D6.2.

Due date of deliverable: Month 12

Actual submission date: 8.9.2023

Deliverable status:

Version	Status	Date	Author(s)
1.0	Draft	17/8/2023	Franziska Wolff, Hannes Böttcher, OEKO
	Review	28/8/2023	Diana Feliciano, Hans Verkerk, Rafal Chudy
2.0	Final	8/9/2023	Franziska Wolff, Hannes Böttcher, OEKO

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Key takeaway messages

- A broad **range of policies** potentially affect climate- and biodiversity-smart forest management and wood use (“CBS”). Beyond forestry, climate and biodiversity policies these include energy policies, bioeconomy, trade, water, sustainable product and circular economy policies etc. These policies are situated in a **multilevel governance system** that spans from the international to the national, subnational and partly municipal levels. The policies can affect CBS forestry **directly** through their provisions. However, they can also impact CBS forestry **indirectly** through long (and partly unintended) chains of effects such as global shifts in the supply of and demand for biotic products.
- The **impact** of international, EU and national policies on CBS forestry in general and on CBS forestry in the EU countries is difficult to assess. The impact differs for different policy goals. It was found to be positive for most policies regarding **climate mitigation**. **Adaptation** to climate change and protection of **biodiversity** are less stringently addressed. However, none of the assessed policies had overall negative impacts on any these goals.
- We find that most of the policies address a mix of categories of “**protect**”, “**manage**”, “**restore**”, and “**wood use**”. The width of the scope of the policies can be large (e.g. for the International Tropical Timber Agreement and Organization, the EU Forest Strategy for 2030, the LULUCF Regulation, EU Biodiversity Strategy for 2030, and the EU Bioeconomy Strategy that address all four categories of CBS forestry). Also, the assessed international policies seem to have a rather wide scope, addressing three or four of the CBS forestry categories.
- Policies make use of different types of **governance mechanisms** that steer target group behaviour with regard to CBS forestry (sub-) categories in different ways. **Standards** appear to be used most frequently in the analysed policies across all categories. Similarly, **targets** are included in many policies covering a wide range of CBS forestry categories and sub-categories. **Prohibitions** as a governance mechanism do not appear in policies addressing restoration and only a small degree in policies targeting wood use. **Incentives** target especially the sub-category “active management (other than harvesting)”.
- At the **national level**, prohibition and standards seem to be frequent governance mechanisms to protect forests in the countries. Policies to manage forests at the national level use different governance mechanisms across the board.
- **Model assessments** planned under the ForestPaths project need to consider the impact of policies on CBS forestry in EU countries through different governance mechanisms. The framework of the defined CBS forestry categories and sub-categories can help to differentiate policy impacts to better reflect their influence on scenarios of the future development of forests in the EU.
- **Stakeholder views and requirements** towards the analysed policies are highly diverse. We found commentaries pushing for more stringent as well as for less stringent CBS requirements. The views are frequently in line with what one would expect in terms of the stakeholders’ economic interests. The EU Nature Restoration Law is a rare example where the European Parliament pushed for CBS provisions less ambitious than those of the EU Commission.

Summary

Forests play a crucial role in fighting the coupled climate and biodiversity crises. In this deliverable report, we map the policy landscape by identifying policy and stakeholder requirements in relation to forests and forestry in the medium to long-term, with a focus on the EU. More specifically, we analyse how present policies may affect climate- and biodiversity-smart forest management and wood use (in short: “CBS”) in Europe. CBS is a comprehensive approach that aims to enhance the resilience and productivity of forest ecosystems, seeking to integrate conservation, adaptation, and mitigation strategies to cope with climate change and reverse biodiversity loss while maintaining sustainable forest systems that can provide a wide range ecosystem goods and services contributing to the bioeconomy and the circular economy. It considers regional differences and country-specific challenges. We break down CBS into the categories of “protecting”, “managing” or “restoring” forests, as well as “wood use”.

The purpose of this analysis is to better understand the policy framework conditions under which European forestry will develop in the future. Specifically, the policy analysis will feed the design of exploratory scenarios in the ForestPaths project. On their basis, policy pathways will be developed during next steps in the project that outline alternative trajectories for how European forests and the forest-based sector can help climate change mitigation and adaptation, while conserving their biodiversity and sustaining ecosystem services.

Altogether, we analyse 26 policies – three international ones, 14 European ones and nine national ones in selected EU Member States (Finland, Italy, The Netherlands, Romania):

- International: UNFCCC and the Paris Agreement, the Convention on Biological Diversity (CBD) and the International Tropical Timber Agreement and Organization (ITTO)
- EU: the Forest Strategy for 2030, the Regulation on deforestation-free products, the LULUCF Regulation, the Carbon Farming initiative and EU Certification for Carbon Removals, the Adaptation Strategy, the Biodiversity Strategy for 2030, the European Nature Restoration Law, Natura 2000, the Water Framework Directive, the Renewable Energy Directive, the Circular Economy Action Plan, the Ecodesign for Sustainable Products Regulation, the (draft) Soil Monitoring Law and the EU Bioeconomy Strategy
- EU Member States: the Finnish Climate Plan for the Land Use Sector (MISU) and forestry state aid; the Italian national law on forests and forest supply chains (TUFF), the forest law of the Italian region of Sardinia as well as the Sardinia Region Environmental Energy Plan 2020 (PEARS); the Dutch National Forest Strategy and a provincial ban on wood harvest in old deciduous forests; as well as the Romanian Forestry Code and selected technical norms for forest management planning.

The main text of this report includes brief summaries of each policy, including of their relevance to CBS in general and their expected impact on CBS forestry in EU countries. Additional information on each policy is included in the report’s Annex. The Annex covers a general description of each policy, a description of their provisions relevant for CBS forestry, an assessment including views of stakeholders and an outlook on possible future developments. Following the policy summaries in the main report, we “map” the policies according to three dimensions: whether they can overall be assessed to contribute to climate mitigation, climate change adaptation and biodiversity goals; whether they serve to “protect”, “manage” or “restore” forests, or pertain to “wood use” (CBS categories); and which governance mechanisms they employ to address these categories: target setting, prohibitions, standards, incentives, or other (e.g., information).

List of abbreviations

CBD	Convention on Biological Diversity
CBS	Climate- and biodiversity-smart forestry and wood use
CEAP	Circular Economy Action Plan
CO ₂	Carbon Dioxide
EP	European Parliament
ESPR	Ecodesign for Sustainable Products Regulation
EU	European Union
EUDR	EU Regulation on deforestation-free products
EU NRL	EU Nature Restoration Law
EUTR	EU Timber Regulation
GHG	Greenhouse gases
HWP	Harvested Wood Products
ITTA	International Tropical Timber Agreement
ITTO	International Tropical Timber Organisation
JRC	Joint Research Centre
LULUCF	Land use sector, Land Use, Land-Use Change and Forestry
MISU	Finnish Climate Plan for the Land Use Sector
PEARS	Sardinia Region Environmental Energy Plan 2020 (PEARS)
RED	Renewable Energy Directive
SDG	Sustainable Development Goals
SFM	Sustainable Forest Management
UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

Forests and other wooded land cover a significant share – about 44% – of the EU’s land area. They play a crucial role in fighting the coupled climate and biodiversity crises. Firstly, forests and their products sequester and store carbon and can thus contribute to **climate change mitigation**. In 2021, net removals from forest land amounted to -281 Mt CO₂ (European Union 2023). Forests are hence able to remove some 10% of the EU’s total greenhouse gas emissions. Harvested wood products store additional carbon. In the EU, this amounted to -47 Mt CO₂ in 2021 (European Union 2023). Moreover, biomass-based products can to some degree substitute fossil-based products and thereby reduce GHG emissions in other sectors. Forests can thus contribute to achieving the European goal of reducing greenhouse gas emissions by 2030 by at least 55% and becoming climate neutral by 2050.

Secondly, forests can support **climate change adaptation** by reducing the expected impacts of climate change (IPCC 2023). Apart from timber and non-timber products, forests provide many different ecosystem services. They help keep drinking water clean and safe, they protect against soil degradation by preventing erosion as well as natural hazards (e.g., landslides, floods) and extreme weather events (storms, hurricanes). Forest ecosystems both in rural and urban contexts regulate flow regimes, aquatic systems and the microclimate. Finally, they contribute to nutrient cycling and primary production (Creed 2018; van Bodegom et al. 2009).

Thirdly, forests harbour a rich **diversity** of plant and animal species as well as fungi and microorganisms (Muys et al. 2022). They provide habitat for many endangered and threatened species – and the ecological basis for producing the mentioned ecosystem services.

Climate change, however, threatens biodiversity and the capacity of forests to increase climate adaptability in Europe (EEA 2020): Expected changes in temperature, precipitation patterns and sea levels can lead to changes in ecosystem dynamics and functioning, habitat connectivity, species composition and phenology, and can increase coastal ecosystem vulnerability. It is hence imperative to promote forest-based mitigation of climate change, improve climate change adaptation through and of forests, and ultimately protect and restore their biodiversity.

Climate- and biodiversity-smart forest management and wood use (in short: “**CBS**”) is a comprehensive approach that aims to enhance the resilience and productivity of forest ecosystems, seeking to integrate conservation, adaptation, and mitigation strategies to cope with climate change and reverse biodiversity loss while maintaining sustainable forest systems that can provide a wide range ecosystem goods and services contributing to the bioeconomy and the circular economy. It is a holistic concept that considers and needs to be adapted to regional differences and country-specific challenges.

In this deliverable report, we map the policy landscape by identifying policy and stakeholder requirements in relation to forests and forestry in the medium to long-term, with a focus on the EU. We also analyse how present policies may affect CBS in European forests. The purpose is to understand better the policy framework conditions under which European forestry will develop in the future. Specifically, the policy analysis will feed the design of exploratory scenarios in the ForestPaths project. On their basis, policy pathways will be developed during next steps in the project that outline alternative trajectories for how European forests and the forest-based sector can help climate change mitigation and adaptation, while conserving their biodiversity and sustaining ecosystem services.

In the following, we first describe our methodological approach (**Chapter 2**). We then look at three international policies (**Chapter 3**), 14 EU policies (**Chapter 43**) and nine national policies in selected EU Member States (**Chapter 5**). Among others, we look at forestry-related provisions within the international climate and biodiversity regimes, and at European policies related to forestry, climate mitigation and adaptation, nature protection, energy and environmental policies. While the selected 26 policies are expected to impact CBS forestry in a direct or indirect (positive or negative) way, there are of course further policies that will affect forestry in Europe. We chose the selected 26 policies because we expect them to have the greatest impact on CBS in Europe in the future. In the main text of this report, each policy is presented with a brief summary box, and in the report's summary we provide a general description, information on provisions relevant for CBS forestry (among others, a "governance matrix" which classifies the policy's measures about specific CBS aspects and governance modes), an assessment (including stakeholder views) and an outlook.

In addition to the international and European policies, we analyse nine policies at the national (and in one case, regional) levels of Finland, Italy (including the region of Sardinia), the Netherlands and Romania. These countries function as demo cases within the ForestPaths project. Since Member States in the case of EU regulations (unlike directives) have leeway to design their (forestry-related) policies within the framework specified by the EU, it is expedient to take account of possible national-level policies and include these in the scenario building and modelling of policy pathways. The policy analyses at the different geographical levels follow a common structure: Each chapter starts out with a summary table, followed by sections on the policy's provisions relevant for CBS forestry activities, an assessment (which includes a "governance matrix" classifying the policy's measures about specific CBS aspects and governance modes), and an outlook.

In **Chapter 6**, we synthesize main findings and draw conclusions, supported by synthesising tables that help to "map" the policy landscape.

It has to be noted how forest-related policies are developed and implemented within the European Union and its Member States. Decision-making on most of the policies relevant for forestry in the EU follows the 'ordinary legislative procedure' in which Commission, the Council (i.e., line ministers of Member State governments) and the European Parliament (EP) co-decide, typically after inter-institutional negotiations ('Trilogue'). However, in some forest-related questions, decision-procedures differ, and the EP plays a lesser role.¹ In European politics, thus, EU institutions, national interests, party programmes, local demands, various stakeholders and expert committees have a say. When it comes to implementation, about 60% of the forest area within the EU is privately owned and 40% public.² Public forests are owned by municipalities, regional or national governments. Overall, the property sizes range from below one hectare to up to several millions of hectares. However, almost 90% of private forest holdings are smaller than 10 hectares, many are even much smaller. Income generated by forest use spreads to a large number of families and individuals in society.³

¹ <https://efi.int/forestquestions/q17>

² https://efi.int/forestquestions/q2_en

³ https://efi.int/forestquestions/q2_en

2 Methods

In the following, we describe our methodological approaches to selecting as well as analysing and mapping policies.

2.1 Policy selection

Policies to be analysed in this report were selected when complying with the following selection criteria – they are expected to...

- impact CBS forestry in a direct or indirect (positive or negative) way;
- cover different policy fields (forest policy, climate mitigation/ adaptation, energy policy, nature protection etc.) but should potentially have significant impact on at least one the four CBS categories (“protect”, “manage”, “restore”, “wood use”);
- be existing policies but might also be planned policies;
- cover different governance mechanisms (target setting, regulation, positive or negative incentives; other – e.g., information);
- include concrete instruments (e.g. laws/regulations, finance programmes etc.) and more general strategies (e.g., setting targets, providing finance etc.).

In the **international and EU** realm, we chose the 17 policies we expected to have the greatest impact on CBS in Europe in the future. These include:

- International: UNFCCC and the Paris Agreement, the Convention on Biological Diversity (CBD) and the International Tropical Timber Agreement and Organization (ITTO)
- EU: the Forest Strategy for 2030, the Regulation on deforestation-free products, the LULUCF Regulation, the Carbon Farming initiative and EU Certification for Carbon Removals, the Adaptation Strategy, the Biodiversity Strategy for 2030, the European Nature Restoration Law, Natura 2000, the Water Framework Directive, the Renewable Energy Directive, the Circular Economy Action Plan, the Ecodesign for Sustainable Products Regulation, the (draft) Soil Monitoring Law and the EU Bioeconomy Strategy

Well-known policies such as the UN’s Sustainable Development Goals (SDGs) or the EU Taxonomy for sustainable activities were not taken up for analysis. We consider them to have too little direct impact on the ground, at least presently.

For **national policies**, two additional selection criteria were applied; the policies should:

- target the national level or sub-national/ regional level within the demo cases of the ForestPath project;
- be innovative policies.

Within the ForestPaths project, four demo cases are elaborated to ensure practical usability and relevance of the knowledge generated in the project for use by policymakers, practitioners, and other stakeholders. The demo cases are Finland, Italy, Romania, and The Netherlands. They have been selected to cover a range of forest decision-making structures (including ownership), importance of forests and forest sector to the national economy, climate change impacts, approach to biodiversity and biogeographic regions. For each demo case country, a list of three

to four national policies⁴ was compiled based on knowledge of national experts. The following policies were selected and are further analysed in Chapter 5:

- Finland: Climate Plan for the Land Use Sector (MISU); State aid for forestry activities in private forests
- Italy: National law on forests and forest supply chains (TUFF); Forest law of the Sardinia region; Sardinia Region Environmental Energy Plan 2020 (PEARS)
- The Netherlands: National Forest Strategy; provincial measure: ban on wood harvest in old deciduous forests
- Romania: National Forestry code; technical norms for forest management planning

2.2 Policy analysis and mapping

The policy analysis is based on an appraisal of the policy documents related to the respective policies (such as international treaties or decisions taken by a treaty's conference of parties, EU regulations and their annexes, national strategy documents). Secondary sources were included such as impact assessment or evaluation documents, scientific literature and stakeholder position papers or press releases (issued, for instance, during the policies' development or evaluation).

The **main text** of this report includes brief summaries (in boxes) of each policy, covering the following aspects:

- Policy level (international, EU, national);
- Policy field (e.g., forestry, energy, trade, biodiversity etc.);
- Policy addressee (e.g., national governments, EU Commission, landowners);
- Time horizon of policy (short/ medium/ long-term);
- Provisions relevant for CBS forestry (in general);
- Potential impact on CBS forestry (in EU countries).

Additional information on each policy is included in the report's Annex. The **Annex** covers:

- a general description of each policy;
- a description of their provisions relevant for CBS forestry;
- an assessment including views of stakeholders and ;
- an outlook on possible future developments.

For national policies, the Annex also includes an **introduction on each country** (Finland, Italy, the Netherlands, Romania). Each covers a brief description of the countries' forest context, including forest structures, state of the forests, ownership structures, management regimes and policy context relevant for CBS.

The analysis takes into account to what extent the policies aim to protect, manage or restore forests, or regulate wood use (i.e., address the different **CBS categories**).

The CBS categories include a number of sub-categories, such as:

⁴ We are aware of similar policy analysis work carried out by the Bioconsent project covering Bulgaria, Germany, Spain and Sweden (<https://www.biodiversa.eu/2022/10/11/bioconsent/>)

- “protect”: avoiding deforestation, forest conservation, species conservation, other;
- “manage”: forest harvesting, active management other than harvesting;
- “restore”: forest restoration (including peatlands), a-/reforestation, other;
- “wood use”: shifts in wood uses (including by-products), cascading (end-of-life), increased efficiency, other (increasing carbon stock in HWP).

We also classify what **governance mechanisms** the policies make use of. We distinguish between mechanisms setting targets, prohibitions, standards, incentives, or other (e.g., providing information).

Following the policy summaries in the main report, we “**map**” the policies according to three dimensions: whether they can overall be assessed to contribute to climate mitigation, climate change adaptation and biodiversity goals; whether they serve to “protect”, “manage” or “restore” forests, or pertain to “wood use” (CBS categories); and which governance mechanisms they employ to address these categories: target setting, prohibitions, standards, incentives, or other (e.g., information) (on different types of governance mechanisms cf. Wolff 2004). The maps synthesise the previous classifications and findings in tabular form.

3 International policies

3.1 United Nations Framework Convention on Climate Change & Paris Agreement

<p>Policy level: Global</p> <p>Policy field: Climate policy (mitigation, adaptation)</p> <p>Policy addressee: Governments (contracting parties), indirectly: local authorities, non-governmental actors (foresters, farmers, indigenous people etc.)</p> <p>Time horizon of policy: Long-term (2050+)</p> <p>Provisions relevant for CBS forestry (in general): Under UNFCCC countries need to comply with reporting requirements including forestry-related land use categories, such as “Forests remaining forest land” and “Harvested Wood Products”. The Kyoto Protocol included obligations for accounting for afforestation, deforestation and forest management, based on rules for the reporting of these land use categories. The Paris Agreement, however, is less strict in terms of specific targets for land use activities in general and forestry specifically. The NDCs put forward by countries may include the land use sector and thus forests and their management. But the categories included, and the level of ambition can be determined by the countries themselves. Therefore, the impact on CBS depends very much on parties’ strategies and the level of detail reflected in their NDC.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	The UNFCCC and Paris Agreement may in a positive way contribute to climate mitigation through targets set in Nationally Determined Contributions (NDCs) including on land use. They contribute to mitigation indirectly through reporting obligations sector and forestry activities. The role of forests for national GHG mitigation efforts is recognized as crucial as biological growth can provide negative emissions that are essential for achieving GHG neutrality. Although reporting obligations alone may not directly reduce emissions, they can indirectly contribute to climate mitigation efforts by creating an environment where transparency, accountability, and informed decision-making are prioritized.
Climate adaptation	The UNFCCC and the Paris Agreement set out the necessity for climate adaptation planning and implementation, whereas the Paris Agreement the co-benefits of mitigation for adaptation. Both documents stress that developed country parties shall assist developing countries in meeting costs of adaptation that is particularly urgent due to local vulnerabilities. This commitment has resulted in an agreement to provide a dedicated “loss and damage” fund at the UN Climate Change Conference COP 2022.
Biodiversity	The UNFCCC and Paris Agreement do not directly address biodiversity. With the UN Global Biodiversity Framework, biodiversity policy has become more interlinked with climate change policy. There are co-benefits for biodiversity associated with many mitigation measures, even though such synergies are not directly incentivized by the framework. However, depending on the mitigation action, there can also be conflicts, e.g. in case of afforesting lands that host high or endemic biodiversity.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

3.2 United Nations Convention on Biological Diversity

<p>Policy level: Global</p> <p>Policy field: Biodiversity policy</p> <p>Policy Addressee: governments (contracting parties), indirectly: local authorities, non-governmental actors (foresters, farmers, indigenous people etc.)</p> <p>Time horizon of policy: long-term.</p> <p>Provisions relevant for CBS forestry (in general): The Convention requires a combination of biodiversity conservation and sustainable use and addresses sustainable forest management in several subsequent strategic frameworks.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	Effectively implementing the CBD's goals of conservation and sustainable use of biodiversity will enhance the application of nature-based solutions for climate mitigation.
Climate adaptation	Effectively implementing the CBD's goals of conservation and sustainable use of biodiversity will enhance the application of nature-based solutions for the adaptation to climate change. However, under stricter protection or conservation constraints there may be limited possibility for specific active adaptation options.
Biodiversity	The CBD's goals of conservation and sustainable use of biodiversity are directed, among others, towards the protection, restoration and sustainable management of forests.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

3.3 International Tropical Timber Agreement and Organisation

<p>Policy level: Global</p> <p>Policy field: Forest policy, trade policy</p> <p>Policy addressee: Governments (ITTO member countries)</p> <p>Time horizon of policy: Short- or medium term</p> <p>Provisions relevant for CBS forestry (in general): ITTO develops “internationally agreed policy guidelines and norms to encourage sustainable forest management (SFM) and sustainable tropical timber industries and trade”⁵. Its SFM definition has been translated into Criteria & Indicators that have influenced sustainable forest management worldwide.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	Implementing ITTO's objective to expand the global stock of tropical timber originating from sustainably managed forests and to promote sustainable forest management itself may promote efforts to sustain carbon storage capacities in tropical forests. However, by promoting the processing and international trade of tropical timber, ITTO may also promote logging and hence reduce the capacity for carbon sequestration as well as carbon

⁵ https://www.itto.int/about_itto/

	storage. To the extent that application of ITTO's Criteria & Indicators for SFM may reduce supply of tropical timber, demand for tropical timber substitutes (including from EU sources) may increase, reducing carbon sequestration there.
Climate adaptation	ITTO's objective to expand the global stock of tropical timber originating from sustainably managed forests and to promote sustainable forest management itself may promote efforts increasing the adaptation of forests to climate change. However, by promoting the processing and international trade of tropical timber, ITTO may also contribute to deforestation and hence reduce the adaptability of tropical landscapes. To the extent that application of ITTO's Criteria & Indicators for SFM may reduce supply of tropical timber, demand for tropical timber substitutes (including from EU sources) may increase, reducing climate resilience there.
Biodiversity	ITTO promotes the sustainable tropical forest management. ITTO's Criteria & Indicators for SFM include several dimensions of biodiversity which are applied on a <i>voluntary</i> basis. However, by promoting the processing and legal international trade of tropical timber, ITTO may also contribute to deforestation and hence reduce biodiversity in tropical countries. To the extent that application of ITTO's Criteria & Indicators for SFM may reduce supply of tropical timber, demand for tropical timber substitutes (including from EU sources) may increase, putting forest ecosystems under pressure there.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4 EU policies

4.1 Forestry policy

4.1.1 EU Forest Strategy for 2030 (2021)

<p>Policy level: EU</p> <p>Policy field: Forestry</p> <p>Policy addressee: EU Commission (for further policy development); EU Member State governments; indirectly: public and private forest owners</p> <p>Time horizon of policy: Short- or medium term</p> <p>Provisions relevant for CBS forestry (in general): The Forestry Strategy 2030 lays out numerous policy measures, mostly at EU level, that the Commission intends to implement till 2030. Some of the measures are not new as such but were initially suggested in the context of other strategies (e.g., EU Biodiversity Strategy).</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	The strategy can positively contribute to climate mitigation by promoting payments for ecosystem services and a regulatory framework for certifying carbon removals (on its expected effectiveness, see Chapter 0).
Climate adaptation	The strategy can positively contribute to climate change adaptation by promoting the restoration of ecosystems and forest biodiversity. The strategy also envisages informational instruments with relation to climate adaptation (e.g., guidance and knowledge exchange on good practices on climate adaptation and resilience).
Biodiversity	The strategy can positively contribute to the conservation and sustainable use of biodiversity by a range of measures envisaged in the strategy. Some of these are targets (e.g., 30% of EU land area to be put under effective management regime), some are standards (e.g., forest management plans, legally binding instruments for ecosystem restoration), some are intended to remain voluntary (e.g., “Closer-to-nature” certification scheme for biodiversity friendly management practices). Risks for biodiversity may emerge from encouraged bioenergy use: while the Forest Strategy refers to RED sustainability criteria, these are rather weak (see Chapter).
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.1.2 Regulation on deforestation-free products (2022)

<p>Policy level: EU</p> <p>Policy field: Climate, biodiversity, forestry, agriculture</p> <p>Policy addressee: governments (EU Member State governments, competent authorities designated by Member States, governments of countries placing cattle, cocoa, coffee, palm oil, rubber, soya, and wood as well as products listed in Annex 1, on the EU market); private sector actors (operators and traders of commodities and products coming from supply chains associated with deforestation/forest degradation).</p> <p>Time horizon of policy: Short- or medium term</p> <p>Provisions relevant for CBS forestry (in general): The regulation aims at curbing deforestation and forest degradation provoked by EU consumption and production, notably of agricultural commodities and products. The regulation introduces a mandatory due diligence procedure: Relevant commodities and products shall not be placed or made available on the market or exported, unless (a) they can count as “deforestation-free”; (b) they have been produced in accordance with relevant legislation of the country of production; and (c) they are covered by a due diligence statement. This obligation applies both to operators and larger traders. The relevant commodities are timber/wood, soy, palm oil, cocoa, coffee and cattle, and products made from these (e.g., leather, chocolate, charcoal, printed paper etc.).</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	Prohibiting timber and agricultural products that are linked to deforestation, degradation or non-compliance with producer country legislation from entering the EU market can contribute to forest conservation and reduced deforestation and degradation in these countries, reducing forestry-related emissions there. This positive effect may be counteracted by a resulting potential increase of timber harvesting in the EU which will reduce the forests’ capacity to store of sequester carbon.
Climate adaptation	Prohibiting timber and agricultural products that are linked to deforestation, degradation or non-compliance with producer country legislation from entering the EU market can contribute to forest conservation and reduced deforestation and degradation in these countries, increasing the resilience of ecosystems there. This positive effect may be counteracted by a resulting potential increase of timber harvesting in the EU which will reduce the forests’ capacity for climate adaptation there.
Biodiversity	Prohibiting timber and agricultural products that are linked to deforestation, degradation or non-compliance with producer country legislation from entering the EU market can contribute to forest conservation and reduced deforestation in these countries. Without appropriate regulation, EU consumption and production of relevant commodities would contribute approximately 248,000 hectares of deforestation annually by 2030 (Recital 8, EUDR). However, if supply of relevant commodities and products in third countries is reduced because of the EUDR, demand for timber from EU sources may increase, putting pressure on forests and forest biodiversity in the EU.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.2 Climate mitigation & adaptation policy

4.2.1 LULUCF Regulation (2022)

<p>Policy level: EU</p> <p>Policy field: Climate mitigation (Land use sector, Land Use, Land-Use Change and Forestry; LULUCF)</p> <p>Policy addressee: Governments of EU member states</p> <p>Time horizon of policy: Short- or medium term</p> <p>Provisions relevant for CBS forestry (in general): The LULUCF Regulation includes reporting requirements including forestry related land use categories, such as Forests remaining forest land and Harvested Wood Products. Moreover, it includes rules for accounting of emissions and removals from LULUCF in two commitment periods, 2021-2025 and 2026-2030. For the first compliance period the rules require Member States to achieve a net balance of accounted emissions and removals on average over the period of five years. For the accounting of forest management emissions and removals reported data are compared to a forest reference level (FRL) that reflects a continued level of management intensity in the period of 2000 to 2009. For the second commitment period post 2026 no such reference levels are applied. Instead, Member States need to meet an absolute net emissions or removal level. This target includes all LULUCF land-use categories of which forests is just one. However, forests form the most important category regarding its current size of and also future sink potential.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	<p>The LULUCF Regulation directly targets climate mitigation. It establishes a framework for binding EU and national targets for emissions and removals from managed land areas covered by the LULUCF sector. This means that EU Member States need to take measures to increase carbon stocks in grasslands, croplands, wetlands and especially forests to meet their targets. The regulation has been revised in 2022 and includes rules for accounting of emissions and removals in two commitment periods (CP), 2021-2025 and 2026-2030. For CP 1 the rules require Member States to achieve a net balance of accounted emissions and removals on average over the period of five years. For the accounting of forest management emissions and removals reported data are compared to a reference level that reflects a continued level of management intensity in the period of 2000 to 2009. Other land use categories are compared against historic reference levels. For the second commitment period post 2026 no such reference levels are applied. Instead, Member States need to meet an absolute net target. This level amounts to -310 Mt CO₂ for the whole EU and is broken down to individual MS by comparing historic net emissions or removals from the sector and the relative share of area.</p>
Climate adaptation	<p>The LULUCF Regulation does not address climate adaptation directly. It leads to increased carbon stocks, e.g., through afforestation and reduction of management intensity and might thus also increase resilience of ecosystems. However, this depends very much on the type of ecosystem.</p>

<p>Biodiversity</p>	<p>Annex V of the Regulation lists types of areas that need to be considered in GHG reporting under the Regulation, e.g.: protected areas, areas with high biodiversity or areas of high carbon stocks. From 2026 onwards, these areas need to be reported with a high level of accuracy and the use of detailed national information, including geographically explicit datasets.</p> <p>The LULUCF Regulation leads to increased carbon stocks, e.g., through afforestation and reduction of management intensity and might thus also benefit biodiversity. However, this depends very much on the type of ecosystem and mitigation action considered.</p>
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.2.2 Carbon Farming and Proposal for a Regulation on EU Certification for Carbon Removals

<p>Policy level: EU</p> <p>Policy field: Climate mitigation (Land use sector, Land Use, Land-Use Change and Forestry; LULUCF)</p> <p>Policy addressee: Private sector (notably, companies) in EU Member States</p> <p>Time horizon of policy: Short- or medium term</p> <p>Provisions relevant for CBS forestry (in general): The proposed Regulation affects economic operators such as farmers, foresters but also industrial companies that will develop carbon removal activities on the ground; private organisations and Member States authorities, who may develop private or public certification schemes to implement and control the certification process. Thus, there is no direct impact on forestry activities in EU Member States. However, forest owners are potential participants in voluntary carbon markets that are regulated by the policy.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	The proposed Regulation affects economic operators such as farmers, foresters, but also industrial companies that will develop carbon removal activities on the ground; private organisations and Member States authorities, who may develop private or public certification schemes to implement and control the certification process. Thus, there is potential positive impact on forestry activities in EU Member States. Especially, because forest owners are potential participants in voluntary carbon markets that will be regulated by the policy and need to comply with certification criteria.
Climate adaptation	The proposal does not address climate adaptation directly. However, there are potential impacts through funding opportunities for forestry activities, e.g., afforestation, that can also be used for adaptation measures.
Biodiversity	Certified carbon removal activities must have a neutral impact on or generate co-benefits for various sustainability objectives. These objectives are climate change mitigation and adaptation, circular economy, pollution prevention and control, protection and restoration of biodiversity and ecosystems and sustainable use and protection of water and marine resources. Forest owners are potential participants in voluntary carbon markets that are regulated by the policy. The proposal explicitly states that activities that harm biodiversity should not be certified, e.g. forest monocultures
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.2.3 EU Adaptation Strategy (2021)

<p>Policy level: EU</p> <p>Policy field: Climate adaptation</p> <p>Policy addressee: EU Commission; EU Member States</p> <p>Time horizon of policy: long-term (up to 2050)</p> <p>Provisions relevant for CBS forestry (in general): The new EU Adaption Strategy aims to improve knowledge on climate impacts and resilience, to implement a Horizon Europe Mission on ‘Adaptation to Climate Change’, to upgrade adaptation monitoring, reporting and evaluation, to integrate climate-risk management into its Better Regulation guidelines/ toolbox and sectoral policies including the EU Taxonomy, Natura 2000, climate change guidance, guidelines on biodiversity-friendly afforestation and reforestation etc.. The strategy prioritizes nature-based solutions as one pillar of adaption action.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	The Adaptation Strategy promotes nature-based solutions – both for adaptation and for carbon removals; the latter can directly contribute to mitigation (cf. Chapter 0). Also, strengthening adaptation through improved knowledge and coordinated implementation plans will improve the ecological status of (forest) ecosystems and, indirectly, their capacity to sequester and store carbon.
Climate adaptation	The Adaptation Strategy promotes a host of measures to integrate climate resilience in EU and national policies and to strengthen adaptation on the ground, including at local level. If implemented (effectively), they will contribute to greater climate resilience.
Biodiversity	If the Adaptation Strategy leads to the improvement of climate adaptation on the ground, in particular through nature-based adaptation, biodiversity will profit. The extent to which such (voluntary) investments in nature-based solutions will be made by (actors in) Member States, however, cannot be determined in advance. Drought management plans and political measures to safeguard the availability and sustainability of freshwater will also benefit biodiversity. Finally, establishing a climate and health observatory under Climate-ADAPT can promote the One Health approach, which highlights and promotes the benefits of ecosystems for health.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.3 Nature conservation and biodiversity policy

4.3.1 EU Biodiversity Strategy for 2030 (2021)

<p>Policy level: EU</p> <p>Policy field: Nature conservation; forestry</p> <p>Policy addressee: EU Commission, EU Member States</p> <p>Time horizon of policy: Medium-term (up to 2030)</p> <p>Provisions relevant for CBS forestry (in general): The EU Biodiversity Strategy for 2030 sets out specific biodiversity goals to be met by 2030 in a variety of different ecosystems, to put Europe's biodiversity on a good path to recovery by 2030. The following targets are relevant for CBS forestry:</p> <ul style="list-style-type: none"> • Legally protect a minimum of 30% of the EU's land area and 30% of the EU's sea area and integrate ecological corridors, as part of a true Trans-European Nature Network. • Strictly protect at least a third of the EU's protected areas, including all remaining EU primary and old-growth forests. • Effectively manage all protected areas, defining clear conservation objectives and measures, and monitoring them appropriately • Introduce, within the EU Nature Restoration Plan, legally binding EU nature restoration targets • By 2030, significant areas of degraded and carbon-rich ecosystems are restored; habitats and species show no deterioration in conservation trends and status; and at least 30% reach favourable conservation status or at least show a positive trend • Three billion new trees are planted in the EU <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	Through protecting forest biodiversity, the Biodiversity Strategy can have a positive impact on climate mitigation. Improved forest protection and biodiversity will also improve the carbon storage function of forests. Furthermore, restoration measures will specifically target ecosystems with great potential to store carbon.
Climate adaptation	The Strategy aims to foster nature restoration to maintain and enhance ecosystem services such as climate or water regulation which also promote climate adaptation.
Biodiversity	The primary objective of the Strategy is to protect and restore biodiversity within the EU, and to improve the governance framework regarding biodiversity. If the Strategy and its targets are effectively implemented, forest biodiversity including the status of at least 30% habitats and species will be improved.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.3.2 EU Nature Restoration Law (planned, 2023)

<p>Policy level: EU</p> <p>Policy field: Nature conservation; forestry</p> <p>Policy addressee: EU Member States</p> <p>Time horizon of policy: long-term</p> <p>Provisions relevant for CBS forestry (in general): The proposal sets out targets and obligations, to be met in different habitat types, including forest habitats to improve biodiversity and, concurrently, climate mitigation and adaptation. Among others, indicator-based obligations are set out for forest restoration specifically. In addition, area-based targets require restoration measures in Natura 2000 sites, which includes forests.</p> <p>Adjustments made by the European Parliament in July 2023 have limited the scope of various obligations to Natura 2000 sites and have diminished the clout of the obligations. The draft regulation is still open to changes and will only be adopted when the Trilogue process between Parliament, Commission and the Environmental Council has concluded.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	The proposal's overarching objective includes a contribution to achieving climate mitigation and climate adaptation objectives (Art.1 (b)). Restoration measures should generally facilitate synergies with climate mitigation and resilience. However, through the EP's recent adjustments to the proposal an article on the restoration of agricultural ecosystems was deleted, which would have included peatland restoration and thus a key lever for increasing carbon sequestration.
Climate adaptation	The proposal's overarching objective also includes a contribution to achieving climate mitigation and climate adaptation objectives (Art.1 (b)). Restoration measures should generally facilitate synergies with climate change resilience. However, through the EP's recent adjustments the provisions on ecosystem restoration were weakened, so that the positive effects on ecosystem resilience can be expected to be weaker, too.
Biodiversity	The overarching objective of the proposal is to contribute to a continuous, sustained recovery of biodiverse and resilient nature across the EU's land and sea areas and the restoration of ecosystems (Art.1 (a)). Multiple binding targets and obligations are set for restoring a range of ecosystems and habitats (including all types of forests), as well as species. The ambitious scope of the original draft legislation has been reduced though. Among others, through the EP's recent adjustments to the proposal, an article on the restoration of agricultural ecosystems was deleted, which would have included peatland restoration and thus a key lever for combatting intensive agriculture as main cause of biodiversity loss.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.3.3 Natura 2000 (Habitats Directive 92/43/EEC, Birds Directive 2009/147/EC)

<p>Policy level: EU</p> <p>Policy field: Nature protection/ biodiversity, forestry</p> <p>Policy addressee: EU Member States, private, public, and communal forests</p> <p>Time horizon of policy: Long-term</p> <p>Provisions relevant for CBS forestry (in general): “Natura 2000” is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected through the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC). The network extends across all EU countries, both on land and at sea. Its goal is to ensure the long-term survival of the species and habitats listed under the two directives.</p> <p>The Habitats Directive 92/43/EEC aims to the maintain biodiversity through the conservation of natural habitats and of wild flora and fauna, in order to maintain or restore, at „favourable conservation status“, natural habitats and species of wild fauna and flora of Community interest. Member States are required to designate and protect Special Areas of Conservation (SAC) for the protection of the natural habitat types and habitats of the species listed in Annex I and II of the Directive. They are also responsible for developing conservation measures to prevent deterioration of the designated sites and to monitor the developments. The Birds Directive aims to protect, manage and regulate all bird species living in the wild within Member State territory, including their habitats. About half of the Natura sites and about half the area covered by Natura sites are forests.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	The conservation and sustainable management of Natura 2000 designated forests has a positive climate mitigating effect, as forests in good conditions maximize climate mitigation. Forests have the highest carbon value of all other Natura 2000 habitats, with an estimated value of € 318.3 and 610.1 billion in 2015.
Climate adaptation	Both Directives do not address climate adaptation. However, the objectives and linked obligations for restoration and non-deterioration of habitats and species populations, if effectively pursued, can contribute to maintain ecosystem functions that are also relevant for climate adaptation.
Biodiversity	Positive impact on biodiversity conservation (main goal) through the protection of rare and threatened species and their habitats, which includes a list of forest types.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.3.4 EU Water Framework Directive

<p>Policy level: EU</p> <p>Policy field: Water policy, nature protection/ biodiversity</p> <p>Policy addressee: EU Member States</p> <p>Time horizon of policy: Short term (objective 2027) and long-term (no sunset clause)</p> <p>Provisions relevant for CBS forestry (in general): The objective of the Water Framework Directive (2000/60/EC) (WFD) is a 'good status' of all European water bodies by 2027, including both surface waters and groundwater. Member States are required to prepare River Basin Management Plans including Programmes of Measures for River Basin Districts. Forests, due to their capacity to affect water quality and quantity, are indirectly affected by the Water Framework Directive. For instance, the Directive may have an impact on existing forests when their management needs to change (e.g. different trees, less pesticides) or when they need to be converted into alluvial forests or peatlands in order to achieve the Directive's goal.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	There might be some effects on forestry connected climate mitigation, but they depend heavily on a case-to-case basis. This may include an initial slight decrease in carbon storage, but long-term increase.
Climate adaptation	The Directive does not address climate adaptation, but a reestablishment of natural water cycles and of "the right tree in the right place" increases overall climate resilience.
Biodiversity	In order to achieve 'good status' of waters, land management in the surrounding area has to be taken into account. This may also include changes in forest management or even – regarding the reestablishment of peatlands or floodplains – a demolition of existing working forests.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.4 Energy policy

4.4.1 EU Renewable Energy Directive (RED, 2009, 2018, revision planned for 2023)

<p>Policy level: EU</p> <p>Policy field: Renewable energy, energy efficiency</p> <p>Policy addressee: Governments of EU member states</p> <p>Time horizon of policy: Short- or medium term</p> <p>Provisions relevant for CBS forestry (in general): The Renewable Energy Directive (RED) does not directly address CBS forestry but may indirectly impact it. EU Member States must require economic operators (i.e. bioenergy producers) to show that the biofuels, bioliquids and biomass fuels comply with sustainability criteria related to land use, GHG saving criteria and energy efficiency requirements. Economic operators have two methods to do this: either by providing the relevant national authority with data/evidence required under the Directive; or, by using 'voluntary' certification schemes recognized by the Commission.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	<p>RED II specifies default values for solid biomass fuels (incl. wood and high-density agricultural residues such as straw) for heating/cooling and for electricity that are differentiated by transport distance. In the case of wood briquettes or pellets, default values are also given for different energy inputs during production.</p> <p>However, the GHG balancing method in REDII assesses neither the CO₂ emissions from the combustion of harvested wood nor changes in carbon storage in the forest area. This is despite the fact that impacts of an increased use of forest biomass for energy can be expected to have negative implications for the forest carbon sink.</p>
Climate adaptation	<p>RED II does not address climate adaptation and there are also no expected direct positive or negative impacts. Indirectly increased demand for wood also for bioenergy might increase harvest intensity that might have negative implications for climate adaptation in terms of ecosystem resilience. However, it can also be argued that increased wood demand may offer opportunities for investments in forest management (e.g., developing currently less adapted monocultures into better adapted mixed forests).</p>
Biodiversity	<p>RED II sustainability requirements for forest biomass include:</p> <ul style="list-style-type: none"> - Timber harvesting needs to be legal. - Forest regeneration takes place on the harvested area. - Protected areas are not used. - Harvesting activities take care to maintain soil quality and biodiversity to minimize disturbance. - Harvesting activities maintain or enhance the long-term productive capacity of the forest.

