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New EU Forest Strategy post-2020

1. Introduction

Forests and other wooded land [1] cover over 43 [2]% of the EU's land space and they are essential for the health and wellbeing of all Europeans. We depend on them for the air we breathe and the water we drink and their rich biodiversity and unique natural system are home and habitat for most species found on land around the world.[1] They are a place to connect with nature and are central to preserving lively and prosperous rural areas.

Forests have long held a hugely important role in our economy and society, creating jobs and providing food, medicines, materials, clean water and other services. This role has been honed and strengthened over centuries and forests continue to be a thriving hub for cultural heritage and craftsmanship, tradition and innovation. But as important as they have been for generations past, they remain essential for our future. Forests are a natural ally in adapting to and fighting against climate change and will play a vital role in making Europe the first climate neutral continent by 2050. Protecting forest ecosystems also lessens the risk of zoonotic diseases and global pandemics. A healthy future for people, planet and prosperity therefore depends on enSuring healthy, biodiverse and resilient forests across Europe and the world.

Despite this imperative, European forests are under increasing strain — partly as a result of natural processes but also because of increased human activity and pressures. While forest area has become bigger in the last decades thanks to both natural processes and active restoration and certain trends are improving, ecosystem condition is poor even in the 27% of the EU forest area that is protected and should be the healthiest[2] . Climate change continues to negatively affect European forests, particularly in areas with mono species and even aged stands. It has also brought to light previously hidden vulnerabilities aggravating other destructive pressures such as pests, pollution, diseases, extreme weather events and forest fires. Tree cover loss has accelerated from 27% in the period 2001-2012 to 74% in the period 2009-2018 [3] and increase in harvest for different economic purposes has been widely documented.

This new EU Forest Strategy aims to overcome these challenges and unlock the potential of forests for our future. It is anchored in the European Green Deal and the EU 2030 Biodiversity Strategy and recognises the central role of forests, foresters and the entire forest-based value chain for achieving by 2050 a sustainable and climate-neutral economy and for ensuring that all of ecosystems are restored, resilient, and adequately protected. It sets out the policy framework to deliver growing, healthy, diverse and resilient EU forests, which contribute

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[1] Forests contain 60,000 different tree species, 80 percent of amphibian species, 75 percent of bird species, and 68 percent of the world's mammal species (IUCN?).

[2] Based on Member States' reports (covering the 2013-2018 period) under Article 17 of the Habitats Directive on the conservation status of habitats listed in Annex I of that Directive, only 49% of forest habitats is in a good condition Annex I forest habitats cover about 27% of all forested area in the EU.

[3] Maes, J., Teller, A., Nessi, S., Bulgheroni, C. , Konti, A., Sinkko, T., Tonini, D, & Pant, R. (2020). Mapping and assessment of ecosystems and their services: An EU ecosystem assessment. In JRC Science for Policy Reports. European Commission.

significantly to our biodiversity and climate ambition, secure livelihoods in rural areas and beyond and

1 Sustainable Development Goals report 2021 — to be published on 15 June. Link to be added. FAO defines a forest as lands of more than 0.5 hectares, with trees higher than 5 metres and a tree canopy cover of more than 10 0/0, which are not primarily under agricultural or urban land use. The FAO defines other wooded land as land of more than 0.5 hectares with a canopy cover of 5-10 % of trees able to reach a height of 5 metres in situ; or a canopy cover of more than 10 % when smaller trees, shrubs and bushes are included http://www.fao.org/3/18661EN/i8661en.pdf, or the EUROSTAT definition: https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Glossary:Forest

2 https://ec.europa.eu/eurostat/documents/3217494/12069644/KS-FK-20-OO-EN-N.pdf/a7439b01-671b-

support a sustainable forest bioeconomy that relies on most sustainable forest management practices.

The starting point for this is that to succeed in this transition we will need bigger, healthier and more diverse forests than we have today, notably for carbon storage and sequestration and halting loss of habitats and species. To get there, we will have to reverse negative trends, improve monitoring to better capture the state of our forests, as well as step up our efforts to protect and restore forest biodiversity and with that ensure forest resilience. We must also ensure the availability of wood materials to substitute fossil-based counterparts, as well as boost forest-based economic activities that do not rely on wood resources extraction to diversify local economies and jobs in rural areas.

Given the increasing and sometimes competing demands on forests, we must also ensure that wood is optimally utilised in line with the cascading principle[4] so that the majority of it is used for long-lived materials and products that are of highest value for a climate neutral and circular economy, while minimising its use for short-lived products and energy production.

This is the first EU Forest Strategy written at the onset of accelerating biodiversity loss and nature crises. The next decade is crucial and the Strategy therefore presents a concrete plan for 2030, combining regulatory, financial and voluntary measures. It includes measures for strengthening forest protection and restoration, enhancing sustainable forest management and improving and harmonising the planning and monitoring of EU forests with a view to ensuring resilient forest ecosystems. The Strategy also focuses on sustainable re- and afforestation and is accompanied by a roadmap for planting at least 3 billion additional trees in the EU by 2030.