	<p>If a country has national and/or sub-national legislation in place in the harvesting area on these points, and there are monitoring and enforcement systems in place to ensure compliance, then forest biomass can be considered sustainable.</p> <p>However, if the legal situation and the monitoring and enforcement systems are not sufficient for one or all points, it must be demonstrated that management systems in the extraction area ensure the requirements.</p>
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.5 Other environmental policies

4.5.1 Circular Economy Action Plan (2020)

<p>Policy level: EU</p> <p>Policy field: Environmental policy, industry policy, product policy, consumer policy</p> <p>Policy addressee: EU Commission (indirectly: Member States, polluters, industry, individuals/consumers)</p> <p>Time horizon of policy: Short-term (till 2023)</p> <p>Provisions relevant for CBS forestry (in general):</p> <p>Through the new Circular Economy Action Plan (CEAP), the EU aims to reduce its consumption footprint and achieve a regenerative growth model. In order to double the EU economy's circular material use rate in the coming decade, the Plan introduces a range of interrelated measures, focussing on selected product value chains (including packaging, plastics, textiles, construction and buildings, food, water and nutrients). Selected measures (envisaged or already adopted) under the CEAP that indirectly affect CBS forestry include:</p> <ul style="list-style-type: none"> • The New Eco-Design Directive/ Ecodesign for Sustainable Products Regulation (ESPR) & Sustainable Products Initiative (adopted in 2022) introduces ecodesign requirements among others for wood-based products. Criteria such as reusability, recyclability, longevity and reparability can reduce demand for newly harvested timber. • The proposed Directive on Empowering Consumers for the Green Transition aims to strengthen consumer protection against false environmental product claims and premature obsolescence. Consumers will have to be informed on the reparability of products and unauthorized sustainability labels have to be banned. The Directive will incentivize the production of more durable products, including products containing wood, in turn reducing logging. • The EU policy framework on biobased, biodegradable and compostable plastics (adpted in 2022) is a non-binding framework that emphasises that biomass production should prioritize the use of organic waste and by-products. When primary biomass is used, it should be sustainably sourced (i.e., not negatively impact biodiversity or ecosystem health) and used in long-lived products. • The ongoing revision of Directive 94/62/EC on Packaging and Packaging Waste sets recycling targets for packaging waste, among others for wood which is expected to reduce the demand for virgin wood. <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	By promoting reusability, recyclability, longevity and reparability of products and circularity of material flows, the CEAP aims to reduce overall resource consumption and the related extraction and processing. To the extent that this includes consumption of wood and wood-based products, CEAP measures can reduce the demand for virgin wood, lessening the pressure for overharvesting and unsustainable logging practices that reduce forest ecosystems' capacity to sequester and store carbon. The CEAP can also contribute to the long term storage of carbon in wood products and wood

	construction, as well as the re-use and storage of carbon in wood(-based) products.
Climate adaptation	Indirectly, by reducing the pressure on land and biodiversity, the CEAP can support climate adaptation: intact forest ecosystems are able to more easily regenerate and adapt to climate change-induced disturbances and damages.
Biodiversity	More than 90% of biodiversity loss come from resource extraction and processing (EC 2020, p. 2). Increased circularity and the prioritization of long-lived products lessen the pressure for overharvesting and unsustainable logging practices forests, thus reducing biodiversity loss and forest degradation.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.5.2 Ecodesign for Sustainable Products Regulation

<p>Policy level: EU</p> <p>Policy field: Environmental policy, industry policy, product policy, consumer policy</p> <p>Policy addressee: Member States, manufacturers, distributors, dealers</p> <p>Time horizon of policy: Short- to medium-term (no sunset-clause though)</p> <p>Provisions relevant for CBS forestry (in general): To meet objectives of the Circular Economy Action Plan (CEAP), the current Ecodesign Directive is being reworked into an Ecodesign for Sustainable Products Regulation. It will require a broad variety of products to fulfil ‘ecodesign’ requirements relating to, among others, product durability, reusability, reparability, resource use or resource efficiency, recycled content, possibility of remanufacturing and recycling, possibility of recovery of materials, environmental impacts (including carbon and environmental footprint) and expected generation of waste materials. The specific requirements for specific products will be adopted in future delegated acts by the Commission. Wood-based furniture, firewood, wood chips, wood-based panels, wood-based toys and paper are discussed, among other product groups, to be regulated under the Regulation early on after its adoption.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	<p>Ecodesign requirements relating to the environmental impacts of products (e.g., carbon footprints, resource efficiency, product durability) can reduce the demand for virgin wood, lessening the pressure for overharvesting and unsustainable logging practices that reduce forest ecosystems’ capacity to sequester and store carbon.</p>
Climate adaptation	<p>By reducing the pressure on forest resources and forest biodiversity, the Regulation’s ecodesign requirements can support climate adaptation: intact forest ecosystems are able to more easily regenerate and adapt to climate change-induced disturbances and damages.</p>
Biodiversity	<p>Ecodesign and the prioritization of long-lived products lessen the pressure for overharvesting and unsustainable logging practices forests, thus reducing biodiversity loss and forest degradation. Also, future delegated acts on product requirements can possibly define biodiversity-related parameters on environmental impacts.</p>
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.5.3 Proposal for a Directive on Soil Monitoring and Resilience

<p>Policy level: EU</p> <p>Policy field: Environmental policy</p> <p>Policy addressee: Member States</p> <p>Time horizon of policy: Long-term (2050)</p> <p>Provisions relevant for CBS forestry (in general): The draft Soil Monitoring Law aims at achieving healthy soils by 2050. However, it focusses to a large extent on monitoring and assessing soil health rather than substantive obligations. The draft Directive lays down measures on:</p> <ul style="list-style-type: none"> • monitoring and assessment of soil health (requiring Member States to establish a system for monitoring and assessing soil health) • sustainable soil management (requiring Member States to establish soil districts throughout their territory to manage soils; and to define sustainable soil management principles which are to be gradually implemented on all managed soils; the draft Directive also defines sustainable soil management principles, some of which are relevant for forestry, too – for instance on minimising physical soil disturbances (e.g. by machinery), using site-adapted species etc.; increasing soil carbon content is not explicitly / directly mentioned as management practice) • contaminated sites (including obligations regarding the identification, declaration, registration and management of contaminated sites). <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	Though increasing soil carbon content is no explicit goal stated in the draft Directive, the assumption is that sustainable soil management will result in increased carbon sequestration (Recital 14, draft Directive), including in forest soils.
Climate adaptation	Improved soil health including the restoration of the sponge-like function of soils can support climate adaptation: it will boost the supply of clean and fresh water, reduce the impacts of flooding and alleviate the impacts of droughts (Recital 15, draft Directive).
Biodiversity	The Directive does not address the question of increased forest biodiversity, though improved soil management practices might have this impact: “Healthy soils also provide a favourable habitat for organisms to thrive and are crucial for enhancing biodiversity and the stability of ecosystems. Biodiversity below and above ground are intimately connected and interact through mutualistic relationships (e.g. mycorrhizal fungi that connect plant roots)” (Recital 19, draft Directive). Ultimately, healthy soils might thus benefit forest biodiversity.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

4.5.4 EU Bioeconomy Strategy (2012, updated 2018)

<p>Policy level: EU</p> <p>Policy field: Food and agricultural policy, forestry policy, energy policy, climate policy, innovation and industrial policy</p> <p>Policy addressee: Commission, Member States, primary producers (agriculture, forestry, fishing, aquaculture) and processing industries</p> <p>Time horizon of policy: Medium-term</p> <p>Provisions relevant for CBS forestry (in general): The EU's revised Bioeconomy Strategy from 2018 aims to “pave the way to a more innovative, resource efficient and competitive society that reconciles food security with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection” (EC 2018a, p. 8). It covers all sectors of the bioeconomy including forestry and sets out five interrelated objectives: Ensuring food and nutrition security, managing natural resources sustainably, reducing dependence on non-renewable, unsustainable resources whether sourced domestically or abroad, mitigating and adapting to climate change, and strengthening European competitiveness and creating jobs. The Bioeconomy Action Plan sets out 14 actions relating to these objectives. The 2022 EU Bioeconomy Strategy Progress Report points to projections of a 40-70% biomass gap between biomass supply and biomass demand in Europe by 2050.</p> <p>Potential impact on CBS forestry (in EU countries):</p>	
Climate mitigation	The Bioeconomy Strategy aims to mitigate climate change through long-term GHG emission reductions by means of more resource efficient and sustainable primary production practices, decreased dependencies on fossil materials and the maintenance and enhancement of natural climate regulation capacities. Indirect Land Use Change (ILUC) effects, however, may counteract mitigation targets.
Climate adaptation	The Bioeconomy Strategy pursues the maintenance of natural ecosystem functions in order to facilitate climate adaptation mechanisms but also co-benefits between climate mitigation and adaptation through negative emissions and carbon sinks. Concrete measures for climate adaptation are not formulated though.
Biodiversity	The Bioeconomy Strategy pursues a sustainably managed European bioeconomy to establish a way of natural resource use that avoids ecosystem degradation and enables ecosystem productivity. Biodiversity is recognized as a crucial lever for healthy and productive ecosystems. At the same time, bioeconomy practices such monocultural biomass cultivation with feedstocks such as maize may also harm biodiversity.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

5 National policies

As described in Chapter 2, we selected nine policies implemented in EU Member States that serve as “demo cases” in the ForestPaths project (Finland, Italy, The Netherlands, Romania). In the following, we describe the policies in the same structure as the international and European policies. An introductory section presents data on forests and forest policy contexts in the countries, and more details on the policies are provided in Annex I.

5.1 Finland

5.1.1 Climate Plan for the Land Use Sector (MISU)

Policy level: National (governmental, parliament approval)	
Policy field: Climate policy (land-use sector)	
Target groups: Government, parliament, ministries, land-owners, publicly owned forests	
Time horizon of policy: Short-to-medium term, but permanent mechanism required by the Finnish Climate Act	
Provisions relevant for CBS forestry (in general): MISU is a Climate Plan for the land use, land-use change and forestry sector (LULUCF) of Finland, which targets reducing emissions and increasing sinks in forestry and agriculture, while adapting to climate change. It prescribes a specific additional annual net removals target of -3 Mt CO ₂ -eq. by 2035. This target should be reached without reducing biodiversity and undermining food security and weakening profitability of farms. When choosing measures, the emphasis should be on those that promote climate change mitigation and adaptation, as well as biodiversity.	
Potential impact on national CBS forestry:	
Climate mitigation	positive response, targeting 2035, but positive response expected also in the longer term
Climate adaptation	Adaption needs are accounted for in the policy. MISU foresees that mitigation actions could support adaptation of the sector, e.g. mitigation actions planned for soils could support the climate resilience, and actions planned for increasing forest growth and sinks of carbon account for forest health.
Biodiversity	Improvement due to implemented activities, or no effect
<i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i>	

5.1.2 State aid for forestry activities in private forests

Policy level: National (governmental, parliament approval)	
Policy field: Forestry	
Target groups: Non-industrial private forest owners	
Time horizon of policy: Short-term (Kemera period ends 31.12.2023, Metka period ends 31.12.2029)	
Provisions relevant for CBS forestry (in general): The prime objective of the aid scheme is to increase timber growth, maintain road networks for forestry and other rural purposes, protect small-scale biotopes of high biodiversity value from harvests with fixed 10-year environmental contracts, promote fertilization with wood ash on peatland forests where nutrient imbalances often weaken timber growth and vitality, and promote ditch network maintenance on drained peatlands. Most aid is allocated to early tending of seedling stands and precommercial thinnings, which actually decrease timber volume (biomass) compared to unmanaged stands but in the long-term increase production of large-sized timber for industrial purposes, particularly for higher value products such as sawnwood and plywood which promote carbon storage in products.	
Potential impact on national CBS forestry:	
Climate mitigation	Positive in terms of timber production, overall effect mixed/unclear/depends on time scale. Ditch network maintenance increases timber growth but induces soil emissions which may be dominant in the long term.
Climate adaptation	Policy does not specifically consider adaptation. Support for forest roads (indirectly support fire protection) and requirements of growing suitable tree species for the site can be considered to adaptation measures.
Biodiversity	Mixed effect (positive and negative impacts). Includes e.g. subsidies for conservation, but also subsidies that tend maintain conventional rotation forestry (subsidies for tending young forests).
<i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i>	

5.2 Italy

5.2.1 National law on forests and forest supply chains (TUFF)

<p>Policy level: National</p> <p>Policy field: Forestry, nature conservation and biodiversity, climate mitigation and adaptation, bioeconomy, sustainable forest management</p> <p>Target groups: National and Regional governments, private and public forests, wood sector</p> <p>Time horizon of policy: Long term (relevant till 2040)</p> <p>Provisions relevant for CBS forestry (in general): sustainable management to guarantee the maintenance of forest structural and functional traits, forest health, conservation and valorisation, biodiversity and bioeconomy.</p> <p>Potential impact on national CBS forestry:</p>	
Climate mitigation	The enforcement of this law has beneficial impacts on climate mitigation. It foresees initiatives aimed at prevention as well as interventions for the reconstitution of damaged forest potential, enhances forest neoformations, aims to manage and naturalize, where appropriate, the afforestation and artificial reforestation
Climate adaptation	The enforcement of this law has beneficial impacts on climate adaptation. In particular, sustainable management can encourage silvicultural practices aimed at improving the resilience and resistance capabilities of forests to climate change
Biodiversity	One of the law's purposes is to maintain and enhance biodiversity by sustainably manage the forest using silvicultural methods and intervention practices that may involve the protection and conservation of the dynamics of ecological evolution, the prevention of natural and anthropogenic hazards, controlling alien invasive species, improvement of habitats and forest health status.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

5.2.2 Forest law of the Sardinia region (l. reg. 2016, n. 8)

<p>Policy level: Regional (Sardinia)</p> <p>Policy field: Forestry; climate mitigation & adaptation; biodiversity</p> <p>Target groups: Local governments, local administrations, private forests, public forests, communal forests</p> <p>Time horizon of policy: Medium term (up to 2030)</p> <p>Provisions relevant for CBS forestry (in general): Ensuring the sustainable management of forest resources while simultaneously preserving biodiversity and their protection.</p> <p>Potential impact on national CBS forestry:</p>	
Climate mitigation	The enforcement of this law has a beneficial impact on the management of forests at the regional level, and this could help to address the current issues that forests are facing, particularly regarding wildfires.
Climate adaptation	Adaption needs are accounted for in the law. Indeed, its main purpose is to propose sustainable forest management (including fire-smart management activities), establishing forest planning and programming, caring and managing the forest heritage, its expansion also through reforestation or afforestation, the reconstitution of degraded or damaged woods, cultivation treatments, interventions of renaturalization and phytosanitary defence; thus contributing to building resilience and adapt to climate change
Biodiversity	The law's purposes are protecting biodiversity, environmental risk prevention, and land management. The aim is to avoid conflicts between environmental protection and the development of forest resources by promoting their sustainable valorisation and utilisation.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

5.2.3 Sardinia Region Environmental Energy Plan 2020 (PEARS)

<p>Policy level: Regional</p> <p>Policy field: Climate and energy policy</p> <p>Target groups: Regional and local governments, local public authorities, other private sector actors, individuals/consumers, owners</p> <p>Time horizon of policy: Medium term (up to 2030)</p> <p>Provisions relevant for CBS forestry (in general): The Plan illustrates the main and specific objectives to achieve the energy, socio-economic and environmental goals to 2030. Based on that, it takes into consideration the energy potential of biomasses, including woody</p> <p>Potential impact on national CBS forestry: This regulation enforces planning analysing also the sustainability impacts on different sectors, including climate, ecosystem and forestry</p>	
Climate mitigation	The PEARS aims to reduce CO ₂ emissions, promote the use of renewable energy sources, improve energy efficiency, and adopt a more sustainable approach to resource use, all crucial aspects for mitigating climate change and reducing environmental impact in Sardinia
Climate adaptation	The PEARS can positively contribute to climate adaptation since it foresees numerous behavioural, structural, and technological adjustments, from improving the knowledge in the system to preventing effects or reducing risks, and exploiting the opportunity arising from the use of renewable sources and decentralize the energy structure
Biodiversity	Intends to positively contribute by promoting new energy approaches and models minimizing the consumption of land, landscape and natural resources across Sardinia region
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

5.3 The Netherlands

5.3.1 National Forest Strategy

<p>Policy level: National</p> <p>Policy field: Forestry (revitalisation, afforestation, agroforestry. Efforts towards climate mitigation and reinforcing biodiversity)</p> <p>Target groups: National government, provinces, municipalities, private forests, public forests, agricultural lands, wood sector.</p> <p>Time horizon of policy: focus on 2030 but should have impact beyond</p> <p>Provisions relevant for CBS forestry (in general):</p> <p>Protect → Forest conservation - Creating 10% more natural forests by 2030, where the focus is solely on biodiversity</p> <p>Manage → Active management - Revitalize forests through: mixing species, more age classes, more old trees, more deadwood, rich litter species, rock flout, restore → afforestation - 37,000 hectares expansion of current forested land by 2030 (for biodiversity and climate mitigation).</p> <p>Potential impact on national CBS forestry:</p>	
Climate mitigation	Intends to positively contribute to climate mitigation, because of increased CO ₂ capture through afforestation (37,000 hectares) and revitalizing practices like diversifying species composition and forests with a more diverse structure (all development phases should be present).
Climate adaptation	Intends to positively contribute to climate adaptation by actively stimulating more mixed stands, partly by introducing species from more southern provenances and new species from elsewhere in Europe that should be better adapted to future climate conditions.
Biodiversity	Intends to positively contribute to reinforcing biodiversity by more deadwood in forests, improving the quality of forests soils and improving the connectivity between forested lands. Also by practices like diversifying species composition and forests with a more diverse structure (all development phases should be present) and improving abiotic factors like reduction of nitrogen deposition.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

5.3.2 Provincial measure: Ban on wood harvest in old deciduous forests

<p>Policy level: Regional/provincial</p> <p>Policy field: Nature conservation</p> <p>Target groups: Owners of specific protected forest types (public and private)</p> <p>Time horizon of policy: no specific time horizon, impacts on biodiversity should become apparent over time.</p> <p>Provisions relevant for CBS forestry (in general):</p> <ul style="list-style-type: none"> • Protect: ending wood harvest, less impact of ungulates and soil protection • Manage: less invasive tree and shrub species, more open spaces for typical old forest and forest edge flora species that need light and more habitat for species that need old, degenerating and dead trees • Restore: restoring specific protected forest habitat types • Wood use: ending wood harvest in specific habitat types will limit the availability of timber and effect the timber industry. <p>Potential impact on national CBS forestry:</p>	
Climate mitigation	As a direct effect of gradually ending wood harvest, the above ground carbon stock will increase, compared to managed forests and the below ground carbon stock will be protected.
Climate adaptation	No direct impact on climate adaptation foreseen. An end to wood harvesting may lead to less regeneration and may thus slow down (genetic) adaptation processes.
Biodiversity	Intends to positively contribute to reinforcing biodiversity by more deadwood in forests, improving the quality of forests soils and improving the connection between forested lands.
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

5.4 Romania

5.4.1 Romania's Forestry code

<p>Policy level: National</p> <p>Policy field: Forestry in general with implications for climate mitigation/ adaptation and biodiversity policy</p> <p>Target groups:</p> <ul style="list-style-type: none"> • Governmental actors: state government (competent authority for forests and environment); local public authorities (environmental agencies, forest service and forest control agencies) • Private sector actors: owners, local communities, operators (managers, management planning entities, timber harvesting and processing entities, NGOs, tourism, and leisure facilities/services) associated with forest management and conservation. <p>Time horizon of policy: long-term</p> <p>Provisions relevant for CBS forestry (in general): Strictly regulating forest management and forestland use (regardless of ownership), the law aims to ensure perpetuation of a stable (or increasing) area of forest ecosystems with natural structures and efficient provision of all ecosystem services (from timber to biodiversity and climate mitigation/adaptation).</p> <p>CBS-categories addressed:</p> <p>“Protect” → “Avoid deforestation”, “Forest conservation”, “Species conservation”, “Other”</p> <p>“Manage” → “Forest harvesting”, “Active management”, “Other (forest management planning)”</p> <p>“Restore” → “Forest restoration”, “Afforestation/Reforestation”, “Other”</p> <p>Potential impact on national CBS forestry: This regulation enforces a close-to-nature and sustainable management (oriented to biodiversity conservation, forest stability and resilience) of the entire forestland.</p>	
Climate mitigation	Intends to positively contribute to climate mitigation providing a stable (or increasing) forestland with high resilience (well adapted native species) and good carbon sequestration capacity (long rotations)
Climate adaptation	The policy mentions climate adaptation in one of the principles for sustainable management of the national forestland. It could contribute to this task by ensuring conservation of landscape mosaics with stands with diversified structures and natural compositions (obtained mostly by natural regeneration). It also imposes the high-forest regime (long rotations) for most forests providing for good carbon sequestration capacity.
Biodiversity	Intends to positively contribute to producing and maintaining a high biodiversity in the forestland across the country (in general, not only in protected areas)
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

5.4.2 Technical norms for forest management planning

<p>Policy level: National</p> <p>Policy field: Forest management planning in general with implications for climate mitigation/adaptation and biodiversity</p> <p>Target groups:</p> <ul style="list-style-type: none"> • Governmental actors: state government (competent authority for forests and environment); local public authorities (environmental agencies, forest service and forest control agencies) • Private sector actors: owners, operators (e.g., managers, management planning entities) associated with forest management and conservation. <p>Time horizon of policy: long-term</p> <p>Provisions relevant for CBS forestry (in general): Strictly regulating forest management planning (regardless of ownership), the policy aims to ensure a comprehensive management of forest ecosystems for efficient provision of all ecosystem services (from timber to biodiversity and climate mitigation/adaptation).</p> <p>CBS-categories addressed: “Protect” → “Avoid deforestation”, “Forest conservation”, “Species conservation”, “Other” “Manage” → “Active management”, “Other”</p> <p>Potential impact on national CBS forestry: This regulation enforces planning for a close-to-nature sustainable forest management.</p>	
Climate mitigation	Intends to contribute to climate adaptation and mitigation by ensuring forests with a high resilience (well adapted, naturally regenerated native species) and good carbon sequestration capacity (long rotations).
Climate adaptation	The policy does not address explicitly climate adaptation. However, it could contribute to this task by ensuring forests of well adapted (mostly naturally regenerated) native species and good carbon sequestration capacity (long rotations). It also favours naturally mixed stand compositions (presence of all species adapted to the site) and also long regeneration periods (which result in more diverse stand structures).
Biodiversity	Intends to positively contribute by ensuring conditions for high levels of biodiversity in forest lands across the country (in general, not only in protected areas)
<p><i>Key: Green mark = positive contribution expected; grey mark = no contribution expected; orange = negative contribution expected; yellow mark = both positive and negative contributions expected.</i></p>	

6 Synthesis of policy mapping and stakeholder views at EU level relevant for the forestry sector

To provide an assessment and synthesis of policy mapping and stakeholder views at EU level relevant for the forestry sector, we analysed 3 international policies, 14 EU policies and 9 national policies in the four demo cases of ForestPaths, namely Finland, The Netherlands, Italy, and Romania. The 14 EU policies cover the policy fields of forestry (2), climate mitigation and adaptation (3), nature conservation and biodiversity (4), energy (1), and other environmental policies (4). In total 26 policies were analysed, however, for two EU policies (EU Water Framework Directive and Ecodesign for Sustainable Products Regulation & Sustainable Products Initiative) the assessment was limited. This is due to a limited relevance found in the first step of the assessment and also due to time constraints.

In the following, we are synthesising the findings of the policy analysis by summarising the information collected in the individual policy assessments. The colour coding of findings helps to “map” the policies in the following overview tables. We look at the contribution of policies to climate change mitigation, adaptation, and biodiversity goals but also assess the coverage of policies regarding CBS categories defined in ForestPaths, as well the coverage regarding governance mechanisms.

6.1 Contribution to climate mitigation, adaptation, and biodiversity goals

We assessed to what extent the screened policies contribute to climate mitigation, adaptation and biodiversity goals. We find that the majority of policies contributes to all of these goals (see Table 1). 20 of 26 of the analysed policies promote climate mitigation. For five policies we found a mixed potential impact with positive and negative effects. A smaller number of policies (16) contributes to adaptation to climate change through CBS forestry, and a similar number (15) can be considered coherent with biodiversity goals. Only one policy was found to have no effect on climate mitigation through the promotion of CBS forestry activities (EU Water Framework Directive). The Soil Monitoring Law was assessed to have no impact on biodiversity. 12 policies out of 26 were assessed to be coherent with all three policy goals in EU forestry.

Policies that may have both positive and negative effects on (several of) the three goals include ITTA, the Regulation on deforestation-free products, the LULUCF Regulation and the Carbon Farming and EU Certification for Carbon Removals, the Renewable Energy Directive, the EU Bioeconomy Strategy, the forestry state aid in Finland, and the Italian PEARS policy. The selected national policies tend to better contribute to climate mitigation goals than to biodiversity goals. None of the policies was assessed to have an overall negative impact on the three policy goals related to forestry in EU countries.

It has to be noted that the analysis only provides a limited look into the selected policies and the categorisation into the groups of level of contribution can only be based on expert judgement. This is also due to the fact that the policies do not always include concrete policy targets or binding provisions that could be used as strong support for the categorisation. Moreover, most policies’ impacts result from the specific way of implementation at the national level. Thus, the impact of policies might differ in EU countries. Policy impacts also depend on the type of forest owner, forest structure, market situation and other factors that could not be considered in the assessment.

Table 1: Contribution of screened policies to climate mitigation, adaptation and biodiversity goals related to forestry.

	Climate mitigation	Climate adaptation	Bio-diversity			
Sum	20	16	16	Sum		
	5	10	10			
	1	0	0			
<i>International policies</i>						
UNFCCC & Paris Agreement				2	1	0
Convention on Biological Diversity				2	1	0
International Tropical Timber Agreement and Organization				0	3	0
<i>EU policies</i>						
EU Forest Strategy for 2030				3	0	0
Regulation on deforestation-free products				0	3	0
LULUCF Regulation				1	2	0
Carbon Farming & EU Certification for Carbon Removals				1	2	0
EU Adaptation Strategy				3	0	0
Biodiversity Strategy for 2030				3	0	0
European Nature Restoration Law				3	0	0
Natura 2000				3	0	0
Water Framework Directive				2	0	1
Renewable Energy Directive				0	3	0
Circular Economy Action Plan				3	0	0
Ecodesign for Sustainable Products Regulation				3	0	0
Directive on Soil Monitoring and Resilience				3	0	0
EU Bioeconomy Strategy				0	3	0
<i>National policies in demo cases</i>						
Finland – MISU				2	1	0
Finland – forestry state aid				0	3	0
Italy – TUFF				3	0	0
Italy – Forest law Sardinia				3	0	0
Italy – PEARS				1	2	0
Netherlands – National Forest Strategy				3	0	0
Netherlands – Provincial measure				2	1	0
Romania – Forest Code				3	0	0
Romania – Technical norms				3	0	0

The assessment included only a limited amount of selected international, EU and national policies. The authors also considered in the selection process also the representation of different policy types. However, the selection is by no means providing a complete picture of policies that could have some relevance for the EU forestry sector. But the analysis presents

illustrative examples of policies and gives an indication of the diversity of policies and types of policy interventions with more or less likely impact on EU forestry.

6.2 Coverage of policies regarding CBS categories and sub-categories

We analysed to what extent the screened policies cover the CBS forestry identified categories (“protect”, “manage”, “restore”, “wood use”) and related sub-categories used in the ForestPaths project. Note that we do not differentiate here whether the policies require activities on a mandatory or a voluntary basis.⁶ We find that most of the policies address a mix of the categories, though generally there seems to be a division between policies relating to “protect”, “manage” and “restore” (and hence, to forests or ecosystems more widely) and policies relating to “wood use” (and hence, to products and their design, including of wood-based products, see Table 2). Only few of the selected national policies address the cascading principles and increased efficiency of wood uses. Similarly, restoration is less a focus of these policies. Table 2 also displays the width of the scope of the policies when looking at how many of the sub-categories are addressed according to the assessment. Namely, the International Tropical Timber Agreement and Organization, the EU Forest Strategy for 2030, the LULUCF Regulation, EU Biodiversity Strategy for 2030, and the EU Bioeconomy Strategy are EU policies that address all four categories of CBS forestry.

The assessed international policies seem to have a rather wide scope, addressing three or four of the CBS forestry categories. It has to be noted that these policies do not necessarily address EU forestry activities (UNFCCC and the Convention on Biological Diversity do, the ITTO does not). Nevertheless there can be indirect effects on EU forestry by all international policies. The analysis does not deliver a stringent impact assessment of policies but rather provides an overview of the width of policy scopes and intensity of the relationship between policies the included provisions and CBS forestry categories and sub-categories. The latter can also be interpreted as a measure of density of regulation regarding specific CBS forestry categories.

⁶ As to this differentiation, the detailed policy analyses need to be consulted.

D6.2 Synthesis of policy and stakeholder requirements relevant for the forestry sector

Table 2: Coverage of the screened policies regarding CBS categories and sub-categories. Colours indicate number of sub-categories per policy and CBS forestry category: the darker the colour the more CBS forestry sub-categories were found to be affected by policies and their provisions.

	Protect	Manage	Restore	Wood Use
<i>International policies</i>				
UNFCCC & Paris Agreement	<ul style="list-style-type: none"> • (Avoiding deforestation) • Forest conservation 	<ul style="list-style-type: none"> • (Forest harvesting) 	<ul style="list-style-type: none"> • (A-/reforestation) 	
Convention on Biological Diversity	<ul style="list-style-type: none"> • Avoiding deforestation • Forest conservation • Species conservation • Other (genetic diversity) 	<ul style="list-style-type: none"> • Forest harvesting • Active management (other than harvesting) 		<ul style="list-style-type: none"> • Shifts in wood uses (including by-products) • Cascading (end-of-life) • Increased efficiency
International Tropical Timber Agreement and Organization	<ul style="list-style-type: none"> • Avoiding deforestation • Forest conservation • Species conservation • Other: genetic variation 	<ul style="list-style-type: none"> • Forest harvesting • Active management (other than harvesting) 	<ul style="list-style-type: none"> • Forest restoration • A-/reforestation 	<ul style="list-style-type: none"> • Shifts in wood uses (including by-products) • Increased efficiency
<i>EU policies</i>				
EU Forest Strategy for 2030	<ul style="list-style-type: none"> • Forest conservation • Species conservation • Other 	<ul style="list-style-type: none"> • Forest harvesting • Active management (other than harvesting) • Other 	<ul style="list-style-type: none"> • Forest restoration (including peatlands) • A-/reforestation 	<ul style="list-style-type: none"> • Shifts in wood uses (including by-products) • Cascading (end-of-life) • Increased efficiency • Other
Regulation on deforestation-free products	<ul style="list-style-type: none"> • Avoiding deforestation • Forest conservation 	<ul style="list-style-type: none"> • Forest harvesting • Active management (other than harvesting) 	<ul style="list-style-type: none"> • Forest restoration (including peatlands) 	
LULUCF Regulation	<ul style="list-style-type: none"> • Avoiding deforestation • Other (carbon stock conservation) 	<ul style="list-style-type: none"> • Forest harvesting • Other (enhancement of carbon stocks & sinks) 	<ul style="list-style-type: none"> • Forest restoration (including peatlands) • A-/reforestation 	<ul style="list-style-type: none"> • Shifts in wood uses (including by-products) • Cascading (end-of-life) • Other (increasing carbon stock in HWP)
Carbon Farming & EU Certification for Carbon Removals	<ul style="list-style-type: none"> • Avoiding deforestation • Forest conservation 	<ul style="list-style-type: none"> • Forest harvesting 		<ul style="list-style-type: none"> • Shifts in wood uses (including by-products) • Cascading (end-of-life)
EU Adaptation Strategy	<ul style="list-style-type: none"> • Species conservation 	<ul style="list-style-type: none"> • Active management (other than harvesting) • Other (genetic adaptation) 	<ul style="list-style-type: none"> • A-/reforestation 	
EU Biodiversity Strategy for 2030	<ul style="list-style-type: none"> • Forest conservation • Species conservation 	<ul style="list-style-type: none"> • Active management (other than harvesting) 	<ul style="list-style-type: none"> • A-/reforestation 	<ul style="list-style-type: none"> • Shifts in wood uses (including by-products) • Cascading (end-of-life)
European Nature Restoration Law	<ul style="list-style-type: none"> • Species conservation 	<ul style="list-style-type: none"> • Active management (other than harvesting) 	<ul style="list-style-type: none"> • Forest restoration (including peatlands) • A-/reforestation • Other (Increase Biodiversity in forest ecosystems) 	
Natura 2000	<ul style="list-style-type: none"> • Species conservation 	<ul style="list-style-type: none"> • Active management (other than harvesting) 	<ul style="list-style-type: none"> • Forest restoration (including peatlands) • A-/reforestation • Other (Increase Biodiversity in forest ecosystems) 	
Water Framework Directive				
Renewable Energy Directive	<ul style="list-style-type: none"> • Avoiding deforestation • Forest conservation • Species conservation 	<ul style="list-style-type: none"> • Forest harvesting 	<ul style="list-style-type: none"> • A-/reforestation 	
Circular Economy Action Plan		<ul style="list-style-type: none"> • Active management (other than harvesting) 		<ul style="list-style-type: none"> • Shifts in wood uses (including by-products) • Cascading (end-of-life)

	Protect	Manage	Restore	Wood Use
				<ul style="list-style-type: none"> Increased efficiency Other (digital product passport)
Ecodesign for Sustainable Products Regulation				<ul style="list-style-type: none"> Shifts in wood uses (including by-products) Cascading (end-of-life) Increased efficiency Other (digital product passport)
Directive on Soil Monitoring and Resilience	Avoid deforestation	<ul style="list-style-type: none"> Active management (other than harvesting) 		
EU Bioeconomy Strategy	<ul style="list-style-type: none"> Forest conservation 	<ul style="list-style-type: none"> Forest harvesting Active management (other than harvesting) 	<ul style="list-style-type: none"> Forest restoration (including peatlands) 	<ul style="list-style-type: none"> Shifts in wood uses (including by-products) Cascading (end-of-life) Increased efficiency
<i>National policies</i>				
Finland – MISU	<ul style="list-style-type: none"> Avoiding deforestation 	<ul style="list-style-type: none"> Forest harvesting Active management (other than harvesting) Other (Avoid ditch network maintenance) 	<ul style="list-style-type: none"> Af-/reforestation 	<ul style="list-style-type: none"> Shifts in wood uses (including by-products)
Finland – forestry state aid	<ul style="list-style-type: none"> Avoiding deforestation Forest conservation 	<ul style="list-style-type: none"> Forest harvesting Active management (other than harvesting) Other 	<ul style="list-style-type: none"> Forest restoration (including peatlands) 	
Italy – TUFF	<ul style="list-style-type: none"> Avoiding deforestation Forest conservation Species conservation 	<ul style="list-style-type: none"> Active management (other than harvesting) Other (Promote active prevention of hazards) 	<ul style="list-style-type: none"> Forest restoration (including peatlands) 	<ul style="list-style-type: none"> Shifts in wood uses (including by-products) Cascading (end-of-life)
Italy – Forest law Sardinia	<ul style="list-style-type: none"> Avoiding deforestation Forest conservation Species conservation Other (Prevention of forest fires) 	<ul style="list-style-type: none"> Forest harvesting Active management (other than harvesting) 		<ul style="list-style-type: none"> Shifts in wood uses (including by-products)
Italy – PEARS	<ul style="list-style-type: none"> Forest conservation 	<ul style="list-style-type: none"> Active management (other than harvesting) 		<ul style="list-style-type: none"> Shifts in wood uses (including by-products) Increased efficiency
Netherlands – National Forest Strategy	<ul style="list-style-type: none"> Avoiding deforestation Forest conservation 	<ul style="list-style-type: none"> Active management (other than harvesting) 	<ul style="list-style-type: none"> Af-/reforestation 	<ul style="list-style-type: none"> Shifts in wood uses (including by-products)
Netherlands – Provincial measure	<ul style="list-style-type: none"> Forest conservation Species conservation 	<ul style="list-style-type: none"> Forest harvesting Active management (other than harvesting) 	<ul style="list-style-type: none"> Forest restoration (including peatlands) 	<ul style="list-style-type: none"> Shifts in wood uses (including by-products)
Romania – Forest Code	<ul style="list-style-type: none"> Avoiding deforestation Forest conservation Species conservation Other (Protection against illegal logging) 	<ul style="list-style-type: none"> Forest harvesting Active management (other than harvesting) Other 	<ul style="list-style-type: none"> Forest restoration (including peatlands) Af-/reforestation 	
Romania – Technical norms	<ul style="list-style-type: none"> Avoiding deforestation Forest conservation Species conservation Other 	<ul style="list-style-type: none"> Active management (other than harvesting) Other 		

6.3 Coverage of policies regarding CBS categories and governance mechanisms

We analysed for each of the 26 selected policies through which governance mechanisms policies address different CBS categories, including the mechanisms “target”, “prohibition”, “standard”, “incentive”, and “other”. Table 3 presents results of the analysis for international and EU policies. The table lists policies that include the specific type of governance mechanism for the different CBS forestry categories and sub-categories. The colour coding provides a “heat map” of how many policies with relevance for each sub-category makes use of different types of governance mechanisms.

Standards appear to be used most frequently in the analysed policies across all categories. Similarly, targets are included in many policies covering a wide range of CBS forestry categories and sub-categories. Prohibitions as a governance mechanism do not appear in policies addressing restoration and also to only a small degree in policies targeting wood use. Incentives target especially the sub-category “active management (other than harvesting)”.

Table 4 presents the analysis for the national policies that were assessed. At the national level prohibition and standards seem to be frequent governance mechanisms in place with the aim to protect forests in the countries. Policies that address management of forests use different governance mechanisms across the board. It is striking that incentives are not occurring as prominently as a governance mechanism for regulating management of forests as for international and EU policies. However, this can also be the result of the rather limited scope of the analysis for this group of policies due to a smaller number.

Table 3: Coverage of the screened **international and EU policies** (excluding national policies) regarding CBS categories and governance mechanism. Colours indicate number of policies per CBS sub-category and governance mechanism: the darker the colour the more policies were found to impact CBS sub-categories in EU countries.

CBS category	CBS sub-category	Governance mechanism				
		a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	<ul style="list-style-type: none"> • (UNFCCC) • UNCBD • LULUCF 	<ul style="list-style-type: none"> • EUTD • EU RED 	<ul style="list-style-type: none"> • EUTD • CRCF 	<ul style="list-style-type: none"> • EUTD 	<ul style="list-style-type: none"> • ITTO
	Forest conservation	<ul style="list-style-type: none"> • UNCBD • EU Forest Strategy • EU Biodiversity Strategy 	<ul style="list-style-type: none"> • EUTD • EU RED 	<ul style="list-style-type: none"> • (CBD) • (ITTO) • EU Forest Strategy • CRCF • Natura 2000 	<ul style="list-style-type: none"> • UNFCCC • EU Forest Strategy 	<ul style="list-style-type: none"> • ITTO • EU Bioeconomy Strategy
	Species conservation	<ul style="list-style-type: none"> • UNCBD • EU Biodiversity Strategy • EU NRL 	<ul style="list-style-type: none"> • EU RED 	<ul style="list-style-type: none"> • (ITTO) • EU Forest Strategy • Natura 2000 		<ul style="list-style-type: none"> • ITTO
	Other (carbon stock conservation)	<ul style="list-style-type: none"> • (UNFCCC) • LULUCF 				
	Other (genetic diversity)	<ul style="list-style-type: none"> • UNCBD 		<ul style="list-style-type: none"> • EU Adaptation Strategy 		<ul style="list-style-type: none"> • ITTO
	Other (guidelines for closer-to-nature-forestry)				<ul style="list-style-type: none"> • EU Forest Strategy 	<ul style="list-style-type: none"> • EU Forest Strategy
Manage	Forest harvesting	<ul style="list-style-type: none"> • (UNFCCC) • UNCBD 	<ul style="list-style-type: none"> • EUTD • EU RED 	<ul style="list-style-type: none"> • (ITTO) • CRCF 	<ul style="list-style-type: none"> • EU Forest Strategy 	<ul style="list-style-type: none"> • ITTO

CBS category	CBS sub-category	Governance mechanism				
		a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
		<ul style="list-style-type: none"> LULUCF 			<ul style="list-style-type: none"> EU Bioeconomy Strategy 	
	Active management (other than harvesting)	<ul style="list-style-type: none"> UNCBD EU Forest Strategy EU NRL 		<ul style="list-style-type: none"> (ITTO) EU Forest Strategy EUTR EU Adaptation Strategy EU Biodiversity Strategy EU NRL CRCF 	<ul style="list-style-type: none"> EU Adaptation Strategy EU Biodiversity Strategy EUTR EUTD CEAP EU Bioeconomy Strategy 	<ul style="list-style-type: none"> EU Forest Strategy
	Other (enhancement of carbon stocks & sinks)	<ul style="list-style-type: none"> (UNFCCC) LULUCF 				
	Other (regulation on EU forest observation, reporting, and data collection)	<ul style="list-style-type: none"> EU Forest Strategy 		<ul style="list-style-type: none"> EU Forest Strategy 		
	Other (genetic adaptation)				<ul style="list-style-type: none"> EU Adaptation Strategy 	
Restore	Forest restoration (including peatlands)	<ul style="list-style-type: none"> UNCBD EU Forest Strategy LULUCF 		<ul style="list-style-type: none"> (ITTO) EU Forest Strategy EUTD EU NRL 		<ul style="list-style-type: none"> EU Bioeconomy Strategy
	A-/reforestation	<ul style="list-style-type: none"> (UNFCCC) EU Forest Strategy LULUCF 		<ul style="list-style-type: none"> ITTO (EU Forest Strategy) EU Adaptation Strategy EU Biodiversity Strategy EU NRL 	<ul style="list-style-type: none"> EU Forest Strategy 	<ul style="list-style-type: none"> EU Biodiversity Strategy
	Other					
Wood use	Shifts in wood uses (including by-products)	<ul style="list-style-type: none"> EU Forest Strategy LULUCF CEAP EU Bioeconomy Strategy 	<ul style="list-style-type: none"> CEAP 	<ul style="list-style-type: none"> UNCBD ITTO EUTR EU Biodiversity Strategy CRCF 	<ul style="list-style-type: none"> EU Forest Strategy EU Bioeconomy Strategy 	<ul style="list-style-type: none"> EU Forest Strategy CEAP Ecodesign Regulation
	Cascading (end-of-life)	<ul style="list-style-type: none"> LULUCF EU Bioeconomy Strategy 	<ul style="list-style-type: none"> EU Biodiversity Strategy 	<ul style="list-style-type: none"> UNCBD CRCF CEAP Ecodesign Regulation 		
	Increased efficiency			<ul style="list-style-type: none"> UNCBD ITTO CEAP Ecodesign Regulation 		<ul style="list-style-type: none"> EU Bioeconomy Strategy
	Other (increasing carbon stock in HWP)	<ul style="list-style-type: none"> (UNFCCC) LULUCF 			<ul style="list-style-type: none"> EU Forest Strategy 	

Table 4: Coverage of the screened **national policies** regarding CBS categories and governance mechanism. Colours indicate number of policies per CBS sub-category and governance mechanism: the darker the colour the more policies were found to impact CBS sub-categories in EU countries.

CBS category	CBS sub-category	Governance mechanism				
		a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	<ul style="list-style-type: none"> FI Climate Plan FI state aid IT TUFF IT Forest law Sard 	<ul style="list-style-type: none"> FI Climate Plan IT TUFF IT Forest law Sard NL NFS RO Forestry code 	<ul style="list-style-type: none"> IT Forest law Sard RO Technical norms 		<ul style="list-style-type: none"> FI Climate Plan
	Forest conservation	<ul style="list-style-type: none"> NL NFS 	<ul style="list-style-type: none"> NL harvest ban 	<ul style="list-style-type: none"> IT TUFF IT Forest law Sard IT PEARS RO Forestry code RO Technical norms 	<ul style="list-style-type: none"> FI state aid NL NFS 	<ul style="list-style-type: none"> NL harvest ban
	Species conservation	<ul style="list-style-type: none"> IT TUFF 	<ul style="list-style-type: none"> NL harvest ban 	<ul style="list-style-type: none"> IT Forest law Sard RO Forestry code RO Technical norms 		
Manage	Forest harvesting	<ul style="list-style-type: none"> FI Climate Plan IT Forest law Sard 	<ul style="list-style-type: none"> NL harvest ban RO Forestry code 	<ul style="list-style-type: none"> IT Forest law Sard RO Forestry code 	<ul style="list-style-type: none"> FI state aid NL harvest ban 	<ul style="list-style-type: none"> FI Climate Plan NL harvest ban
	Active management (other than harvesting)	<ul style="list-style-type: none"> FI Climate Plan IT TUFF IT Forest law Sard NL NFS 		<ul style="list-style-type: none"> IT PEARS NL harvest ban RO Forestry code RO Technical norms 	<ul style="list-style-type: none"> FI Climate Plan FI state aid NL NFS 	<ul style="list-style-type: none"> FI Climate Plan
Restore	Forest restoration (including peatlands)	<ul style="list-style-type: none"> IT TUFF 	<ul style="list-style-type: none"> NL harvest ban 	<ul style="list-style-type: none"> RO Forestry code 	<ul style="list-style-type: none"> FI state aid 	
	A-/reforestation	<ul style="list-style-type: none"> FI Climate Plan NL NFS 		<ul style="list-style-type: none"> RO Forestry code 	<ul style="list-style-type: none"> FI Climate Plan NL NFS 	
Wood use	Shifts in wood uses (including by-products)	<ul style="list-style-type: none"> FI Climate Plan IT TUFF NL NFS 	<ul style="list-style-type: none"> NL harvest ban 	<ul style="list-style-type: none"> IT Forest law Sard IT PEARS 	<ul style="list-style-type: none"> FI Climate Plan 	<ul style="list-style-type: none"> FI Climate Plan
	Cascading (end-of-life)	<ul style="list-style-type: none"> IT TUFF 				
	Increased efficiency			<ul style="list-style-type: none"> IT PEARS 		

7 Conclusions

From the above findings, we draw the following conclusions:

- A broad **range of policies** potentially affect climate- and biodiversity-smart forest management and wood use (“CBS”). Beyond forestry, climate and biodiversity policies these include energy policies, bioeconomy, trade, water, sustainable product and circular economy policies etc. These policies are situated in a multilevel governance system that spans from the international to the national, subnational and partly municipal levels. The policies can affect CBS forestry directly through their provisions. However, they can also impact CBS forestry indirectly through long (and partly unintended) chains of effects such as global shifts in the supply and demand of specific biotic products.
- The **impact** of international, EU and national policies on CBS forestry in general and on CBS forestry in the EU countries is difficult to assess. The impact differs for different policy goals. It was found to be positive for most policies regarding **climate mitigation**. **Adaptation** to climate change and protection of **biodiversity** are less stringently addressed. However, none of the assessed policies had overall negative impacts on any these goals.
- We find that most of the policies address a mix of categories of “**protect**”, “**manage**”, “**restore**”, and “**wood use**”. The width of the scope of the policies can be large (e.g. for the International Tropical Timber Agreement and Organization, the EU Forest Strategy for 2030, the LULUCF Regulation, EU Biodiversity Strategy for 2030, and the EU Bioeconomy Strategy that address all four categories of CBS forestry). Also, the assessed international policies seem to have a rather wide scope, addressing three or four of the CBS forestry categories.
- Policies make use of different types of **governance mechanisms** that steer target group behaviour with regard to CBS forestry (sub-) categories in different ways. **Standards** appear to be used most frequently in the analysed policies across all categories. Similarly, **targets** are included in many policies covering a wide range of CBS forestry categories and sub-categories. **Prohibitions** as a governance mechanism do not appear in policies addressing restoration and also to only a small degree in policies targeting wood use. **Incentives** target especially the sub-category “active management (other than harvesting)”.
- At the **national level**, prohibition and standards seem to be frequent governance mechanisms to protect forests in the countries. Policies to manage forests at the national level use different governance mechanisms across the board.
- **Model assessments** planned under the ForestPaths project need to consider the impact of policies on CBS forestry in EU countries through different governance mechanisms. The framework of the defined CBS forestry categories and sub-categories can help to differentiate policy impacts to better reflect their influence on scenarios of the future development of forests in the EU.
- **Stakeholder views and requirements** towards the analysed policies are highly diverse. We found commentaries pushing for more stringent as well as for less stringent CBS requirements. The views are frequently in line with what one would expect in terms of the stakeholders’ economic interests. The EU Nature Restoration Law is a rare example where the European Parliament pushed for CBS provisions less ambitious than those of the EU Commission.

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Annex: In-depth policy analysis

A 1 International policies

A 1.1 United Nations Framework Convention on Climate Change & Paris Agreement

A 1.1.1 General Description

The United Nations Framework Convention on Climate Change (**UNFCCC**) entered into force already in 1994 and was ratified by 198 countries (referred to as Parties to the Convention). Its main aim is preventing “*dangerous*” human interference with the climate system. This requires stabilization of greenhouse gas concentrations “*at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.*” The Convention states that “*such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.*”

In the UNFCC framework Convention, adaptation is referred to as one component to ensure that responses to climate change are cost-effective and provide global benefits at the lowest possible cost (Art. 3(3)). Furthermore, parties shall cooperate in adaptation planning and address coastal zone management, water resources, agriculture, protection and rehabilitation of areas, particularly those affected by drought and desertification (Art. 4 (1, e)).

The **Kyoto Protocol** (KP, adopted in 1997 and entered into force 2005) established a cap-and-trade system for developed countries (“Annex I countries” to the Convention) that imposed national caps on GHG emissions for countries that had ratified the Protocol. Under the KP forests played a significant role. KP rules defined for the first-time what part of the reported emissions and removals from the land sector should be taken into account in achieving climate targets and what rules had to be followed in accounting for these emissions or removals. In its Articles 3.3 and 3.4, the Kyoto Protocol distinguished between mandatory and voluntary accounting of land-use activities that result in direct anthropogenic emissions or removals. While initially only afforestation, reforestation and deforestation were obligatory to be accounted for and forest management as well as arable and grassland activities could voluntarily be accounted for (first commitment period 2008-2012), obligatory accounting of activities was extended to forest management in the second commitment period (2013-2020).

The KP requires Annex 1 countries to include in their national and regional programmes also measures on **climate adaptation** (Art. 10 (b)). It also introduced carbon crediting mechanisms to serve a compliance market of Parties. Under the **Clean Development Mechanism** (CDM, Art. 12, for trade between Annex I and non-Annex II), as land use related activities, only afforestation and reforestation projects were eligible, due to concerns over environmental integrity risks. Under the **Joint Implementation** Mechanism (JI, for trade between Annex I countries) all types of land use activities were eligible.

CDM can be considered an important international policy instrument under the UNFCCC that links mitigation and adaptation. This is because 2% of the money paid for carbon offset projects under the CDM is imposed to finance the Adaptation Fund (Kyoto Protocol Article 12.8), even if CDM projects are not formally required to incorporate adaptation activities.

The Warsaw Framework for **REDD+** (Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries) provides an international framework for results-based payments for measurable and verifiable emission reductions or removals (measured in t CO₂) through concrete measures in developing countries. Eligible activities include reducing forest conversion to other land uses, reducing forest degradation and improving forest management and afforestation. REDD+ is a national level approach that was developed for implementation in developing countries, also in response to the fact that avoided deforestation had not been accepted as an activity under the CDM. To date, substantial investments have been made to enhance institutional capacities of countries to fulfil REDD+ requirements and implement actions under REDD+ readiness. In accordance with the requirements of this framework, developing countries have established national plans and monitoring structures or are in the process of doing so.

With the adoption of the **Paris Agreement (PA)**, the ultimate objective of the UNFCCC “to achieve the stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system” has been translated into a numerical temperature goal. With Article 2.1 of the PA countries agreed “to hold the increase in global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels”, recognizing that that this would significantly reduce the risks and impacts of climate change. The PA includes in Article 5 an explicit call on all Parties “to take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases, including forests”.

Art. 7 (1) of the Paris Agreement establishes “the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change [...]”. The current need for adaptation is recognized to be “significant” whereas “mitigation can reduce the need for additional adaptation efforts” (Art. 7 (4)). Each Party shall engage in adaptation planning and implementation which includes the formulation of national adaptation plans (Art. 7 (9)) and shall submit and regularly update an adaptation communication which may include priorities, plans and actions or implementation and support needs (Art. 7 (10)).

All Parties to the PA have committed to contribute to achieving its goal and to regularly pledge mitigation contributions in their NDCs. 102 countries included the land-use sector in various ways in their first NDCs (Herold and Böttcher 2018). The ‘bottom-up character’ of the NDCs, where countries were free to choose approaches, scope and documentation, caused large differences in type of land uses included, method of baseline setting and other accounting rules applied (e.g., whether or not accounting for natural disturbances or harvested wood products). Parties under the PA may also use approaches for voluntary cooperation that are defined under Article 6 of the PA. Article 6.2 establishes a framework for countries to engage in **international carbon market mechanisms**. Article 6.4 establishes a new crediting mechanism that aims to contribute to the mitigation of GHG emissions and supports sustainable development, a mechanism that can be regarded as a successor of the CDM and JI.

A 1.1.2 Provisions relevant for CBS forestry

Climate: Relevance of the UNFCCC to CBS Forestry with regard to climate change mitigation is given through **reporting obligations**. Reporting aims at documenting the level and development of GHG emissions and removals over time. International guidelines for reporting emissions and removals in GHG inventories by countries have been developed and adopted

under the UNFCCC. Reporting under the UNFCCC forms an important basis for assessing the impact of human activities on emissions and removals and thus its impact on climate change. Under the UNFCCC processes, activities or mechanisms that remove carbon dioxide from the atmosphere are referred to as “natural sinks”. These include carbon accumulation in living and dead biomass and in soils in forests and other terrestrial, coastal and marine ecosystems. Parties are committed to develop, periodically update, publish and make available to the Conference of the Parties (COP) national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases. Parties are also required to use comparable methodologies consistent with IPCC guidance. These are the **2006 IPCC Guidelines for National Greenhouse Gas Inventories**, the **2013 Kyoto Protocol Supplement for LULUCF** and the **2013 Wetland Supplement** to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for Annex I Parties. Non-Annex I Parties need to submit data on LULUCF activities as part of their **National Communications (NC)** or **Biennial Update Reports (BUR)**. The NCs shall be prepared in accordance with the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories.

Land use categories to be reported under the UNFCCC involving forests are Forest land remaining forest land, Land converted to forests but also Forests converted to other land uses. The latter is reported under the respective category to which forests are converted, e.g. cropland. However, it includes emissions from forest conversion, such as removing forest biomass from the area. Another important category is Harvested Wood Products, under which carbon stock changes are reported that occur through production and decay of wood products.

Accounting, in contrast to reporting, relates to the definition and tracking of the achievement of a GHG mitigation target and can therefore address a variety of accounting elements, such as the reference against which targets are compared or the emission sources or sinks included in the target. Accounting goes beyond reporting and sets the reported emissions and removals into perspective to a target. An important element of accounting is the **reference, baseline or base year** against which a target for GHG emissions and removals is compared to. Under different compliance schemes, accounting rules might differ. For example, accounting of REDD+ projects involves project level baselines and additionality assessments with rather high information demand for accounting. In contrast, accounting of forests under the Kyoto Protocol in the second commitment period included the comparison of reported emissions and removals from forests with a national level baseline (Forest Management Reference Level). Such reference levels were estimated from forward-looking projections of the development of emissions and removals under business-as-usual conditions. Under the revised LULUCF Regulation forests are accounted for as they are reported in the GHG inventory (see 4.2.1).

The UNFCCC, the Kyoto Protocol and the Paris Agreement all refer to climate mitigation as one component of the necessary international response to climate change. All parties shall include specific adaptation measures in their NDCs. The Paris Agreement encourages joint mitigation and adaptation approaches for sustainable forest management in developing countries and generally emphasizes the co-benefits of climate mitigation for adaptation.

Biodiversity: The **Marrakesh Accords** (UNFCCC 2002) formed a set of principles for accounting for the LULUCF sector into national targets under the Kyoto Protocol. These principles partly aimed at establishing safeguards to protect the environment. They also formed the basis for more elaborated accounting rules developed and applied in the first and second commitment period of the Kyoto Protocol. Principle e required that the implementation of LULUCF activities “*contributes to the conservation of biodiversity and sustainable use of natural*”

resources”. Principle (e) required that the implementation of LULUCF activities “contributes to the conservation of biodiversity and sustainable use of natural resources”.

More explicitly, the REDD + **safeguards** (Cancun Safeguards) were introduced to ensure that REDD + activities adequately address preservation of natural ecosystems, but also other sensitive issues such as the rights of indigenous peoples and traditional communities, social participation, the permanence of carbon removals and the risk of displacement of the pressure from deforestation and forest degradation to other areas.

Table 5: Governance matrix UNFCCC

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	UNFCCC requires reporting of emissions from deforestation for Annex 1 countries. Under Kyoto Protocol, emissions from deforestation had to be accounted for. Under the Paris Agreement, many countries include forests in their NDCs and therefore have indirect obligations to reduce deforestation (often compared to a baseline).	(X)				
	Forest conservation	UNFCCC provides a voluntary framework for addressing emissions from deforestation and forest degradation (REDD+) for developing countries.				X	
	Species conservation						
	Other						
Manage	Forest harvesting	UNFCCC requires reporting of managed land, including managed forests. Under Kyoto Protocol, accounting of emissions and removals from forest management was voluntary. Under the Paris Agreement, many countries include managed forests in their NDCs and therefore have indirect obligations to increase carbon stocks and reduce emissions.	(X)				
	Active management (other than harvesting)						
	Other						
Restore	Forest restoration (including peatlands)						
	A-/reforestation	UNFCCC requires reporting of emissions and removals from afforestation for Annex 1 countries. Under Kyoto Protocol, emissions and removals from afforestation had to be accounted for.	(X)				

		Under the Paris Agreement, many countries include forests in their NDCs and therefore have indirect obligations.					
	Other						
Wood use	Shifts in wood uses (including by-products)	UNFCCC requires reporting of emissions and removals from HWP for Annex 1 countries.					
	Cascading (end-of-life)	Under Kyoto Protocol, accounting of emissions from HWP was voluntary.					
	Increased efficiency	Under the Paris Agreement, many countries include HWP in their NDCs and therefore have indirect obligations.					
	Other (increasing carbon stock in HWP)		(X)				

A 1.1.3 Assessment (including stakeholder views)

The implications of the UNFCCC for CBS are multifold. The Kyoto Protocol included obligations for accounting for afforestation, deforestation and forest management, based on rules for the reporting of these land use categories. The Paris Agreement, however, is less strict in terms of specific targets for land use activities in general and forestry specifically. The NDCs put forward by countries may include the land use sector and thus forests and their management. But the categories included and the level of ambition can be determined by the countries themselves. Therefore, the impact on CBS depends very much on parties' strategies and the level of detail reflected in their NDC.

The NDC of the EU includes forestry through the LULUCF sector. This implies that wood harvest is fully accounted for as an emission. If forest increment is higher than harvest and natural mortality, the carbon stock in forests increases, reported as net sink. The EU NDC refers to the LULUCF Regulation (Regulation (EU) 2018/841) regarding the inclusion and accounting of land use sector related emissions and removals in the EU (see 4.2.1).

The UNFCCC and the Paris Agreement motivated many countries for national GHG reduction or carbon removal targets set for their land use sectors, including forests. In Germany, the government agreed in 2021 in its Federal Climate Protection Act on the national target of considerably reducing GHG emissions until 2030 and reaching GHG neutrality by 2045. GHG neutrality is planned to be achieved by compensating remaining emissions in 2045 through CO₂ removals by natural sinks. Therefore, the government has also set up net sink targets to be achieved by the LULUCF sector, aiming for in total -25 Mt CO₂ in 2030, -35 Mt CO₂ in 2040 and -40 Mt CO₂ in 2045. Also, other countries have set national removal targets for the land use sector, such as Finland and the Netherlands (see also Chapter 5, for an assessment of selected national policies).

The UNFCCC and Paris Agreement do not directly address biodiversity. Safeguards have been agreed that aim to protect biodiversity from negative impacts of mitigation measures. These are to be applied to activities under the REDD+ framework and thus of less relevance for EU countries. There are co-benefits for biodiversity associated with many mitigation measures. However, such synergies are not directly incentivized by the framework.

A 1.1.4 Outlook

The UNFCCC is currently undertaking the Global Stocktake. The Global Stocktake is a process for countries to see where they are collectively making progress towards meeting the goals of the Paris Agreement – and where they are not. The Stocktake takes place every five years, with the first-ever Stocktake scheduled to be concluded at the UN Climate Change Conference (COP28) at the end of 2023.

Those countries that refer to land use activities in their NDCs, mostly do not specify very clearly which individual activities they will include and whether the targets were defined on the basis of such activities (Herold and Böttcher 2018). Fyson and Jefferey (2019) found that the land sector is included in 121 NDCs, but only 11 provide a LULUCF target that can be fully quantified using information presented or referenced in the NDC. The ambiguity in LULUCF contributions currently still causes an uncertainty range in the anticipated LULUCF sink in 2030 of 2.9 GtCO₂eq/year. This is —larger in size than the estimated LULUCF sink of -2 GtCO₂eq/year. It is therefore very important that future updates of the NDCS become much more explicit regarding the inclusion of the land use sector in general and specific forestry-related activities in particular. A Global Stocktake will not result in meaningful outcomes without having increased transparency also about the contribution of forestry for national GHG mitigation efforts.

Recent research evaluated policy characteristics of countries' net-zero targets, and assigned credibility ratings that indicate that these targets are still far from being sufficient to achieve the required emission reductions (Rogelj et al. 2023).

A 1.2 United Nations Convention on Biological Diversity

A 1.2.1 General Description

The Convention on Biological Diversity (CBD) entered into force on 29 December 1993 (Convention on Biological Diversity 2023). It is generally regarded as a historical step towards the effective international protection of biodiversity, going beyond traditional conceptions of biodiversity-protection that were restricted to certain areas, single species and did not include the sustainable use of biodiversity (Simonis 1996). The Convention has two Protocols which pertain to biosafety (Cartagena Protocol) and to Access and Benefit-Sharing (Nagoya Protocol).

The three **main objectives** of the Convention are “the conservation of biological diversity”, the “sustainable use of its components” and the “fair and equitable sharing of the benefits” arising out of the utilization of genetic resources (Article 1, CBD⁷). Each contracting Party is asked to develop and adapt national strategies as well as sectoral and cross-sectoral measures that address those objectives and other components from the convention that seem relevant to it (Art.6). In reference to “conservation”, the Convention particularly values conservation of ecosystems and conservation of species and genetic resources *in situ* (OECD 1999).

“Sustainable use” is defined as the effort to utilize components of biological diversity without instigating a “long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations” (Article 2). Article 8 sets out several guidelines for in-situ conservation, whereby the parties shall define protected areas

⁷ References to articles in the following chapter refer to the text of the Convention on Biological Diversity.

where viable populations and species should be sustained within their natural habitats. In addition, areas neighbouring those under protection should be dealt with sustainably for a potential extension of protected areas (Article 8(a), (d), I).

Article 8(f) calls for the restoration of degraded ecosystems. In-situ conservation according to the Convention also involves the conscious management of risks stirring from living modified organisms made from biotechnology which could affect biological diversity negatively (Art. 8(g)). Article 9 states that ex-situ conservation shall be applied mainly in order to complement in-situ conservation. Local actions with a high probability for adverse effects on biological diversity according to the Convention have to come along with an environmental impact assessment and a counter-initiative to avoid or at least minimize these effects (Article 14).⁸

Decision V/5 develops the “ecosystem-approach” as an instrument to harmonize the three objectives of the Convention. It is defined as the “integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way”. Principle 4 of the ecosystem approach calls for economic incentives for biodiversity-friendly behaviour and suggests the reduction of unfavourable market distortions and the internalization of costs and benefits in the given ecosystem to the extent feasible.⁹

A 1.2.2 Provisions relevant for CBS forestry

Biodiversity: The core intention of the CBD is to achieve a positive impact on biodiversity. The Convention requires the conservation and sustainable use of biological diversity as explained above. The CBD’s “**Programme of work on forests and biodiversity**”, developed by the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) and adopted by the Conference of the Parties (COP) in 2002, particularly addresses the conservation of forest ecosystem services (COP Decision VI/22, paragraph 10, annex).¹⁰ The Work Programme contains three programme elements: conservation, sustainable use and benefit-sharing; institutional and socio-economic enabling environment; and knowledge, assessment and monitoring. It specifies guidelines with reference to forests. It also defines threats and impacts on forest biodiversity, requirements for effectively protected forest area networks and promotion of sustainable use of forest biological diversity (Convention on Biological Diversity 2007).

As a follow-up to the Strategic Plan for Biodiversity 2011-2020 (also called “Aichi Biodiversity Targets”), COP 15 finalized and adopted the Kunming-Montreal **Global Biodiversity Framework (GBF)** in late 2022. The GBF is supposed to act as a strategic plan for the implementation of the Convention and its protocols over the period 2022-2030. It contains 23 global targets for 2030 and four goals to be achieved by 2050, including the overriding goal of “living in harmony with nature” with two to three milestones per goal to be achieved by 2030. The following targets are particularly relevant for CBS forestry:

- **Spatial Planning:** According to Target 1, all areas should be under participatory, integrated and biodiversity inclusive spatial-planning and land- and sea use should be altered in such a way that the loss of areas of a high biodiversity importance will be close to zero by 2030; this includes, among others, primary forests;

⁸ Convention on Biological Diversity <https://www.cbd.int/doc/legal/cbd-en.pdf>

⁹ COP 5 Decision V/6 <https://www.cbd.int/decision/cop/?id=7148>

¹⁰ <https://www.cbd.int/decision/cop/?id=7196>

- **Restoration:** Target 2 calls for a 30 % share of degraded terrestrial, inland water, marine and coastal ecosystems (which include forests) being under effective restoration by 2030;
- **Conservation:** Target 3 requires that 30 % of different areas are conserved and managed in an effective way by 2030 as well as consistency of any sustainable use with conservation efforts;
- **Threatened species:** Target 4 calls to halt human induced extinction of known threatened species and for the recovery and conservation of species, as well as maintaining and restoring genetic diversity; this includes tree species and their genetic diversity;
- **Invasive alien species:** Target 6 calls to eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by at least 50 per cent by 2030;
- **Climate change:** Target 8 requires minimising the impact of climate change and ocean acidification on biodiversity and increasing the resilience of biodiversity through mitigation, adaptation, and disaster risk reduction actions
- **Sustainable management:** Target 10 envisions sustainable management of all areas, including those under forestry;
- **Nature's contributions to people:** Target 11 demands that nature's contributions to people are restored and enhanced, including the regulation of air and water, as well as the protection from natural hazards and disasters – all of which profit from intact forests.

The long-term goals for 2050 include a halt of human-induced extinction of threatened species, a tenfold reduction of the extinction rate and risk for all species and protection of traditional knowledge associated with genetic resources in order to contribute to conservation and sustainable use¹¹.

Climate: The Global Biodiversity Framework and its targets are considered to significantly contribute to climate protection by the conservation of biodiversity as 14 out of the 23 biodiversity targets were found to support climate-change deceleration (Helmholtz Centre for Environmental Research - UFZ 2022):

- **Nature's contributions to people (incl. climate regulation):** Target 11 demands that nature's contributions to people are restored and enhanced, including the regulation of climate;
- **Consumption:** Target 16 requires reducing, by 2030, the global footprint of consumption in an equitable manner; this could include the cascading and more efficient use of wood products;
- **Mobilisation of finance:** In the context of finance, Target 19I suggests optimising co-benefits and synergies of finance targeting the biodiversity and climate crises.

¹¹ Decision adopted by the conference of the parties to the convention on biological diversity- 15.4. Kunming-Montreal Global Biodiversity Framework, p. 2 pp, <https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf>

Table 6: Governance matrix CBD

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030 (Target 1, GBF)	x				
	Forest conservation	Spatial planning shall be used to prevent the loss of areas with a high biodiversity importance (e.g., primary forests) (Target 1, GBF)	x x				
		Identify by 2025, and eliminate, phase out or reform incentives harmful for biodiversity (Target 18, GBF)	x				
	Species conservation	Halt human induced extinction of threatened tree species, recover and conserve threatened tree species (Target 4, GBF)	x				
	Other (genetic diversity)	Maintain and restore the genetic diversity within and between populations of native, wild and domesticated species (Target 4, GBF)	x				
Manage	Forest harvesting	Sustainable management of areas under forestry (Target 10, GBF), “including through a substantial increase of the application of biodiversity friendly practices ... contributing to the resilience and long-term efficiency and productivity of these production systems”	x				
	Active management (other than harvesting)	Sustainable management of areas under forestry (Target 10, GBF)	x				
		Eliminate, minimize, reduce and or mitigate the impacts of invasive alien tree species on biodiversity and ecosystem services by at least 50 per cent by 2030 (Target 6, GBF)	x				
	Other						
Restore	Forest restoration (including peatlands)	30 % of degraded forests and peatlands (as well as other ecosystems) under effective restoration by 2030 (Target 2, GBF)	x				
	A-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	Reduce, by 2030, the global footprint of consumption in an equitable manner and waste generation (Target 16, GBF); this could include the cascading and more efficient use of wood products			x		
	Cascading (end-of-life)				x		
	Increased efficiency				x		
	Other						

A 1.2.3 Assessment (including stakeholder views)

The CBD's goals and main provisions are conducive to promoting climate- and biodiversity-smart forestry: The conservation and sustainable use of biodiversity, including forest biodiversity, protect nature and ecosystem services and, indirectly, strengthen nature-based mitigation of climate change and adaptation to climate change. While the CBD is an internationally legally binding treaty, its obligations need to be transposed into national law. Hence, the extent to which its provisions, its ecosystem approach and current strategic Global Biodiversity Framework (GBF) are being implemented and actually contribute to climate- and biodiversity-smart forestry depends on national implementation, capacities and priorities. On an international level, the CBD lacks mechanisms to deal with violations of its provisions.

Target 3 (Restoration) of the new GBF is considered a “paradigm-shift” with regard to the promotion, recognition and support of fair and effective conservation (IUCN 2023). However, it has also been criticized that the wording “effectively conserved and managed” in Target 3 is too vague (Dreyer 2022). Greenpeace stresses that it is now up to the contracting parties to specify these terms, and thus confront the involved national-level lobbies (Dreyer 2022).

Other aspects of the GBF that have been commended are its recognition of the contributions, roles, rights and responsibilities of Indigenous Peoples and local communities to the management of natural resources and the interrelations between Targets 1 (Spatial Planning), 2 (Restoration) and 4 (Species Conservation Action (IUCN 2023).

It has been criticized that the GBF does not principally exclude harmful activities such as logging in protected areas in its targets on conservation, restoration and sustainable use (Dreyer 2022).

A 1.2.4 Outlook

Decision XV/6¹² requests the parties to submit their National Biodiversity Strategies and Action Plans (NBSAPs) to review progress on the implementation of the GBF. The decision further determines that at COP-16 and each subsequent meeting of the CBD, a global analysis will be conducted on NBSAPs, revised or updated in alignment with the GBF, including national targets in a standardized format. At COP-17 and -19, a global review of the collective progress of the GBF shall take place. Other mechanisms recommended are voluntary peer reviews of NBSAP revision and implementation, an open-ended forum for voluntary country reviews and reporting on non-state actor commitments towards the GBF.

¹² Conference of the Parties to the Convention on Biological Diversity (2022). Decision adopted by the conference of the parties to the Convention on Biological Diversity- 15/6. Mechanisms for planning, monitoring, reporting and review. <https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-06-en.pdf>

A 1.3 International Tropical Timber Agreement and Organisation

A 1.3.1 General Description

The International Tropical Timber Agreement (ITTA) in its current (2006¹³) version entered into force in 2011. It defines the rules and procedures of the intergovernmental International Tropical Timber Organizations (ITTO). ITTO has two categories of members: producers and consumers of tropical timber.

The two main objectives of ITTA are “*to promote the expansion and diversification of international trade in tropical timber from sustainably managed and legally harvested forests and to promote the sustainable management of tropical timber producing forests*” (Art. 1, ITTA).

The organization aims to reach its objectives through (Art.1):

- capacities to improve forest law enforcement and governance and address illegal logging and trade,
- encouragement of members to develop national policies aimed at sustainable utilization and conservation of timber producing forests,
- amplified collection, processing and dissemination of statistics on trade in timber,
- improved marketing and distribution of tropical timber and timber product exports from sustainably managed and legally harvested sources,
- encouragement of member countries to support and develop tropical timber reforestation as well as rehabilitation and restoration of degraded forest land.

In addition to ITTA, direction is given to and by ITTO members through policy guidelines and norms that aim at encouraging sustainable forest management (SFM), trade and sustainable tropical timber industries as well as assisted adaption of those guidelines to local circumstances and assisted implementation via projects or other activities on the ground (ITTO 2023a).

In 1992, ITTO was the first international organization to agree on a concept of sustainable forest management (SFM) and develop criteria and indicators for SFM (ITTO 2016). ITTO defines SFM as “*the process of managing forests to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment*” (ITTO 2009). The SFM definition is specified by a set of Criteria & Indicators (C&I) (ITTO 2016), which have been adjusted over the years. Though countries can use these C&I for monitoring, assessment and reporting on a voluntary basis, ITTO is reported to have “made significant progress towards implementing the C&I in all of their member countries through a broad front of programs” (Linser et al. 2018, p. 8). Neither the C&I nor ITTO’s “[Voluntary Guidelines for the Sustainable Management of Natural Tropical Forests](#)” specifically prevent changes from natural to managed forests being called ‘sustainable’.

The current ITTO Strategic Action Plan (ITTO 2022) sets as strategic priorities: promoting good governance and policy frameworks to enhance financing and investment in sustainable tropical forest management, legal and sustainable forest product supply chains and related trade;

¹³ ITTA 2006 follows ITTA 1984 and 1994; cf.

https://www.itto.int/direct/topics/topics_pdf_download/topics_id=3363&no=1&disp=inline

increasing the contribution of the tropical forest sector to national and local economies and resilient livelihoods; improving resilience of forests vis-à-vis climate change, restoration and conservation of forest biodiversity; and improving information on tropical forest product markets, supply chains and international trade.

The general working mode of ITTO includes policy work and project activities within producer countries (Article 24), the latter funded via ITTO's "Bali Partnership Fund". Policy activities include the preparations of guidelines, manuals, studies, reports, basic communication and outreach tools (Art. 24 ITTA).

A 1.3.2 Provisions relevant for CBS forestry

The International Tropical Timber Agreement does not specifically mention climate change or biodiversity. It sets out the rules and procedures of ITTO but does not formulate policy-oriented requirements or directed actions to be taken by members. The agreement merely raises "general obligations of members" (Art. 29) which imply that members shall use their best endeavors and cooperate to promote the attainment of the agreements' objectives and avoid any adherent actions and compliance of members to the Councils decisions.

As we will show, ITTO policies – though voluntary – have relevance for CBS forestry. As their focus is on tropical timber, they are mainly relevant for tropical countries, with more indirect effects on forest management and wood use in other world regions (e.g., the EU). Basically, if ITTO policies on sustainable forest management are implemented diligently and lead to reduced harvesting in tropical countries, demand for tropical timber substitutes (including from EU sources) may increase, negatively affecting carbon sequestration and biodiversity there.

Biodiversity: ITTO takes a dual approach to biodiversity conservation: "*First, [ITTO] aims to reduce the loss of biodiversity associated with the extraction of forest products and services, particularly timber, through improved forest management. Second, it assists member countries to manage protected areas*" (ITTO 2023b).

In the early 1990s, the organization worked with IUCN to develop joint Guidelines for the Conservation of Biological Diversity in Tropical Forests which were published in 2009 (ITTO 2009). The ITTO/IUCN Guidelines highlight the importance of tropical forests as well as tropical timber production forests "under good management" for the conservation of the world's biological diversity as they can complement national parks and other reserves and therefore extend the area of near-natural habitats in the tropics. The Guidelines set out general approaches of biodiversity-friendly forest management and practical experiences to provide advice for the design of locally applicable guidelines. Approaches include, for example, landscape-level arrangements, adaptive management and monitoring of biodiversity outcomes, the compensation of forest managers for incremental costs of biodiversity conservation and the voluntary facilitation of certification for sustainable timber products.

According to ITTO, its SFM definition (see above) implies the conservation of biodiversity. The following of ITTO's Criteria & Indicators (ITTO 2016) are relevant with regard to biodiversity:

- Criterion 1: Enabling conditions for SFM
 - One of the indicators addresses existing incentives to encourage SFM
- Criterion 2: Extent and condition of forests
 - Indicators address, among others, the extent of forests committed to production and protection (Indicator 2.2); extent and percentage of total land area under different

forest types (Indicator 2.3); change in forested area (Indicator 2.6); forest condition (Indicator 2.7)

- Criterion 3: Forest ecosystem health and resilience
 - Indicators address, among others, degraded forests and landscapes restored (Indicator 3.4) and area of formerly degraded forest or forest land restored (Indicator 3.5)
- Criterion 4: Forest production
- Criterion 5: Forest biodiversity
 - Indicators address, among others, the forest extent in protected areas (Indicator 5.1), buffer zone management and connectivity of protected forest areas (Indicator 5.2), threatened forest-dependent species (Indicator 5.3), Procedures for conserving tree species diversity in natural tropical forests (Indicator 5.4), in situ conservation of genetic variation within specified forest tree species (Indicator 5.5), biodiversity conservation measures in natural production forests (Indicator 5.6) and in planted forests (Indicator 5.7)
- Criterion 6: Soil and water protection
- Criterion 7: Economic, social and cultural aspects

Climate: According to ITTO, the above-mentioned SFM definition implies, among others, the conservation of carbon stocks, forest soils and water as well as forest resilience, which contribute to climate change mitigation and adaptation capacities development.

With regard to mitigation and adaptation, ITTO's Criteria & Indicators (ITTO 2016) stipulate the following:

- Criterion 2: Extent and condition of forests
 - Indicators address, among others, forest carbon stock in all five carbon pools (Indicator 2.8)
- Criterion 3: Forest ecosystem health and resilience
 - Indicators address, among others, forest resilience and climate-change adaptation (Indicator 3.3)
- Criterion 4: Forest production
 - Indicators address, among others, forest carbon stock resulting from through the sustainable management of natural forests, forest conservation, enrichment of degraded forests and guided natural restoration, afforestation and reforestation in non-forested areas (Indicator 4.4)

In addition, climate-change mitigation and adaptation is one of the focus areas around which ITTO works. This includes, for example, policy work or projects on the carbon sequestration enhancing management of productive forests or the enhancement of forests resilience via restoration or wildfire risk minimization (ITTO 2023c).

Target 15 under the latest ITTO Strategic Action Plan directs that the ITTO should seek to establish a memorandum of understanding (MOU) with the UNFCCC to promote collaboration and synergies, including on forest restoration and the integration of SFM in climate-change mitigation and adaptation strategies.

Table 7: Governance matrix ITTO (and related guidelines)

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Criterion 2, Indicator 2.6 – change of forest area					x
	Forest conservation	Producing members are encouraged to develop policies aimed at sustainable utilization and conservation of timber producing forests Art.1 (m) ITTA			x		
		Criterion 2 & 5 and related indicators					x
		[ITTO’s SFM definition includes continuous functionality of tropical forests]					x
	Species conservation	Criterion 5, Indicator 5.3-5.5					x
		ITTO/IUCN Guidelines promote the conservation and sustainable use of native animal and plant species in tropical production forests and specify practices that can mitigate negative impacts on hosted species			x		
Other: Genetic variation	Criterion 5, Indicator 5.5					x	
Manage	Forest harvesting	ITTO/IUCN Guidelines promote sustainable harvesting practices (among others, Guideline 29-30, 34)			x		x
	Active management (other than harvesting)	ITTO/IUCN Guidelines promote sustainable management (e.g., Guidelines 32-33, 35)			x		
	Other						
Restore	Forest restoration (including peatlands)	Producing members are encouraged to support and develop tropical timber restoration of degraded forest land Art.1 (j) ITTA			x		
	A-/reforestation	Producing members are encouraged to support and develop tropical timber reforestation Art.1 (j) ITTA			x		
	Other						
Wood use	Shifts in wood uses (including by-products)	Voluntary guidelines on sustainable tropical forest management (Principle 6, 6.5: “provide opportunities for local communities to participate in SFM”, p.60) “Encourage diversified and value-added forest production through for example the use of lesser-known timber species and wood residues”(ITTO 2015)			x		
	Cascading (end-of-life)						
	Increased efficiency	Voluntary guidelines on sustainable tropical forest management:			x		

		Establish a system of incentives and penalties to encourage practises to reduce wood waste in forests					
	Other						

A 1.3.3 Assessment (including stakeholder views)

ITTO defines sustainable forest management and defines criteria and indicators for the sustainable management of *tropical forests*. While accepting sustainable forest management as one of its two overarching objectives, ITTO’s 2006 agreement has been assessed to be a “*trade agreement that breaks new ground in mainstreaming environmental and social concerns*” (Saint-Laurent 2006), ITTO still is a commodities agreement, not an environmental treaty.

Almost two decades after the adoption of ITTA 2006, forest loss and illegal forest clearing are continuing. The main direct causes are expansive commercial agriculture, extractive activities, infrastructure development and, increasingly, climate change (Seymour n.d.). An up-to-date “Status of Tropical Forest Management”-assessment has not been carried out after 2011. In 2021, an alliance of trade associations from producer and consumer countries claimed that global strategies aiming to halt the loss of tropical forests so far have had limited impact. Launching the “Tropical Timber Accord” with the initiative “Global Forests need Global Governance”, the trade associations suggest that ITTO is not effective enough to incentivize sustainable tropical forest management and product industries at greater scale. The Accord argues that the FLEGT policy framework can have limited market leverage as long as it is only recognized by the EU and UK. They call for stronger legal frameworks for the sustainable management of tropical forests and suggest a new governance approach for the global tropical forest sector.

ITTO’s relevance for CBS forestry in the EU is indirect: On the one hand, ITTO’s pioneer work on C&I for SFM has affected the forest discourses in Europe in the 1990s, notably through the ‘sustainable forest management’ discourse (Arts et al. 2010; cf. Edwards et al. 2022). On the other hand, sustainable management of tropical countries, if implemented effectively, could limit harvesting in tropical countries. When this dynamic is not accompanied by a simultaneous reduction of tropical timber demand, demand could shift to substitutes, which may include both non-timber substitutes or timber from European forests. At the same time, a dramatic increase in demand for wood products and wood energy is expected in the next decades, especially in Africa (Dieterle and Karsenty 2020).

A 1.3.4 Outlook

During the 57th session of the International Tropical Timber Council from 29 November to 3 December 2021, ITTO members decided to extend the ITTA for another five years. Within those five years, the assessment of the relevance and added value of the ITTA in the global context should be conducted to help decide whether to renegotiate or further the extend the agreement. In 2024, two years before the end of the latest extension, this decision will be made¹⁴.

As regards implementation of sustainable management of tropical forests, the new EU deforestation-free supply chain Regulation (see Chapter 3.1.3) provides an ambitious regulation

¹⁴Council Decision (EU) 2021/837 of May 2021 on the position to be taken by the European Union in the International Tropical Timber Council on the extension of the International Tropical Timber Agreement, 2006. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D0837>

on imports of forest products into the EU (Romano 2023a), which may complement the technical and financial assistance given by ITTO to its producing members. Furthermore, the recent proposal of the European Commission for a new Ecodesign Directive (see Chapter 3.6.2) may have an incentivising effect for sustainable forest management in producer countries. It may also reduce the overall need for logging in tropical forests due to product parameters such as reusability or upgradability as well as the pursued shift in processing from primary raw materials towards secondary raw materials.