The ambitious vision presented in this Strategy relies greatly on motivation and dedication of all relevant stakeholders, namely forest and land owners and managers, and it therefore seeks to develop financial incentives, in particular for private forest owners and managers, for the provision of ecosystem services. To further support sustainable bioeconomy for a climate

4 Cascade principle was already enshrined in the EU Forest Strategy 2014-2020. Under the cascade principle, wood is used in the following order of priorities: l) wood-based products, 2) extending their service life, 3) re-use, 4) recycling, 5) bio-energy and 6) disposal.

neutral future, the strategy proposes measures for innovation and promotion of new materials and products to replace the intensive fossil-based counterparts as well as for boosting non-wood forest economy, including ecotourism.

All the measures are to be designed and implemented in close cooperation with public and private forest owners and other caretakers of forests, as they are the enablers of the necessary changes and of a vibrant and sustainable forest-based bioeconomy in the EU. The Strategy seeks the active engagement of all relevant actors and levels of governance, from Member States to forest owners and managers, forest-based industries, scientists, civil society and other stakeholders.

While the Strategy is focussed only on EU forests and aims to make an important contribution from the EU to the UN 2030 Sustainable Development Goals, in particular the Goal 15, it fully recognises that forest-related challenges are inherently global. The Commission reaffirms its commitment to deliver on its 2019 Action Plan to Protect and Restore the World's Forests[5], including by working in close partnership with its global partners on forest protection, restoration and sustainable forest management, as well as adopting a legislative proposal to ensure that products, whether sourced from within the EU or from third countries, sold on the EU market do not contribute to global deforestation.

2. Protecting, restoring and enlarging EU's forests to combat climate change, reverse biodiversity loss and ensure resilient forest ecosystems

In light of climate change and biodiversity loss there is an urgent need for adaptive forest restoration and ecosystem-based management approaches that strengthen the resilience of EU forests. This is a precondition for forests to be able to deliver on their socio-economic and environmental functions for future generations. But it is also to avoid escalating socioeconomic costs from forest disasters, protect people, land and houses from floods and landslides, and preserve the carbon stock and sink function and other vital ecosystem services provided by forests such as clean air, water regulation, and habitat for the variety of living species they host. To improve forest resilience, we have to increasingly protect and restore forest biodiversity and adopt biodiversity-friendly forest management practices. This is also a great economic opportunity, if forest owners and managers are properly supported in the transition. According to the World Economic Forum, the conservation, restoration and sustainable management of forests could generate 190 billion EUR in business opportunities and 16 million jobs worldwide by 2030[6] .

In addition, we need robust approaches to risk reduction in the context of significant uncertainty related to future forests. The onset of climate change means forest change. Europe's vegetation zones have started to shift upwards and northwards, triggering the transformation of forest ecosystems in most places. This means that very few forests will

[5] EU Communication 2019 - Forests - Environment - European Commission. (europa.eu)

[6] https://www.weforum.org/press/2020/08/us-businesses-governments-and-non-profits-join-global-pushfor- I -trillion-trees/

either not be strongly affected by climate change, or will not require immediate management action to reduce their vulnerability to climate change.

Forest owners and managers across Europe are already strongly aware of climate change and are concerned with its impacts. This awareness needs to be increasingly translated into sufficient and tangible adaptation actions and resilience-enhancing forest management practices. For that, technical knowledge and information as well as targeted regulatory and financial incentives and support need to be developed. This Strategy aims to address these issues to support forest owners and managers in their efforts, scale up best practices and ensure an increase in the quantity and quality of EU's forest cover for decades to come.

2.1. Protecting EU's last remaining primary and old-growth forests

To leave space for nature to recover, the EU Biodiversity Strategy for 2030 has proposed a target to protect at least 30% of the EU land area, out of which 10% should be put under strict legal protection and effective management regime. Also forest ecosystems will need to make a contribution to this target.

All primary and old growth forests, in particular, will have to be strictly protected. Their estimated cover is only around 3% of EU forested land and patches are generally small and fragmented. Primary and old-growth forests are not only among the richest EU forest ecosystems, but they also remove carbon from the atmosphere and store significant carbon stocks, while being of paramount importance for biodiversity and the provision critical ecosystem services[7].

Yet, there is still an immediate need to map the primary and old-growth forests and establish their protection regime, including increased efforts to protect the primary forests in outermost regions and overseas territories of the Union, given their exceptionally high and unique biodiversity value. To maintain the undisturbed character of strictly protected forests it is essential to leave as much as possible the dynamic of the forest cycle in these forests to natural processes, limiting extractive human activities from none to minimum, while finding synergies with sustainable ecotourism and recreational opportunities.

The Commission is working in cooperation with Member States and stakeholders to agree, by the end of 2021, on a common definition for primary and old-growth forests and the strict protection regime. Member States should urgently engage in completing the mapping and monitoring of these forests, and ensuring no deterioration until they start to apply the protection regime.

2.2. Ensuring forest restoration and reinforced sustainable forest management for climate adaptation and forest resilience

[7] Barredo Cano, J.I., Brailescu, C, Teller, A. , Sabatini, F.M., Mauri, A. and Janouskova, K., Mapping and assessment of primary and old-growth forests in Europe, EUR 30661 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-34229-8, doi: 10.2760/13239, JRC124671.