A 2 EU policies

A 2.1 Forestry policy

A 2.1.1 EU Forest Strategy for 2030 (2021)

General Description

The New EU Forest Strategy for 2030 was adopted July 16, 2021. It aims to restore the condition of negatively affected forests, while unlocking forests' full potential in aiding the reduction of greenhouse gas emissions and increasing forest resilience towards climate changes and natural catastrophes. Also, the strategy aims to support the development of a climate-neutral economy by finding a sustainable balance between economic and environmental interests. The strategy provides an orientation for EU as well as Member State policies up to 2030. It contains several actions aimed at improving forest protection, sustainable forest management, forest data collection, and includes regulatory, financial, and voluntary measures. It is not binding on any actor. It follows the principle of subsidiarity and encourages collaboration between all interest groups from member states to farm/landowners and managers new EU forest strategy (European Commission 2021). The EU Forest Strategy forms part of the European Green Deal; it was presented together with the EU's "Fit for 55" package and is linked with other policies (e.g. RED and LULUCF).

Provisions relevant for CBS forestry

Climate: Regarding climate, the Forest Strategy for 2030 aims to contribute towards a 55% GHG emission reduction by 2030. The Commission is developing a legislative proposal on forest observation and data collection to create an EU-wide integrated forest monitoring framework (Section 4, p. 19). In revision of the Construction Products Regulation, the European Commission will develop a standardized methodology for quantifying the climate benefits of wood construction products and other building materials (Section 2.1, p. 6). A 2050 roadmap for reducing carbon emissions from buildings will work towards further introducing long-lived wood products in the construction industry through a material substitution effect. Wood-based bioenergy will also be encouraged as a renewable energy source, but it is dependent on practices that align with Climate Law and the Biodiversity strategy for 2030, and the overall availability of wood. The cascading principle (enshrined in the EU Forest Strategy 2014-2020) shall be used to help ensure that the amount of wood used stays within planetary boundaries. According to the cascading principle, wood should be used following a specific order that prioritizes the highest economic, and environmental value of wood: 1) wood-based products, 2) extending their service life, 3) re-use, 4) recycling, 5) bio-energy, 6) disposal (European Commission 2021, p. 2).

Forest restoration, monitoring, and health aims to increase carbon removal through natural sinks, while member states are encouraged (and will be provided guidelines to) create financial incentives for stakeholders taking ecological measures. To aid this process, the Commission plans developed a regulation framework for carbon removal (see Section 3.4, p. 19 below). To help achieve the strategy's goals, member states are specifically encouraged to develop financial incentives (in implementing the Common Agricultural Policy (CAP) Strategic Plans for 2023-2027) and provide these to forest owners who practice climate friendly forest management

through the development of ecosystem payment schemes, like in the Finnish METSO programme.

Biodiversity: To ensure the growth of existing forests, and to minimize biodiversity loss, the Forest Strategy for 2030 aims to develop better indicators and thresholds for sustainable forest management, along with a sustainable forest bioeconomy. The Commission suggests that all publicly managed forests, and an increased share of private forests should be under Forest Management Plans (FMP). FMPs should include forest-related risk assessment and management, as well better integrate biodiversity-related data (Section 4, p. 21). The EU also plans to protect remaining primary and old-growth forests. Further measures include the development of legislation for ecosystem restoration (cf. Chapter 0) and for an EU forest observation, reporting, and data collection (Section 4).

In the context of the EU's Biodiversity Strategy for 2030, the EU Forest Strategy for 2030 envisages a Roadmap for planting at least 3 billion additional trees by 2030, which shall establish criteria for tree planting, counting, and monitoring, along with "Guidelines for biodiversity-friendly afforestation, reforestation and tree planting"¹⁵ (Section 3.2, p. 15). Also, member states will be provided guidelines to financially incentivize afforestation and reforestation measures, and the sustainable production of wood and non-wood products.

Table 8: Governance matrix Forest Strategy for 2030

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (<i>'relevance' can be positive or negative</i>)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation	Guidelines on the definition, mapping monitoring and protection of primary and old-growth forests (Section 3.1, p. 11)			x		
		30% of EU land area to be put under effective management regime. 10% of land to be put under strict protection (In relation to Biodiversity Strategy for 2030)	x				
		Promote payment schemes for forest ecosystem services under CAP, LIFE and other funding instruments				x	
	Species conservation	Supplement the revision of the legislation on forest reproductive material with measures to promote the production of forest reproductive material suitable for future climatic conditions			x		
	Other	Develop a definition and adopt guidelines for closer-to-nature-forestry practises and a				x	x

¹⁵ Published in March 2023, cf. https://environment.ec.europa.eu/document/download/10b11f4e-974c-4d3b-80fd-1f5378548f5f_en

		voluntary “closer-to-nature” certification scheme					
Manage	Forest harvesting	Consider including sustainable activities related to harvesting, production and use of wood products in forthcoming delegated acts of Taxonomy Regulation				x	
	Active management (other than harvesting)	30% of EU land area to be put under effective management regime	x				
		Increased share of forest areas covered by forest management plans (FMPs)	x		x		
		Additional indicators and thresholds for sustainable forest management					
		Financial incentives for forest owners that adopt climate friendly forest management practices	x				
		Guidance and knowledge exchange on good practices on climate adaptation and resilience					
Other	Proposal for regulation on EU forest observation, reporting, and data collection Development of Strategic Plans for Forests based on EU-wide integrated forest monitoring framework (Section 4)	x		x			
Restore	Forest restoration (including peatlands)	Proposal for a legally binding instrument for ecosystem restoration (part of implementation of Biodiversity Strategy for 2030)	x		x		
	A-/reforestation	3 Billion Tree Planting Pledge for 2030	x				
		Develop guidelines on biodiversity friendly afforestation and reforestation			x (vol.)		
		Legislative proposal for carbon removal certification (Section 3.4)				x	
	Other						
Wood use	Shifts in wood uses (including by-products)	Contribution to European Climate Law target of reducing greenhouse gas emissions at least by 55% until 2030	x				
	Cascading (end-of-life)						
	Increased efficiency						
		Develop a 2050 roadmap for reducing whole life-cycle carbon emissions in buildings					x
		Establish standard methodology to quantify climate benefits of wood construction products and other building materials (Section 2.1)					x
		Investments in wood processing chain to support long-lived wood products.				X	
		Consider including sustainable activities related to production and use of wood products in forthcoming delegated acts of Taxonomy Regulation (p. 10)					x
	Other	Promote the sustainable production of non-wood-based forest products.					X
Proposal of measures to boost the non-wood forest economy such as ecotourism (p. 3)						x	

		Financial incentives for forest owners to produce specific wood and non-wood products.				X	
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Assessment (including stakeholder views)

Depending on its implementation, the EU Forest Strategy for 2030 can positively contribute to climate and biodiversity goals, among others by its 3 Billion Tree Planting Pledge for 2030. However, the Forest Strategy also received critique from various stakeholders. NGOs found fault with it because of its lack of binding indicators and thresholds for sustainable forest management.¹⁶ WWF, for instance, highlighted that while the previous draft contained mandatory criteria for assessing sustainable forest management, the final draft took this out of the legal proposal and made them voluntary measures.¹⁷ Analysts also saw the need for clearer definitions in the strategy¹⁸ and for recognising the realities or diversity of EU forests.¹⁹ Forest owners criticised the strategy for being too centralized and bureaucratic, while forest industry did not want jobs or economic developments to be disrupted by the strategy, noting that there was a lack of coherence between climate and growth strategies.²⁰ Then-agricultural ministers of Germany and Austria rejected the Commission's proposal of centralized, legally binding measures.²¹ Comments from MEPs varied, with some of them criticising the strategy for not doing enough to protect forests or for treating forests solely as carbon sinks, others claiming it neglected the forest industry.²² Analysts also criticised that the 3 Billion Treen Planting Pledge's indicator (number of trees planted) is not an outcome-based indicator; it does not translate into estimated carbon sequestration potential not does it account for tree mortality.

Outlook

Following publication of the new Forest Strategy, the EU Commission has published both the envisaged Guidelines on Biodiversity-Friendly Afforestation, Reforestation and Tree Planting as well as the Guidelines for Defining, Mapping, Monitoring and Strictly Protecting EU Primary and Old-Growth Forests. Other elements mentioned in the Forest Strategy have also been submitted in the meantime, such as legislative proposals for carbon removal certification (Chapter 0) and for nature restoration (Chapter 0). Other products, such as the EU-wide whole life carbon roadmap for buildings, have not been published yet.

¹⁶ <https://www.mdpi.com/1999-4907/13/9/1503>

¹⁷ <https://www.wwf.eu/?4040816/EU-Forest-Strategy-hampered-by-shortsighted-interests#:~:text=EU%20Forest%20Strategy%20hampered%20by%20shortsighted%20interests%20Post%20ed,%20ahead%20of%20many%20climate%2C%20biodiversity%20and%20social%20considerations>

¹⁸ <https://www.mdpi.com/1999-4907/13/9/1503>

¹⁹ <https://epthinktank.eu/2022/02/23/new-eu-forest-strategy-for-2030/>

²⁰ <https://epthinktank.eu/2022/02/23/new-eu-forest-strategy-for-2030/>

²¹ https://www.bmel.de/SharedDocs/Downloads/DE/Presse/pm140-erklaerung-koestinger-kloeckner.pdf?__blob=publicationFile&v=2; Further interesting sites: <https://epthinktank.eu/2022/02/23/new-eu-forest-strategy-for-2030/>

https://ec.europa.eu/commission/presscorner/detail/en/fs_21_3670

²² <https://eustafor.eu/meps-criticize-the-new-eu-forest-strategy>

A 2.1.2 Regulation on deforestation-free products (2022)

General description

The Regulation (EU) 2023/1115 on deforestation-free supply chains²³ (“EUDR”) was adopted in May 2023 and has entered into force end of June 2023. The regulation repeals the previous EU Timber Regulation (“EUTR”).

The main objective of the regulation is to curb deforestation and forest degradation that is provoked by EU consumption and production (Art. 1(a)). This entails minimising the consumption of products coming from supply chains associated with deforestation or forest degradation, while increasing EU demand and trade in legal and ‘deforestation-free’ commodities and products. The regulation also aims to reduce EU-driven greenhouse gas emissions and biodiversity loss (Art. 1(b)). The predicted yearly reduction of carbon emissions could equal 31.9 million metric tons.²⁴

At the core of the regulation is a mandatory due diligence procedure which is expanded vis-à-vis that of the EUTR: Relevant commodities and products shall not be placed or made available on the market or exported, unless (a) they are deforestation-free (see box below); (b) they have been produced in accordance with the relevant legislation of the country of production; and (c) they are covered by a due diligence statement (Art. 3). This obligation applies both to operators²⁵ and larger (‘non-SME’) traders²⁶ (Art. 4, 5). The relevant commodities are timber/wood, soy, palm oil, cocoa, coffee and cattle, and products made from these (e.g., leather, chocolate, charcoal, printed paper etc.). The due diligence statement has to be made available to Member State authorities (Art. 4.2) by depositing it in an information system to be set up by the Commission (Art. 33).

“Deforestation-free” means “(a) that the relevant products contain, have been fed with or have been made using, commodities that were produced on land that has not been subject to deforestation after December 31, 2020, and (b) in case of relevant products that contain or have been made using wood, that the wood has been harvested from the forest without inducing forest degradation after December 31, 2020” (Art. 2). Deforestation is defined as “conversion of forest to agricultural use, whether human-induced or not”, and forest degradation as “structural changes to forest cover, taking the form of the conversion of primary forests or naturally regenerating forests into plantation forests or into other wooded land and the conversion of primary forests into planted forests” (Art. 2).

Compliance with ‘relevant legislation’ in countries of production includes legislation on land use rights, environmental protection, sustainable forest management, third parties’ rights, labour and human rights, as well as tax, anti-corruption, trade and customs regulations (Art. 2.40). A FLEGT licence can be used to prove compliance with relevant legislation of the country of

²³ <https://eur-lex.europa.eu/legal-content/EL/TXT/PDF/?uri=CELEX:32023R1115>

²⁴ Legislative Financial Statement of the proposal for a regulation on deforestation-free supply chains, cf. COM(2021) 706 final, p. 60. Reduction of consumption and production of relevant commodities, and therefore the reduction of carbon emissions could potentially save € 3.2 billion per year.

²⁵ i.e., natural or legal persons who, in the course of a commercial activity, place relevant products on the Union market or exports them from the Union market, cf. Art 2 (12).

²⁶ i.e., persons in the supply chain other than the operator who, in the course of a commercial activity, makes relevant products available on the market, cf. Art. 2 (17).

production (Art. 3(b)), though it will not prove that products are deforestation-free. Information in due diligence statements need to include the geolocation of all plots of land where the relevant commodities (contained in products) were produced, as well as information on suppliers and customers (Art 9(g)-(f)).

Operators and traders need to establish and annually review internal procedures and measures to ensure that their products comply with Article 3 (Art. 12). They also need to collect data, assess the risk of a product's non-compliance with the EU deforestation-free regulation (Art. 10) and mitigate potential risks to negligible levels (Art. 11) prior to placing the product on the EU market. In their risk assessments, operators may take account of "complementary information [...] supplied by certification or other third-party-verified schemes" (Art. 10(2)(n)).

Simplified due diligence procedures are required for commodities or products produced in countries or regions classified as 'low risk' (Art. 13). For this purpose, the regulation establishes a three-tier system for the assessment of countries to be classified as 'high risk', 'low risk' and 'standard risk' (Art. 29). To assess the risk factor of every country, the Commission will take into account the rate of deforestation and forest degradation, rate of expansion of agriculture land for relevant commodities, production trends of relevant commodities and products, as well as information provided by the countries concerned, regional authorities, NGOs and third parties. A list of low-risk countries is to be published by the Commission no later than 30 December 2024.

Member States need to designate competent authorities responsible for enforcing the regulation (Art. 14). The authorities will carry out checks within their territory to establish whether operators and traders established in the Union comply with the regulation (Art. 18); for this, they shall establish annual plans containing national risk criteria and operators and traders to be checked.

Member States shall also lay down rules on penalties applicable to EUDR infringements by operators and traders (Art. 25). The provisions regarding penalties within the EUDR are stricter than those within the EUTR.²⁷

The deforestation-free supply chain regulation (EUDR) repeals the EU Timber Regulation (EUTR 995/2010). The two regulations along with the Forest Law Enforcement, Government and Trade Regulation (FLEGT) are closely related, but there are some major differences, too:²⁸

- Scope of products: The EUDR includes a wider scope of commodities and products. The EUTR and FLEGT primarily concern illegal timber logging, not logging / deforestation per se. The EUDR relates to timber, soy, cocoa, coffee, beef, palm oil and some derived products. Timber and timber products as defined in the EUTR are, in this regulation, the equivalent of wood and wood products listed in Annex I of the EUDR (Recital 80, Annex I).²⁹

²⁷ Fines shall be proportionate to the environmental damage and the value of the relevant commodities or products concerned (depriving those responsible of economic benefits resulting from infringements). In the case of a legal person, the maximum fine shall be at least 4% of the operator's or trader's total annual Union-wide turnover in the previous financial year. Additionally, relevant products and revenues gained from their transactions shall be confiscated, guilty operators/traders shall be temporarily excluded (maximum 12 months) from public procurement processes and access to public funding, and temporarily prohibited from placing relevant commodities and products on the Union market, or exporting them, in the event of a serious infringement or of repeated infringements. Also, they will be prohibited from using a simplified due diligence procedure (Art. 25 EUDR).

²⁸ <https://preferredbynature.org/newsroom/new-anti-deforestation-regulation-replace-eutr>

²⁹ <https://kpmg.com/be/en/home/insights/2023/02/sus-the-eu-anti-deforestation-regulation.html>

- **Scope of due diligence:** While under the EUTR, due diligence was limited to the legality of timber, due diligence under the EUDR includes compliance with ‘relevant legislation’ in the country of production including environmental protection, sustainable forest management, human rights etc.
- **Scope of addressees:** While under the EUTR, only operators were subjected to due diligence responsibilities, the EUDR also subjects larger traders down the supply chain to these.
- **Requirements on operators and traders:** Unlike under the EUTR, due diligence statements will need to be submitted (to be deposited in the EU’s information system). Operators and large traders will need to produce geolocation data so that commodities can be traced back to their origin. While under the EUTR, timber operators are required to carry out risk assessments on their own, the EU Commission will make risks assessments available for all commodity operators and traders covered by EUDR.

Provisions relevant for CBS forestry

Climate: The EU is a relevant consumer of products contributing to deforestation and forest degradation, which both exacerbate climate change and biodiversity loss. Deforestation alone accounts for 11% of GHG emissions.³⁰ By implementing a legally binding mechanism for deforestation-free supply chains, the EU plans to limit its consumption of products and commodities contributing deforestation and/or forest degradation, while increasing demand for legal and deforestation-free products and commodities. This is expected to contribute to the reduction of GHG emissions in countries of production as well as to the adaptability and resilience of their forests (Recital 3, 4 EUDR).

On an impact level, prohibiting timber and agricultural products that are linked to deforestation, degradation or non-compliance with producer country legislation from entering the EU market can affect land use in Europe. For example, palm oil could be replaced by olive oil or rapeseed oil or sunflower oil produced in Europe. Consuming less meat produced in deforestation prone areas may mean that this would have to be produced in Europe. Different scenarios are possible: Respective shifts in demand may potentially lead to an intensification of land use and an increase of timber harvesting in the EU; they could also promote agroforestry or reduce meat consumption (methane being a powerful GHG and given the EU’s net zero GHG targets).

Biodiversity: The commodities and products to which the regulation applies – see above: cattle, cocoa, coffee, oil palm, rubber, soya and wood – are commodities with the highest EU embodied deforestation and hence impact on forest biodiversity. Subjecting their import into the EU to supply chain responsibility (Art. 3) can incentivise the reduction of deforestation and forest conservation. Required compliance with national legislation can strengthen forest management and biodiversity conservation in producer countries. Finally, the EUDR provides for partnership and cooperation mechanisms with producers from third countries to focus on the conservation, restoration and sustainable use of forests, deforestation, forest degradation and the transition to sustainable production, consumption, and trade methods (Art. 30 (1)).

³⁰ https://environment.ec.europa.eu/system/files/2021-11/COM_2021_706_1_EN_ACT_part1_v6.pdf ,(2) p. 22

On the impact level, if supply of relevant commodities and products in third countries is reduced as a consequence of the EUDR, demand for timber from EU sources may increase, putting pressure on forests and forest biodiversity in the EU.

Table 9: Governance matrix Regulation on deforestation-free products

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Reduction in deforestation and forest degradation due to...					
		...the prohibition of products and commodities associated with deforestation/forest degradation from being placed on the EU market (Art. 3)		x			
		Fines of at least 4% of operators or trader’s annual turnover, confiscation of relevant commodities (Art. 25)				x	
		Benchmarking system (Art. 13) makes it easier for competent authorities to monitor and enforce compliance, which also incentivizes producing countries to reduce their deforestation impact.			X		
	Forest conservation	Requirement of Art. 3 that commodities/ products can only be imported in EU when they comply with national legislation, among other forest management and biodiversity conservation, where directly related to wood harvesting Cooperation with partner countries to focus on, i.a., conservation of forests (Art. 30)		x			
	Species conservation						
	Other						
Manage	Forest harvesting	Requirement of Art. 3 that commodities/ products can only be imported in EU when they comply with national legislation, among other forest management and biodiversity conservation, where directly related to wood harvesting		x			
	Active management (other than harvesting)	The Commission will offer new types of support and incentives promoting sustainable forest management, intensification and diversification, agro-ecology and agroforestry (Recital 29)				x	
		Producing countries shall be supported in the transition towards SFM (Recital 29)				x	
	Other						

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Restore	Forest restoration (including peatlands)	Cooperation with partner countries to focus on, i.a., restoration of forests (Art. 30) (Art. 30)			x		
	A-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)						
	Cascading (end-of-life)						
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

The due diligence system of this regulation was adapted and improved I the due diligence system of the pre-existing EU Timber Regulation (EUTR), after fitness checks of the EUTR and the Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan. Improvements include:³¹ Expansion of the scope of products covered (from timber/ timber products to other agricultural products related to deforestation); expansion of the scope of due diligence (from legality of timber to deforestation-free supply chains and compliance with national legislation); introduction of a due diligence statement; geographic information requirement which increases product traceability; increased cooperation with customs, minimum inspection levels; and the country benchmarking system. Also, the European Parliament was successful in expanding the definition of forest degradation to cover primary or naturally regenerating forests being converted into plantation forests or other wooded land, and primary forests being converted into planted forests.

There have also been critical voices. For instance, it has been criticised that operators need to comply with the production laws in the producing country, as this does not guarantee that relevant products and commodities are indeed deforestation-free. For example, in Brazil, laws protecting environmental and indigenous rights were dismantled by the previous government and have not yet been repealed.³² Another critique is that the EU failed to address other vulnerable ecosystems, such as wetlands, grasslands, and peatlands, or effective prosecution measures, including

³¹ <https://preferredbynature.org/newsroom/new-anti-deforestation-regulation-replace-eut/>; <https://www.europarl.europa.eu/news/en/press-room/20221205IPR60607/deal-on-new-law-to-ensure-products-causing-deforestation-are-not-sold-in-the-eu>; <https://www.germanwatch.org/en/eu-regulation-deforestation-free-products>; <https://www.europarl.europa.eu/news/en/press-room/20221205IPR60607/deal-on-new-law-to-ensure-products-causing-deforestation-are-not-sold-in-the-eu>

³² <https://www.germanwatch.org/en/eu-regulation-deforestation-free-products>; <https://www.mightyearth.org/2022/09/13/european-parliament-votes-for-new-deforestation-law/>

accessible ways to provide proof of violations. To address other vulnerable, carbon-rich ecosystems, the Commission shall present an impact assessment and, if necessary, a legislative proposal to expand the scope of this regulation and include other wooded land (Art. 34). Finally, the amount of fines (limited to a maximum of 4% of a company's annual profit) has been assessed to be a weak deterrent by some observers.³³

Outlook

The EUDR has entered into force, but companies will need to be compliant only by end of 2024. Further expansions of the regulation are still outstanding: By mid-2024 (respectively mid-2025), impact assessments will be conducted to examine whether to extend the scope of the Regulation to include other wooded land and, respectively, other natural ecosystems such as other land with high carbon stocks and with a high biodiversity value. Furthermore, by mid-2025, the Commission shall assess the need and feasibility of extending the scope to further commodities (Art. 34(1) and (2)).

³³ https://www.bosch-stiftung.de/sites/default/files/publications/pdf/2022-03/Assessing_policy_approaches_to_halt_deforestation_in_eu_supply_chains.pdf

A 2.2 Climate mitigation & adaptation policy

A 2.2.1 LULUCF Regulation (2022)

General Description

In 2021, the European Commission published in the Communication COM(2021) 554 final its proposal for a revision of the EU LULUCF Regulation EU (2018/841) as part of the “Fit for 55” package of legislation that makes all sectors of the EU’s economy fit to meet the target of reducing its net GHG emissions by at least 55% by 2030 under the European Climate Law. The proposal was accepted with certain amendments end of 2022 ((EU) 2023/839). The revised Regulation can be considered a gradually performed paradigm shift regarding the treatment of the LULUCF sector in the EU’s climate target architecture.

The first paradigm shift is related to the **rules for accounting of LULUCF**. Since the first recognition of land-use activities under the Kyoto Protocol climate policy regime, emissions and removals from the sector were treated differently from other sectors. This LULUCF accounting approach consisted of different reference values for different land use categories, including also caps to emissions and removals that could be accounted for (Böttcher et al. 2019). The revised Regulation overcomes any special treatment of LULUCF emissions and removals and, after 2025 and introduces an accounting system relying only on reported emissions and removals.

Second, as a consequence of paradigm shift one, the revised Regulation formulates **absolute EU and national binding targets** for the period 2026 to 2030. For the EU it is set to -310 Mt CO₂e and is based on projections of emissions and removals for LULUCF under policy scenarios. It is supposed to reflect cost efficiency of mitigation measures in the sector. The national targets are instead based on historic reported emissions and removals and therefore sensitive to accuracy of GHG reporting data, in particular in Member States whose existing monitoring approaches need to be significantly improved to ensure accurate annual tracking of progress.

The integration of LULUCF in the overall 2030 EU climate target and the EU Climate Law, significantly increases the **visibility of the sector** by making LULUCF a relevant component for achieving the GHG emission reduction target of -55%. This visibility comes also with an increased risk of non-compliance both for EU and individual Member States as some categories of inventory data on LULUCF show significant levels of uncertainty.

The revised LULUCF Regulation also aims at **enhancing quality of monitoring and reporting** of emissions and removals from LULUCF motivated by the much more prominent role of the sector in the EU’s integrated net emissions reduction target based on GHG inventories. Moreover, the Commission strives for more coherence with other EU policies that also rely on land monitoring – such as the Common Agricultural Policy, Habitat Directive, etc. This is to be achieved by Member States through the use of geographically explicit data layers with relevance to these policies and listed in Annex III of the proposed Regulation.

Provisions relevant for CBS forestry

Climate: The LULUCF Regulation establishes a framework for binding EU and national targets for emissions and removals from managed land areas covered by the LULUCF sector. This includes CO₂ emissions from living and dead biomass and soils, removals of CO₂ through biomass growth and emissions of non-CO₂ emissions, e.g. from biomass burning or wetlands.

The Regulation builds on national data on the land use categories forest land, cropland, grassland, wetlands, settlements, other land and harvested wood products annually reported by EU member states.

The Regulation has been revised in 2022 and includes rules for accounting of emissions and removals in two commitment periods, 2021-2025 and 2026-2030. For the first compliance period the rules require Member States to achieve a net balance of accounted emissions and removals on average over the period of five years. For the accounting of forest management emissions and removals reported data are compared to a forest reference level (FRL) that reflects a continued level of management intensity in the period of 2000 to 2009. Other land use categories are compared against historic reference levels. For the second commitment period post 2026 no such reference levels are applied. Instead, Member States need to meet an absolute net emissions or removal level. This level amounts to -310 Mt CO₂ for the whole EU and is broken down to individual MS by comparing historic net emissions or removals from the sector and the relative share of area. This target includes all LULUCF land-use categories of which forests is just one. However, forests form the most important category regarding its current size of and also future sink potential.

Biodiversity: Annex V to the revised LULUCF legislation (Regulation (EU) 2023/839) replaces part 3 of Annex V to the Governance Regulation (Regulation (EU) 2018/1999). This annex requires additional elements to be included in GHG estimates related to biodiversity, nature conservation, protection of natural habitats, rare species, areas of high carbon stocks or ecosystem restoration. From 2026 onwards, these areas need to be reported with a high level of accuracy and the use of detailed national information, including geographically explicit datasets.

Table 10: Governance matrix LULUCF Regulation

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Indirectly, reporting and accounting of emissions against target	x				
	Forest conservation						
	Species conservation						
	Other (carbon stock conservation)	National net LULUCF emissions and removal targets, including emissions from forest conversion	x				
Manage	Forest harvesting	Indirectly, reporting and accounting of emissions against target	x				
	Active management (other than harvesting)						
	Other (enhancement of carbon stocks & sinks)	National net LULUCF emissions and removal targets, including managed forests	x				
Restore	Forest restoration (including peatlands)	Indirectly, reporting and accounting of emissions against target	x				

	A-/reforestation	National net LULUCF emissions and removal targets, including land converted to forests	x				
	Other						
Wood use	Shifts in wood uses (including by-products)	Indirectly, reporting and accounting of emissions against target	x				
	Cascading (end-of-life)	Indirectly, reporting and accounting of emissions against target	x				
	Increased efficiency						
	Other (increasing carbon stock in HWP)	National net LULUCF emissions and removal targets, including for Harvested Wood Products	x				

Assessment (including stakeholder views)

Nabuurs et al. (2018) assessed impacts of the earlier LULUCF Regulation (2018/841) on the potential wood supply in the EU. They quantified the harvesting possibilities under the LULUCF regulation within the limits of the “no-debit” rule. The simulations showed that in the EU 26 harvest may increase from 420 million m³ in 2000–2009 to 493 million m³ in 2050, while still complying with the Regulation and within sustainability limits requiring harvest rates to stay below 90% of the increment. The FRL gives the projected future carbon sink in the compliance periods 2021–2025 under continuation of forest management practices as they were in the reference period 2000–2009.

The revision of the LULUCF Regulation changes the rules for accounting for the period after 2025. The accounting against FRLs will no longer apply. Instead, **absolute national targets** are set to be compared with the absolute reported net emissions and removals during the compliance period. For the first compliance period, it is thus likely that the Regulation will not prevent any additional harvesting. Due to differences between Member States concerning the state of their forest resources, the implementation of the Regulation using FRLs as a baseline for harvesting has different implications for different Member States (Nabuurs et al. 2018).

The situation is expected to be different for the period after 2025. Under all scenarios provided by Nabuurs et al. (2018), the **living forest biomass sink shows a decline**. This is in line with other authors that published earlier but also later projections of the EU forest sink (Hyyrynen et al. 2023; Böttcher et al. 2012; Korosuo et al. 2023). The EU target of -310 Mt CO₂ in 2030 is allocated to individual Member States based on the historic size of net LULUCF emissions and removals in the period 2017-2019 and the share of land area of the country. Overall, net sinks in the EU need to be increased from the historic level of -258 Mt CO₂ in the period 2017-2019 to the target of -310 Mt CO₂. The level of ambition for individual Member States, however, can be very different, based on the metric (e.g. Germany very ambitious, Finland less ambitious, see Böttcher et al. 2022). Moreover, the sensitivity of forest and LULUCF sinks to harvests, as measured by the magnitude of the effect, varies greatly across the Member States, which is mostly related to the intensity of forest utilization (Hyyrynen et al. 2022).

For countries with high harvesting sensitivities, increasing sinks by decreasing harvesting might be easy but also associated with relatively high costs. To promote higher carbon stocks in the forests (living biomass, deadwood, SOC, litter), especially for the period until 2030 and 2050, **incentives** for less intensive forest management and compensation for foregone revenues from wood sales may be needed (Welle et al. 2020). Increasing sinks further in countries with historically high sinks is even more challenging and requires different measures, such as

improving forest increment and reducing losses through natural disturbances (Pilli et al. 2022). Such incentive schemes are not provided by the LULUCF Regulation directly. The Carbon Farming Initiative and the proposal for an EU Regulation for a Framework for the Certification of Carbon Removals (EU CRCF) is expected to form a basis for such incentive instruments (see 0, Carbon Farming Initiative and Proposal for a Regulation on EU Certification for Carbon Removals).

It has to be noted that forest **adaptation** to climate change will have to be considered in future management regimes to ensure continuous rates of carbon sequestration and to protect forest carbon stocks (Verkerk et al. 2020; Verkerk, P.J., Delacote, P., Hurmekoski, E., Kunttu, J., Matthews, R., Mäkipää, R., Mosley, F., Perugini, L., Reyer, C. P. O., Roe, S., Trømborg, E. 2022) (Verkerk et al. 2020; 2022). These adaptation measures can have synergies with extensification measures. For example, promoting mixed forest stands with deciduous tree species to minimize the devastating effects of natural disturbances like storms or insect pests.

Adaptation and mitigation activities in forests in the EU might lead to significant shifts in **species composition** (over a period of decades, though). This has implications also for the pool of Harvested Wood Products. Wood products hold back emissions from wood harvest and can contribute to mitigation, especially when products are long-lasting and recycling rates are high. Wood from broad-leaved trees, for example, is to a large extent directly used for energy. Coniferous trees instead are mostly used for construction wood. Extensification of wood harvest can reduce domestic wood supply and thus lead to increased imports if wood demand is not addressed through other policies.

Outlook

In summary, the LULUCF Regulation will be of highest relevance for forestry in the EU. Compliance checks with the Regulation will be based on the annually reported emissions and removals for the LULUCF sector. These checks will be performed in 2027 for the first period 2021-2025 and in 2032 for the period 2026-2030. Progress towards the national targets depends on the measures implemented by Member States to reduce emissions (e.g. from organic soils) and increase sinks. But also the quality of the GHG inventories matters. GHG reporting of forests is in most EU countries based on National Forest Inventories. They usually have a high accuracy but are also rather infrequent (compiled every 5 to 10 years) leading to regular recalculations of historic emissions and removals. This makes steering of mitigation measures under the LULUCF Regulation a challenge as effects of potential management changes will show up only very late in the GHG inventories. This leaves Member States but also the EU with high uncertainties regarding potential compliance issues with the targets.

A 2.2.2 Carbon Farming and Proposal for a Regulation on EU Certification for Carbon Removals

General description

With the aim to create direct incentives for the adoption of climate-friendly practices in the land use sector in the EU, in December 2021 the Commission adopted the Communication on

Sustainable Carbon Cycles (COM(2021) 800)³⁴. The Communication sets out short- to medium-term actions aiming to address current challenges to carbon. These include:

- Promoting carbon farming practices under the Common Agricultural Policy (CAP) and other EU programmes such as LIFE and Horizon Europe;
- Driving forward the standardisation of monitoring, reporting and verification methodologies to provide a clear and reliable framework for carbon farming;
- Providing improved knowledge, data management and tailored advisory services to land managers.

Examples of effective carbon farming practices with relevance to forestry include:

- Afforestation and reforestation that respect ecological principles favourable to biodiversity and enhanced sustainable forest management, including biodiversity-friendly practices and adaptation of forests to climate change;
- Agroforestry and other forms of mixed farming combining woody vegetation (trees or shrubs) with crop and/or animal production systems on the same land;
- Restoration of peatlands and wetlands that reduces oxidation of the existing carbon stock and increases the potential for carbon sequestration.

With the Commission's proposal on a Carbon Removal Certification Framework (CRCF, COM(2022) 672)³⁵ of November 2022, the Commission proposes a voluntary EU **framework for carbon removal certification**, which includes criteria for the certification of removals, rules for the certification process and the recognition of certification schemes. With this proposal, the Commission intends to support the effective upscale of carbon removals, including through natural sinks.

The proposal defines carbon removal as “*either the storage of atmospheric or biogenic carbon within geological carbon pools, biogenic carbon pools, long-lasting products and materials, and the marine environment*”, or “*the reduction of carbon release from a biogenic carbon pool to the atmosphere*”.

Along the same lines, the proposal defines carbon removal activity as “*one or more practices or processes carried out by an operator resulting in permanent carbon storage, enhancing carbon capture in a biogenic carbon pool, reducing the release of carbon from a biogenic carbon pool to the atmosphere, or storing atmospheric or biogenic carbon in long-lasting products or materials*”. In the logic of the proposal, there are three types of carbon removal activities, i.e.

- permanent carbon storage, requiring that carbon is stored in geological reservoirs or similar permanent storage system;
- carbon farming, activities leading to carbon removal through land management to increase carbon storage in living biomass, dead organic matter and soils; and
- carbon storage in products, storing atmospheric and biogenic carbon in long-lasting products or materials.

According to Article 7.1, carbon removal activities must have a neutral impact on or generate co-benefits for various sustainability objectives. Article 7.2 lists these objectives, including

³⁴ https://climate.ec.europa.eu/system/files/2021-12/com_2021_800_en_0.pdf

³⁵ https://climate.ec.europa.eu/system/files/2022-11/Proposal_for_a_Regulation_establishing_a_Union_certification_framework_for_carbon_removals.pdf

climate change mitigation and adaptation, circular economy, pollution prevention and control, protection and restoration of biodiversity and ecosystems and sustainable use and protection of water and marine resources.

Sustainability criteria for forestry activities could draw on the EU Taxonomy's sustainability criteria and on the Renewable Energy Directive's sustainability criteria for forest and agriculture biomass raw material. The proposal states that activities that harm biodiversity should not be certified, highlighting forest monocultures as an example.

The proposal aims at robust and transparent certification of the net carbon removal benefit but also at avoiding disproportionate administrative burden for operators or group of operators, in particular for small farmers and forest holders. To achieve this, the proposal foresees delegated acts to be established with detailed certification methodologies for the different carbon removal activities.

Provisions relevant for CBS forestry

The proposed Regulation affects economic operators such as farmers, foresters but also industrial companies that will develop carbon removal activities on the ground; private organisations and Member States authorities, who may develop private or public certification schemes to implement and control the certification process. Thus, there is no direct impact on forestry activities in EU Member States. However, forest owners are potential participants in voluntary carbon markets that are regulated by the policy.

Climate: McDonald et al. (2023) evaluate the minimum certification criteria provided with the proposal for the regulation. They form the so-called Q.U.A.L.I.T.Y criteria. According to these minimum criteria carbon removal projects under EU certification have to:

- be quantifiable and quantified,
- additional to existing climate benefits,
- strive for Long-term storage, and
- contribute to sustainability.

These criteria apply to climate-friendly land management activities, including forestry activities. In that respect, the proposed Regulation has relevance for forestry activities in the EU regarding the following aspects:

Type of activities covered by the Regulation: Forestry activities addressing biomass stocks in forests would be considered carbon farming activities. Activities aiming to increase carbon stocks in Harvested Wood Products would be covered by carbon products.

Definition of permanence: Compared to the geological storage of carbon, carbon in forest biomass and soil and wood products has relatively low permanence. In a market where such activities are competing for the issuance of credits, more permanent activities are clearly favoured. Forestry activities might, however, provide credits at rather low costs as currently storage of carbon in geological reservoirs is still in a piloting phase.

Biodiversity: The proposal requires carbon removals to be correctly quantified, to deliver additional climate benefits, strive to store carbon for a long time, prevent carbon leaks, and contribute to **sustainability**. The proposal also sets out requirements for third party verification and certification of carbon removals, in order to harmonise the certification process, ensure environmental integrity and build public trust. The EU Carbon Removal Certification Framework aims at preventing negative impacts on biodiversity and ecosystems, especially concerning

resource or energy-intensive industrial solutions. Here, forestry activities might have a comparative advantage. Recital 17 proposes that in order to promote activities that generate co-benefits for biodiversity, the Commission should prioritise methodology development for carbon farming activities that generate significant biodiversity benefits.

Table 11: Governance matrix proposal for Carbon Removal Certification Framework

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	The proposal sets out minimum sustainability criteria and requirements for third party verification and certification of carbon removals. This includes sustainability criteria aiming to protect forests from conversion. However, details have not been decided.			X		
	Forest conservation	The proposal sets out minimum sustainability criteria and requirements for third party verification and certification of carbon removals. This includes sustainability criteria aiming to protect forests from conversion. However, details have not been decided.			X		
	Species conservation						
	Other						
Manage	Forest harvesting	The proposal sets out minimum sustainability criteria and requirements for third party verification and certification of carbon removals. This includes sustainability criteria aiming to promote forestry activities that do not harm the environment.			X		
	Active management (other than harvesting)						
	Other						
Restore	Forest restoration (including peatlands)						
	A-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	The proposal sets out minimum sustainability criteria and requirements for third party verification and certification of carbon removals. This includes criteria ensuring permanence of carbon removals, including through harvested wood products.			X		
	Cascading (end-of-life)	The proposal sets out minimum sustainability criteria and requirements for third party verification and certification of carbon removals. This includes criteria ensuring permanence of carbon removals, including through harvested wood products.			X		

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS <i>(‘relevance’ can be positive or negative)</i>	Governance mechanism					
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other	
	Increased efficiency							
	Other							

Assessment (including stakeholder views)

As stated above, there is an indirect impact of the proposed regulation on forestry activities in the EU. This is through participation of farmers and forest owners in future voluntary carbon markets. In fact, such schemes can form an important basis for alternative income sources for forest owners in the EU. Forest owners will have to comply with the sustainability rules of the Regulation. The proposal stipulates that carbon removal activities shall have a neutral impact or generate positive co-benefits for all sustainability objectives, including climate change mitigation, adaptation, water/marine resources, pollution, circular economy, biodiversity. To comply with this requirement, the proposal specifies that all carbon removal activities must comply with minimum sustainability requirements that will be defined in the delegated acts’ certification methodologies. Sustainability criteria for forestry activities could draw on the EU Taxonomy’s sustainability criteria and the Renewable Energy Directive’s sustainability criteria for forest and agriculture biomass raw material. It also states clearly that activities that harm biodiversity should not be certified, e.g. forest monocultures.

The proposal faces a number of shortcomings that need to be addressed according to McDonald et al. (2023): it needs to better address that removal activities through nature-based solutions could be short-lived and their climate impact reversed very quickly. This also applies to many forestry activities. It is unclear whether risks for reversals could be differentiated by type of activity. This would have implications also for forestry activities. Another issue refers to liability. It is not yet clear which actor will ultimately be responsible for the carbon stored. When forest biomass is harvested and transferred into products, this would imply also a transition of liability for the stored carbon in the product.

It is important that the detailed rules for the CRCF reflect the situation of forest owners, who often do not know who buys the wood and for what the wood is used. Rules under the CRCF need to provide a transparent system involving forest owners, forestry industry and consumers, to ensure that forestry is contributing to long-term carbon removals and thus effective climate change mitigation.

Outlook

The Commission’s proposal for the CRCF needs to be adopted by the European Parliament and the Council in the EU legislative procedure. In April 2023, the Committee on Environment, Public Health and Food Safety of the European Parliament published their first response requiring an improved monitoring, liability and transparency mechanisms and a focus on long-term carbon removal. The proposal forms a first attempt for an overall framework to address the demand for carbon removals.

A 2.2.3 EU Adaptation Strategy (2021)

General description

On 24 February 2021 the European Commission adopted the new EU Strategy on Adaption to Climate Change (COM(2021) 82), which replaces the 2013 EU Adaptation Strategy. The new Strategy describes a long-term pathway towards a fully climate-resilient and adapted European society by 2050.