Forest management practices that preserve and restore biodiversity lead to more resilient forests. Therefore all forests should be increasingly managed so that they are sufficiently biodiverse, taking into account the differences in natural conditions, biogeographic regions and forest typology. There are significant opportunities for win-win measures, which simultaneously improve forest productivity, timber production, biodiversity, carbon sink function, healthy soil properties and climate resilience. A greater diversity of forest ecosystems and species, and the use of well-adapted genetic resources and ecosystem-based approaches to forest management can enhance long-term adaptability and forests' capacity to recover and self-organise.

In addition, certain management practices that support biodiversity and resilience, such as the creation or maintenance of functionally diverse, mixed-species forests, especially with more broadleaves and deciduous trees and with species with different biotic and abiotic sensitivities and recovery mechanisms following disturbances, instead of monocultural plantations, are essential in this context. Also management practices like uneven-aged and continuous-cover forestry, sufficient quantities of deadwood, regulation of wildlife densities and the establishment of protected habitat patches or set aside areas in production forests help ensure longterm environmental and socio-economic viability of forests. Such practices provide an 'insurance policy' and safeguard that forests can continue to provide their full set of goods and services in a variable and uncertain future.

Conversely, some other practices should be avoided. One of such forestry practices is clearcutting, unless it is proven necessary for environmental or ecosystem health reasons. In addition to destroying above ground biodiversity, clear cuts cause the loss of carbon in the roots and part of the carbon in the soil. This practice is already banned or limited in several countries. What should also be avoided is removing stumps and roots, which should be left in the forest, and carrying out intensive logging during nesting period.

Taking care of soil is particularly important, as there is a strong interdependence between trees and the soil on which they grow, with mutual benefits and losses. For trees to thrive, tree roots need to obtain all essential elements and nutrients from the soil. Therefore, the soil properties and soil ecosystem services must be protected as the very foundation of healthy and productive forests and for example undue use of heavy machinery that cause soil compaction should be avoided.

These above-mentioned more sustainable principles and practices are already embraced by many European forest owners and managers in the context of sustainable forest management and, when moving forward, should increasingly form its backbone. A common understanding of sustainable forest management has been agreed upon in the frame of the Pan-European Ministerial Conference on the Protection of Forests ('Forest Europe'), comprising voluntary principles, guidelines and indicators, which are used by the signatories to monitor the progress of their forests. Sustainable forest management means the stewardship and use of forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems.

In order to better respond to new challenges and needs, and in light of the increasing role of forests in the delivery of the EU's commonly agreed climate and biodiversity objectives, the sustainable forest management framework will have to be reinforced, notably as regards criteria relating to ecosystem health, biodiversity and climate change so that it can become a more detailed screening tool to determine and compare different management approaches, their impact and the overall state of EU forests. This requires the identification and establishment of more concrete indicators and benchmarks. The sustainable forest management already covers several relevant indicators, such as deadwood and species diversity, but it does not yet define thresholds or ranges as benchmarks for the desirable condition.

Therefore, building on the Forest Europe sustainable forest management criteria, and in close cooperation with Member States and forest stakeholders, the Commission will identify additional indicators as well as thresholds or ranges for sustainable forest management concerning in particular forest ecosystem health, biodiversity and climate objectives. Subject to the impact assessment, these will be included in the future legislative proposal on EU forest planning and monitoring. This will allow for a better comparative understanding of the overall sustainability of forests within the EU and demonstrate the contribution of sustainable forest management to EU's objectives. The indicators, thresholds or ranges should build on existing work and take into account forest variability, biogeographic regions and forest typology, in addition to providing the necessary flexibility. Guidelines on closer to nature forestry [10] are being developed by the Commission and will feed into the work on indicators and new thresholds for sustainable forest management that will be undertaken in close partnership with Member States.

The Commission will also develop criteria for a harmonised "closer-to-nature" voluntary certification scheme, so that the most biodiversity friendly management practices could benefit from an EU quality label.

As part of the implementation of the EU Biodiversity Strategy for 2030, the Commission will also propose a legally binding instrument for ecosystem restoration, covering in particular those ecosystems with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. This will include targets for restoring forest ecosystems namely as far as these are identified under EU nature legislation [11].

In addition to adaptive restoration and ecosystem-based management practices of forests, climate adaptation also requires investing in disaster preparedness, response and post-disaster

[10] Closer-to-nature forestry is an example of such practices. It seeks multifunctional forests by combining biodiversity (even in planted forests), carbon stock preservation and timber-related revenues. Despite not having a universally accepted definition yet, closer-to-nature forestry is a concept discussed by private and public organisations, both in within the EU and globally.

[11] Annex I of Habitats Directive

forest recovery. However, contributing to the required equipment and operations should be the last resort, after everything has been done to prevent climate related damages and

increase forest resilience. Also, spending on disaster response and post-disaster recovery should include, as a minimum, 'restore and reforest better' conditions in line with the described management practices.

Last but not least, adapting forests to climate change and restoring forests following climate damages will require large quantities of appropriate forest reproductive material. This implies efforts to secure and sustainably use — based on ecological principles — the genetic resources on which a more climate-proof forestry depends; to increase the production and availability of such material; to provide better information on its suitability for future climatic conditions; and to enhance its collaborative production and transfer across national borders. The Commission will supplement the revision of the Regulation on forest reproductive material with measures to increase the availability of forest reproductive material suitable for future climatic conditions. Research and innovation, and the testing and selecting of species and suitable provenances for future conditions should also be enhanced.