The strategy is based on three EU-internal priorities:

- **“Smarter adaptation”** (Section 2.1 of the Strategy): The Commission intends to improve knowledge on climate impacts and resilience, including adaptation modelling, and to update and expand the European platform for adaption knowledge “Climate-ADAPT” through a climate and health observatory.
- **“More systemic adaptation”** (Section 2.2): The Commission plans to upgrade adaptation monitoring, reporting and evaluation, and to update its Better Regulation guidelines and toolbox to better integrate climate-risk management. They also want to step up their support to planning and implementation of local adaptation and support the reskilling and requalification of workers. They intend to dampen the fiscal impact of climate-related events and reduce fiscal-sustainability risks. Finally, the Commission aims to foster the development of financial approaches and products nature-based solutions for carbon removals as well as for adaptation.
- **“Faster adaptation”** (Section 2.3): To accelerate the rollout of adaptation solutions, the Commission will implement the Horizon Europe Mission on ‘Adaptation to Climate Change’. They will integrate adaptation in various new and existing policies, including the EU Taxonomy, Natura 2000, climate change guidance, guidelines on biodiversity-friendly afforestation and reforestation, legislation on the production and marketing of seeds, EU disaster risk prevention and management, the criteria for the construction and renovation of buildings and critical infrastructure as well as standards by standardisation organisations. In the context of the Renewed Sustainable Finance Strategy, the Commission plans to promote natural disaster insurance penetration in Member States and to explore the wider use of financial instruments and innovative solutions to deal with climate-induced risks. The availability and sustainability of freshwater is to be ensured by various measures, among others by raising the water-saving requirements for products, encouraging water efficiency and savings, and by promoting the wider use of drought management plans as well as sustainable soil management and land-use.

The Strategy states that adaptation action will be implemented in an integrated manner with other European Green Deal initiatives such as the Biodiversity Strategy, Renovation Wave, Farm to Fork Strategy, the Circular Economy and Zero Pollution Action Plans, Forest Strategy, Soil Strategy, Smart and Sustainable Mobility Strategy, and Renewed Sustainable Finance Strategy.

Looking beyond the EU, the Adaptation Strategy aims at stepping up international action for climate resilience, notably in least developed countries and island states.

Provisions relevant for CBS forestry

Climate: The Strategy aims at reducing vulnerability to climate change by 2050. All enlisted measures aim at contributing to climate change adaptation. In addition, the announcement that

the Commission will promote nature-based solutions for carbon-removals can contribute to climate change mitigation (see also Chapter 0).

Biodiversity: The EU Adaptation Strategy emphasizes the relevance of nature-based solutions for the purpose of jointly reaching climate, biodiversity and sustainable development goals. Examples mentioned in the Strategy include wetland protection and restoration, soil protection, as well as the sustainable management of forests and farmland (Section 2.2.4). To better adapt forests to climate change, the Commission suggests making better use of genetic diversity and non-harmful plant genetic resources and announces that it will amend the Directive on the marketing of forest reproductive material and the Marketing Directives on seed and other propagating material (Section 2.3.1). While developing an EU-wide climate risk assessment, the Commission will pay special attention to ecosystem vulnerabilities (p.14) which may increase Member States' understanding of the different climate risks originating from the degradation of ecosystems, including the loss of biodiversity.

Table 12: Governance matrix EU Adaption Strategy

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation						
	Species conservation						
	Other (genetic diversity)				x		
Manage	Forest harvesting						
	Active management (other than harvesting)	Foster the development of financial approaches and products that also cover nature-based adaptation				x	
		Integrate climate adaptation in Natura 2000			x		
		Integrate climate adaptation in guidelines on biodiversity-friendly afforestation and reforestation			x		
	Other (genetic adaptation)	Integrate climate adaptation legislation on the production and marketing of seeds			x		
Restore	Forest restoration (including peatlands)						
	A-/reforestation	Integrate adaptation into guidelines on A/R			x		
	Other						
Wood use	Shifts in wood uses (including by-products)						
	Cascading (end-of-life)						
	Increased efficiency						

Assessment (including stakeholder views)

From the perspective of CBS forestry, the EU Adaptation Strategy's focus on nature-based solutions, nature restoration, water management and biodiversity are positive.

One of the main drawbacks of the Strategy is that it does not contain “concrete, measurable and time-bound targets for the EU and Member States to become climate resilient” (European Environmental Bureau 2021).³⁶ As a consequence, no in-depth monitoring and review process is envisaged (European Environmental Bureau 2021). Moreover, the Strategy does not announce more hard-wired obligations for Member States. As the Climate Action Network stresses, the EU's preparedness against hazardous climate change events would at least require mandatory adaptation plans, climate assessments and climate stress tests at local, regional and national levels.³⁷

Another concern raised regards the effects of climate change on work and social disparities in general. Even though the strategy does introduce the concept of “just resilience” concrete policies to protect workers, low-income households and prevent water and energy poverty across Europe are missing in the document (Taylor 2021).

Outlook

The state of implementation of the EU Adaptation Strategy is not very clear from the EU Commission's website.³⁸ Little information is provided on what measures mentioned in the Strategy have been implemented and which are still outstanding.

In May 2022, the EU Commission's Directorate-General for Climate Action and the European Environment Agency started preparations of the first European Climate Risk Assessment (EUCRA) as a response to Section 2.3.3 of the Strategy. Among others, the assessment will address ecosystem vulnerabilities. Publication of the first EUCRA is scheduled for spring 2024 (Climate ADAPT n.d.).

³⁶ The Strategy thus falls short both of the Commission's previous announcement to go beyond the 2013 Strategy and the Europeans Parliament's call to introduce binding and quantifiable targets.

³⁷ <https://caneurope.org/letter-eu-environment-ministers-adaptation-strategy-ahead-council-meeting/>

³⁸ https://climate.ec.europa.eu/eu-action/adaptation-climate-change_en

A 2.3 Nature conservation and biodiversity policy

A 2.3.1 EU Biodiversity Strategy for 2030 (2021)

General description

The EU Biodiversity Strategy for 2030 – “Bringing nature back into our lives” (COM(2020) 380) – sets out specific biodiversity goals to be met by 2030 in a variety of different ecosystems, to put Europe’s biodiversity on a good path to recovery by 2030 (Section 2.2.1 of the Strategy). The Strategy addresses the five main contributors to biodiversity loss: changes in land and sea use, overexploitation, climate change, pollution, and invasive alien species (Section 1). The targets apply to the Union as a whole, but can be differentiated by bio-geographical region, where “every Member State will have to do its fair share of the effort based on objective ecological criteria” (Section 2.1).

To develop a **coherent network of protected areas** (Section 2.1), the Commission suggests to (by 2030):

- legally protect a minimum of 30% of the EU’s land area and 30% of the EU’s sea area and integrate ecological corridors, as part of a true Trans-European Nature Network.
- strictly protect at least a third of the EU’s protected areas, including all remaining EU primary and old-growth forests.
- effectively manage all protected areas, defining clear conservation objectives and measures, and monitoring them appropriately.

Member States will have until end of 2023 to show ‘significant progress’ in legally designating new protected areas and integrating ecological corridors.

As part of the Strategy, the Commission also proposes an **EU Nature Restoration Plan** (Section 2.2, see also Chapter A 2.3.2 in this report). The Plan is a reaction to the situation that, to date, EU Member States are not required to take biodiversity restoration measures, and there is a lack of agreed definitions or criteria regarding restoration and the sustainable use of ecosystems as well as legally binding targets and timelines. The Commission fixes the following key commitments (by 2030):

- legally binding EU nature restoration targets (proposed by the Commission in June 2022). By 2030, significant areas of degraded and carbon-rich ecosystems are restored; habitats and species show no deterioration in conservation trends and status; and at least 30% reach favourable conservation status or at least show a positive trend.
- at least 10% of agricultural area is under high-diversity landscape features.
- at least three additional billion new trees are planted in the EU, in full respect of ecological principles.
- a 50% reduction in the number of Red List species threatened by invasive alien species.

A range of further measures less relevant to CBS forestry relate to organic farming, the use of chemical pesticides, nutrient losses, pollinators, urban planning, contaminated soils, rivers and marine/ aquatic biodiversity. As part of the Nature Restoration Plan, the Commission has developed a draft Nature Restoration Law (cf. Chapter A 2.3.2).

In addition, the Commission will introduce a new **European biodiversity governance framework** (Section 3.1) to fill the current absence of a comprehensive governance framework to direct the implementation of agreed-upon biodiversity commitments. The new framework

should include a set of agreed, clearly defined indicators, and a monitoring and review mechanism to facilitate the assessment of goals, and, when necessary, corrective measures (Section 3.1).

Within the EU, the Commission also plans to step up the **implementation and enforcement** of EU environmental legislation (Section 3.2), notably by completing the Natura 2000 network, the effective management of sites, species-protection provisions, and species and habitats that show declining trends. The Commission also strives to improve compliance assurance.

Related to **business and society** (Section 3.3), the Strategy announces a delegated act under the Taxonomy Regulation to establish a common classification of economic activities that substantially contribute to protecting and restoring biodiversity and ecosystems; a Renewed Sustainable Finance Strategy better reflecting biodiversity issues; and a new initiative on supply chain responsibility with environmental duty of care and mandatory due diligence. The Commission also announces that, to improve access to justice in national courts in environmental matters for individuals and NGOs, it will revise the Aarhus Regulation.

Beyond EU borders, the Strategy defines EU initiatives for a **global biodiversity agenda**.

Provisions relevant for CBS forestry

Climate: A central goal of the strategy is increasing the quantity, quality and resilience of forests to maximize their potential for biodiversity, climate, and water regulation etc. Protecting 30% of the EU’s land area and ensuring an effective biodiversity management on this land; enlarging the Natura 2000 network with strict protection for areas of very high biodiversity and climate value; strict protection of primary and old-growth forests; planting 3 billion trees; and restoring significant areas of degraded and carbon-rich ecosystems will contribute both to climate mitigation and adaptation.

In parallel with the EU Forest Strategy for 2030, the EU will develop guidelines on biodiversity-friendly afforestation and reforestation and closer-to-nature-forestry practices. This shall support the Member States in creating management plans for all public forests and increase the number of management plans for privately owned forests. In parallel with the Renewable Energy Directive, the Commission will develop new sustainability criteria on forest biomass for energy, and, by 2030 gradually phase out bio-fuel production with high indirect land-use change risk, and the use of whole trees, food, and feed crops for energy production (Section 2.2.5).

Biodiversity: The above mentioned measures (as well as further ones) all contribute to protecting and restoring (forest) ecosystems.

Table 13: Governance matrix EU Biodiversity Strategy

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism					
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other	
Protect	Avoiding deforestation							

	Forest conservation	Habitats show no deterioration in conservation trends and status, at least 30% should reach a “favorable” conservation status or at least show a positive trend.	x				
		Protected areas, including the Natura 2000 network shall be enlarged.	x				
		Legally protect a minimum of 30% of the EU’s land area and integrate ecological corridors.	x				
		Strictly protect at least a third of the EU’s protected areas, including all remaining EU primary and old-growth forests.	x				
		At least 10% of agricultural area is under high-diversity landscape features	x				
	Species conservation	Species show no deterioration in conservation trends and status, at least 30% should reach a “favorable” conservation status or at least show a positive trend.	x				
	Other						
Manage	Forest harvesting						
	Active management (other than harvesting)	Increase the uptake of agro-forestry in CAP Strategic Plans				x	
		Incentivise nature-based-solutions				x	
		Guidelines on closer-to-nature-forestry practices			x		
	Other						
Restore	Forest restoration (including peatlands)						
	A-/reforestation	3 billion new trees to be planted in the EU					x
		Guidelines on biodiversity-friendly afforestation and reforestation			x		
	Other						
Wood use	Shifts in wood uses (including by-products)	Renewable Energy Directive with new sustainability criteria (& operational guidance) on forest biomass for energy ³⁹			x		
	Cascading (end-of-life)	Gradual phase out bio-fuel production with use of whole trees		x			
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

The EU Biodiversity Strategy 2030 contains over 100 specific actions and commitments ranging across several policy area, in order to protect and restore biodiversity in Europe and improve biodiversity governance. It highlights that biodiversity helps mitigating climate change. It has been criticised, however, that many commitments lack clear definitions, concrete information on

³⁹ <https://europa.eu/capacity4dev/file/26882/download?token=ifXopB8u>,
https://publications.jrc.ec.europa.eu/repository/bitstream/JRC122719/jrc-forest-bioenergy-study-2021-final_online.pdf

how they can be achieved and what is needed from the Member States.⁴⁰ Also, the Strategy does not address the drivers of unsustainable production and consumption.⁴¹

Regarding forests specifically, the WWF believes that the strategy should emphasize that forest protection and restoration are more effective than reforestation and afforestation in terms of the climate and biodiversity.⁴² Also, there should be concrete targets on the amount of forests subjected to sustainable forestry practices.⁴³

As regards implementation, the EU Biodiversity Action Tracker indicates that crucial steps, for instance with regards to procedural guidance for member states or revisions of initiatives have already been in completed or are still in progress while only ten of the planned actions are delayed.⁴⁴

On the material level, a possible effect of the Strategy's implementation is a decrease in timber production within the EU. If the demand for timber in the EU remains similar, there would be an increase in timber production around the world to meet demand in the EU, which could exacerbate climate change and biodiversity loss in other regions around the world.⁴⁵

Outlook

Annex I of the EU Biodiversity Strategy defines the specific measures that the Commission is to implement in the years following the Strategy's adoption. Follow-up activities include the EU Nature Restoration Law and the Soil Health Law (see respective policy analyses).

A 2.3.2 EU Nature Restoration Law (planned, 2023)

General description

As announced in the EU Biodiversity Strategy for 2030, the European Commission introduced a proposal for a Nature Restoration Regulation (COM(2022) 304)⁴⁶ in June 2022 (abbreviated "NRL", for "Nature Restoration Law"). It is the first overarching piece of EU biodiversity legislation since the Habitats Directive in 1992. The Commission's draft regulation aimed to set multiple binding targets and obligations across a wide range of ecosystems, complementing existing legal instruments. However, adjustments made by the European Parliament on 12 July 2023⁴⁷, following pressure by the European Peoples Party, have limited the scope of various

⁴⁰ https://wwfeu.awsassets.panda.org/downloads/assessment_of_the_2030_eu_biodiversity_strategy_wwf_eu.pdf

⁴¹ https://wwfeu.awsassets.panda.org/downloads/assessment_of_the_2030_eu_biodiversity_strategy_wwf_eu.pdf

⁴² https://wwfeu.awsassets.panda.org/downloads/assessment_of_the_2030_eu_biodiversity_strategy_wwf_eu.pdf

⁴³ https://wwfeu.awsassets.panda.org/downloads/assessment_of_the_2030_eu_biodiversity_strategy_wwf_eu.pdf

⁴⁴ <https://dopa.jrc.ec.europa.eu/kcbd/actions-tracker/#summary>

⁴⁵ <https://www.thuenen.de/en/newsroom/press-releases/current-press-releases/detailansicht/bei-umsetzung-der-eu-biodiversitaetsstrategie-wird-sich-die-holzproduktion-verlagern>

⁴⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0304>

⁴⁷ https://www.europarl.europa.eu/doceo/document/TA-9-2023-0277_EN.html#title2

obligations to Natura 2000 sites and have diminished the clout of the obligations. The draft regulation is still open to changes and will only be adopted when the Trilogue process between Parliament, Commission and the Environmental Council has concluded. Provisions presented in this chapter include the amendments by the European Parliament.

Overall, restoration measures should cover at least 20% of the EU's land and sea areas by 2030 and all ecosystems in need by 2050 (Art. 1(2)). By "restoration" the proposal means "*the process of actively or passively assisting the recovery of an ecosystem in order to improve its structure and functions with the aim of conserving or enhancing biodiversity and ecosystem resilience; the restoration of ecosystems (...) is done through improving to good condition of a habitat type, its re-establishing to favourable reference area and improving to sufficient quality and quantity of a habitat of a species and fulfilling targets and obligations under Articles 6 to 10*" (Art. 2(3)).

The NRL specifies restoration among different ecosystems including terrestrial, coastal and freshwater ecosystems, marine ecosystems, urban ecosystems, natural connectivity of rivers and natural functions of the related floodplains, agricultural ecosystems, forest ecosystems and pollinator populations. Related targets are either area-based (among others, Natura 2000 sites, almost half of whose area are forests⁴⁸), or indicator-based (among others, forest ecosystems); in the latter case, Member States have more flexibility regarding measures and outcomes.

Member States "*shall aim to put in place the restoration measures in Natura 2000 sites that are necessary to move towards reaching favourable conservation status of habitat types listed*" in the regulation's Annex I (Art. 4(1)). In addition, Member States "*shall put in place restoration measures necessary to re-establish the habitat types listed in Annex I in areas not covered by those habitat types with the aim to reach their favourable reference area*" (Art. 4(2)).

Member States shall put in place the restoration measures necessary to enhance the biodiversity of forest ecosystems (Art. 10). They shall achieve an increasing trend at national level of the common forest bird index and in three of the following five indicators: share of forests with uneven-aged structure; forest connectivity; stock of organic carbon; share of forests dominated by native tree species; or tree species diversity. Indicators relating to deadwood have been removed in the EP's position.

In urban ecosystems, Member States are required to achieve "*an increasing trend of urban tree canopy cover*" (Art. 6.3).

To reach the targets at national level, Member States will need to develop nature restoration plans (Art. 11-12). The plans shall cover the period up to 2050, with intermediate deadlines, and be submitted (Art. 13) and assessed (Art. 14) by the Commission. Monitoring (Art. 17) and reporting obligations (Art. 18) complement these provisions.

The EP's amendments led to a significant weakening of the draft regulation's ambition level. Most notably, implementation of the regulation has been delayed until the Commission has provided robust and scientific data to the EP and Council on the necessary conditions to guarantee long-term food security (Art. 23). Also, the area-based restoration targets of Article 4 had initially not only applied to Natura 2000 sites but to terrestrial habitats in general and had been complemented by time-bound targets. A clause with a non-deterioration obligation, preventing further degradation of habitats, has also been deleted (Art. 4.7, Art. 5.7 of Commission proposal). Obligations to restore degraded agroecosystems (Art. 9 of Commission

⁴⁸ <https://www.eea.europa.eu/ims/natura-2000-sites-designated-under>

proposal) have been deleted by the European Parliament altogether. These had included commitments to improve the status of biodiversity (e.g. birds) in agricultural landscapes, soil carbon in arable soils the proportion of structural elements in the landscape, as well as targets for the rewetting of drained peatlands. Finally, provisions have been deleted that that members of the public may legally challenge national restoration plans and failures to act of the authorities (previous Art. 16 on access to justice).

Provisions relevant for CBS forestry

Biodiversity: The overarching objective of the proposal is to contribute to a continuous, sustained recovery of biodiverse and resilient nature across the EU's land and sea areas and the restoration of ecosystems (Art.1 (a)). The draft regulation provides various quantitative and qualitative stipulations for levels and spatial scope of restoration that are considered satisfactory. Besides, requirements such as enhanced biodiversity of forest ecosystems (Art.10), and improvement of urban tree canopy cover (Art. 6) can be said to have biodiversity enhancing effects. However, crucial elements have been rejected in the Parliaments position.

Climate: The proposal's overarching objective also includes a contribution to achieving climate mitigation and climate adaptation objectives (Art.1 (b)). By aiming to improve the condition of ecosystems, the regulation is conducive to strengthening natural sinks and mitigate climate change impacts. For the preparation of national restoration plans, Member States shall identify synergies with climate change mitigation, climate change adaptation and disaster prevention and prioritize their restoration measures accordingly (Art.11.5). The plans shall contain estimated co-benefits for climate change mitigation of the restoration measures over time (Art.12.2(j)). Further they should include a dedicated section on how the planning of restoration measures refers to climate change scenarios and an overview of the interplay between the measures included in the national restoration and the national energy and climate plan (Art.12.2(k(i,iv))). The rate of organic carbon stock is an at least voluntary indicator proposed to measure the improvement of forest biodiversity (Art. 10). However, the EP deleted the original Art. 9 which would have included peatland restoration and thus a key lever for increasing carbon sequestration.

Table 14: Governance matrix EU Nature Restoration Regulation

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (<i>'relevance' can be positive or negative</i>)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation						
	Species conservation	Member States shall achieve an increasing trend of the common forest bird index	x				
	Other						
	Forest harvesting						

Manage	Active management (other than harvesting)	Member States shall achieve an increasing trend of share of forests with uneven-aged structure, forest connectivity and/or stock of organic carbon (Art. 10)	x				
	Other						
Restore	Forest restoration (including peatlands)	Member States shall put in place restoration measures in Natura 2000 sites (Art. 4) as well as outside these where necessary to enhance biodiversity of forest ecosystems (Art. 10). (Peatland-related restoration obligations have been deleted, Art. 9)			x		
	A-/reforestation	Member States shall expand urban green space (Art. 6).			x		
	Other						
Wood use	Shifts in wood uses (including by-products)						
	Cascading (end-of-life)						
	Increased efficiency						

Assessment (including stakeholder views)

The relevance of the draft regulation lies in going beyond the conservation of biodiversity and focussing on biodiversity restoration, providing both goals and some instruments. Prior to the amendments by the EP, it received much critical acclaim for its stringent targets (UNEP 2022; IUCN 2022). However, even before the parliamentary changes, environmental groups called for accelerated restoration of forests, appropriate indicators, a broader scope for binding targets and a deterioration prohibition in restored areas (Deutscher Naturschutzring 2023a). After the EP's revision, they assessed the resulting compromise as coming at a very high cost (EEB 2023).

The proposal faced strong opposition among several parliamentary fractions of the European Parliament, from certain Member States and the agricultural, fisheries and forestry sectors (Andrés 2023; Moore 2023). As the new law would commit the EU to legally protect all remaining primary and old-growth forests on its territory, some MEPs argue that the proposal ignores the regional diversity of forests and their socioeconomic role. Forest management is particularly sensitive for Nordic and Baltic countries which large forestry sectors and related industries (Romano 2023b).

Outlook

The Commission aims at finalizing legislative work before the European elections in June 2024, when a new legislature will be formed. After the summer break, the European Parliament, the Council and the Commission will start to negotiate a final version of the NRL based on their adopted positions.

A 2.3.3 Natura 2000 (Habitats Directive 92/43/EEC, Birds Directive 2009/147/EC)

General description

“Natura 2000” is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected through the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC). The network extends across all EU countries, both on land and at sea. Its goal is to ensure the long-term survival of the species and habitats listed under the two directives.

The Habitats Directive 92/43/EEC aims to maintain biodiversity through the conservation of natural habitats and of wild flora and fauna, in order to maintain or restore, at „favourable conservation status“, natural habitats and species of wild fauna and flora of Community interest (Art. 2, Habitats Directive). The conservation status of a natural habitat means „*the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species (...)*“ (Art. 1 (e)). Member States are required to designate and protect Special Areas of Conservation (SAC) for the protection of the natural habitat types and habitats of the species listed in Annex I and II of the Directive (Art. 3). Additionally, Member States are responsible for developing the necessary conservation measures to prevent deterioration of the designated site, and, when necessary, develop effective management plans for the designated sites (Art. 6.1, 6.2). To monitor this process, Member States must submit a report (every six years) that elaborates on the measures taken to preserve a site, as well as an impact assessment of those measures (Art. 17.1).

The Birds Directive aims to protect, manage and regulate all bird species living in the wild within Member State territory, including their nests, eggs and habitats (Art. 1, Birds Directive). This, too, includes forest habitats. The populations of all wild bird species are to be maintained 'at a level which corresponds in particular to ecological, scientific and cultural requirements' (Art. 2). Member States need to preserve or re-establish a sufficient diversity and area of habitats for the species of interest, among others through creating and managing protected areas, creating biotopes and carrying out special conservation measures to ensure their survival and reproduction in their area of distribution (Art. 3-4). For (altogether 197) threatened bird species listed in Annex I, Member States must classify Special Protection Areas (SPAs), as well as for other migratory birds.

Provisions relevant for CBS forestry

Climate: About half of the Natura sites and about half the area covered by Natura sites are forests, which help sequestering and storing carbons well as adjusting to climate change. There are, however, no specific provisions in the Habitat and Bird Directives that refer to climate change mitigation or adaptation. A set of „Guidelines on climate change and Natura 2000“ are published in 2013 to support Natura 2000 site managers in dealing with the impact of climate change.

Biodiversity: A number of forests are protected as Natura 2000 sites, as forests provide natural habitats for many of the species listed in the Birds and Habitats Directive. By 2015, over 27,000 sites have been included in the Natura 2000 network. Of those sites, forests make up approximately 50% of the land covered by Natura 2000 sites, which is approximately 375,000

km² of forest (about 20% of total forest resources in the EU). Forests can be protected as a Natura 2000 site for three main reasons:

- the site has an important area for one or more forest habitat types of European interest. In Annex I of the Habitats Directive, 85 forest habitat types are listed (29 of which are priority habitats);
- the site contains one or more important habitats for one or more species of European importance found in the list in Annex II of the Habitats Directive or Annex I of the Birds Directive;
- the forest plays an important role for the ecological coherence of another Natura 2000 site (e.g. ecological corridors connecting core habitats of protected species and buffer zones located around core areas etc.).

At the EU level, there is no legal obligation to produce a forest management plan for forests included in the Natura 2000 Network, as long as the current management does not cause any deterioration of the designated habitat. Legal obligations to produce forest management plans (FMPs) depend on national rules in each Member State. Several Member States require FMPs for certain forests and forests that exceed a certain size. Member States, in the context of their conservation measures (which may include close-to-nature silviculture), may also specify management rules. For instance, harvesting may need to take soil protection into account, or may need to be postponed to preserve mature stands (prolonged rotation cycles); also, changes in tree-species composition may be limited or excluded.

Table 15: Governance matrix Natura 2000

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (*relevance* can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation	For special areas of conservation - which include forest habitats - Member States shall establish conservation measures involving, if need be, management plans, and prevent deterioration of the sites (Art. 6, Habitats Directive)			x		

	Species conservation	Maintaining or restoring, at favourable conservation status, natural habitats and species of wild fauna and flora (Art. 2 Habitats Directive) (- this protects habitat-typical tree species) Bird species: Conservation of all naturally occurring bird species in the territory of the Member States (Art. 1, Birds Directive)			x		
	Other						
Manage	Forest harvesting	At Member State level, restrictions of harvesting may be applied (e.g., relating soil protection).	x		x		
	Active management (other than harvesting)	At Member State level, limitation or exclusion of changes in tree-species composition	x		x		
	Other						
“Restore”	Forest restoration (including peatlands)						
	A-/reforestation						
	Other (Increase Biodiversity in forest ecosystems)						
“Wood use”	Shifts in wood uses (including by-products)						
	Cascading (end-of-life)						
	Increased efficiency						

Assessment (including stakeholder views)

Member States are legally obliged to take appropriate measures to prevent the deterioration of habitat types and significant negative impacts on species of interest. Member States must establish a competent legal regime to assess and enforce a site’s conservation status, which is measured against the original conditions of a site.

The 2015 ‘Nature Report’ indicates that the status of species and habitats protected under the Habitat and Wild Birds Directives is generally poor, and much needs to be done to meet the targets of favourable conservation status. The conservation status of all forest habitat types in nine biogeographical regions for the period 2007-2012 shows that only 15% of assessed forests achieved favourable conservation status. On the other hand, 80% were deemed unfavourable (see Figure 5, 6). Compared with assessments from 2001-2006, the 2007-2012 period showed an improvement in the number of sites deemed to be ‘unfavourable-bad’, which have decreased from 35 to 26%. However, the number of sites deemed ‘unfavourable-inadequate’ had increased from 28 to 54%. This means that the total percentage of forest habitats in the Natura 2000 Network deemed as ‘unfavourable’ (‘unfavourable-inadequate + ‘unfavourable bad’) has increased from 63% (2001-2006) to 80% (2007-2012). This is partially due to the improved knowledge of conservation status. Compared with the previous period, the sites with ‘unknown

conservation status' decreased from 16 to 5% during the period from 2007-2012. Nevertheless, the percentage of forest habitats deemed unfavourable and the lack of improvement are alarming.

Improvement is needed in the methodology used by Member States to assess the conservation status of forests in the Natura 2000 Network. There is great variance between the methods countries use to identify and assess designated sites. For example, some states use the same assessment indicators for all forest types, while others use indicators specifically based on forest type. This highlights the need to further harmonize the methods for assessing the conservation status of forests.

Outlook

The Natura 2000 network will be strengthened in the future: The full implementation and enforcement of existing EU environmental legislation, including the Habitats and Bird Directives, is at the heart of the EU Biodiversity Strategy for 2030. It is an investment priority to complete and fully enforce the Natura 2000 network, and the EU plans to unlock €20 billion per year for spending on nature. As part of a coherent network of protected areas in the Biodiversity Strategy, and strictly protecting 10% of land and 10% of EU sea, the EU plans to help with funding in additional Natura 2000 sites. In addition, the Nature Restoration Law will support effective management of Natura sites.

A 2.3.4 EU Water Framework Directive

General description

The objective of the Water Framework Directive (2000/60/EC) (WFD) is a 'good status' of all European waters, including both surface waters and groundwater. The EU legislation on protecting groundwater focuses on achieving good chemical status and good quantitative status. The groundwater status also encompasses the status of groundwater-dependent terrestrial ecosystems such as wetlands. For surface waters, the good chemical and ecological status has to be achieved. The good ecological water status has been derived from the very good status, which looks at pristine water bodies where human activity has not yet significantly altered the ecological conditions of the surface waters. That means going back in time where the land management in the river basin (might have) looked significantly different.

To achieve the objectives of the WFD, the Member States have to draw up management programmes for the river basins. The measures depend on the individual circumstances of the water bodies. A land use change or a change in management might be necessary in order to achieve good ecological surface water status or good quantitative groundwater status.

Provisions relevant for CBS forestry

Climate, biodiversity: Forests, due to their capacity to affect water quality and quantity, are indirectly affected by the Water Framework Directive. For instance, the Directive may have an impact on existing forests when their management needs to change (e.g. different trees, less pesticides) or when they need to be converted into alluvial forests or peatlands in order to achieve the Directive's goal. How the impact of forestry on water quality is qualified seems to depend on national circumstances. For instance, in 2011 both Finland and Sweden discussed

the value of buffer strips and other near stream measures. Finland focused on sediment transport, e.g. due to ditch cleaning or how sites were prepared. Sweden restricted the creation of new ditches and focused on acidification from long range pollutant transport and agricultural eutrophication, as well as on “educational campaigns designed to raise awareness amongst forestry workers about ways of minimizing the impacts of forest management” (Futter et al. 2011). One example of changes in forest management due to the Water Framework Directive is Ireland. In Ireland, forestry is identified as a significant pressure in 51 (40%) of the surface water bodies who are at risk of achieving the WFD objectives. Therefore, the overall approach in forestry is: “(i) to safeguard water during all forestry operations; (ii) to restructure existing forests to reflect water sensitivities, where required; and (iii) to situate and design new woodlands and forests in a way that protects water quality.”⁴⁹ The document “recognises that inappropriately sited forests and poorly-managed forest operations can potentially impact water quality and aquatic habitats and species such as salmonids and Freshwater Pearl Mussel, particularly in terms of siltation and nutrient runoff. As such, the protection of water forms a key component of its assessment of all applications for forestry licences and grants.”⁵⁰

In the German federal state of Baden-Württemberg, a number of measures had been identified in order to improve water quality through adapted forest management. These include measures regarding river continuity, changes of water courses in forests, conversion of forests (e.g. less spruces, more beeches) and creation of small biotopes etc. Such changes typically promote biodiversity in the forests and climate adaption, and they may increase also carbon storage.

A 2.4 Energy policy

A 2.4.1 EU Renewable Energy Directive (RED, 2009, 2018, revision planned for 2023)

General description

The Renewable Energy Directive (RED) lays down the policy framework to promote renewable energy in the European Union. RED I in 2009 set targets for renewable energy and energy efficiency in 2020. The Directive was extended as RED II in 2018 ((EU) 2018/2001) addressing the period 2021-2030. RED II again, has very recently (June 2023) been revised as RED III that now aims at achieving an overall 45% share of renewable energy by 2030 with related national renewable energy targets and binding targets for the respective sectors. EU countries need to set out how they plan to meet these targets and the general course of their renewable energy policy in National Energy and Climate Plans (NECPs). Progress towards national targets is measured every two years when EU countries publish national renewable energy progress reports.

Bioenergy is the main renewable energy source consumed in the EU, accounting for 60% of renewable energy consumption. The heating and cooling sector is the largest end-user, using

⁴⁹ https://merrionstreet.ie/en/gallery/images/doyle_announces_two_publications_%E2%80%98forests_and_water%E2%80%99_and_%E2%80%98draft_plan_for_forests_and_freshwater_pearl_mussel_in_ireland%E2%80%99.html

⁵⁰ <https://oceanfocus.ie/native-woodlands-to-protect-water-and-aquatic-ecosystems/>

about 75% of all bioenergy (JRC 2019). Camia et al. (2021) document an increasing overall use of woody biomass in the EU in the past two decades (around 20% since 2000), except for a marked low noted after the financial crisis of 2008. Similarly, the subset of woody biomass used for the specific purpose of energy has followed an increasing trend until 2013 (about 87% from 2000-2013), after which the growth has slowed. According to Camia et al. (2020), wood-based bioenergy production is, to a large extent, based on secondary woody biomass (forest-based industry by-products and recovered post-consumer wood), which makes up almost half of the reported wood use (49%). Primary woody biomass (stemwood, treetops, branches, etc. harvested from forests) makes up at least 37% of the EU input mix of wood for energy production. The remaining 14% is uncategorised in the reported statistics.

Camia et al. (2021) estimate that roughly 20% of the total wood used for energy production is made up of stemwood, while 17% is made up of other wood components (treetops, branches, etc.). There are risks of negative environmental impacts that need to be managed by public and private policies. In this context, the RED sets out mandatory sustainability criteria for bioenergy, in order to avoid direct impacts on high biodiversity lands and high carbon-stock lands (land criteria) and to optimize the direct GHG benefits (GHG emission savings criteria). These criteria apply to liquid, solid and gaseous biomass used in heat and power.

As set out in Article 30 of REDII, Member States are responsible for the implementation of the EU bioenergy sustainability criteria. To this end, they must require economic operators (i.e. bioenergy producers) to show that the biofuels, bioliquids and biomass fuels concerned comply with the relevant land sustainability criteria (related to land use), GHG saving criteria and energy efficiency requirements. Economic operators have two methods to do this: either by providing the relevant national authority with data/evidence required under the Directive; or, by using 'voluntary' certification schemes recognized by the Commission. Member States have to require that economic operators arrange for an adequate standard of independent auditing of the information submitted.

Provisions relevant for CBS forestry

Climate: Art. 29.10 of RED II specifies GHG reduction targets for biomass types in the sectors. For the transport sector, all old plants must achieve a GHG reduction of at least 50% or 60% compared to the fossil reference. These values were already applied in RED I. As of Jan. 1, 2021, slightly stricter limits of 65% GHG reduction apply to new plants. Renewable synthetic fuels of non-biogenic origin, on the other hand, must achieve a GHG reduction of 70 % according to Art. 25.2.

For numerous solid biomass fuels (incl. wood and high-density agricultural residues such as straw) for heating/cooling and for electricity, default values are differentiated by transport distance. In the case of wood briquettes or pellets, default values are also given for different energy inputs during production. In total, most of the default values are above the threshold values of 70% or 80% if the transport distance is less than 2,500 km and if - in the case of wood briquettes or pellets - electricity and heat come from a CHP boiler that is operated with pre-dried wood chips. Also, for transport distances of 10,000 km and more, the default values are more often above the limits. The GHG limits restrict the energetic use of wood and straw for electricity and heating/cooling in Europe only at higher transport distances. This applies in particular to critical material flows from logs:

- Wood chips from logs: standard values are above 80% up to 2,500 km for electricity and heating/cooling and 79% up to 10,000 km for heating/cooling.

- Wood briquettes or pellets from logs have a default value >80 %, except for electricity when the transport distance exceeds 10,000 km (73 %).

The use of wood briquettes and pellets produced with non-renewable energy is clearly limited by the values.

Article 29.7 requires countries to include carbon storage effects in other emission sectors or to demonstrate that carbon stocks and sinks are maintained or enhanced in the long term. It aims to ensure compliance with Land use, Land-use Change and Forestry (LULUCF) requirements. Compliance can be demonstrated in two ways:

- Level A: the harvesting criteria are complied with by the national or subnational legislation applicable in the area of harvest, as well as monitoring and enforcement systems;
- Level B: for each criterion for which compliance cannot be demonstrated at national or subnational level, compliance needs to be demonstrated through management systems applicable to the forest sourcing area level.

The GHG balancing method in REDII therefore does not assess the CO₂ emissions from the combustion of harvested wood. However, impacts of an increased use of forest biomass for energy can be expected to have negative implications for the forest carbon storage (Camia et al. 2021; Soimakallio et al. 2022). Soimakallio et al. (2022) found from 45 suitable studies that contributed more than 450 forest scenarios that for boreal and temperate forests, a mean carbon loss of 1.2 tonnes CO₂ per m³ of wood harvested can be assumed. Fehrenbach et al. (2022) present a method to integrate forest sink dynamics into GHG balances.

A more explicit integration of emissions on the forest area related to biomass sourcing would mean a deviation from the politically agreed convention of an emission factor of zero in the RED, in principle.

Biodiversity: Recital 102 of REDII states that “woody raw material should only be sourced from forests that are harvested in accordance with the principles of sustainable forest management that are developed under international forest processes and that are implemented through national law or best management practices at sourcing area level. Operators should take the appropriate steps to minimise the risk of using unsustainable forest biomass for the production of bioenergy and to ensure that carbon stocks can be tracked.” More explicitly, REDII includes sustainability criteria for forest biomass through Article 29.6 that aims to minimise the risk of using forest biomass derived from unsustainable production. Similarly to Article 29.7 compliance needs to be demonstrated following a **risk-based approach** taken in the REDII. If a country has legislation and proper enforcement and monitoring in place at a national level (level A), there is a low risk of forest biomass derived from unsustainable production. Which elements this legislation should comprise in detail is not defined, since sustainable forest practices can differ a lot by region and thus by country. If this legislation and enforcement/monitoring is not in place, the risk on a national level is higher, and thus it is important to assure on the level of the sourcing area that forest biomass is derived from sustainable production only (level B). This approach is intended to balance administrative burden while minimizing the risk that unsustainably produced forest biomass is used for energy production in Europe. For level B the criteria need to be checked in more detail and locally, so more is required than checking whether a law is in place, monitored and enforced.

Following the precautionary principle, therefore some practices that are generally seen as irreconcilable with the sustainable harvesting criteria, are excluded from compliant forestry operations and thus explicitly mentioned in level B while not explicitly referred to in level A.

Harvesting of roots and stumps is an example of this. These forest sustainability criteria apply to all biomass produced from forestry (Article 2.26) used to produce biofuels, bioliquids and solid and gaseous biomass fuels consumed in EU. Forest biomass includes logs, logging residues (e.g. branches, bark, leaves, needles, tree-tops, stem parts, small-diameter trees), stumps and roots.

The forest biomass is directly generated by traditional timber harvest or is salvaged from areas affected by biotic forest disturbances such as insect or fungus infestations or abiotic forest disturbances such as fires or storms.

The criteria do not apply to:

- Processing residues from forest-based industries, such as sawdust, wood shavings, black liquor, brown liquor, fiber sludge, lignin and tall oil. To avoid the risk of fraud, the REDII clarifies that processing residues shall not be a primary aim of the production process and the process shall not be deliberately modified to produce them.
- Wood wastes (e.g. discarded furniture, wood that was used in construction) that are being repurposed and further processed into biofuels, bioliquids and biomass fuels.

However, according to the REDII, wastes have to fulfil the GHG emission saving criteria laid down in Article 29 paragraph 10. For electricity and heat produced from biomass fuels, compliance with the criteria has to be checked for installations with a total rated thermal input equal to or exceeding 20 MW in the case of solid biomass fuels and equal to or exceeding 2 MW for gaseous biomass fuels (Article 29.1).

Table 16: Policy measure matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Land-use change, i.e. a conversion from forest to another land-use type, would imply that the forest regeneration criterion (Article 29.6a ii) cannot be fulfilled.		x			
	Forest conservation	Protected areas are respected (Article 29.6a iii)		x			
	Species conservation	Harvesting activities take care to maintain soil quality and biodiversity to minimize disturbance (Article 29.6a iv)		x			
	Other						
Manage	Forest harvesting	Timber harvesting needs to be legal (Article 29.6a i)		x			

		Harvesting activities maintain or enhance the long-term productive capacity of the forest (Article 29.6a v)		x				
	Active management (other than harvesting)	Forest regeneration takes place on the harvested area (Article 29.6a ii)						
	Other							
Restore	Forest restoration (including peatlands)							
	A-/reforestation							
	Other							
Wood use	Shifts in wood uses (including by-products)							
	Cascading (end-of-life)							
	Increased efficiency							
	Other							

Assessment (including stakeholder views)

In summary, RED II sustainability requirements for forest biomass include (Art. 29.6 a):

- Timber harvesting needs to be legal (Article 29.6a i);
- Forest regeneration takes place on the harvested area (Article 29.6a ii);
- Protected areas are respected (Article 29.6a iii);
- Harvesting activities take care to maintain soil quality and biodiversity to minimize disturbance (Article 29.6a iv);
- Harvesting activities maintain or enhance the long-term productive capacity of the forest (Article 29.6a v).

If a country has national and/or sub-national legislation in place in the harvesting area on these points, and there are monitoring and enforcement systems in place to ensure compliance, then forest biomass can be considered sustainable per se (cf. Art. 29.6(a)). If necessary, a self-certification in which a forest enterprise assures to comply with the relevant rules is sufficient.

However, if the legal situation and the monitoring and enforcement systems are not sufficient for one or all points, it must be demonstrated that management systems in the extraction area ensure the requirements (cf. Art. 29.6(b)). This means that proof is required, e.g. via a certification system at farm level.

As a further requirement, according to Art. 29.7, it should be ensured that emissions in the LULUCF sector are taken into account in the country of origin of the biomass within the framework of the Paris Agreement. If this is not the case, stricter requirements on carbon stocks and sinks than the IPCC rules apply in the harvesting area.

RED II has potentially clear implications for forestry activities in the sourcing area of biomass used for bioenergy (where compliance at level B needs to be demonstrated). However, it has to

be noted that the sustainability requirements of the RED only need to be met if the bioenergy use is meant to be accounted for under the RED target for the share of renewable energy. Many EU Member States rely on sustainable biomass for their renewable targets.

Stakeholders, especially from environmental NGOs (e.g. Fern 2021) but also parts of the scientific community (e.g. Searchinger et al. 2018) have criticised RED II, pointing to weaknesses including that the rules are limited to large power plants.