2.3. Re- and afforestation of biodiverse forests

Spontaneous forest regrowth through natural succession is the main force driving the increase of forested areas in the EU, mostly associated with abandonment of agriculture and rural areas. But additionally there is potential for extending forest and tree coverage in the EU through active and sustainable re- and afforestation and tree planting.

This concerns mainly urban and peri-urban areas (including e.g. urban parks, trees on public and private property, greening buildings and infrastructure, and urban gardens) and agricultural area (including e.g. in abandoned areas as well as through agroforestry and silvopastures, landscape features and the establishment of ecological corridors). It is important to capitalise on this potential, as enhanced afforestation is also among the most effective climate change mitigation strategies in the forest sector, and can create substantial job opportunities,
e.g. in relation to collecting and cultivating of seeds, planting seedlings, and ensuring their development.

The EU Biodiversity Strategy for 2030 sets outs a pledge to plant at least 3 billion additional trees by 2030 in full respect of ecological principles. This initiative will significantly contribute, over time, to increasing the EU forest cover and, with that, the EU land carbon sink and stock. It will also help raise societal awareness and commitment, contributing to reaching the objective of becoming the first climate neutral continent by 2050, to biodiversity restoration and to the circular economy. This Strategy includes a roadmap for the implementation of the pledge based on the overall principle of planting and growing the right tree in the right place and for the right purpose.

Roadmap for planting at least 3 billion additional trees by 2030
The roadmap [include link/reference to annex and/or SWI)] sets out clear criteria for tree planting, counting and monitoring. It is supplemented by an electronic platform/website [include reference]. A timeline for how additional elements will be developed, including a tree-counter, guidelines for biodiversity-friendly afforestation and reforestation and criteria for closer-to-nature forestry, which will be developed in parallel, and platforms for exchange of best practices, is included in annex xx.

The roadmap includes a strong monitoring component, which will be essential to track progress for meeting the target. This will build on the expertise of the Commission's Joint Research Centre and the European Environment Agency. Based on monitoring data, the Commission and the European Environment Agency will provide assessments of trends and state of implementation. Synergies with technological solutions already in use, i.e. for air quality monitoring, will be sought in order to compile information on planting pledges at national, regional and local level.

2.4. Financial incentives for forest owners and managers for improving the quantity and quality of EU forests

Strengthened forest protection and restoration and enhanced and more biodiversity-friendly sustainable forest management are the right thing to do to ensure the resilience and productive capacity of forests for decades to come. However, it has to be acknowledged that this will not happen without the motivation, engagement and action of European forest owners and managers — the principal caretakers of forests. The right thing to do must also be economically viable and best practices show that this can be the case.

In publicly owned forests it is only reasonable for Member States to strengthen forest protection and restoration efforts to achieve the commonly agreed increased EU climate and biodiversity ambition and to ensure the transition to a climate-neutral economy

Yet, private forest owners and managers, especially small holdings, often depend on forests directly for their livelihoods and today their main income comes from the supply of wood. The other benefits, especially the provision of ecosystem services, are rarely or never rewarded. This has to change. Forest owners and managers need drivers and financial incentives to be able to provide ecosystem services through forest protection and restoration and to increase the resilience of their forests through the adoption of most climate and biodiversity friendly forest management practices. This is particularly important in parts of Europe that have been hit by climate change earlier and harder than anticipated and where rural areas have suffered from the loss of income, livelihoods and even lives due to forest disasters.

Some good examples on public and private schemes for ecosystem service payments exist (e.g. on protection of drinking water), and other options are being explored for deployment with EU research support [i2].

Examples of public and private schemes for ecosystem service payments

The Finnish Metso Programme pays private forest owners to set aside their land for biodiversity. The amounts provided depend on the value of the land and for how long the forest will be set aside.

The Croatian tax for all requires natural and legal persons conducting economic activities and an income over 400.000 euro to pay 0.0265% of their total revenue for benefiting from forest ecosystem services and through a special national fund this is distributed to forest owners according to the forest area in accordance to the forest management plans.

The French Label Bas Carbon scheme allows private and public actions to voluntary offset their greenhouse gas emissions by financially supporting environmental services (low-carbon actions) in forest management in France.
In Germany, Federal water legislation entitles forest owners to receive compensation payments for management restrictions in groundwater protection areas.

As to EU policies, the CAP, through the national Rural Development Programs already provide financial support for forests and forest management, namely for adaptation and resilience to climate-related risks. In 2014-2020, the CAP forestry measures committed € 6.7 billion in

[12] Horizon projects: InnoForest, SINCERE

support of EU policy targets, mostly for afforestation (27%), prevention of forests fires and disasters (24%) and investments on resilience, ecological and social functions (19%). Yet, the uptake of forestry measures has been low, and decreased substantially along the programming period. This is for example due to the lack of capacity to handle the administrative procedures to request access to the funds, coupled with insufficient attractiveness of the premium and the lack of capacity building support through advisory services, as well as limited guidance on how to implement forest based adaptation activities and measures to climate change in order to prevent and reduce risks (e.g. wildfires, soil erosion, diseases, floods).

The Commission will strive to increase the uptake of rural development funds available for the purposes of this strategy. The new CAP offers increased flexibility to design forest-related interventions according to national needs and specificities, reducing red tape while linking the European Green Deal, the national forest policies, and the EU environment and climate acquis. The recommendations to Member States on the CAP Strategic Plans have encouraged the due consideration of forests. Further action need to be undertaken by Member States for better involving forest stakeholders in the development of CAP Strategic Plans at Member States level. The Commission will provide new means to share information on good practices on best design and implementation of forest-relevant interventions, fostering the exchange between experts in Member States, and providing demonstration tools for consistent use of funding; supporting local and regional networking, including in situ demonstration initiatives. An assessment of forest-related interventions in the CAP in relation to European Green Deal objectives, in the context of the mid-term assessment of the CAP Strategic Plans, will provide the basis for further promoting the optimal use of forest interventions by Member States. The Commission will furthermore carry out a study on

behavioural science applied to the uptake of foresters of public funds to better identify further policy improvement routes

In the context of the long-term vision for rural areas, a network of forest-dominant rural areas and municipalities will be promoted to give voice to forest rural areas, ensuring their representation in key initiatives (rural observatory, ENRD porta1 [8]), and facilitating specific assessments of reality and needs of forest areas across the EU.

The carbon farming initiative, announced in the Farm to Fork Strategy, will aim to promote a new green business model that rewards climate—friendly practices by land managers, including forest managers and owners, based on the climate benefits they provide. This new business model should provide a new source of income by giving financial incentives for activities leading to carbon removals and storage.

Carbon farming schemes can be financed through public support such as CAP funding (via ecoschemes or rural development support), State aid (for example through the EU agricultural and forestry guidelines) or other EU funding, or through private initiatives, in the form of carbon certificates that can be traded in the markets. Result-based carbon farming schemes, under which beneficiaries receive payments linked to the results delivered, have the advantage of ensuring a more targeted use of the relevant funds towards the intended climate objective. Carbon farming can hence constitute a potential channel to achieve and implement targets underlying the present Strategy.

The Commission is furthermore developing a regulatory framework for certifying carbon removals, as announced in the Circular Economy Action Plan. The Commission plans to

publish a Communication setting out an action plan for both carbon farming and carbon removal certification by the end of 2021.

[8] https://enrd.ec.europa.eu/

The Commission will

1. Propose a legally binding instrument for ecosystem restoration, including forest ecosystems
2. Develop guidelines on the definition of strict protection, including definition, mapping, monitoring and strict protection of primary and old-growth forests
3. Identify additional indicators as well as thresholds or ranges for sustainable forest management to be included in the future legislative proposal on EU forest planning and monitoring
4. Develop guidelines on biodiversity friendly afforestation and restoration
5. Develop a definition and adopt guidelines for closer-to-nature-forestry practices as well as criteria for closer-to-nature forest management certification scheme
6. Provide guidance and promote knowledge exchanges on good practices on climate adaptation and resilience, using inter alia the Climate-ADAPT platform
7. Supplement the revision of the Regulation on forest reproductive material with measures to boost the availability and distribution of forest reproductive material suitable for future climatic conditions
8. Promote forest-related interventions in the CAP in relation to European Green Deal objectives, following the mid-term assessment of the CAP Strategic Plans

Develop an action plan for carbon farming and carbon removal certification

3. Supporting the socio-economic functions of forests for thriving rural areas and boosting sustainable forest bio-economy

There are 16 million private forest owners in the EU, and 40% of forests are under different public ownership schemes. In 2020, in the EU there were 2.1 million people working in the traditional forest sector (logging, sawmilling, wood-based products, cork, pulp and paper), and another 1.1 million people in manufacturing of furniture. In 2015, 420.000 enterprises were active in wood-based industries, representing 20% of manufacturing enterprises across the EU, and the extended forest-based industry value chains supported 3.6 million jobs in the green economy, with a turnover of EUR 640 billion. Yet, employment in the forest-based sector decreased by about 33% from 2000 to 2015 [9].

Forests and the forest-based sector provide multiple socio-economic functions and benefits, including jobs and growth opportunities in rural areas and sustainable raw wood materials and products that are key in EU's transition to a sustainable climate-neutral economy. During their lifetime, trees help removing C02 from the atmosphere by storing carbon in their leaves, trunks, roots and soils. At the end of their life by harvest or natural death, carbon is again released to the atmosphere e.g. by fires, burning for energy, incineration or over time by natural decaying processes. However, the carbon removal period can be significantly extended when transforming woody biomass into wood materials and products with a long-life cycle.

Through its embodied carbon, sustainably-produced and long-lived wood products can add to the carbon removal by biological processes and thus help to achieve climate neutrality[10] .

[9] ESTAT 2020: 511.000 jobs in forestry and logging in the EU in 2020. Wood-based manufacturing industries in the EU-27 employed 3.1 million persons in 2018.

[10] COM (2020) 98 final

Harvested wood products in the EU represent an active net carbon sink of around -40 MtC02e/year, while also generating climate benefits through a material substitution effect, with values ranging from -18 to -43 MtC02e/year[11].

That is why it is crucial that, when building a sustainable and climate-neutral economy, we ensure an optimal use of wood in line with the cascading principle. This means that the majority of it should be used for making long-lived materials and products. Wood use for shortlived products and energy production should be minimised and rely namely on secondary woody biomass such as sawmill by-products, residues, recycled materials.