Outlook

RED III has very recently been formally adopted (March 2023). Changes compared to RED II regarding sustainability criteria were not analysed in this report.

A 2.5 Other environmental policies

A 2.5.1 Circular Economy Action Plan (2020)

General description

Through the new Circular Economy Action Plan (CEAP)⁵¹, the EU aims to reduce its consumption footprint and achieve a regenerative growth model. A circular economy aims to replace the current linear economy that functions along the lines of “take-make-use-dispose”. A goal is to double the EU economy’s circular material use rate in the coming decade. Through the gradual introduction of several interrelated initiatives and measures, the plan is to establish a coherent product policy framework. The CEAP focusses on key product value chains such as electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and buildings, and food, water and nutrients. The Action Plan is based on three pillars:

- **Designing sustainable products:** While there is existing EU legislation that addresses the degree of sustainability of certain products, like the Ecodesign Directive (promoting the efficiency and circularity of certain energy-related products), there is no comprehensive set of requirements regarding the sustainability and circularity of all products entering the EU market to date. The CEAP aims to apply the Ecodesign framework to the widest variety of products possible and improve, among others, product durability, reusability, upgradability and reparability, the energy and resource efficiency of products and the recycled content in them.
- **Empowering consumers and public buyers**, among others through a “right to repair”, clarification on companies’ use of “green claims” and minimum mandatory green public procurement (GPP) criteria and targets in sectoral legislation.
- **Circularity in production processes**, among others through promoting the use of digital technologies for tracking, tracing and mapping of resources.

⁵¹ EC (2020): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A new Circular Economy Action Plan – For a cleaner and more competitive Europe, COM(2020) 98 final.

Provisions relevant for CBS forestry

Climate & biodiversity: Many of the measures can indirectly affect CBS forestry in Europe and worldwide. Less consumption (including of, for instance, single use paper plates, cups or wood cutlery) and more recyclability and circularity will reduce the pressure on raw material extraction and the agricultural production of biomass, thus reducing competition for land and pressures towards deforestation. Implementing CEAP measures thus has the potential of allowing for a less production-oriented forest management (though some rebound effects⁵² may be expected).

More specifically, the following CEAP initiatives may affect CBS forestry:

- The **New Eco-Design Directive/ Ecodesign for Sustainable Products Regulation (ESPR) & Sustainable Products Initiative** (envisaged in the CEAP and adopted in 2022) introduces ecodesign requirements for products that have so far not been covered by such requirements, including possibly wood-based products. Criteria such as reusability, recyclability, longevity and repairability can reduce demand for newly harvested timber, with positive effects on land use, sustainable forest management and biodiversity. A more detailed assessment follows in Chapter 4.5.2.
- The **proposed Directive on Empowering Consumers for the Green Transition**⁵³ is part of the first circular economy package and the Sustainable Products Initiative, aims to strengthen consumer protection against false environmental product claims and premature obsolescence. According to the draft Directive, consumers have to be informed on the reparability of products and unauthorized sustainability labels have to be banned. The European Parliament has urged for a ban of design features that limit a product's life deliberately or lead to premature malfunctioning and for products to be labelled with not only the length of the legally required guarantee but also the length of any possible guaranteed extensions offered by producers (News European Parliament 2023). The Directive would also incentivize more durable products containing wood and in turn reduce logging.
- Based on the CEAP, the Commission adopted an **EU policy framework on biobased, biodegradable and compostable plastics** in November 2022.⁵⁴ The legally non-binding framework "brings clarifications on biobased, biodegradable and compostable plastics and sets out the conditions to ensure that the overall environmental impact of their production and consumption is positive."⁵⁵ While increased use of biobased raw materials can increase pressure on land as well as biodiversity, the Commission emphasises that biomass production should prioritize the use of organic waste and by-products, and when primary biomass is used, it should be sustainably sourced (i.e., not negatively impact biodiversity or ecosystem health) and used in long-lived products. The related **Communication on**

⁵² i.e., increased material efficiency making available financial resources to consumers which they may spend on additional products with an environmental and material footprint.

⁵³ EC (2022c): Proposal for a Directive of the European Parliament and of the Council amending Directives 2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better protection against unfair practices and better information. COM/2022/143 final.

⁵⁴ EC (2022a): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Communication for an EU policy framework on biobased, biodegradable and compostable plastics. COM(2022) 682 final.

⁵⁵ https://environment.ec.europa.eu/topics/plastics/biobased-biodegradable-and-compostable-plastics_en

‘Sustainable Carbon Cycles’⁵⁶ sets the goal of sourcing 20% of the carbon used in chemical and plastic products to come from non-fossil sources. The cascading principle should be used for biomass production by prioritizing its use for products, including plastics, and only in subsidiary order, as a source of bioenergy. Biomass used for plastic must meet EU sustainability criteria for bioenergy; this includes forest biomass and biofuels that have higher risks of direct and indirect land use change (EC 2022a, p. 5-6).

- The ongoing revision of **Directive 94/62/EC on Packaging and Packaging Waste**⁵⁷ aims to reduce (over)packaging and packaging waste. For this purpose, Art. 46.1 of the proposal sets recycling targets for packaging waste, among others for wood (25% till end of 2025, 30% till end of 2030, with minimum percentages by weight). This push for circularity is expected to result “in significantly reduced needs of virgin raw materials such as wood” (EC 2022b, p. 101).
- The **EU Strategy for Sustainable and Circular Textiles**⁵⁸ intends to increase re-use and recycling of textiles as well as the share of long-lived textiles. It is thus conducive to reducing the need for agricultural land and may reduce deforestation and the pressure for production-focussed forest management.
- The **Strategy for a Sustainable Built Environment** that was announced in the CEAP and that could have affected the use of wood in construction is severely delayed and has potentially been dropped by the Commission.⁵⁹
- The development of **mandatory Green Public Procurement (GPP) criteria** and targets in sectoral legislation (including the phasing-in mandatory reporting on GPP) has the potential to mainstream public procurement of wood and wood-based products from sustainably managed sources. However, no respective proposal has been published by the Commission so far.
- The plan to establish a regulatory framework for **certification of carbon removal** is part of the CEAP, too. We discussed it in Chapter 0.

⁵⁶ EC (2021): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Communication on ‘Sustainable Carbon Cycles. COM(2021) 800.

⁵⁷ EC (2022b): Proposal for a Regulation of the European Parliament and of the Council Directive on packaging and packaging waste, amending Regulation (EU) 2019/1020 and Directive (EU) 2019/904, and repealing Directive 94/62/EC. COM (2022) 677 final.

⁵⁸ EC (2022d): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: EU Strategy for Sustainable and Circular Textiles. COM/2022/141 final.

⁵⁹ <https://eeb.org/library/call-for-swift-delivery-of-eu-strategy-for-a-sustainable-built-environment-eeb-letter/>

Table 17: Governance matrix Circular Economy Action Plan

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation						
	Species conservation						
	Other						
Manage	Forest harvesting						
	Active management (other than harvesting)	Incentivising carbon removal and development of a regulatory framework for the certification of carbon removals (cf. Chapter 0).				x	
	Other						
Restore	Forest restoration (including peatlands)						
	A-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	The non-binding EU policy framework on biobased, biodegradable and compostable plastics prioritises the use of secondary biomass such as organic waste and by-products for producing plastics, to minimize direct and indirect land-use changes.	x				
		Directive on empowering consumers for the green transition (SPI & Circular Economy Package) to tackle obsolescence and enhance more efficient (wood) use		x			x
	Cascading (end-of-life)	The Commission has proposed the New Ecodesign Directive which widens the current Ecodesign framework and shall improve several product parameters, promoting the cascading principle and resource efficiency including potentially for wood-based products (cf. Chapter 4.5.2.).			x		
	Increased efficiency	The Commission has proposed the New Ecodesign Directive which widens the current Ecodesign framework and shall improve several product parameters, promoting the cascading principle and			x		

	resource efficiency including potentially for wood-based products (cf. Chapter 4.5.2.).					
Other	Proposal for a mandatory green public procurement (GPP) (outstanding)			x		

Assessment (including stakeholder views)

Forests play an important role in the circular economy, as forests provide biomass for material use. At the same time, unsustainable forest management contributes to biodiversity loss.

Recycling and recovery still receive significant attention in EU circular economy initiatives, while reducing and reusing are increasingly receiving more attention. This means that circular economy initiatives are increasingly dealing with issues higher up in the waste hierarchy, not just waste itself. However, the principles of avoiding, reducing and reusing at the top of the waste hierarchy are targeted by fewer CAEP initiatives, which hinders the potential for an overall reduction in resource consumption within the EU.

The CEAP contains synergies with other overarching (EU) policies such as the Bioeconomy Strategy, the EU Industrial Strategy or the European Green Deal. The Action Plan itself does not set out targets for reductions of material use in absolute or relative terms, which could be an effective lever to actually reduce pressures on natural resources and land (Pantzar and Suljada 2020). As the CEAP does not set out fiscal (but rather less compulsive) incentives to promote circularity in production processes it has also been recommended to introduce a shift of tax burdens from labour to the use of non-renewable energy and virgin raw materials (ibid).

Outlook

A number of the CEAP's key actions⁶⁰ have already been taken up and implemented, others are still outstanding. In May 2023, the Commission revised the Circular Economy Monitoring Framework which recognizes interlinkages between circularity, the EU's climate neutrality goal, the zero-pollution ambition, competitiveness, sustainability and secure materials supply and introduces new indicators.

⁶⁰ See https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_2&format=PDF

A 2.5.2 Ecodesign for Sustainable Products Regulation

General description

The Commissions' proposal for an "Ecodesign for Sustainable Products Regulation" (ESPR) (short: Ecodesign Regulation⁶¹) was published in March 2022. It builds on the current Ecodesign Directive which had set product standards exclusively for energy-related products, as well as on the Commissions' recent "Sustainable Products Initiative" (SPI).

The SPI aims at revising the current Ecodesign Directive in order to meet objectives of the Circular Economy Action Plan (CEAP) (see Chapter 4.5.1 / A 2.5.1). The initiative is generally concerned with enhancing the sustainability of products placed on the EU market along their whole life cycle and making sustainable products the norm (EESC 2022).

The proposal for the new Ecodesign Regulation significantly expands the scope of the current Ecodesign Directive both in terms of products and in terms of sustainability requirements. As regards product scope, almost all physical goods placed on the EU market are covered, including components and intermediate products. Exceptions are: food, feed, medical products for human use, veterinary medicinal products, living plants, animals and micro-organisms, products of human origin and products of plants and animals relating directly to their future reproduction (Art. 1(2) draft Ecodesign Regulation). As regards ecodesign requirements, these are envisaged to relate to the following product aspects (Art. 5(1)):

- Product durability
- Reliability
- Reusability
- Upgradability
- Reparability
- Possibility of maintenance and refurbishment
- Presence of substances of concern
- Energy use or energy efficiency
- Resource use or resource efficiency
- Recycled content
- Possibility of remanufacturing and recycling
- Possibility of recovery of materials
- Environmental impacts, including carbon and environmental footprint
- Expected generation of waste materials

The Commission will establish ecodesign requirements to improve the above-mentioned parameters of products, organised along different product groups or horizontally along (technical) similarities across different product groups (Art. 5(2)); it is required not to adversely affect safety, competitiveness, administrative capacities etc. (Art. 5(5)). Ecodesign requirements

⁶¹ EC (2022e): Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC. COM (2022) 142 final, 2022/0095 (COD).

include performance requirements relating to the product parameters referred to in Annex I (Art. 6) and information requirements (Art. 7).

Performance requirements will be set up according to analyses of the economic and environmental impacts of different options requirements, of availability of resources and technologies, of energy prices, raw material costs and external environmental costs to ensure proportionality of regulations (Annex II). Product-specific requirements will be established through future delegated acts by the Commission (Art. 4). Products covered by a delegated act can only access the EU market if they comply with it (Art. 3(1)). In case of non-compliance of a product with national requirements relating to a product parameter covered by a delegated act pursuant to Article 4, the regulations of the delegated act supersede national legislation.

Information requirements include requirements on the performance of the product in relation to the respective product parameters (Art. 7). A digital product passport which facilitates electronic registration, processing and sharing of product-related information amongst supply chain businesses, authorities and consumers shall be put in place to enable transparency, monitoring, enforcement and a market-intelligence tool for future revisions of regulations (Art. 8-10).

Relevance for CBS forestry

As already mentioned, the draft Regulation does not yet set out specific requirements for specific products but directs on the content and design of future requirements that will be adopted in delegated acts by the Commission. However, a draft of a preliminary study on new product priorities of the Commissions' Joint Research Centre (JRC) from 2023 suggest a number of product groups that may be suitable for prioritisation under the ESPR once it enters into force. The JRCs' suggestions include wood-based furniture, firewood, wood chips, wood-based panels, wood-based toys and paper (Faraca et al. 2023). The JRCs' report will be used as an input to a public consultation organized by the Commission. The first ESPR working plan will respond to these consultations.

Climate: The draft Regulation aims to cover the whole life cycle of products and therefore also addresses aspects of the production process such as resource-efficiency or environmental impacts including carbon footprints (Art. 5). Those would make relevant criteria for the forestry and wood industries to observe. Other factors related to the final product, such as reusability, possibility of remanufacturing and recycling or upgradability are also relevant for the production of wood- or wood-containing products and at the same time respond to sustainable wood use and the cascading principle as finished products and their components are supposed to remain in use as long as possible. The draft Regulation prospects “*a shift of activity from the processing of primary towards secondary raw materials and from production of products to maintenance, re-use, refurbishment, repair and second-hand sales*” (EC 2022e, p. 98) which eventually corresponds to less logging.

Biodiversity: In Annex I, resource-efficiency is defined by means of factors such as energy-, water and consumption of other resources as well as impacts of production on deforestation (Annex I (g)). The calculation of the environmental footprint of a product would be specified in a related delegated act. The exact categories of environmental impact can therefore not be assessed yet. They might though include ecosystem and biodiversity conservation. The information requirements of the draft Regulation aim to ensure traceability of products along the value chain. They come with specific requirements for manufacturers, dealers, distributors and importers who have to adopt or examine the adoption of conformity assessments specified in

delegated acts (Art.21, Art. 23, Art. Art.24, Art.25). Hereby, information to be provided on the origin of product materials and the primary production process which could directly be related to the forestry sector are only demanded in so far as the product performance shall be assessed in relation to parameters described earlier (environmental footprint and resource-efficiency).

Accordingly, *the draft Regulation itself* merely indicates factors of primary production that shall be screened for conformity assessment that relate to standards for ecosystem management, biodiversity or conservation but future delegated acts could complement on respective factors.

Table 18: Governance matrix New Eco-Design Directive/ Ecodesign for Sustainable Products Regulation (ESPR)

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation						
	Species conservation						
	Other						
Manage	Forest harvesting						
	Active management (other than harvesting)						
	Other						
Restore	Forest restoration (including peatlands)						
	A-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	The Digital Product Passport can support consumers, businesses and public authorities to make informed choices on purchases or better perform conformity assessments of (wood) products, contributing to shifts in wood uses.					x
	Cascading (end-of-life)	The draft Regulation widens the current Ecodesign framework and shall improve several product parameters, promoting the cascading principle and resource efficiency including potentially for wood-based products.			x		

Increased efficiency	The draft Regulation widens the current Ecodesign framework and shall improve several product parameters, promoting the cascading principle and resource efficiency including potentially for wood-based products.			x		
Other						

Assessment (including stakeholder views)

Stakeholder consultations prior to publication of the draft Regulation showed general agreement on the lack of clear, comprehensive and binding legislation and trustworthy information to be obstacles for increased availability of sustainable products. While the regulation is broadly appreciated for having the potential to make all products in the EU market repairable, durable, reusable, energy-efficient and free of hazardous chemicals, different stakeholders have expressed different requirements for the regulations’ design and implementation to make it successful (Ragonnaud 2022). The European Recycling Industries Confederation (EuRIC) notes that the vast majority of products placed on the market are designed without any consideration for their end-of-life stage and supports the emphasis of the regulation on recycled content in products and recyclability. That regulations’ success depends on the levels of ambition of future performance and information requirements. The ambitions will in fact essentially depend on the findings on prospected environmental benefits and technical feasibility of certain product requirements and which interests will be represented in the assessment of those factors, as pointed out by the Environmental Coalition on Standards (ECOS) (ibid).

Outlook

In May 2023, the Council adopted its position (general approach) on the proposal. The position requires a minimum transition period of 18 months after the entry into force of the regulation. Member States are given a 2 year-period of adaption (Council of the European Union 2023). In Parliament, the proposal has been referred to the Committee on the Environment, Public Health and Food Safety (ENVI) and a position still has to be worked out. The Council together with the Commission and the Parliament are yet to enter the trialogue format to negotiate the final draft of the Ecodesign Regulation. If adopted, the Commission should set up a working plan covering at least three years to indicate sustainability criteria for prioritized products and those product groups to be introduced under the directive in the near term (Art. 16).

A 2.5.3 Proposal for a Directive on Soil Monitoring and Resilience

General description

The European Commission is currently developing a proposal for a Directive on Soil Monitoring and Resilience (short: Soil Monitoring Law). A first draft was published in July 2023.⁶² Originally, a more ambitious version was envisaged with clearer obligations for the Member States. The

⁶² EC (2023): Proposal for a Directive of the European Parliament and of the Council on Soil Monitoring and Resilience (Soil Monitoring Law). COM(2023) 416 final.

Commission's Draft now focuses heavily on monitoring, though the objective is as well to *"continuously improve soil health in the Union with the view to achieve healthy soils by 2050 and maintain soils in healthy condition"* (EC 2023). This shall ensure that soils *"can supply multiple ecosystem services at a scale sufficient to meet environmental, societal and economic needs, prevent and mitigate the impacts of climate change and biodiversity loss, increase the resilience against natural disasters and for food security and that soil contamination is reduced to levels no longer considered harmful to human health and the environment"* (Art. 1). The draft Directive covers all soils, including forest soils.

Member States need to establish a monitoring system. This is expected to give *"foresters easier access to soil data, and also lead to a wider range, better availability and more affordable technical support for sustainable soil management, including decision support tool"* (EC 2023, p. 4) Regarding soil management, Member States will have to define *"sustainable soil management practices" that shall be "gradually implemented on all managed soils"* and define practices that need to be avoided (Art. 9).

Annex III defines sustainable soil management principles. With regard to forests, the most relevant ones are:

- *"(a) avoid leaving soil bare by establishing and maintaining vegetative soil cover, especially during environmentally sensitive periods;*
- *(b) minimise physical soil disturbance;*
- *(c) avoid inputs or release of substances into soil that may harm human health or the environment, or degrade soil health;*
- *(d) ensure that machinery use is adapted to the strength of the soil, and that the number and frequency of operations on soils are limited so that they do not compromise soil health;*
- *(e) when fertilization is applied, ensure adaptation to the needs of the plant and trees at the given location and in the given period, and to the condition of soil and prioritize circular solutions that enrich the organic content;*
- *(f) in case of irrigation, maximise efficiency of irrigation systems and irrigation management and ensure that when recycled wastewater is used, the water quality meets the requirements set out in Annex I of Regulation (EU) 2020/741 of the European Parliament and of the Council¹⁴ and when water from other sources is used, it does not degrade soil health;*
- *(g) ensure soil protection by the creation and maintenance of adequate landscape features at the landscape level;*
- *(h) use site-adapted species in the cultivation of crops, plants or trees where this can prevent soil degradation or contribute to improving soil health, also taking into consideration the adaptation to climate change;*
- *(i) ensure optimised water levels in organic soils so that the structure and composition of such soils are not negatively affected;"*
- *"in case of known disproportionate loss of one or several functions that substantially reduce the soils capacity to provide ecosystem services, apply targeted measures to regenerate those soil functions."*

Member States shall also increase awareness through trainings etc.

Provisions relevant for CBS forestry

Climate: According to the Commission, better soil management may also lead to better climate adaptation with regard to wildfires. *“As the extreme weather and climate-related hazards intensify, the risk of wildfires is increasing across Europe. The conditions that heighten the fire risk are set to increase with climate change, notably heat and humidity of ecosystems, including soils. Healthy soils with functional water retention capacity also support healthy forest ecosystems that are more resilient to wildfires”* (EC 2023, p. 2). Healthier soils also improve water retention and increase carbon storage. A change in forest management might be needed to improve soil health. It is likely that these changes also improve overall biodiversity in the forests, but at this point, the exact impact on CBS forestry is not foreseeable.

Furthermore, regarding land take, Member States shall

- *“(a) avoid or reduce as much as technically and economically possible the loss of the capacity of the soil to provide multiple ecosystem services, including food production, by: (i) reducing the area affected by the land take to the extent possible and (ii) selecting areas where the loss of ecosystem services would be minimized and (iii) performing the land take in a way that minimizes the negative impact on soil;”*
- *(b) “compensate as much as possible the loss of soil capacity to provide multiple ecosystem services”* (Art. 11).

The draft Directive explicitly refers to “forestry land” in its preamble Nr. 30 where it defines land take. Depending on how “mandatory” this provision will be interpreted and implemented, this might lead to a decrease of land take in the Member States.

Finally, the Soil Monitoring Law requires to improve the management of contaminated sites (Art. 11-13) which might include forest areas, too.

A 2.5.4 EU Bioeconomy Strategy (2012, updated 2018)

General description

In 2012, Europe’s initial bioeconomy strategy was adopted. It addressed the production of renewable biological resources and their conversion into products and bioenergy. After a review (EC 2017), an update of the bioeconomy strategy was introduced in 2018 to redesign actions and better support the UN’s 2030 Agenda (Sustainable Development Goals), the Paris Agreement and new EU policy priorities (EC 2018a). It also shifted the focus to a circular bioeconomy. The new strategy is complemented by an Action Plan (EC 2018b). In 2022, a Bioeconomy Strategy Progress Report was published (EC 2022).

The **revised strategy** aims to “pave the way to a more innovative, resource efficient and competitive society that reconciles food security with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection” (EC 2018a, p. 8). It sets out five interrelated objectives (ibid, pp. 8):

- **Ensuring food and nutrition security** based on sustainable, nutrition-sensitive, resource-efficient, resilient, circular food and farming system and sustainable;
- **Managing natural resources sustainably** to avoid ecosystem degradation, restore and enhance ecosystem functions, increase food and water security and contribute to the adaptation and mitigation of climate change through negative emissions and carbon sinks;

- **Reducing dependence on non-renewable, unsustainable resources whether sourced domestically or abroad**, to deliver on EU energy and climate targets;
- **Mitigating and adapting to climate change** through long-term GHG reductions by promoting more resource efficient and sustainable primary production practices on land and sea and increasing the capacity of ecosystems to regulate climate;
- **Strengthening European competitiveness and creating jobs.**

The **Bioeconomy Action Plan** sets out 14 actions related to the priorities “1. *Strengthen and scale up the bio-based sectors*” (among others developing biobased substitutes to plastics), “2. *Deploy local bioeconomies rapidly across Europe*” (among others, through transitioning to sustainable forestry), “3. *Understand the ecological boundaries of the bioeconomy*” (among others though enhancing the biodiversity benefits in primary production).

The Bioeconomy Strategy Progress Report observes the following trends in the development of the bioeconomy in Europe (EC 2022, 6, 9):

- *“National bioeconomy strategies are becoming more numerous throughout Europe;*
- *The main use of biomass is for food and feed; woody biomass is increasingly used; – Primary and secondary woody biomass use has increased by 25 % and 29 % respectively in the past two decades. Energy-use of woody biomass has increased in the EU by about 12 % over the past two four-year periods of available data (2010-2013 and 2014-2017);*
- *The cascading principle must apply to the use of all biomass;*
- *Important innovations in food and other bio-based industries show the potential of the bioeconomy;*
- *Public involvement in R&I has shown good results so far and should be strengthened”*

Provisions relevant for CBS forestry

Climate: The objectives of the EU Bioeconomy Strategy include the mitigation of and adaptation to climate change. Specifically, the sustainable management of natural resources can contribute to mitigation and adaptation through the protection and build-up of carbon sinks in healthy ecosystems. The Bioeconomy Strategy grants particular meaning to the forest-based sector, describing forests as main primary producers and suppliers of biomass in the EU (EC 2018a, pp. 35). The second priority in the Bioeconomy Action Plan sets out the formulation of a Strategic Deployment Agenda for, among others, sustainable forestry (EC 2018b, p. 72). As part of this agenda, new opportunities for the forestry sector in terms of replacement of non-sustainable raw materials in construction and packaging and possible innovations in forestry-based textiles, furniture and chemicals as well as new business models for the valuation of forestry ecosystem services should be assessed (EC 2018a, p. 13). Replacing fossil fuel-based raw materials and energy/ fuels by bio-based substitutes can contribute to achieving climate targets, when indirect land use change (ILUC) effects are minimised.

Long-term carbon sequestration is implied in several components of the sustainable bioeconomy including carbon storage in wooden and woody biomass-based products, improved circularity and defossilization of major economic sectors (EC 2018a, p. 44). A basic principle of a sustainable bioeconomy is a resource-efficient primary production based on functioning (climate regulating) ecosystems (ibid, pp. 8).

Biodiversity: As written in the Strategy, the second objective, “managing natural resources sustainably”, is particularly needed to address increased environmental pressures and the

ongoing biodiversity loss. Under the third priority of the Strategy, “understand the ecological boundaries of the bioeconomy”, bioeconomy is defined as an approach that values and protects biodiversity which needs to include increased monitoring and reporting on the status of ecosystems and their biodiversity and on related impacts of land use and land changes (EC 2018a, pp. 14). However, as demand for forest resources grows, the pressure on forest ecosystems can be expected to grow, too. An expansion of forest land thus needs to balance the increasing demand for timber.

Table 19: Governance matrix EU Bioeconomy Strategy

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation	An action within the Bioeconomy Action Plan is the provision of voluntary guidance to operate the bioeconomy within safe ecological limits, an indicator for which is an improved conservation status of habitats or an increase in areas of ecosystems in good condition (EC 2018a, p. 98)					x
	Species conservation						
	Other						
Manage	Forest harvesting	The Bioeconomy Strategy refers to the EU bioenergy sustainability framework (RED) which defines sustainability criteria for forest-based biomass to prevent unsustainable harvesting (EC 2018a, p. 49)			x		
	Active management (other than harvesting)	The Strategy’s principle of working within “safe ecological limits” includes natural resource management, including forests			x		
	Other						
Restore	Forest restoration (including peatlands)	An action within the Bioeconomy Action Plan aims to “Increase observation, measurement, monitoring and reporting capabilities on the condition of biodiversity, ecosystems and ecosystem services, to underpin ecosystem conservation and restoration”					x
	A-/reforestation						
	Other						

Wood use	Shifts in wood uses (including by-products)	The Bioeconomy Strategy calls for a circular bioeconomy which also adds value to biological waste and residues (EC 2018a, p. 50)	x				
		An action in the Bioeconomy Action Plan is the launch of a Euro 100 million Circular Bioeconomy Thematic Investment Platform (EC 2018a, p. 76).				x	
	Cascading (end-of-life)	The Bioeconomy Strategy calls for application of the cascading principle (EC 2018a, p. 53).	x				
	Increased efficiency	An action in the Bioeconomy Action Plan is to facilitate the development of new sustainable biorefineries, which can improve the efficiency of biomass utilisation by increasingly parallel exploitation of sideflows, reducing and/or recovering waste and residues (EC 2018a, p. 45).					x
	Other						

Assessment (including stakeholder views)

The feedback on the revised Bioeconomy Strategy (EC 2018) and the related Action Plan has been largely positive and assessed as essential for transforming the EU towards a green economy. However, the Confederation of European Forest Owners (CEPF) urges the Commission to take into account that carbon sequestration, storage and substitution in forests and forest products “does not have the same capacity in aeternum and it is not extensive and accumulative. It is compulsory to have a sustainable forest management to prevent fires and floods provoked by biomass accumulation and massive afforestation without active management” (Hartl 2021).

As regards the Strategy’s setup, its five objectives rather appear as an outline of principles than measurable targets. The three priority areas of action are more operative, though they mostly include actions that are to be taken through EU innovation and research programmes, without much regulatory clout. Policy measures (e.g. within the Common Agricultural Policy) are missing that can effectively address the risk of intensive and ultimately unsustainable primary production and of impeding food security or nature conservation. Clear sustainability criteria for the production and utilisation of biomass are required, even if these restrict its availability. Where there are more sustainable alternatives available (e.g., solar and wind energy vs. biofuels), these should be made use of. Ultimately, reducing absolute levels of consumption (“sufficiency”) also needs to be striven for and operationalised by policies.

Outlook

The EU Bioeconomy Strategy Progress Report points to projections of a 40-70% biomass gap between biomass supply and biomass demand in Europe by 2050. Therefore, in order to close this gap, strategic considerations on European bioeconomies shall address trade-offs between nature protection, mitigation potentials and biomass supply as well as between increasing demands for materials, bioenergy, food etc. and the insufficient workforce for the bioeconomy (EC 2022f, p. 13). In this context, the report projects that technological solutions alone will not achieve closing the biomass gap so that more sustainable consumption patterns based on true costs are to be aspired. Further implementation of the EU Bioeconomy Action Plan will further have to consider future developments of food and energy prices, rising global demands and

global supply chains that affect the EU's resilience, competitiveness and respective incentives for local bioeconomies. Policies and regulations introduced since 2018 as a reaction to the Strategy are attested to have had pivotal effects on private investment decisions in biorefineries. However, the report points out that market access remains a challenge in this segment due to missing comprehensive regulatory policies in the EU and a large gap between the current costs of bio-products and consumers' demand. In addition, a stronger leverage for bio-based materials and products in general should provide an even playing field on the market, enhance innovation and stimulate start-up creation. Building on the European Circular Bioeconomy Fund, further investments should be provided to overcome the particularly large "valley of death" in bioeconomy innovations, caused by a lack of financing to transfer knowledge into innovations a long-term policy pull. With regards to consumption patterns, new standards, labels and transparency on the environmental footprint of circular bio-based products should be advanced, and reduced consumption should be considered.

A 3 National policies

A 3.1 Finland

A 3.1.1 Introduction

Finland has 26.3 million hectares of forest land, of which 77% is productive forest land, and the rest poorly productive or unproductive land, or used for forest roads etc. Most of the forest area of Finland locates on the boreal biogeographical zone. Southern coastal parts extend to the hemiboreal subzone of the temperate zone (Ahti et al. 1968 ; Fig. 1).

Approximately, 2/3 of forestry land is located on mineral soils, and 1/3 on peatlands. Peatland forestry is an important feature of Finnish forestry. Most of the peatland forests used for timber production have been drained to improve timber growth. Forestry-drained peatland soils are also an important source of GHG emissions into the atmosphere and nutrient leaching to water.

Scots pine and Norway spruce are economically the most important species, covering approximately half and one third of the growing stock, respectively; rest being broadleaved species, mainly Downy and Pubescent birch (Korhonen et al. 2017).

Regeneration fellings are typically clearcuts and conducted at stand age of 80–90 years in southern Finland and 85–140 years in northern Finland. According to the good practice guidance to forestry, stands are thinned 1-3 times per rotation period (Äijälä et al. 2019).

According to recent inventories, forests of ages between 41 and 80 years cover 38% of forest land. Forests older than 100-years cover 16%. Most of the old-growth forests locate in northern Finland and in protected areas. Altogether, 13% of forest land area is protected but most of the protected forests are in northern Finland and significant part on unproductive land. In southern Finland only 3-4 % of the forest land is under strict protection (Kulju et al. 2023). Other forests in Finland are mainly intensively managed, almost exclusively with rotation forestry, area managed with clearcuts covering 80% of all regeneration felling area in 2018.

The forestry sector accounted for 4.3% (9.3 billion €) of the total value added to the national economy in 2021, making it economically more important than agriculture and food industry, and a relatively important employer with 62,100 people. However, forest sector employment has decreased significantly in the 2000s. Nonindustrial private forest owners own 52% of forest land (59% of productive forest land), the state owns 35%, companies 8%, and the rest is owned by different communities. Private forest owners are a diverse and large group (620,000) owning 344,000 forest properties more than 2 ha of size (Kulju et al. 2023). Due to the importance of forest sector to the economy, long traditions and cultural heritage associated with forest, and a large group of forest owners, forest sector organizations, NGOs etc., the views about sustainable use of forests often differ and discussions are active.

There are multiple laws in Finland, which are associated with forest use and management and its subsidies. The Forest Act (1093/1996)⁶³ was renewed in 2014 and amended with the Government Decree of Sustainable Forest Management and Use (1308/2013)⁶⁴. The laws cover forests growing on forestry land, and mainly used for wood production. The Forest Act “promotes economically, ecologically and socially sustainable management and utilisation of

⁶³ <https://www.finlex.fi/fi/laki/ajantasa/1996/19961093>

⁶⁴ <https://www.finlex.fi/fi/laki/alkup/2013/20131308>

forests in order that the forests produce a good output in a sustainable way while their biological diversity is being preserved". It sets only minimum requirements for the management and use of forests, which relate to e.g., wood harvesting, forest regeneration, and preserving habitats of special importance, usually small in size, but otherwise the forest owner can usually freely make the management decisions. Laws exist also for supporting certain type of forest management and conservation practices (Act on the Financing of Sustainable Forestry, 34/2015⁶⁵, and Nature Conservation Act, 9/2023)⁶⁶, and temporary act for afforestation (1114/2020)⁶⁷.

In recent years, Finland has also developed an ambitious Climate Law (423/2022)⁶⁸ aiming at climate neutrality by 2035. The Climate Law established an overarching framework and planning and monitoring process for the implementation of climate policies. It also requires specific policies which need to be reviewed every second parliamentary term, including the Medium-term Climate Plan and the Climate and Energy Strategy, as well as the Climate Plan for the Land Use Sector ("MISU"), which is associated with forestry measures. These follow-up policies set specific plans for mitigation/adaptation action, e.g. MISU initiated the governmental process leading to a Catch the Carbon -research/development funding programme for the land-use sector in 2020, governmental policy decisions concerning the use and management of state forests in 2020, and the preparation of the deforestation fee.

Several other policies associated with forest management also exist. Strategies like the Finnish Bioeconomy Strategy (Finnish Government 2022b) and National Forest Strategy 2035 (2023) aim at climate and biodiversity smart management and use of forests but tend to emphasize economically sustainable use of forests, particularly timber harvesting for industrial purposes. They do not present concrete measures or detail the measures that should be implemented, nor have legislative power, but may have important role in shaping how policies and practices develop in the future.

For this policy review, we selected two policies for deeper review. Regular MISU updates by Finnish governments set agenda for establishing laws and programs that promote mitigation and adaptation in the land-use sector including forestry. The Act on the Financing of Sustainable Forestry provides a state aid mechanism to promote activities in private forestry, although so far, its measures have focused mostly on increasing wood production. The state aid mechanism also includes some measures to promote biodiversity and other environmental objectives.

A 3.1.2 Climate Plan for the Land Use Sector (MISU)

General description

MISU is a Climate Plan for the land use, land-use change and forestry sector (LULUCF) of Finland, which targets reducing emissions and increasing sinks in forestry and agriculture, while adapting to climate change. It prescribes a specific additional annual net removals target of -3 Mt CO₂-eq. by 2035. This target should be reached without reducing biodiversity and undermining food security and weakening profitability of farms. When choosing measures, the

⁶⁵ <https://www.finlex.fi/fi/laki/ajantasa/2015/20150034>

⁶⁶ <https://www.finlex.fi/fi/laki/alkup/2023/20230009>

⁶⁷ <https://www.finlex.fi/fi/laki/alkup/2020/20201114>

⁶⁸ <https://www.finlex.fi/fi/laki/alkup/2022/20220423>

emphasis should be on those that promote climate change mitigation and adaptation, as well as biodiversity.

The Climate Plan was prepared by the Ministry of Agriculture and Forestry, in close interaction with researchers and stakeholders. Before the final parliamentary approval in February 2023, the plan went through a public consultation. MISU sets up mostly concrete actions, which are then implemented by the relevant government bodies, mainly ministries. According to the Finnish Climate Act, the plan is reviewed at least every second parliamentary term. The Climate Act further sets requirements what it should contain. Some of the EU regulation can be also implemented through the process involving MISU.

Provisions relevant for CBS forestry

MISU forest-related plans are targeting activities, which have been identified based on research as potential ways to achieve emission reductions in near future. MISU plan is clearly oriented to the climate mitigation, although it also mentions the aim of not reducing biodiversity and eutrophication. The presented mitigation activities in MISU have been selected based on a third-party evaluation, which considered the efficiency of activities, uncertainties, and other aspects affecting their feasibility like legislative aspects and acceptance by landowners (farmers and forest owners). Each of the activities, which are planned to be implemented during the current parliamentary term, has been assessed by estimating potential GHG removals the activity could reach. Required budgets have also been estimated for some of the measures, which should facilitate reaching the removals estimate. Activities are enacted through different mechanisms, ranging from soft steering from the ministries to budget allocation for certain subsidies. New research and innovation projects are also allocated funding, which is expected to support effective mitigation activities in the future. Besides near-term implementation plan for selected activities, the plan also envisions additional activities foreseen to be implemented in the forthcoming parliamentary terms. The MISU-plan is aligned with the national medium-term climate plan (KAISU, Finnish Government 2022a) which applies to the effort sharing sector, i.e. sectors outside emissions trading, except for the land use sector, and is required in the Climate Law. The idea is that all measures under the Climate Law would serve national long-term targets and be consistent across parliamentary terms.

Several measures have also been listed, which are not directly affecting specific forest activities, such as developing catchment management planning, and promoting and facilitating markets for voluntary carbon emission (and eutrophication) reductions and carbon storage for which associated pilot projects have been envisioned. MISU also plans to initiate research and innovation, and development programmes to increase understanding to implement mitigation measures in the land-use sector, as well as cross-cutting initiatives like road maps and dissemination.

Table 20: Governance matrix. Note, MISU sets targets for selected measures, and it suggests/anticipates mechanisms that for implementing the measures.

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS	Governance mechanism
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		<i>(‘relevance’ can be positive or negative)</i>	a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Deforestation for urban and agricultural lands continues in Finland at rates 3 Mt CO ₂ -eq per year. MISU plans reducing these rates in four main ways: 1) by implementing EU deforestation legislation and specific restrictions of the CAP for using converted forest peatland in agricultural production. Targets reducing deforestation due to cattle raising needs, which conversion currently proceeds with rates of 2000 --- 4000 ha/a in Finland. Aim is set for reducing these losses by 900 ha/a in peat soils, and 800 ha/a in mineral soils. 2) MISU lists a plan for improving the structure of field holdings, which is expected to reduce the need for deforestation. Tools: existing financial aid for field plot consolidation, and information provision. 3) Reducing forest clearing for settlements is planned, too, but mainly using guidance, land use planning and by developing a tool for urban planners to assess climate impacts of land use changes. 4) Preparation of a land use change fee for all land use or an authorization requirement for clearing land.	x	x			x
	Forest conservation						
	Species conservation						
	Other						
Manage	Forest harvesting	Steering Metsähallitus (‘state forests’): sets increasing target for Metsähallitus for net reductions in forestry sector by 0.4 Mt CO ₂ -eq. in year 2030, and by 0.7 Mt CO ₂ -eq in 2035. Tool: letters from the Ministry (owner policy)	x				x
	Active management (other than harvesting)	Switch to continuous-cover forestry: 30% of harvests should be continuous-cover type in fertile spruce mires, i.e. approximately 6 000 ha/a. Continuous cover forestry would be adopted on 78,000 hectares of mires and bogs by 2035. The estimated climate impact is 0.21 million tonnes of carbon dioxide equivalent by 2035. Tools: change of subsidy scheme KEMERA/METKA (see next), training and guidance.	x			x	x
		Increase dead and down wood carbon pool. Target to reduce biodiversity loss and increase dead wood stocks. Tools: Retention trees, not harvesting damaged trees, at forest owner own cost, information and guidance. Estimated to gain 0-0.3 Mt CO ₂ -eq/a.	x				x
		Avoid ditch network maintenance (DNM) during thinnings in fertile spruce and poorly	x			x	

	Other (Avoid ditch network maintenance)	productive pine dominated peatlands, from 2023 onwards. The target is to reduce DNM by 13,000 ha by 2025, i.e. approximately 1,000 ha/a. Tools: change of subsidy scheme KEMERA/METKA (see next), guidance and training. The preliminary estimate for the emission reduction potential is 0.05 Mt CO ₂ -eq by 2035 (highly tentative estimate).					
		Ash fertilization on drained peatlands. Targets to increase ash fertilization by 390,000 ha by 2035, i.e. 26,000 ha/a from the current annual level of appr. 11,000 ha. This is expected to gain additional emission reductions of 0.4 Mt CO ₂ -eq, in 2035 and require 4.625 mill. € state aid. Tools: change of subsidy scheme KEMERA/METKA (see next), guidance and training.	x			x	
		Fertilization (nitrogen) on mineral forest soils. Increase from 24,000 ha/a to 50,000 ha/a (starting from 2023). In 2035, the increase in the overall area fertilised would equal 360,000 hectares. The projected annual impact is approximately 0.46 million tonnes of carbon dioxide equivalent in 2030 and approximately 0.28 million tonnes in 2035. Tools: dissemination (market-based i.e. usually profitable for the forest owner also without subsidies).	x				x
		Promote fast regeneration (cultivation) of forests after regeneration harvests (clearcuts). Tools: dissemination	x				x
Restore	Forest restoration (including peatlands)						
	Af-/reforestation	Afforestation on abandoned lands. Target: 3,000-4,000 ha/a, which is expected to gain 0.1 Mt CO ₂ -eq/a by 2035, and 0.2 Mt CO ₂ -eq by 2065 compared to previous land use. In 2021, the government laid out a temporary subsidy for abandoned land afforestation for years 2021-2023 (1114/2020). According to MISU, the subsidy plan is reviewed and continued (possibly upgraded). Afforestation of low-yield mineral soil and shallow peatland fields. Fields with a shallow peat layer and widely cultivated peatland fields suitable for afforestation cover an area of 9000 ha. Only a minor increase will be achieved in the carbon stock of trees by 2035, but emissions from soil will decrease. The overall impact is estimated at approximately 0.1 Mt CO ₂ -eq. Need for state aid in period 2023-2028 is expected to be 12 mill €.	x			x	
	Other						
“Wood use”	Shifts in wood uses (including by-products)	Promote use of wood in long-lived products by increasing the share of wood in public constructions and interior surfaces, and through research and innovation and legislation development, as well as creating lifecycle and carbon footprint estimation tools.	x			x	x

	Cascading (end-of-life)						
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

Lately, there has been an active discussion whether the actions introduced in MISU are sufficient to achieve the net removals target of the land use sector by 2035 and thereby also the Finnish national target of climate neutrality by 2035 which rests heavily on the land use sector and especially on forest carbon sinks. Already, before the parliamentary acceptance of the plan, some concerns were raised about the validity of assumptions and scenarios behind the targets and guiding mitigation activities. The operational environment has also changed: the LULUCF-sector in Finland has become a net source of emissions due increased timber harvests and soil emissions and slightly decreased timber growth.

Regarding to forests, MISU does not identify measures that could lead to quick emission reductions, such as measures restricting too early and intensive harvests in commercial forests (while conserving remaining old-growth forests). The implementation plans are also relatively soft, while climate mitigation could have benefitted on stricter initiatives on regulation of deforestation, and stricter policies considering restoring hydrology of drained peatland forests. These are also measures, which could have negative implications for wood production and rural livelihoods.

Considering the activities listed in MISU, progress has been diverse. While some rather straightforward measures are already in the implementation phase, others have been prepared but not enacted, and some are still under work in ministries. For example, subsidies for afforestation of abandoned land (note, not that of agricultural land) and ash fertilization of peatland forests have been implemented already before MISU, but measures for reducing deforestation have been under preparation in the Ministry of Agriculture and Forestry for several years.

Outlook

MISU will remain an important policy tool to plan and initiate the implementation of climate mitigation measures in the forest sector (and the whole land-use sector). It is important to understand that the current MISU plan was created by the government that ends its term in June 2023, and that it does not directly bind the next government. However, it was approved by clear majority in the parliament, which sets considerable political weight on the plan. Still, the next government, which is expected to start mid-2023, will most likely review and update some parts of the existing MISU plan, especially those that have not yet been enacted. Although the adopted measures depend on the government programme, the Climate Act states that MISU is a policy tool that will regularly be used in the process of planning the implementation of climate mitigation measures.

A 3.1.3 State aid for forestry activities in private forests

General description

The Finnish government allocates annually approximately 50 M€ in state budget to finance forestry activities in private forests. The aid scheme is a cost-share programme where the nonindustrial private forest owners eligible for the aid usually pay 30-70% of the incurred costs of a management activity, most often early tending of (pine or spruce) seedling stands and pre-commercial thinning of similar stands. The prime objective of the aid scheme (called KEMERA 1997-2023 and METKA 2024 onwards) is to increase timber growth, maintain road networks for forestry and other rural purposes, protect small-scale biotopes of high biodiversity value from harvests with fixed 10-year environmental contracts, promote fertilization with wood ash on peatland forests where nutrient imbalances often weaken timber growth and vitality, and promote ditch network maintenance (DNM) on drained peatlands. DNM includes also making new ditches, especially in northern Finland, and forest road maintenance allows to a certain extent aid for the construction of new forest roads. Approximately 70% of the state aid is allocated to two measures, 1) early tending of seedling stands and 2) precommercial thinnings, in which eligible costs are one-off working costs covering 40-60% of the actual costs. In precommercial thinnings, also collection of forest residue (small-sized trees and logging residue (treetops, branches, needles, and leaves) may be eligible for aid. Since 2015, stumps have been excluded from this aid mostly because of environmental reasons. Commercially profitable first thinning sites are not eligible for the aid.

Provisions relevant for CBS forestry

The climate impacts (mitigation and adaptation) of KEMERA and METKA are somewhat mixed and depend, e.g., on the time scale. Most aid is allocated to early tending of seedling stands and precommercial thinnings, which actually decrease timber volume (biomass) compared to unmanaged stands but in the long-term increase production of large-sized timber for industrial purposes, particularly for higher value products such as sawnwood and plywood which promote carbon storage in products.

Early tending of seedlings stands as well as precommercial thinnings are usually profitable investments for forest owners, but the long return time of the investment has been considered the main obstacle for carrying out these activities at a proper scale in private nonindustrial forests without subsidies. The stated objective of the aid allocated to these two measures is “to guarantee healthy and well-growing timber stands”, which is assumed to promote climate change adaptation. On the other hand, these management activities are often carried out in a way that leads to decrease in the share of broadleaved species, especially birch and aspen, which undermines climate adaptation and biodiversity.

State aid to ditch network maintenance (DNM) is perhaps the most controversial measure in KEMERA. The stated objective is “to support restoration of ditch drainage systems and water protection measures in areas drained in the past”. DNM can be done by clearing the old ditches (ditch cleaning) to their original depth (80–100 cm) or digging new ditches between the old ones (supplementary ditching), or as a combination of both.

Recent research suggests that water protection measures in DNM are often insufficient and that leaching of nutrients and organic matter from drained peatlands to water bodies is much higher

and more persistent phenomena than has been previously estimated (Nieminen et al. 2018), and that the effects persist for long time (Nieminen et al. 2022). The climate impacts of DNM are complex and multidimensional since they involve standing timber (species, volume, age-class and size-structure, growth, also ingrowth), harvest regimes, water table, soil emissions, nutrient imbalances and possible fertilization, and wide range of other site and catchment properties.

Table 21: Governance matrix. Kemera/Metka's descriptions are based on current Kemera system that is active until the end of 2023.

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation		x				
	Forest conservation	Fixed-term (10 yrs) voluntary protection of valuable habitats against financial compensation (METSU-program). Program funds temporary, permanent, and conservation measures in forests that have high conservation value and are important habitats for forest-dwelling species. The program has been popular among forest owners and it continues until 2025.				x	
	Species conservation						
	Other						
Manage	Forest harvesting	Pre-commercial thinnings (tending of young forest). Stand, (dominant species) height must be at least 3 m and less than 16 cm in diameter after the operation. The density of remaining trees must be less than 3000 trees/ha after the operation, but the limit decreasing with the size of the remaining trees. Alternatively, the mechanism allows collection of small wood.				x	
		Tending of seedling forests. Remaining seedling stand needs to be between 0.7-3.0 m tall <u>after, remove at least 3000 trees/ha and have maximum of 5000 trees/ha after the operation.</u>				x	
	Active management (other than harvesting)	Ditch network maintenance in peatlands (incl. digging new ditches).				x	
	Other	Forest roads, construction and maintenance				x	
		Forest fertilization (mostly peatland forests suffering nutrient imbalances, typically lack of P, K, B)				x	
Restore	Forest restoration (including peatlands)	Restoration, e.g. wetlands, wells, brooks and other small-scale water bodies, prescribed burning, removal of invasive species, and other activities for nature and culture and recreation				x	

	Other						
Wood use	Shifts in wood uses (including by-products)						
	Cascading (end-of-life)						
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

Kemera/METKA are temporary subsidy systems and form a major part of the MISU measures in forest environments. Content and duration of the systems are regulated by a law but in practise the duration follows CAP. Most measures require an implementation plan, which is evaluated before approval. The subsidy system defines conditions when the subsidies apply, and it has laid out a monitoring system for the impacts of measures that were implemented with the subsidies. Subsidies can also be reclaimed but this happens rarely. Monitoring of the measures occurs if there are doubts about successful implementation and with risk-based and random checks.

Kemera has been criticized for being focussed on timber production, while the negative environmental effects have been of considerably less importance. An important feature of Kemera has been the allocation of funds to different measures. However, Kemera does identify environments where fertilization could have negative impacts (or no positive impact), requiring that fertilization is only used when there are shown nutrient imbalances (required for mineral soils) and where there is no risk for the negative impacts e.g. on ground water.

Outlook

METKA is expected to replace the current KEMERA as of starting 2024, containing few amendments, which are expected to reduce harmful environmental impacts of peatland forestry. The METKA system, which is yet to be approved by the European Commission, does not contain a direct subsidy for DNM, which is generally considered to lead to increased soil CO₂ emissions on peatlands. METKA also lays out new subsidies for the catchment scale planning of peatland areas, aiming at sustaining wood production, but also reducing soil and water emissions and negative impacts on biodiversity. However, DNM continues to be subsidized indirectly since the state allocates funds to *planning* of ditching (cleaning old ditches and digging new ditches), the latter being still a widely used practice in northern Finland.

There are no other major changes compared to the existing subsidy system except for fixed-term environmental protection contracts. Under METKA, a forest owner may receive compensation not only on basis of income foregone (due to delaying harvests by 10 years or, if the contract is renewed, even for a longer period) resulting from an environmental commitment, but also on the basis of amount of deadwood on the site. This is a major change in the subsidy policy since part of the payment to the forest owner is in effect based on environmental services that are not remunerated by the market. The EU state aid rules have allowed this type of payments in forestry since January 2023.

A 3.2 Italy

A 3.2.1 Introduction

Italy's forest heritage consists of about 9 million ha of forests and nearly 2 million ha of other forested land, mostly shrublands. Overall, forest areas cover more than 35% of the national territory, and in some regions they represent the most important form of cover, occupying about 50% or more of the regional area, as is the case in Trentino-Alto Adige, Liguria, Tuscany, Umbria and Sardinia (RAF Italia 2019). According to the 2015 National Inventory of Forest and Carbon sources (INFC), the forested areas in Italy have increased from 34.75% (10.467.533 ha) in 2005 to 36.7% (11.054.458 ha) in 2017 (RAF Italia 2019).

Italian forests are characterized by a high variety of species, structural and governance forms. Coppice, in the form of matriculated coppice, prevails in terms of area, but forested formations occupy more than 3 million ha, divided roughly equally between even-aged and uneven-aged or irregular formations. Forest ownership is predominantly private (66%), but publicly owned forests cover substantial portions of the forest area (34%), particularly in some regions and autonomous provinces (Trento, Lazio, Abruzzo and Sicily). Most of the forested area is subject to hydrogeological constraints (81%). Detailed forest planning (forest management plan) is still relatively uncommon at the national level: only 18% of the forest area is currently managed through this type of instrument (RAF Italia, 2019).

Even though the area covered by forests has increased, climate change has made these ecosystems more susceptible to various adversities, such as pests, invasive species, droughts, storms, and fires. In particular, over the past four decades, burned area amounted (on average) to 107,289 ha per year. According to Agnoletti et al. (2022), the expansion of forest area in Italy is mainly due to human influence and the changes in the socio-economic context. The new forested areas spread and grow because of the abandonment of the countryside and the so call "rural exodus" toward urban and coastal areas. Despite this significant increase, the volume of net wood harvest increased only 24% of the (INFC 2015) and Italy ranks as a net importer of forest products. Depopulation and abandonment of rural areas have resulted in a decline in human and financial resources dedicated to forest management, which has in turn increased risks, and well as the interruption of traditional forest knowledge (Agnoletti et al., 2022). Finally, according to Agnoletti et al (2022), at the national level there are no dangers of deforestation, and it is crucial to better manage the existing forests besides further afforestation (Marchetti et al. 2019).

Till 2018, Italy did not possess a proper national forestry policy. In addition, as enshrined in the Constitution (Title V), responsibilities for land management and productive development of forests are delegated to the regions. The process of regionalization, started in 1972, has had different speeds and implications across the territory and has taken place in a scenario of little dynamism and coordination (RAF Italia, 2019). This process allowed to develop regional policies based on the needs of the different regions, but it created a high degree of inhomogeneity in terms of forest monitoring and management, as well as policy implementation. The first law aimed at homogenizing this situation and enhance forestry, safeguarding the environment, and managing the national forest heritage was the Legislative Decree 227/2001 "Orientation and Modernization of the Forestry Sector", which set the framework rules for the sector. Based on Legislative Decree art. 3, the "National Forest Planning Guidelines" were drafted in 2005. The Legislative Decree 227/2001 assigns the regions the task of defining lines of protection, conservation, and enhancement of the forestry sector through the preparation (or

revision) of Regional Forest Plans based on national guidelines, with a view to sustainable and multifunctional forest management. At present, almost all Italian regions have drafted their own regional forestry plans, some merely establishing guidelines, and some others in the form of regional law. For example, **Sardinia developed its Regional Environmental Forestry Plan (PFAR) in 2007 and its Forest Law in 2016.**

Finally, in 2018, the **national law on forests and forestry supply chains (TUFF)** sets unified regulatory guidelines and sector coordination for the Italian regions and relevant ministries. Its primary objective is to promote the sustainability of forest resources and the protection of forest heritage by creating a multilevel institutional competence structure for forest planning. This measure is intended to recognize Sustainable Forest Management (SFM) as a tool to ensure an increase in carbon absorption, as well as the production of quality wood products. In this context, for example, a gradual change in the utilization rates recorded so far is expected over ten years, with a shift from the current 30-33% per year to a possible 40-45% utilization.

The TUFF will contribute to achieve the 2021-2030 greenhouse gas emission reduction target of -33% compared to 2005, as reported in the **National Plan for Energy and Climate 2030 (PNIEC)**. PNIEC targets for 2030 are ambitious in terms of the increase of renewable energy sources (RES), covering the 30% of gross final energy consumption. In particular in the thermal sector, bioenergy will maintain its primal role among RES even in 2030. This consumption trajectory is accompanied by an equipment renewal program, on which the PNIEC puts considerable emphasis (GSE 2021).

The TUFF also deals with climate mitigation and adaptation, and it has been drawn up taking into account the international commitments made by the Italian government to tackle climate change. In this sense, TUFF implementation - through the National Forest Strategy - foresees a strong coordination with the **National Adaptation to Climate Change Strategy and Plan (SRACC and PNACC)**. Particularly, PNACC was prepared in 2017 under the supervision of the MATTM (now MASE) and aimed at preparing the adaptation framework at the national level, functional for the purpose of designing adaptation actions at the different levels of government and in the different sectors of intervention. It was configured as a guiding tool for institutions at all levels of spatial government for the purpose of integrating adaptation issues into sectoral programming and planning tools mostly under regional competence; in this sense it constituted a common base for data, information and analysis methodologies. In 2018, PNACC was subjected to a structured participatory process (such as Strategic Environmental Assessment) that started in 2020. Currently, the PNACC is completing the assessment process in order to be approved.

For this policy review, we selected three policies for deeper review and to take into consideration the regional diversity that characterizes the forest system in Italy. The first one is the TUFF, since - as said above - it aims to strengthen the coordination State/Regions and formulate clear national guidelines on programming, planning, protection and active management of the national forest heritage. Then we will discuss the Forest law of the Sardinia region (l. reg. 2016, n. 8). The Law equips the Region with sector-specific legislation that is in harmony with European Union standards and Italy's international commitments on sustainable forest management, environmental and landscape protection, and mitigation of climate change-related effects. Finally, we will discuss about the Sardinia Region Environmental Energy Plan 2020 (PEARS).

A 3.2.2 National law on forests and forest supply chains (TUFF)

General description

The national law on forests and forest supply chains (TUFF, D. L.vo 03/04/2018 n. 34) implements the reorganization of the forestry matter in Italy introducing innovative conceptual approaches and new operational tools, largely derived from international commitments and new European policies on forestry, agriculture, environment, landscape, trade and rural development. TUFF aims to deal more effectively with the urgent needs of protection and active management of the Italian territory, to prevent agricultural abandonment and demographic decline in the mountainous and rural areas of the country and, secondarily, to ensure environmental and landscape conservation, the development of new "green economies" and job growth, particularly in the internal areas of the country.

The TUFF has been drafted taking into account the international commitments signed by the Italian government in the fight against climate change and the conservation of biodiversity, within the framework of the relevant UN Conventions and consistently with what has been defined by the pan-European conferences (Forest Europe MCPFE - Ministerial Conferences for the Protection of Forests in Europe) and the EU guidelines and plans concerning landscape protection, sustainable development, bioeconomy and forestry matters (e.g., Forest Action Plan 2006, European Forest Strategy 2013, European Biodiversity Strategy 2011, European action for sustainability 2016).

The TUFF was prepared by the Ministry of Agricultural, Food and Forestry Policies in close cooperation with an interdisciplinary working group, who interacted with stakeholders to collect new information and elements useful for the drafting of the **9 implementing decrees**. One of the decrees is the National Forestry Strategy (NFS) of Italy of 2022. It is the first of its kind at a national level and, contains a strategy for the next 20 years.

It is noteworthy that the last TUFF article contains a financial invariance clause. It means that the implementation of this decree shall not result in new or greater burdens on public finance. Although, in 2019, the Forests Fund was established (L. 145/2018) for the implementation of measures under the TUFF. Furthermore, a special decree from the State/Regions Conference distribute the funds across Regions. For example, in 2022, the Forest Fund amounts to about 5 million euros intended to finance the following interventions: (1) protection and enhancement of monumental trees, (2) identification of areas definable as old-growth forests, (3) establishment of the national register of forest reproductive material.

In 2021, furthermore, another fund was established (L. 234/2021) for the implementation of the NFS. It allocates relatively to the years 2022 and 2023 an amount of 30 million euros for each year to finance different types of actions under the SFN, including: biological diversity of forest ecosystems and sustainable forest management. The fund is divided as follows: a fixed share (7.5% of the total amount to all 20 Italian regions), a share proportional to the area of regional territory (e.g., for Sardinia this is about 180 thousand euros), and another share calculated in proportion to the area in hectares derived from the national forest inventory (e.g., for Sardinia about 3 million euros). Finally, each region may autonomously allocate the above-mentioned financial resources considering (1) the priority actions defined through a decree, (2) local characteristics, (3) availability of other financial resources, such as those pertaining to regional budgets or other financial instruments (e.g., Rural Development Funds).

Provisions relevant for CBS forestry

TUFF ensures the protection, enhancement, and active management of the national forest heritage and promotes the sustainable development of its production chains, also identifying the minimum national guidelines to be able to achieve the most suitable silvicultural practices aimed at guaranteeing a rational and effective use of resources forestry in Italy. In that sense, all these topics and the corresponding implementing decree have crucial implications for CBS forestry.

It is through the NFS that national guidelines for the protection and enhancement of the national forest heritage and its supply chains are then defined. The NFS pursues 3 General Objectives, for each of which Operational Actions are identified, complemented by Specific Actions and Instrumental Actions. **Specifically, the first and second NFS objectives affect CBS.**

The first objective “Sustainable management and the multifunctional role of forests” promotes sustainable management and the multifunctional role of forests to ensure, from the national to the local scale, the balanced, steady and continuous supply of goods and Ecosystem Services. Within this objective, the SFN then proposes, among others, an operational action (A.6.1) aimed not only at climate change mitigation through forestry activities, but the adaptive capacity of the forest stock to ensure healthy and viable forest ecosystems that maintain biodiversity, protective and productive functions, and other ecosystem services. The timeframe for achieving the expected results is very short (within 5 years from the publication of the strategy). The intervention instruments and financial sources are: the Agricultural and Rural Development Fund and other Structural Funds; regular resources from the budgets of central and regional governments and additional resources for mountain and inland areas; Framework Program for Research, Community LIFE+ Program and INTERREG as additional and complementary instruments.

Another operational action (A.4) is aimed at biodiversity protection and the reduction of biodiversity loss, monitoring and conservation. Various types of sub-actions are envisaged in this area, ranging from improving knowledge about the state of biodiversity conservation and ecosystem functionality of forests, to introducing actions to halt or at least reduce biodiversity loss (through safeguarding, restoring or even establishing new forest areas in degraded areas), to preserving and improving the ecological diversity and complexity of the agro-sylvo-pastoral heritage. Also, a specific operational action (A.1) foresees an improvement and increase of forest planning and programming, management policies, and landscape and land conservation. In particular, two sub-actions are aimed at increasing by 2030 the national forest area under a homogeneous landscape forest plan (+20%) and under a forest plan at local level (+30%). The intervention instruments and financial sources are: ordinary resources from the budgets of central (e.g., the above mentioned Funds), regional and Autonomous Provinces, additional resources for mountain and inland areas, Structural Funds Structural, funds from private individuals (enterprises, Foundations, trade associations, etc.). Additionally, also funds from research programs, LIFE+ and INTERREG.

The second objective “Efficiency in the use of forest resources for sustainable development of the economies in rural, inland and urban areas” is aimed at improving and increasing sustainable management in existing forests. The objective is to “maintain forest biodiversity, productivity, renewability, vitality and potential to fulfil, now and in the future, relevant ecological, economic and social functions”. In this case, the expected outcome of the specific measure B.1 is a +30% in the area of the national forest area by 2025 compared to 2005. Another aim is represented by fostering forest certification. It represents a commitment and guarantee for the promotion and enforcement of proper forest management and on the traceability of woody

materials to the finished product. Also in this case, it is expected an increase (+30%) in the forest area covered by certification by 2025 compared to 2005. These measures will be financed by the NFS Found.

Within the second objectives, several actions related to wood use are provided. They are related to the development of wood products, as well as of wild forest products, taking into consideration the development in the bioeconomy and bioenergy, innovations in mechanization and logistics, and the need to adapt the forest resource management methods to market dynamics.

Table 22: Governance matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (<i>'relevance' can be positive or negative</i>)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Increasing forest areas Exemption from interventions compensation of the transformation of the forest	x	x			
	Forest conservation	Recognize and remunerate the services of public, environmental and social interest provided by forests and maintained and increased by sustainable forest management			x		
	Species conservation	Reduce and/or halt the loss and improve the biological diversity of forest ecosystems.	x				
	Other						
Manage	Forest harvesting						
	Active management (other than harvesting)	Creating 20% more forest area with a homogeneous landscape forest plan and 30% more forest area with a forest plan at local level	x				
	Other (Promote active prevention of hazards)	Promote active prevention actions against natural and anthropogenic hazards, plant disease, fire, pollution and biotic and abiotic adversities.	x				
Restore	Forest restoration (including peatlands)	Restoration of damaged forest by natural and anthropogenic hazards, plant disease, fire, pollution and biotic and abiotic adversities.	x				
	Af-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	Developing sustainable markets for wood forest products	x				

		Promote and enhance local processing, artisanal and industrial, of woody forest products. Support effective traceability and control systems					
	Cascading (end-of-life)	Qualify the forest-wood-energy supply chain at the local scale Promote the culture of "cascading" use and recycling in the use of forest materials.	x				
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

The TUFF, and the related implementing decrees, in particular the NFS, positively affect CBS forestry as it sets legally binding requirements and rules for environmental and landscape management and conservation, prevention from forest fires, mitigation of and adaption to climate change, and the development of new “green economies”, reducing the supply of woody material from third countries and enhancing local production chains. The Law reinforces the coordination between State and Regions, which was a crucial gap under the forest framework in Italy. The complexity of governance and the prolonged absence of real coordination of forest policies, has not allowed, for example, to consolidate a constant system of data collections. Now regional legislation has to be changed in order to comply with its provisions.

Romano (2020) pointed out that fundraising for implementing NFS actions was to be found only in regional budgets or in the operational programs made available by European programming with partial or no contribution from the National level⁶⁹. Indeed, at that time, only the Forest Fund (financing for example monumental trees and old-growth forests) was in place. With the law 234/2021 and decree 123/2022, the former MIPAAF (Ministry of Agriculture, Food, and Forestry Policies) now MASAF (Ministry of Agriculture, Food Sovereignty and Forestry) presented the amount, criteria, and procedures for using the resources of the NFS Implementation Fund. At the moment, only 8 actions over 26 were selected as priority for the years 2022 and 2023. Thus, Regions have to prioritize funding for forestry measures in their Rural Development Plans or other Structural Funds for the remaining actions.

Outlook

TUFF constitutes the framework law for guiding and coordinating forestry and forest supply chains and provides a series of implementing decrees for its application. So far, 9 implementing decrees have been produced. In particular, TUFF article 6 established the National Forestry Strategy, published in 2022 after receiving the approval from the Permanent Conference for Relations between the State, the Regions and the Autonomous Provinces of Trento and Bolzano (12/2021). The NFS is valid for 20 years and will need to be updated, following five-

⁶⁹ Romano S (2020). L'implementazione della Strategia Forestale Nazionale a livello locale: un'opportunità importante, non facile da cogliere. *Forest@* 17: 58-62. - doi: 10.3832/efor0057-017

year reviews or upon specific institutional requests and in application of new international commitments.

A 3.2.3 Forest law of the Sardinia region (l. reg. 2016, n. 8)

General description

Sardinia's forestry sector underwent a major reorganisation with the introduction of Law No. 8 on April 27, 2016, commonly known as the "Forest Law of Sardinia" (SFL). The new law aimed to address the lack of comprehensive legislation in the forestry sector in Sardinia, where the only available regional instrument was the Regional Environmental Forestry Plan (PFAR), adopted in 2007, also given the growing importance of the forestry sector's environmental, social, economic, and cultural significance, locally and internationally.

- The SFL set out forest management objectives, including forest protection, sustainable resource management, biodiversity conservation, prevention of forest fires, and promotion of economic development related to the forestry sector. The development of the text followed some inspiring principles that can be summarized in the following points: the concept of forest complexity and multifunctionality;
- socio-economic aspects and optimization of forestry work and production chains;
- defining and sharing forest policies with different stakeholders.

In addition, the SFL provides for an organic reform of the organization of the Forestry Authority of Sardinia (Ente Foreste) creating a new different legal entity: the Regional Forestry Agency for Land Development and Environment of Sardinia (FoReSTAS), thus implementing the principles of effectiveness, efficiency and economy.

This law alone can't solve all forest and environmental issues. But it provides a good starting point. To make it effective, cross-functional teams and specialized groups are needed to execute regulatory measures.

Provisions relevant for CBS forestry

The objectives of the SFL include forest protection and care, sustainable management of forest resources to ensure the well-being of present and future generations, prevention and safeguarding against fire risks, hydrogeological protection of the territory through forest management, biodiversity conservation, valorisation of forest supply chains, tourism development, and recreational activities related to the forest heritage, climate change mitigation through sustainable forest management, and promotion of forest culture (Title I). The law aims to maintain coastal and terrestrial ecosystems and care for the entire territory. It is important to note that the protection goal does not conflict with promoting public and private forest resources. Instead, the law encourages sustainable development and utilisation of these resources, promoting associations and productive chains associated with the forestry sector.

The law establishes that forest planning and programming as essential tools for the sustainable management of silvopastoral resources (Title II). The different levels of planning are described including the Regional Environmental Forest Plan (PFAR), District Territorial Forest Plans (PFTD), and Detailed Forest Plans (PFP). These planning tools help guide forest resource management actions in the regional territory. Additionally, it is established that forest planning within protected areas and Natura 2000 sites must comply with the specific regulations of these areas, respecting the conservation needs of natural and semi-natural habitats to prevent

negative impacts on the environment. Finally, Article 11 discusses the Executive Forest Programming Document (DEPF), which represents the forest intervention plan for the region, and Article 12 establishes the Regional Council for Forest Policies, which has an advisory role in forest planning. Title III addresses the management of public forest assets. It defines the concept of public forest heritage and establishes the management procedures for public entity forest properties. The objective is to ensure effective and sustainable management of the public forest heritage. Public forests assigned to the Agency can be leased to third parties such as entities, associations, foundations, and non-profit committees that promote and protect the community's general interests to carry out public interest activities (Art. 18). The transformation of forests into other uses must follow a specific procedure of requests and can only be authorized upon obtaining a landscape authorization from the competent authority (Article 19). If the transformation of forests is approved, it must be compensated by reforesting non-forested areas of equal size with native species (Art. 21).

Preventing and combating forest fires is a priority in forest management (Title IV). It includes the development of prediction-oriented systems through the Regional School of the Forest and Environmental Monitoring Corps, as well as research and experimentation of innovative operational techniques and organizational models (Art. 22). The Region, through the Regional Civil Protection, prepares the Regional Fire Prevention Plan (PRAI), which includes actions, obligations for direct prevention, and technical interventions suitable for preserving the forest and rural vegetation from the danger of fire. It also establishes criteria for regional coordination and standardization of firefighting volunteers (Art. 23). Fire prevention regulations, prohibitions, and penalties are also defined (Art. 24). Additionally, it represents the regional fire system, which includes the Regional Civil Protection, the Forest and Environmental Monitoring Corps, and the Agency (Art. 25).

The law also supports the promotion of forest economy and research by enhancing agrosilvopastoral chains related to forest management and promoting associative forms of forest management (Title V). There are various measures as a regional register of forest companies is established (Article 26), and the creation of associative forms for forest management is encouraged (Article 27). Silvicultural activities are promoted through public and private interventions (Article 28), and forest certification is encouraged for sustainable resource management (Article 29). The value chain of timber production is enhanced (Article 30), and cork oak cultivation is promoted (Article 31). Furthermore, developing activities related to forest products is encouraged (Article 32). Additionally, the SFL seeks to simplify and rationalise the establishment and organisation of the forestry sector (Title VI). The FoReSTAS Agency replaces the previous Forestry Authority to reorganise and update its tasks according to current needs. This reorganisation aims to streamline administrative procedures and improve the coordination of activities, making the forestry sector more efficient. The agency has responsibilities beyond managing forest resources, including actions for biodiversity protection, defence against climate change, productive, touristic, and cultural enhancement of natural heritage, promotion of scientific research, and environmental education.

The law also recognises the importance of knowledge in the forestry sector. Therefore, it promotes scientific research, experimentation, innovation, and technology transfer. Informational and monitoring tools are crucial to support these activities, ensuring the sustainable use of forest resources and promoting the development of innovative solutions for natural environment management and protection.

Finally, Title VII concerns the regional law's financial, initial application, final, and amendment provisions. In particular, Article 53 stipulates that the regional administration must implement this law without creating new or additional financial burdens, using resources already allocated to interventions provided for by other regional laws.

Table 23: Governance matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (<i>'relevance' can be positive or negative</i>)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	When authorized, the conversion of forested areas is compensated through reforestation on non-forested land of equal size with native species. The promotion of forestry activities, as outlined in Article 28, includes expanding through reforestation or afforestation, restoring degraded or damaged forests, practicing tree care, implementing rewilding interventions, and providing phytosanitary protection. Additionally, protecting monumental trees and rewilding forest areas are also prioritized.	x	x	x		
	Forest conservation	-Compensatory measures for the protection and enhancement of biodiversity, landscape, and environment, including forest systems located in coastal and dune environments. -Planning, management, and activities in Natura 2000 sites.			x		
	Species conservation	The region is committed to the conservation of forest systems, biodiversity, and the genetic integrity of native and indigenous species, as well as natural habitats, in accordance with Legislative Decree November 10, 2003, No. 386 (Implementation of Directive 1999/105/EC, Article 33).			x		
	Other (Prevention of forest fires)	The law focuses on the prevention and fights against forest fires, which are a priority in forest management (Forest Road Plan; Regional Fire Prevention Plan PRAI - Article 23; operational plans by the Forest and Environmental Surveillance Corps - Article 23; definition of actors and competencies of the Regional Firefighting System - Article 25).			x		

		Protection of the territory's hydrogeology and soil defence. Mitigation of effects related to climate change and counteracting desertification processes.					
Manage	Forest harvesting	Establishment of the regional register of forestry companies (Article 26); Forms of associative management and forest consortia (Article 27); Promotion of forestry activities (Article 28).	x		x		
	Active management (other than harvesting)	The law provides guidelines for forestry planning and programming, which are considered fundamental tools for ensuring sustainable management of forestry and pastoral resources. Three levels of planning are identified. The law promotes membership of public and private forest owners and managers in voluntary forest certification schemes (Art. 29)	x				
	Other	the FoReSTAS Agency is established to replace the pre-existing Forestry Authority, with the aim of reorganizing and updating its tasks in line with current needs.			x		
Restore	Forest restoration (including peatlands)						
	Af-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	The law aims to enhance and increase forestry and silvopastoral supply chains, related to forest management and the use of forest biomass, for the purpose of energy production. Furthermore, it promotes the development and sustainable use of these resources at the local level, stimulating associationism and production chains related to the forestry sector.			x		
	Cascading (end-of-life)						
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

The impact of the SFL on CBS forestry has been (and it is expected to be) positive. Regional forestry planning has moved forward, and since the approval of the law to date, 7 Detailed Forest Plans (Art. 8) of regional forest have been drafted and approved. The Detailed Forest Plans are the operational tool for the management and planning of silvicultural interventions on forest properties and related works and infrastructure. Thus, the SFL has effectively regulated

active forest management involve different stakeholders. However, sufficient financial coverage and active social commitment are required for these plans to succeed.

Moreover, the forest policy is aimed to positively impact biodiversity, with particular emphasis on protecting and conserving the forest environment while safeguarding against environmental risks. The fire prevention plan is an effective tool for achieving these goals.

Outlook

To promote sustainable forest management that balances economic, social, and environmental aspects, Sardinia region has enacted this legislation for the forestry sector. SFL aligns with European Union regulations and Italy's international commitments and aims to protect and sustainably manage the forest heritage while promoting development and employment in the sector. SFL integrates crucial economic, social, and environmental functions and aims to preserve biodiversity, regeneration capacity, and the maintenance of forest ecosystems. Additionally, it aligns with Italy's international commitments regarding sustainable forest management, environmental and landscape protection, and mitigation of climate change effects.

However, despite the law coming into effect, several specific challenges still require attention in the context of Sardinia. The abandonment and fragmentation of forest properties remain significant problems, and it is essential to promote the creation of consortia and other forms of collaboration that facilitate collective land management to overcome administrative difficulties in obtaining forest management plans.

Another critical challenge concerns the protection of specific silvicultural sectors, mainly the cork oak. This tree species requires traditional knowledge that is deeply integrated into the regional cultural and historical heritage. However, this traditional knowledge is at risk of not being renewed and lost. Therefore, specific measures need to be adopted to conserve and valorise these traditional skills to preserve the cultural heritage and ensure the future of cork oak in the region.

A 3.2.4 Sardinia Region Environmental Energy Plan 2020 (PEARS)

General description

The Regional Environmental Energy Plan 2015-2030 (PEARS) was published in 2016. The Regional Administration uses it to reach its energy, socio-economic and environmental goals by 2030 starting with the analysis of the energy system and the reconstruction of the Regional Energy Balance (BER). The strategic goal for 2030 is to reduce the CO₂ emissions associated with Sardinia's consumption by 50% compared to the values estimated in 1990. This goal shall be achieved through a comprehensive efficiency and savings intervention: i.e., the use of local renewable energy shall be maximised. The Plan aims to promote a new model of circular economy and "truly eco-sustainability" that minimizes the consumption of land, landscape and natural resources.

The PEARS is structured into four general objectives, with several specific objectives: (OG1) Sardinian Smart Energy System; (OG2) energy security; (OG3) efficiency and energy savings; (OG4) research and participation. Within the specific objectives of OG2, the PEARS aims to promote energy distribution from renewable sources for self-consumption, including energy from biomasses. In particular, the PEARS represents a Framework Document, to which two documents contribute: the "Guidance Document for Improving Energy Efficiency in Sardinia

2013-2020" and the "Study on the energy potential of biomass in Sardinia". The latter also analyses the potential of forest biomass and wood arboriculture. Concerning biomass availability, the average annual increment is about 1.5 million tons, and it is sustainable to take withdrawal of 320,000 tons annually from the regional territory.

PEARS has been submitted for Strategic Environmental Assessment (VAS), thus it is periodically monitored in terms of environmental effect through a full-bodied number of indicators.

Provisions relevant for CBS forestry

In addition to the reduction of greenhouse gas emissions by 50% with regards to 1990 levels, energy production from renewable sources is expected to settle at 50% in 2030. The energy scenarios identified by the PEARS were based on these sustainability criteria: (1) limitation of land consumption and landscape conservation; (2) pollution control; (3) biodiversity conservation. The Strategic Environmental Assessment (VAS) also analyzed PEARS' environmental objectives and their coherence with other Plans' objectives. Here we summarise the relevance with regard to climate change mitigation and adaptation, forestry and biodiversity.

CLIMATE: The strategic approach of the PEARS, based on a flexible regional energy system that can govern and cope with changes resulting from market and technology evolution, is also an opportunity in terms of climate change mitigation and adaptation. In particular, OG2 and OG3 showed a strong coherence with the objectives of the European energy strategies (e.g., 20-20-20 strategy, energy road map, EU objective climate-energy 2030). All PEARS objectives except OG3 showed a strong coherence with the National Strategy to Climate Change in terms of reducing risk derived from climate change and maintaining or enhancing ecosystem resilience and adaptation.

FOREST & BIODIVERSITY: The consistency of PEARS (OG4 in particular) with the objective of preserving and protecting the environmental identity of the Sardinian territory (as described in the Regional Landscape Plan) can be recognized in relation to a "conservative" approach of the plan specifically with regard to energy plant endowment at the regional scale, more aimed at the efficiency in the energy and environmental sense of the existing rather than the push for the construction of new plants in areas currently lacking in productive infrastructure.

PEARS encourage sourcing and utilization of renewable energy sources, by-products, waste materials, residues and other non-food raw materials for the purpose of bioeconomy (coherently with the 2014-2020 Rural Development Plan).

The general objectives of the PEARS show general and local interactions with the forest system (as planned by the Regional Forest Plan 2007), mainly from two point of view: (1) impacts due to energy production with respect to biodiversity and quality ecosystem on a regional scale; (2) spillovers to forestry and territorial agro-forestry as a result of the adoption of modern electric or thermal production technologies and processes. The PEARS operational choices are aimed at the preservation of natural systems, focusing the development lines of the agro-energy sector on margin situations that do not possess profitable productive use. Thus, there are positive interaction with the regional forestry planning but mainly related to the conservation of forest and agro-silvopastoral systems.

Table 24: Governance matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation	OS1.1 The objective “Integration of electrical, thermal and mobility energy systems through the enabling technologies of Information and Communication Technology” is meant to ecosystem conservation			X		
	Species conservation						
	Other						
Manage	Forest harvesting						
	Active management (other than harvesting)	OS2.2. The objective “Promotion of distributed generation from renewable sources for self-consumption” is aimed at the dissemination of efficient facilities also using wood biomass from forest clearing			X		
	Other						
Restore	Forest restoration (including peatlands)						
	Af-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	OS1.1 The objective “Integration of electrical, thermal and mobility energy systems through the enabling technologies of Information and Communication Technology” is meant to economic enhancement of existing forest and for the use of forest biomass in various kinds of processes (including that for energy production)			x		
	Cascading (end-of-life)						
	Increased efficiency	OS3.1 - 3.2 “Promotion of the efficient use of biomass for domestic heating by privileging residual endogenous resources, with the aim of creating a certified regional supply chain, for a share of 30% (40 kTep) of the locally available potential and identified by the “Study on the energy potential of biomass in Sardinia”			x		
	Other						

Assessment (including stakeholder views)

Although the VAS analysis reports a strong coherence of several PEARS activity with respect to climate and biodiversity, the impact of this plan on CBS forestry is uncertain. The third monitoring report (published in 2023) illustrates that PEARS has promoted numerous actions

(thus characterizing itself as an influential plan), but in some cases they still have not resulted in measurable effects. Overall, according to the monitoring report, progress has been made in achieving the 4 specific objectives appears. Regarding the assessment of sustainability goals, the evaluation shows that PEARS has greatly progressed in the aspects of energy, transportation, air emissions, energy-environmental research and innovation, and public involvement. Although, several sustainability objectives related to biodiversity (e.g., promote the protection of biodiversity and functionality of ecological systems) cannot be evaluated up to now.

Although, as illustrated by the VAS, there is strong coherence with environmental, rural, and forestry plans, projects for the development of biomass-energy supply chains seem to be lacking at present. A step forward in this regard is the drafting (in 2019) of the guidelines for the regulation and encouragement of the exploitation of resources aimed at the construction of biomass plants in Sardinia (linked to OS2.2). The document advocates, on the one hand, the replacement of existing plants with new ones that are more efficient both in terms of energy and air quality. On the other hand, it promotes the use of local biomass derived from the cleaning and maintenance of forest and public green areas, making sure that these resources are mainly used for thermal energy production in the civil sector.

Outlook

The PEARS is in a good shape towards reaching the goals of CO₂ emissions reduction due to energy consumption in 2030 by 50 percent compared to 1990 values. Since 2018, PEARS is monitored almost every year. The monitoring reports, analysing the evolving policy context, can also propose new actions or revisions of the provided policies. Since the new national and regional legislation on forest and forestry, it is expected that the PEARS will be harmonised with the new codes with the aim to reinforce the provisions related to CBS forestry.

A 3.3 The Netherlands

A 3.3.1 Introduction

The total forest area in the Netherlands is about 370,000 ha, 11% of the total land area. Although the Dutch forest area is small in the European context, it is important for Dutch society. The main function shifted from soil protection and wood production in the past, to recreation and biodiversity protection over the last decades. Annual wood harvest is around 1.5 million m³, which is about 60% of the increment and only about 10% of the annual consumption. Wood harvesting shows a small tendency to decline over time, as a consequence of increased attention to other forest functions, and increased conflicts with the general public when harvests are carried out. Due to the low harvest intensity, growing stock is steadily increasing over time, resulting in a steady carbon sink. However, this sink seems to be declining recently. This is probably due to a combination of decreased increment and increased mortality as a consequence of the recent sequence of dry summers and large-scale dieback of Norway spruce (bark beetles) and ash (ash dieback).

The species distribution is diverse, linked to differences in forest history, site conditions, and changes in species preferences over time. Scots pine was introduced in the 19th century and first half of the 20th century to reclaim heathlands and inland driftsands, located on poor sandy soils. Areas with slightly better soils were planted with non-native conifers like Larch, Norway spruce and Douglas fir. The total area of these stands has remained relatively stable, while their share has decreased over time due to an expansion of the area of broadleaves. A large part of this area expansion has been realised in the land reclamation area of the Flevopolder, including large plantations of poplar, but also sizeable shares of beech, ash and oak. Currently, Scots pine is still the most common tree species with a share of 28% (Schelhaas et al. 2022). The total area of coniferous forest is about 50% and gradually declining. Other important species are native oak (18%) and birch (6%). Especially the coniferous forests originally consisted of single-species, single-aged stands. Due to changing objectives in forest management, since the late 1980s greater attention has been paid to promote the regeneration of native broadleaved species, and to increase the structural diversity of these forest. As a result, the subsequent inventories show a slow but steady increase in the share of broadleaves over time (about 50%), an increased area of forest classified as uneven-aged (from 13% in 2005 to 22% in 2022), and a decreased share of mono-species coniferous forests (from 39% in 2005 to 20% in 2022) (Schelhaas et al. 2022).