The industrial forest sector holds significant potential for improving its production of sustainable and legally harvested wood for circular and long-lived materials and products. This requires stimulating the demand in downstream industries and promoting forest management practices, production tools and processes that are better adapted to different future forest resources, while preserving and restoring biodiversity for forest resilience and climate adaptation.

In addition to the wood-based economy, forests offer a variety of equally important additional products and services, from food to ecotourism, which support the economies and the social fabric in rural areas.

The EU Forest Strategy acknowledges and aims to boost the entire sustainable forest bioeconomy that works in synergy with the EU's increased climate and biodiversity ambition.

3.1. Promoting sustainable forest bioeconomy for long-lived wood products

The European Green Deal implies more sustainable ways of producing and using wood products on our continent. The updated EU Bioeconomy Strategy[12] encourages the transition to a more bio-based and circular economy. Increasing the supply of long-lived wood products should be done in synergy with improving the conservation status of European and global forests. Land managers should be incentivised to increase forest areas suitable for long-lived wood production, in line with reinforced sustainable forest management favourable to biodiversity, resilience and climate adaptation.

The focus therefore has to be on a drastic shift from short-lived to long-lived uses of wood, such as buildings and furniture, including through better reusing and recycling wood products from construction and demolition sites. This is also in line with the new EU Circular Economy Action Plan, which has committed to reducing packaging and further

[11] Harvested wood product categories include 1) sawn wood, 2) wood panels and 3) paper. In GHG mitigation they have, by default, a first decay function with different half live values (35, 25 and 2 years). This way paper decays much faster (has a much lower mitigation potential over time) than the other categories. Anything that does not fall within these category/uses is instantaneously oxidized.

The JRC suggests this citation: Grassi, G. , Fiorese, G., Pilli, R. , Jonsson, K., Blujdea, V., Korosuo, A. and Vizzarri, M., Brief on the role of the forest-based bioeconomy in mitigating climate change through carbon storage and material substitution, Sanchez Lopez, J., Jasineviëius, G. and Avraamides, M. editor(s), European Commission, 2021, JRC124374.

[12] COM (2018) 673 final

restricting single use products. Such short-lived products are made, among others, also of wood-based materials.

In addition, investments are needed throughout the whole wood processing chain. Instead of trying to adapt the forests to their industries, wood processing industries should better adapt their equipment to the changing and diversifying resources of forests. Investments should also focus on the production of long-lived wood products from lower quality logs, from more hardwood species, and anticipating greater fluctuations in production over time.

From this perspective, the most important role of wood products is to help turning the construction sector from a source of greenhouse gas emissions into a carbon sink, as set out in the Renovation Wave Strategy[13] and the new European Bauhaus initiative [14] There is considerable room for improvement, as wood products, with less than 3% of market share, are still only a tiny fraction of building materials in Europe, which largely remain dominated by energy intensive and currently fossil fuel-based materials[15] . The Commission will develop a roadmap for reducing whole life-cycle carbon emissions in buildings. In the context of the revision of the Construction Products Regulation, the Commission will develop a standard, robust and transparent methodology to quantify the climate benefits of wood construction products and other building materials.

Promoting the use of wood products in the EU also requires demand-side actions, including combating misconceptions about fire risk and lack of durability, and acknowledging the multiple advantages of wood products in terms of reducing pollution and energy consumption during the construction, use and deconstruction phases. Construction engineers and architects should acquire the skills for designing buildings with wood. Construction companies, following the principles of life cycle thinking and circularity, should reflect the full benefits of wooden construction in their risk premiums and business models.

Following the New European Bauhaus[16] , research and innovation on architecture, green design and construction materials should be amplified, including on industrial improvements to use more low-grade wood, especially from hardwood species and on how to enhance cascading use and increase circularity, targeting the recovery of existing wood for the manufacture of engineered wood products. In particular, the Innovation Fund[17] dedicated to

[13] COM (2020) 662 final

[14] https://europa.eu/new-european-bauhaus/index en

[15] Wood-based constructions products have an average market share of 2.4% in the EU (representing a total EU consumption of 26.2Mm3, or 15.7M tonnes of material), whereas non-metallic minerals constitute the bulk of materials used in the construction sector (market share of 93%). This market share varies widely between Member States: front-runners such as Finland or Sweden reach a market share above 10%, while most MS display a market share lower than 2%. Source: Trinomics (in prep) Evaluation of the climate benefits of the use of harvested wood products in the construction sector and assessment of remuneration schemes. Task 1.1 Market Analysis.

[16] https://europa.eu/new-european-bauhaus/index en

[17] https://ec.europa.eu/clima/policies/innovation-fund en

the funding of innovative low-carbon technologies, offers support possibilities for innovative projects in construction, including wood construction.

Regulatory approaches also need attention. Scaling up the production of long-lived wood products is still limited by construction regulations, such as fire safety regulations, which do not fully reflect the technical possibilities of modern timber constructions. Member States should be encouraged to reflect best available scientific knowledge in the design of regulations favourable to long-lasting wood products, including acting on energy and environmental performance of building and construction products, promoting ecolabel related with carbon sequestration and increased circularity and by targeting the crucial phases in the life of buildings, including construction, renovation and deconstruction.

Through incentives directly based on carbon sequestration, the upcoming carbon farming initiative and carbon removals certificates framework should include dedicated actions for the production and the use of long-lived wood products. [Placeholder for LULUCF]

3.2. Ensuring sustainable use of wood-based resources for bioenergy

[TO BE UPDATED IN LIGHT OF REDII OUTCOME]

Wood-based bioenergy has the potential to provide part of the solution to the climate and biodiversity crises, but only when biomass is produced sustainably and used efficiently. To meet the at least 55% emission reduction target by 2030, Member States will need to significantly increase the share of renewable sources in their energy mix. Biomass, with 60% share, is currently the main source of renewable energy. The intensification of forest harvesting is, however, one of the causes of concern for the conservation of forests biodiversity and their carbon sink and stock.

A recent Commission Report[18] on the use of woody biomass for energy production in the EU shows an increasing overall use of woody biomass in the EU in the past two decades (around 20% since 2000). While 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 harvested from forests) however still makes up at least 37% of the EU input mix of wood for energy production.

The proposed revised Renewable Energy Directive (add reference depending on timing) includes strengthened sustainability criteria for the use of biomass for energy. The use of whole trees for energy production should be minimised, meaning that planting trees for the purpose of bioenergy should be avoided and bioenergy should rather focus on wood waste and residues.

[18] https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/use-woodybiomass-energy-production-eu.

Negative externalities of bioenergy use, such as air pollution, also have to be minimised. Prioritising residues and a cascade use of wood should remain a key overarching principle for maximising the positive climate impact of bioenergy.

[In the proposal for the revision of the Renewable Energy Directive as part of the Fit-for-55 package, the Commission will]

The Commission will also analyse other incentive schemes for bioenergy and propose revising them as appropriate to ensure that the share of forest-based bioenergy in the EU renewable energy mix remains within the limits of sustainability and its possible negative externalities are adequately mitigated

3.3. Promoting non-wood forest bioeconomy, including ecotourism

EU forests provide highly valuable non-wood products, such as cork (80% of the worldwide production), resin, tannins, fodder, medicinal and aromatic plants, fruits, nuts, roots, mushrooms, seeds, honey, ornamentals and wild game, which often benefit the local communities. They contribute about 20% of the marketable value of forests, and their potential for generating additional revenues to the owning communities can be further promoted and supported in cooperation with the national and local authorities and actors.

This is in particular the case for the tourism sector related to nature that has a significant growth potential. European tourism ecosystem has suffered particularly hard under COVID19 but the pandemic has also made people spend more time in nature. The growing trend of nature tourism is an opportunity to accelerate the green transition of the tourism sector and provide significant income opportunities in rural areas and improve rural welfare, while further promoting biodiversity conservation and the preservation of carbon stocks.

In order to seize additional benefits from non-wood products to rural communities in forested landscapes and supporting producers' organisations, the Commission will promote the elaboration of coordinated and integrated regional, national and subnational programmes on the sustainable production of Non-Wood Forest Products.
In order to boost EU forest ecotourism, the Commission will promote collaboration between the tourism sector, forest-owners and nature protection services, and standards and norms for eco-tourism activities.

3.4. Developing skills and empowering people for sustainable forest bioeconomy

Behind the delivery of the many services that forests provide are concrete people with a wide variety of skills. The increasing multifunctional role that forests will play in the transition to a sustainable and climate neutral future will require more skilled people than we have today, including, among others, experts in enhanced sustainable forest management practices, including adaptive re-and afforestation and restoration, wood-using architects, engineers and designers, food experts, data specialists, chemists, ecotourism facilitators. It is important to develop respective curricula, knowledge and skills.

The Commission will map core forest-related skills needed to achieve the goals of the new EU Forest Strategy and develop relevant education materials. The Commission will also explore possibilities to launch a professional training programme or modules for foresters to acquire modern skills on enhanced sustainable forest management, including closer-to-nature forestry and biodiversity-friendly afforestation, reforestation and tree planting.

In addition, the Commission will also launch a public campaign with a focus on young and unemployed people to inform them on available training and career options in the forestry sector, especially for the jobs and skills needed to achieve the goals of the EU Forest Strategy.

The Commission will

1. As part of the CAP and to increase forest support, provide new means to share information on good practices on best design and implementation of forest-relevant interventions
2. Promote the use of the Natura 2000 logo for non-wood forest-based products and services
3. In order to encourage long-term storage of carbon in construction products and turn part of the construction sector into a carbon sink, establish a standard, robust and transparent methodology to quantify the climate benefits of wood construction products and other building materials, reflecting the most advanced dynamic life cycle analysis techniques
4. Work to ensure that the review of the construction products regulation[19] better reflects the importance of considering temporary carbon storage as a key aspect of the environmental performance of products
5. Consider including sustainable activities related to harvesting, production and use of wood products in the forthcoming reviews of the delegated acts of the Regulation Taxonomy on mitigation and circular economy
6. Identify and address possible hurdles posed by current EU legislation and the State Aid Guidelines to grant adequate public support to services beneficial for the public interest.
7. Create a new alliance between the professionals of tourism and the foresters. It will involve the World Tourism Organisation and the network for Europe's natural and cultural heritage
8. Build a toolkit to help Member States to establish life-long programs and advise to foresters and adapt education and training to the challenges and needs of today's realities, and to develop employment opportunities

4. Strategic EU forest planning, monitoring and data collection

Information concerning the status of EU forests, pressures and ecosystem services, as well as their social and economic value, is patchy. This poses challenges to strategic EU sustainable forest planning, monitoring and management to ensure that forests can deliver on their multiple functions.