During the last decades of the 20th century, the paradigm in forestry slowly changed from a traditional even-aged forestry practice towards more integrated approaches, combining different objectives, using natural processes and aiming to make a 'better' forest in terms of production, ecological values and recreation. This change was initiated by a series of severe windthrow events in the 1970s, sparking criticism from society on the type of management but also showing that natural regeneration was possible in the Dutch context (Mohren and Vodde 2006). More in general, it aligned with an increased interest in forests and nature, leading to a stronger focus on natural processes in forests. The abandonment of the subsidy for replanting in 1995 made replanting very costly, leading to a drastic drop in the area that was regenerated annually and to a further increased use of natural regeneration.

Since the late 1990s, the interest of policy makers for forests decreased and no new policies were developed for two decades. Since around 2010, interests for forests increased again, fuelled by concerns about biodiversity loss, climate change impacts and conflicting targets

around biodiversity conservation and carbon sequestration. This resulted in the publication of a new forest strategy in November 2020 which aims to strike a balance between the different ecosystem services and targets. Among others, it sets clear targets for forest area expansion and an increased forest sink. Each of the 12 provinces is supposed to develop a plan to implement the strategy in practice and contribute to the overall targets, but targets are not predefined. Due to concerns about biodiversity conservation in old broadleaved stands, the province of Gelderland issued a logging ban in these forests, leading to protests of owners and discussions about the effectiveness of such a strategy.

In 2019, the Dutch government adopted the Climate Law, with the explicit aims to reduce GHG emission by 49% in 2030 and 95% in 2050 to comply with the Paris Climate Agreement. Emissions in the base year (1990) were 228 Mt CO₂eq and a reduction to 116 Mt CO₂eq was therefore required. The expected emissions for 2030 were 165 Mt, so an additional 49 Mt reduction needed to be achieved. Negotiations with a broad range of stakeholders from different sectors resulted in the Climate Accord in 2019, which is an agreement of the distribution of the targets over the sectors and the measures that will be taken to achieve these targets. The sectors Agriculture and LULUCF agreed to a combined goal of 3.5 Mt reduction, with an expected residual emission of 29 Mt per year in 2030⁷⁰. The subsector “trees, forests and nature” were targeted with a goal of 0.4-0.8 Mt per year in 2030. Wet areas were expected to contribute 0.14 Mt, leaving a target of 0.26 Mt for forests and trees. Later, the EU launched the Fit for 55 initiative, which is translated to an increased goal of 60% reduction by 2030 and 100% by 2050. As part of the negotiations between different political parties to establish a new government, the draft Policy Programme Climate (Ontwerp Beleidsplan Klimaat) in June 2022 mentions a target for the LULUCF sector of 0.8-1.7 Mt reduction in 2030, with residual emissions in the range of 1.8-2.7 Mt CO₂eq per year, assuming a 2021 emission of 3.5 Mt CO₂eq/yr. The actual reported emissions in 2021 of the LULUCF sector were 4.3 Mt CO₂eq/yr. In contrast to many other countries, the LULUCF sector is a source, due to the high emissions from drained peat soils.

A 3.3.2 National Forest Strategy

General description

The national forest strategy was initiated in 2020 and describes targets for forests in the Netherlands by 2030. This instrument is a strategy, not a directive, so no special restrictions or financial support are directly related to this instrument. The main ambition is to contribute to healthy, future-proof and societally valued forests on the long term and achieving the goals of the national Climate Agreement. The strategy also contributes significantly to achieving the EU Bird and Habitat Directive. To reach these goals the main focus is on mitigating climate change and reinforcing biodiversity. Forested area should be expanded and the quality of forests should be improved. Also outside current forests the number of trees should increase in rural and urban areas. Sustainable use of forests and trees should be stimulated. Balance between different functions of forests is taken into account and the formulated propositions often serve multiple goals.

⁷⁰ <https://www.klimaatakkkoord.nl/klimaatakkkoord/vraag-en-antwoord/wat-is-het-doel-van-het-klimaatakkkoord>

The plan is to increase forest area with 10% by 2030. With an increase of 37,000 hectares, Dutch forested land will then cover around 407,000 hectares. 3,400 hectares of felling, needed for management of Natura 2000 areas in the period 2017-2030, will as much as possible be compensated outside the Nature Network Netherlands (NNN). This is the Dutch network of existing and new nature areas, the network is there to better connect nature areas with each other and the surrounding rural area. Around 15,000 hectares of new forests should be realised within the NNN; mainly on grasslands with low biodiversity. 19,000 hectares remain to be realised outside of the NNN in cities, towns and transition areas between nature and agricultural lands. For example, agroforestry or woody landscape elements like hedges.

To improve the vitality of forests (revitalizing) environmental conditions and surrounding land use management should be improved. For example the decline of nitrogen deposition is needed, policies for this are being developed. The structure and composition of forests should be improved. It should be more diverse in species and also more complete; all age classes.

Provisions relevant for CBS forestry

The national forest strategy describes the need for more trees/forests, more vital forests and more sustainable use of forests. All these topics and the corresponding actions have implications for CBS forestry. It is expected that this policy will result in a higher increment, which will allow a light increase in timber harvest and meeting biodiversity targets at the same time.

According to the strategy, the Dutch forested land should be expanded by 37,000 hectares by 2030. This will contribute to climate mitigation by increasing carbon stocks in the long term and as such working towards the national goals of the Climate Agreement and the International goals of the Paris Agreement. They are looking to expand forests within and outside the NNN, especially to improve the connectivity between nature areas and the adjacent rural areas. More connectivity will also stimulate biodiversity. Moreover, the exception to compensate harvested trees in Natura 2000 areas will be revoked.

The government is also investing in improving the protection of landscape elements like hedges. Also, they want to make agroforestry more attractive through financial support, investigating possibilities of switching, and simplifying administrative issues. Furthermore, they want to stimulate urban green through education, municipalities and expert groups.

The main relevance with regard to CBS forestry of the national strategy is revitalizing forests. The structure and compositions of forests should be improved. Additional species should be planted or mixtures maintained, for more diversity and resilience. They should consist of more age classes and regeneration should be stimulated and be part of fauna management plans. Targeted planting of rich litter tree species is needed. Mineral dust (ground rocks) can be applied to counteract acidification of the soil, mimicking the process of weathering of bedrock. Also, more old trees and deadwood should stay in the forest, which could be supported by subsidies. Also, the government wants to stimulate small scale climate smart forestry with potential climate smart tree species through subsidies. All these management practices can be considered CBS forestry and are part of the national strategy. Small scale climate smart forestry with potential climate smart tree species.

To purely stimulate biodiversity, the area of natural forest (now 140,000 hectares) should be increased by 10% by 2030. These are forests where the sole focus is on reinforcing biodiversity. These forests should be or become self-regulating.

A light increase in timber harvest is described in the strategy. With the revitalizing practices it is possible to slightly increase timber harvest, while the increment will become higher too. Possibilities are being researched to stimulate timber harvest for high-end applications and to look into developing a regulation for biobased building.

To work on climate mitigation and reinforcing biodiversity they are looking into possibilities to reduce the impact of recreation on forests. For example, zoning could be used to concentrate recreation in less vulnerable nature areas and as such protect more valuable nature.

Table 25: Governance matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	revoking the exception of compensating for harvested trees in Natura-2000 areas		X			
	Forest conservation	Creating 10% more natural forests, where the focus is solely on biodiversity	X			X	
	Species conservation						
	Other	Looking into possibilities to reduce impact from recreation	X				
Manage	Forest harvesting						
	Active management (other than harvesting)	Revitalize forests through <ul style="list-style-type: none"> – Mixing species – More age classes – More old trees – More deadwood – Rich litter species – Mineral dust 	X			X	
	Other						
Restore	Forest restoration (including peatlands)						
	Af-/reforestation	37,000 hectares expansion of current forested land	X			X	
	Other						
Wood use	Shifts in wood uses (including by-products)	Looking into possibilities to stimulate timber harvest for high-end applications. Develop stimulating regulation for biobased building	X				
	Cascading (end-of-life)						
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

The policy will positively affect CBS forestry. The described afforestation and revitalization will lead to more CO₂ capture. In the Climate Agreement forests should realise 0.26 Mt CO₂. The National Forest Strategy assumes that the measures initiated should be sufficient to reach the goals that were set. However, sufficient financial cover and societal commitment are important conditions to achieve this.

The policy will have a positive effect on biodiversity and especially the EU Bird and Habitat directive. The most effective measure is expected to be the expansion of the area of natural forests by 10%. Also the application of mineral dust, and reinforcing the structure, species and age composition of the forest are thought to be effective. The planned afforestation can lead to an improved connectivity between nature areas.

Outlook

The strategy is a start towards reaching the goals of the Climate Agreement in 2050. The continuation of the strategy after 2030 is not known yet. The government has the plan to reduce CO₂ emissions by 95% in 2050. In order to reach this goal additional carbon capture by trees is very needed, alongside other measures to increase removals and decrease emissions in the LULUCF sector. A scenario study predicts that an increase of 270,000-380,000 hectares of forest area would be needed in the Netherlands in 2050. Also the use of wood in construction can contribute to the ambition to be circular in 2050. The demand for timber resources will increase, therefore balancing timber harvest, climate mitigation and biodiversity reinforcement will remain a challenge.

For the reinforcement of biodiversity the need to make forests healthier will persist after 2030. In theory, 37,000 hectares expansion should be enough to reach the goals of the EU Bird and Habitat Directive. However, forest expansion might not always be possible on the essential locations. It is possible that after 2030 there will still be a remaining task to reach sufficient spatial connectivity.

A 3.3.3 Provincial measure: Ban on wood harvest in old deciduous forests

General description

The Veluwe is the largest forested area of the Netherlands. The total area measures about 1,000 km², of which 912 km² is designated as Natura 200 area and about 75% is forested. It is an old landscape with traces of human settlement already in prehistoric times. Due to the poor sandy soils, settlements remained small and the average population density is very low compared to the Dutch average. Although the area was probably mostly covered with forest in ancient times, human exploitation led to severe degradation of the landscape, resulting in a very low cover of forest, a high share of heathlands and even the development of large inland driftsands around the mid 19th century. Both heathlands and driftsands were afforested in the period 1895-1940, mostly using Scots pine. Old remnants of beech and oak forests were partly converted to more productive coniferous species such as Japanese larch and Douglas fir. Due to the long history of human use and degradation, many species that can be found in the area that depend on open spaces (both heathlands and driftsands) and are protected under EU Birds and Habitat Directive, such as *Lacerta agilis*. At the same time, the remnants of the old oak and beech forests contain relict populations of species that are considered to be connected to old forests, such as the plant species *Maianthemum bifolium*, *Anemone nemorosa* and *Polygonatum multiflorum*, as well as certain birds, fungi and invertebrates. To protect the rare

plants and animals that live in these endangered habitats, the province of Gelderland has created a special forest restoration programme aimed at ecological restoration and good management. The programme concentrates on the following Natura 2000 habitats:

- H9191; old oak forests
- H9120; beech-oak forests with holly
- H91EoC; moist alluvial forests

The restoration programme mainly focusses on restrictions, combined with financial support, to soften the financial consequences for forest owners.

Provisions relevant for CBS forestry

The programme contains the following restrictions and obligations:

Protect

- Gradually ending wood harvest;
- Lower the unnatural high impact of wild boar and other ungulates by increased hunting or installing fences;
- A ban on machines entering the forest, soil preparation, planting non-native tree species and large scale replacement of avenues.

Manage

- Removing invasive tree and shrub species;
- Creating open spaces for typical old forest and forest edge flora species that need light;
- Optional additional small-scale planting of broadleaved tree species;
- Enhancing the amount of old, degenerating and dead trees.

Restore

- Restoring specific protected forest habitat types,

These restrictions and obligations will have effect on the following CBS themes:

Climate mitigation

- Ending wood harvest will likely result in a higher growing stock volume compared to the current situation⁷¹.

Climate change adaptation

- Ending wood harvest will likely result in older forests with less dynamics in the coming decades. Therefore it is likely that the regeneration of forests will slow down, which will result in a slower reproduction rate and therefore less abilities for trees to adapt to the changing climate.

Biodiversity

- The target of the programme is to enlarge biodiversity. This would partly be reached by increasing the amount of deadwood, through increased mortality as a consequence of increased competition after wood harvesting has ended. However, this process may take

⁷¹ Jan den Ouden, Mart-Jan Schelhaas, Roland van Duuren, Sandra Clerkx, Rein de Waal and Bas Lerink, Kan uitstel van houtoogst bijdragen aan CO₂-mitigatie, Wageningen University

long and at short-term the dynamics of the system may slow down, leading to less light on the ground with negative effects on the ground vegetation. There is no (scientific and societal) consensus if this measure will be effective.

Forestry and wood products

- Ending wood harvest in specific habitat types will limit the availability of timber and affect the timber industry

The legal basis for the restoration programme is the European Birds and Habitat Directive, elaborated in the Nature 2000 management plans. The restoration programme is not a complete renewal of the Nature 2000 management plan. A complete renewal of the management plan will take place when the first planning period of the plan has ended. The renovation programme will however be basis for licensing and enforcement.

Table 26: Governance matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation						
	Forest conservation	A ban on wood harvest and the use of machines, a ban on the use of non-native tree and shrub species, means against ungulates		X			X
	Species conservation	The restoration programme focusses on the following four Nature 2000 species (H1083, A236, A072 and A233)		X			
	Other						
Manage	Forest harvesting	Harvesting of wood in certain habitats has been prohibited. As a compensation, financial support is planned to be provided		X		X	X
	Active management (other than harvesting)	Specific means to improve habitat quality for specific locations have been defined in an appendix.			X		
	Other						
Restore	Forest restoration (including peatlands)	Restoring specific protected forest habitat types		X			
	Af-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)	As a side effect, the ban on wood harvest in certain habitat types will result in a lower wood production/availability,		X			
	Cascading (end-of-life)						
	Increased efficiency						

	Other						
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Assessment (including stakeholder views)

The effects on the CBS categories have been elaborated above and in the summary sheet.

Table 27: CBS assessment

CBS category	Effect	Explanation
Protect	Positive	Deforestation and felling will be limited, forests will be conserved, certain endangered species will be protected and supported.
Manage	Positive/negative	The options to manage forest will be restricted, so owners will have less options to reach their goals, however the restrictions are likely to have a positive effect on biodiversity and protected species.
Restore	Positive	Restoring specific protected forest habitat types
Wood use	Negative	Less availability of wood

The policy process is dynamic. The defined restrictions and prohibitions will be far-reaching, therefore many forest owners have objections, while their freedom to manage forests will be limited.

Outlook

The restoration programme is part of the Birds and Habitat Directive, so the monitoring and reporting is largely directed by national and European rules.

The restoration programme aims to contribute to the protection and restoration of certain habitats and species. The province of Gelderland will monitor the developments. By monitoring they will try to answer the following questions:

- What progress on the EU Birds and Habitat Directive targets have taken place?
- Is the ecosystem recovering?
- Which progress on the restoration programme can be detected?
- What influence do the means of the restoration programme have?

A 3.4 Romania

A 3.4.1 Introduction

Forest land in Romania covers roughly 7 million ha (approx. 30% of country area) being mainly distributed in the mountains and hills (60% and, respectively, 34% according to official data⁷²). In terms of ownership⁷³, almost half (48,3%) belong to the state, an additional 16% are public forests belonging to the local communities and the rest are privately owned (24,1% by different entities and 11,6% by commons). The size of private ownership varies greatly, in most of the cases being less than 10 ha (representing altogether 41% of the private forests), while ownership over 1000 ha is rare (comprises about 0.02% of the forest owners but makes 40% of the total area).

In terms of structure, the forests are composed in most cases (i.e., 97%) of native species and include various types of ecosystems: open oak woodlands in dry lowlands, riparian forests in the flood plains, mixed deciduous forests on the hills, pure European beech in high hills and low mountains followed by mixed beech-conifer and pure Norway spruce stands further up at higher altitudes of the Carpathian Mountains. These forests were under continuous regulated management (applied during the last century and longer in some parts of the country), through a complex system of management planning and implementation based on a single set of technical norms. The forestry legislation (Forestry code and technical norms) enforces a sustainable forest management across the entire forest land (regardless of forest ownership). Some of the keystone principles of Romanian forestry which favour biodiversity and climate mitigation and adaptation include the prevalence of high-forest systems with long rotations (over 100-120 years), natural stand compositions attained mostly through natural regeneration, and control of age class proportion (aiming to ensure a balanced proportion of all classes). The management is done according to plans developed by specialized entities (registered by the ministry), approved by the ministry and implemented in practice exclusively by forest districts (authorized and registered with the ministry as well).

Over time, these principles and rules (for planning and implementation) produced and maintained a well-connected⁷⁴ countrywide forest mosaic of various stand types encompassing all development stages (including the old and very old (old-growth) stages, important habitats for some specialized species). As a result, the Romanian forests harbour large areas of primary forests as well as vigorous populations of diverse species of plants and other animals (including the large carnivores) which are threatened in other parts of Europe. However, this type of forest administration is expensive and less efficient in terms of economic revenue.

The costs for the management planning (carried out by specialized third-party companies) and for the management (carried out only by authorized entities) are paid by the owner. In addition, the forestry rules (i.e., management restrictions and ecological constraints) yield low profitability. All these are not properly sustained by the state (through appropriate financial compensation or

⁷² National Forest Inventory – Cycle II results: <https://roifn.ro/site/rezultate-ifn-2/>

⁷³ Nichiforel, L. Forest Ownership and its Challenging Role in the Forest-based Bioeconomy. In *The Plan B for Romania's Forests and Society*; Giurca, A., Dima, D.-P., Eds.; Transilvania University Press: Brasov, Romania, 2022; ISBN 978-606-19-1463-0.

⁷⁴ Stancioiu, P.T.; Nita, M.D.; Lazar, G.E. Forestland Connectivity in Romania—Implications for Policy and Management. *Land Use Policy* 2018, 76, 487–499.

incentives) and therefore, overall, the close-to-nature management is less appealing for private owners (and even impossible sometimes for small ones).

The most relevant policies in the country related to the Climate and Biodiversity Smart forest practices are the following:

1. The Forestry Code (Law 46/2008, updated 2023) – providing regulations for general management of forests, including forest biodiversity. Also refers to financial compensation of owners (CBS categories: “Protect”, “Manage”, “Restore”).
2. The National Forest Strategy 2030 – setting goals and targets to be reached in all CBS categories (“Protect”, “Manage”, “Restore”, “Wood use”).
3. Technical norms for forest management planning (Ministry Order 2536/2022) – providing regulations for forest management planning (CBS categories: “Protect”, “Manage”, “Restore”).
4. Technical norms for afforestation, reforestation and forest restoration (Ministry Order 2533/2022) – providing regulations for ensuring forest regeneration and afforestation (CBS categories: “Manage”, “Restore”).
5. Technical norms for tending operations (Ministry Order 2534/2022) – providing regulations for tending in young stands (CBS categories: “Manage”, “Restore”).
6. Technical norms for silvicultural treatments (Ministry Order 2535/2022) – providing regulations for regeneration cuttings (CBS categories: “Protect”, “Manage”, “Restore”).
7. Technical norms for regeneration of forests (Ministry Order 2537/2022) – providing regulations for control and monitoring of regeneration (CBS categories: “Manage”).

Out of these, an in-depth analysis is presented below for the Forestry Code (Law 46/2008, updated 2023) and the technical norms for forest management planning (Ministry Order 2536/2022). These two policies cover most of the aspects related to the role of forests in respect to biodiversity and climate mitigation. The forestry code gives the general principles to govern forest management including the obligation of owners to manage forests through specialized entities and according to management plans (developed according to state rules). It also has provisions about financial compensation which should be offered for restrictions imposed on owners. The technical norms for forest management planning provide the rules to be followed by all owners to ensure stable, and resilient but also productive forests. As the Forestry code states that management of all forests (regardless of ownership type) must be implemented only by management plans, the rules for planning the management are the most comprehensive, providing guidance on how all key provisions of the code must be implemented. In terms of the climate mitigation capacity of forests, although Romania does not have a standing alone climate law or other specific legislation on this topic, the country has ratified the Kyoto Protocol and the Paris Agreement as well. As a result, under the United Nations Framework Convention on Climate Change, the country reported for 2020⁷⁵ an annual removal of 24,23 million tons of CO₂. Out of this amount, most of the removals are accounted for existing forests (i.e., 22,63 mil. tons by the category “Forest Land Remaining Forest Land”) while only a small fraction is due to afforestation (1,60 by “Land Converted to Forest Land”).

⁷⁵ https://di.unfccc.int/detailed_data_by_party

A 3.4.2 Romania's Forestry code

General description

The Forestry Code is the organic serving as a framework to subsequent legislation and governing forest land in Romania. It underlines the general principles (valid for all forest owners) to ensure forest integrity and perpetuation, while providing all the ecosystem services needed by society. The law starts by defining categories of lands to be considered forestland and sets the general obligations of owners including the general rules for forest administration, the requirements for sustainable forest management, the rules for management planning, biodiversity conservation, ecological restoration and maintenance of forestland integrity.

Being an organic law, it refers to government agencies (control and implementation), to all types of forest owners, administrators and also to general users. It serves as a framework for the subsequent legislation in the field of forests and forestry and also has connections to other types of legislation (e.g. biodiversity conservation). Except the provisions referring to the compensation of loss incurred by owners due to restrictions, this law sets regulations (restrictions).

Provisions relevant for CBS forestry

By its general aim “to ensure a sustainable management of the national forestland”, the Forestry Code sets out the main principles which govern forestland use and forestry at country level, regardless of ownership type. It also provides the **standards** to be followed (describing general rules for management and protection of forests), the **prohibited activities** and, to a less extent, the **financial support** for implementation of rules. Being an organic law, it represents the foundation of all subsequent legislation regarding the forests and their use and therefore sets mandatory rules for all owners. Moreover, defining the national forestland as a good of national interest regardless of ownership type and therefore subject to the same rules (“the forestry regime”), it produces very large-scale effects (nation-wide). Its links to the CBS forestry start from the beginning, by setting the principles which define the sustainable forest management. Among them the following are important for CBS forestry:

- giving priority to ecological objectives in forest management;
- promoting the natural type of forest (natural composition) and conserve the forest biodiversity;
- mitigation of climate change effects and adaptation of forests to climate change.

Large scale effects

To fulfil these objectives (and others) the administration and management of forests is tightly regulated by the state at county level. Forest management is mandatory for all forest owners and could be done exclusively through specialized entities (forest districts) authorized and registered at the National authority (in the National Register of forest administrators and forest districts). Furthermore, forest management is implemented based on forest management plans elaborated according to national technical norms and are mandatory for ownerships over 10 ha. The technical norms are elaborated by the central authority for forests and forestry and aim at ensuring forests with continuous yield and functional efficacy, as well as ensuring conservation of biodiversity and economic viability. Forest management plans are elaborated by specialized entities (not by the owners themselves) accredited by the national authority and are approved by the national authority.

Management is decided based on the objectives (functions) attributed to a certain forest. As a result, at national scale, according to the functions attributed to them, forests are divided in two categories: forests with special protection functions (biodiversity, climate, soils, waters, air) and forests with production and protection functions (aim at producing timber while also delivering environmental protection as well). The management of each stand is therefore regulated according to the function attributed and is clearly mentioned in the forest management plan. In case of any disturbance (natural or anthropogenic), ecological restoration is mandatory (owners must maintain integrity of forest land) and shall be carried out according to forest management plans and/or studies based on technical norms for afforestation. To ensure this, all owners must set up a special fund (The Forest Conservation and Regeneration fund) out of various sources of income, including sales of timber. The fund can be used exclusively for certain activities (mentioned by the code) among others being also the expenses needed for regeneration works including afforestation of non-forest land and reforestation after natural or anthropogenic disturbances (e.g., temporary land-use change, illegal logging).

Nature conservation and climate mitigation and adaptation

For forests included in natural protected areas, provisions of forest management plans will be harmonized with the provisions of the protected area management plan. Moreover, to ensure biodiversity (but also stability and adaptation of forests), across the entire forestland, conservation of biodiversity is also sought by: strict protection of old-growth (virgin and quasi-virgin) forests; conservation of landscape mosaics; creation of stands with diversified structures and natural compositions; use of natural regeneration; conservation of deadwood (standing and on the ground).

To promote biodiversity but also climate mitigation and adaptation, high forest regime is the general rule (coppice is the exception – stands of poplar, willow and black locust). Clearcutting is rarely used, only in pure even-aged spruce stands or stands of pine, poplar, willow and is forbidden in national and natural parks and in natural reserves. The maximum size of a clearcut is set to 3 ha and a new clearcut cannot be done next to a previous clearcut area until the regeneration on the latter has reached canopy closure. Regeneration works and further tending operations should ensure stand compositions according to the management plans elaborated according to the national technical norms.

Maintenance of forestland integrity and connectivity

In terms of spatial scale of the effects related to CBS forestry, the code is strictly regulating the land-use change of forestland. As a result, reduction of the national forestland area is forbidden. Only some special cases are allowed as exceptions (land needed for objectives of national interest and for public utility). For other reasons, the land-use change is conditioned by a financial charge and a compensation in area at least 3 times larger than the area affected by the land-use change and which has 5 times the value of the latter.

Furthermore, to ensure the protection of forestland, all owners must avoid forest degradation. Therefore, they must ensure forest protection against illegal logging, theft, destruction, degradation, grazing and other acts harmful to the forest. In terms of other biotic factors (pests), surveillance of forest health status and deciding the works needed to be implemented for the prevention and control of diseases and pests is carried out by the specialized service of the central public authority responsible for forestry and become mandatory to the forestland owners. Forest districts are responsible for detection and forecasting of attacks of forest diseases and pests. Such activities will be carried out in accordance with the technical norms. Actions needed for pest control will be carried out by the forest districts and paid for by the forest owners.

Last, but not least, the code is regulating harvest to ensure sustained yield as a requirement for sustainable management. As a result, managers are not allowed to harvest by regeneration cuttings more than the maximum allowable cut volume (mentioned in the management plan for such cuttings) determined for the entire management plan validity (10 years). Annual harvesting from regeneration cuttings cannot go over the maximum annual allowable cut volume (mentioned in the management plan for one year). This rule aims to ensure a balanced proportion of age classes (development stages; habitat conditions) which provides continuous conditions for a high biodiversity (habitats for all species) and for better resilience to natural disturbances.

Support for nature conservation and climate mitigation and adaptation

To ensure the sustainable management of the forest land (privately owned and that belonging to local communities), the code acknowledges the need for financial support for implementation of all rules by the landowners (other than the state). Therefore, it states that the budget of the national authority for forests will offer financial compensations for income loss incurred due to restrictions (i.e., protection functions) established in and imposed by the forest management plans.

Table 28: Governance matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (<i>'relevance' can be positive or negative</i>)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	Reduction of the national forestland area is forbidden (Art. 35). Only some special cases are allowed as exceptions but land-use change is conditioned by a financial charge (Art. 37.(5)) and a compensation in area at least 3 times larger than the area affected by the land-use change and which has 5 times the value of the latter (Art. 37.(3)).		X			
	Forest conservation	For forests included in natural protected areas, provisions of forest management plans will be harmonized with the provisions of the protected area management plan (Art. 21 (11))			X		
	Species conservation	Strict protection of old-growth (virgin and quasi-virgin) forests (Art. 26 (3)); conservation of landscape mosaics; creation of stands with diversified structures and natural compositions; use of natural regeneration; conservation of deadwood (standing and on the ground) (Art. 26(4)).			X		
	Other (Protection against illegal logging)	All owners must ensure forest protection against illegal logging, theft, destruction,			X		

		<p>degradation, grazing and other acts harmful to the forest (Art. 51. - (1)).</p> <p>The works needed to be implemented for the prevention and control of diseases and pests are decided by the specialized service of the central public authority responsible for forestry (Art. 55. (1)) and become mandatory to the forestland owners (Art. 55. (2)). Forest districts are responsible for detection and forecasting of attacks of forest diseases and pests. Such activities will be carried out in accordance with the technical norms (Art. 56). Actions needed for pest control will be carried out by the forest districts and paid for by the forest owners (Art. 57. (2)).</p>					
Manage	Forest harvesting	<p>Clearcutting is rarely used, only in pure even-aged spruce stands or stands of pine, poplar, willow (Art. 29 (1)). The maximum size of a clearcut is set to 3 ha (Art. 29 (2))</p>			X		
		<p>Clearcutting is forbidden in national and natural parks and in natural reserves (Art. 29 (5)). A new clearcut cannot be done next to a previous clearcut area until the regeneration on the latter has reached canopy closure (Art. 29 (4))</p>		X			
		<p>Managers are not allowed to harvest by regeneration cuttings more than the maximum allowable cut volume (mentioned in the management plan for such cuttings) determined for the entire management plan validity (10 years) (Art. 59(1)). Annual harvesting from regeneration cuttings cannot go over the maximum annual allowable cut volume (mentioned in the management plan for one year) (Art. 59(2)).</p>		X			
	Active management (other than harvesting)	<p>High forest regime is the general rule (coppice is the exception – stands of poplar, willow, and black locust) (Art. 28 (2)).</p> <p>Regeneration works and further tending operations should ensure stand compositions according to the management plans (Art. 30 (2)) elaborated according to the national technical norms (Art. 30 (3)).</p>			X		
	Other	<p>Forest management is mandatory for all forest owners (Art. 10 (1)) and could be done exclusively through specialized entities (forest districts) (Art. 10 (2)) authorized and registered at the National authority (in the National Register of forest administrators and forest districts). Furthermore, forest management is implemented based on forest management plans (Art. 19 (1)) elaborated according to national technical norms (Art. 20(1)) and are mandatory for ownerships over 10 ha</p>			X		

		(Art. 20 (2)). The technical norms are elaborated by the central authority for forests and forestry and aim at ensuring forests with continuous yield and functional efficacy, as well as ensuring conservation of biodiversity and economic viability (Art. 20 (4)). Forest management plans are elaborated by specialized entities (not by the owners themselves) accredited by the national authority (Art. 21 (3)) and are approved by the national authority (Art. 22 (1)).					
		(Art. 97(1)) The budget of the national authority for forests will offer financial compensations for income loss incurred due to restrictions (i.e., protection functions) established in and imposed by the forest management plans.				X	
Restore	Forest restoration (including peatlands)	ecological restoration is mandatory (owners must maintain integrity of forestland – Art 17 (2)a-e).			X		
	Af-/reforestation	Afforestation, reforestation and restoration shall be carried out according to forest management plans and/or studies based on technical norms for afforestation (Art. 28 (1))			X		
	Other	For afforestation, reforestation and restoration, all owners must set up a special fund (The Forest Conservation and Regeneration fund) out of various sources of income, including sales of timber (Art. 33 (1-2)). The fund can be used exclusively for certain activities (mentioned by the code) among others being also the expenses needed for regeneration works including afforestation of non-forest land and reforestation after natural or anthropogenic disturbances (e.g., temporary land-use change, illegal logging) (Art. 33 (3) b, c, f).			X		
Wood use	Shifts in wood uses (including by-products)						
	Cascading (end-of-life)						
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

The Forestry Code has a very positive influence on CBS forestry as it sets legally binding provisions for clear requirements which are beneficial for such forest management (e.g., maintain natural compositions, embrace long rotations, enforce natural regeneration, ensure balanced proportion of age classes – a mosaic of all development stages, ensure integrity of forestland and restoration if needed etc.). It is effective (being an organic law) as all subsequent

legislation must be harmonized with its provisions. Moreover, being an organic law, its influences are likely to produce effects in the long-term. The only part, which is not fully implemented, although it is very important for a functional CBS forestry, is the one referring to financial support for owners (financial compensations for income loss incurred due to restrictions). This aspect is not properly implemented in practice (i.e., very few compensations were accorded so far and only for some restrictions and to private owners, not communities).

Outlook

At present, the law is under revision to be updated according to the provisions of the new Forest Strategy 2030. The subsequent legislation (on forests and forestry) will also be updated soon, to be harmonised with the new code. Hopefully, the provisions related to CBS forestry will continue to be enforced by the new (updated) form.

A 3.4.3 Technical norms for forest management planning

General description

The Technical Norms for Forest Management Planning represent the policy governing planning of management across the entire forest land in Romania. It underlines the general principles (valid for all forest owners) to ensure a sustainable forest management of forests and further describes in detail the process of planning with all requirements. As in Romania, according to the Forestry Code, the national forest land is subject to the same regulations regardless of ownership (the forestland being considered of national interest), this ministry order refers to government agencies (control and implementation of management; control of management planning), to all types of forest owners, administrators and also to the management planning entities (as plans are produced by specialized entities not by owners themselves). It is a policy that sets regulations to be followed (which could be considered as restrictions, from the point of view of owners).

Provisions relevant for CBS forestry

The policy is built on the Forestry Code provisions and therefore has the general aim “to ensure a sustainable management of the national forestland”. It provides the **standards** to be followed describing general rules for management planning (including some of the **prohibited activities** – such as, no harvesting in strict protected areas). As the national forest land is defined (by the Forestry Code) as a good of national interest regardless of ownership type, all forests in the country become subject to the same rules including those related to management planning (i.e., the types of lands to be considered as national forest land are defined in this policy regardless of ownership type). Also, any changes in forest land area (for various reasons described by the policy) must be recorded by the head of the forest district and taken into consideration at the time of updating management plans (which will be further subject to approval of the ministry, according to the forestry code). Therefore, area of forestland is under strict control as well. Moreover, as planning is mandatory for management (also according to the forestry code), this policy is binding and produces very large-scale effects (nation-wide). As in the case of the Forestry code described before, its links to the CBS forestry start from the beginning, by setting the principles to be followed during planning to ensure a sustainable management of forests. Among them the following are important for CBS forestry:

- a) sustained yield (not only timber but also of all other ecosystem functions/services!)

- b) functional efficacy (continuously improving their production and protection capacity)
- c) conservation of biodiversity (from genes to landscapes)
- d) economic viability (ensuring continuity of production and protection functions)

More explicitly, CBS measures are provided by various rules aiming at ensuring and maintaining natural compositions, landscape mosaics with all age classes including old forests etc. To reach these goals, planning will prioritize the high-forest regime with natural regeneration from seed (coppice allowed only as an exception, in stands of black locust, alder, poplars and willows). Further, planning will aim to maintain the natural forest composition acquired as much as possible by natural regeneration. Moreover, regulating the amount of timber to be harvested aims at creating an appropriate stand structure (which would ensure proper stability and delivery of ecosystem services sought to be obtained at stand level) and a landscape structure which provides for continuity in time and space of the social and economic benefits. Both methods used for determining the maximum allowable cut in the even aged stands aim at producing and maintaining a balanced spatial proportion of age classes in the landscape.

To fulfil the provisions of the Forestry Code on regulating the management according to the function attributed to the forest (through management planning) and on harmonizing forest management plans with protected areas plans, the policy provides a description of protected area types and the special management measures (restrictions) depending on the level of protection imposed by the protected area regime.

To secure biodiversity in general, forest composition (in terms of tree species) should be natural. Therefore, local species should be regenerated naturally using long regeneration periods to create more diverse stand structures. Moreover, to provide habitat, 1-3 trees per hectare of less common tree species must be retained, as well as trees having unusual large sizes, biodiversity trees (with hollows). Furthermore, to secure biodiversity in all stands, natural regeneration will be used as a priority. When artificial regeneration is needed, seedlings will be obtained from local provenances.

For both biodiversity and stability, management will maintain the natural mixed stand compositions (according to the natural forest type) and will control exotic species when they become invasive. Understorey will not be removed by tending operations (if does not threaten the natural regeneration success) and shrub species will be preserved at stand edges and in the meadows inside forestland to provide food and shelter to wildlife. Meadows inside the forest will be preserved to ensure the biodiversity of herbaceous plants and a mosaic structure. Standing or downed dead trees and other „biodiversity trees” must be retained, with a balanced spatial distribution at forest level.

Moreover, at landscape level, a balanced proportion of age classes should be ensured as each development stage has its own biodiversity . Using long rotations will ensure continuous presence of old forest and offer premises for a high biodiversity in the. Also, marginal habitats (present on small areas inside the forestland – e.g., screes, swamps and bogs, rocky areas, riparian vegetation) will be protected.

To ensure all these biodiversity related benefits, the forest management plans will have a separate chapter on biodiversity conservation including the objectives to be protected (species and habitats). The distribution and abundance provided by the protected area administration, or the environmental authority would be used for setting appropriate management measures. Also, protection measures from protected area management plans will be transposed into the forest management plans. A biodiversity map, including at least the limits of the protected areas and

the forest habitats (if other info is available in the protected areas management plan, it would also be included), will be generated.

Table 29: Governance matrix

CBS category	CBS sub-category	Main provisions of the policy with relevance to CBS (‘relevance’ can be positive or negative)	Governance mechanism				
			a) Target	b) Prohibition	c) Standard	d) Incentive	e) Other
Protect	Avoiding deforestation	area of forestland is under strict control - any changes in area (for various reasons described by the policy) must be recorded by the head of the forest district and taken into consideration at the time of updating management plans (Art. 2 (1))			X		
	Forest conservation	maintain the natural forest composition (Art. 9(6)) acquired as much as possible by natural regeneration (Art. 9 (10)) and Art. 27 (3)a). When artificial regeneration is needed, seedlings will be obtained from local provenances (Art. 27 (3)b).			X		
		local species (Art. 19 (5)a) should be regenerated naturally using long regeneration periods to create more diverse stand structures (Art. 19 (5)b).			X		
		management will maintain the natural mixed stand compositions (according to the natural forest type) (Art. 27 (3)e) and will control exotic species when they become invasive (Art. 27 (3)f).			X		
	Species conservation	principle to be followed during planning to ensure a sustainable management of forests (Art. 1 (2)) - conservation of biodiversity (from genes to landscapes)			X		
		1-3 trees per hectare of less common tree species must be retained, as well as trees having unusual large sizes, biodiversity trees (with hollows) (Art. 19 (5)c). Standing or downed dead trees (Art. 27 (3)j) and other „biodiversity trees” must be retained, with a balanced spatial distribution at forest level (Art. 27 (3)k).			X		
		Understory will not be removed by tending operations (if does not threaten the natural regeneration success) (Art. 27 (3)g) and shrub species will be preserved at stand edges and in the meadows inside forestland to provide food and shelter to wildlife (Art. 27 (3)h). Meadows inside the forest will be preserved to ensure the biodiversity of herbaceous plants and a mosaic structure (Art. 27 (3)i).			X		

		at landscape level, a balanced proportion of age classes should be ensured as each development stage has its own biodiversity (Art. 27 (3)l). Using long rotations will ensure continuous presence of old forest and offer premises for a high biodiversity in the mosaic (Art. 27 (3)m).			X		
		marginal habitats (present on small areas inside the forestland – e.g., screes, swamps and bogs, rocky areas, riparian vegetation) will be protected (Art. 27 (3)n).			X		
	Other	the policy provides a description of protected area types (Art. 26(2))			X		
		the special measures (restrictions) depending on the level of protection imposed by the protected area regime (Art. 26(3-9))		X			
		the forest management plans will have a separate chapter on biodiversity conservation including the objectives to be protected (species and habitats) (Art. 27 (4)a).			X		
		The distribution and abundance provided by the protected area administration, or the environmental authority would be used for setting appropriate management measures (Art. 27 (4)b).			X		
		protection measures from protected area management plans will be transposed into the forest management plans (Art. 27 (4)c).			X		
		A biodiversity map, including at least the limits of the protected areas and the forest habitats (if other info is available in the protected areas management plan, it would also be included), will be generated (Art. 27 (4)d).			X		
Manage	Forest harvesting						
	Active management (other than harvesting)	principle to be followed during planning to ensure a sustainable management of forests (Art. 1 (2)) - functional efficacy of forests (continuously improving their production and protection capacity)			X		
		the high-forest regime with natural regeneration from seed is a general priority (coppice allowed only as an exception, in stands of black locust, alder, poplars and willows) (Art. 9(2))			X		
		ensure proper stability and delivery of ecosystem services sought to be obtained at stand level - Art. 10(2)a) and a landscape structure which provides for continuity in time and space of the social and economic benefits (Art. 10(2)b).			X		
		methods used for determining the maximum allowable cut in the even aged stands aim at producing and maintaining a balanced spatial proportion of age classes			X		

		in the landscape (Art. 13(2) and Art. 14(1)).					
	Other	All types of lands to be considered as national forestland are defined in this policy regardless of ownership type (Art. 2 (1))			X		
Restore	Forest restoration (including peatlands)						
	Af-/reforestation						
	Other						
Wood use	Shifts in wood uses (including by-products)						
	Cascading (end-of-life)						
	Increased efficiency						
	Other						

Assessment (including stakeholder views)

The Technical Norms for Forest Management Planning have a very positive influence on CBS forestry as they set legally binding provisions for clear requirements which are beneficial for such forest management (e.g., maintain natural compositions, embrace long rotations, enforce natural regeneration, ensure balanced proportion of age classes – a mosaic of all development stages, ensure natura conservation at all levels, from stands to landscapes etc.). They are effective as they address the entire forest land subject to management (regardless of ownership) and their influences are expected to produce effects on long-term (being a ministry order). However, one of the very important rules for a functional CBS forestry (the one imposing long rotations) is less effective compared to the past versions of these norms. This is because the normative rule regarding the high forest system which is imposed on most of the forest land is not anymore accompanied by clear limits of rotations (i.e., to ensure long rotations as those imposed in the earlier version of these norms). Such limits are mentioned in the annex 2 of the ministry order (which represents the technical norms) but the annex refers only to guidelines for best practices (not mandatory requirements as those from the norms).

Outlook

At present, according to the provisions of the new Forest Strategy 2030 (adopted by the government), the forest legislation is to be revised. The Forestry Code is already under revision and is expected that the entire subsequent legislation (on forests and forestry) will follow. Therefore, the provisions of these norms might also suffer modifications. Hopefully, the provisions related to CBS forestry (including those related to continuous yield and conservation of biodiversity, from genes to landscapes) will continue to be enforced by any new (updated) form.