There is a need for more comparable data and for a more complete picture from both remote sensing and in situ data, to monitor the actual status and health of the different forest ecosystems across the W, including, among others, aspects such as soil carbon, biodiversity,

[19] Regulation (EU) 305/2011

biotic and abiotic stress. It is important to ensure a holistic monitoring with high spatial and temporal granularity.

The main reasons for today's situation are the absence of comprehensive mandatory reporting requirements since 2007, when the Forest Focus Regulation expired, a missing strategic plan for the future of EU's forests, the lack of more detailed sustainable forest management indicators and thresholds, and challenges related to the use of remote sensing data (i.e. lack of common definitions, data interpretation, non-availability of long and comparable time-series, limitations of the Copernicus forest products).

At the same time, it is crucial to support forest owners and relevant policy makers with science-based knowledge and information in an accessible manner to all, and have a strategic overview of the plans for the management of EU's forests so that forests can fulfil the increasing multiple demands put on them in the transition to a sustainable climate-neutral economy. Also, the rapid unfolding of forest natural disturbances requires more agile tools for monitoring these phenomena in real-time. There is a need for strategic forest planning and monitoring across policies, e.g. for land use and change monitoring for the implementation of the LULUCF regulation, for forest damage prevention and control, and for the ecological condition of EU's forests.

Digital technologies allow a more effective sustainable forest management and offer opportunities for increased and more efficient monitoring. Copernicus Sentinel data and artificial intelligence are being used to provide continuous forest inventories in Portugal, identify land use (changes) as well as check upon the health status of trees in support of forest managers and the pulp and paper industry[26] . In Sweden, information coming from satellite imagery has allowed the detection of illegal cutting (now quite rare) and of poor management practices, since 2000[20]. In Romania, a 'smart forest' project is being implemented in a primary forest to alert forest guards on potential illegal logging[21] . Such examples are no longer the exception, and they drive forest management into the digital era.

Establishing an EU-wide common digital monitoring framework, using remote sensing technologies, will improve the accuracy of monitoring. Subject to an impact assessment, the Commission will put forward a legislative proposal for EU Forest Monitoring and Planning framework. Focus should be on regular and more frequent cost-efficient reporting and update of data on priority policy-relevant topics, such as biodiversity, health, damages, invasive alien species, and effects of climate change. A list of parameters relevant to the areas monitored would be defined, and data should be collected and reported, building on existing indicators and monitoring schemes. The new monitoring instrument should promote the use of best available information, combining in situ and remote sensing/digital means to set up a harmonised system of collection of data. Options for new monitoring parameters and indicators relevant to the EU would be assessed and considered through expert support, research and other means, and would be integrated in the monitoring system when available.

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[20] Case Gallery - earsc.org/sebs

[21] Vodafone powers the first smart forest in Romania to prevent illegal logging - Business Review (business-review.eu)

The new legal framework for forest monitoring would include Strategic Plans for Forests to be developed by competent national or regional authorities laying out the strategic vision for forests and the forest sector for the next 10, 30 and 50 years to cover the short-term planning cycle, the EU climate neutrality in 2050 and net negative emissions thereafter to which forests will need to contribute. Strategic Plans for Forests would serve as a coordinated forest planning and management tool at EU level, helping to identify data gaps, build on the multifunctional role of forests and foster exchanges, collaboration and harmonization of views for EU forests and the forest sector.

In addition and in line with the EU 2030 Biodiversity Strategy, the share of forest areas covered by Forest Management Plans (FMPs) should cover all managed public forests and an increased number of private forests. This is necessary to help forest owners and managers to effectively translate the policy objectives and strategic priorities set at EU, national and regional level into reality on the ground. In preparation of the new legislative instrument on EU forest planning and monitoring, the Commission will perform a comparative assessment of the state of play in Member States and consider setting minimum common requirements for such plans, or their Member State equivalents[22].

The new legal framework will be supported by a comprehensive governance system under the updated more inclusive and coherent EU forest governance framework as per section 6. As part of this, a dedicated group involving key experts and networks on forest monitoring will be established to assist with identifying and defining the common list of indicators and methods to monitor, defining work programmes, and identifying research needs and progress.

The Forest Information System for Europe (FISE) will be enhanced to become the corner stone for harmonised forest data in Europe. The integrated forest monitoring system will therefore be framed under and its results made available through the information system. FISE should be the European contribution to Earth Observation-based global forest monitoring under the EU Observatory.

The Commission will further support initiatives aimed at raising awareness of the digital and remote sensing opportunities for forest monitoring and management, with a view to share best practices and challenges. While monitoring should be based as much as possible on seamless geospatial data, e.g. from remote sensing, in-situ data is still a key for improving EU monitoring for site specific indicators that cannot be monitored through remote sensing (e.g. soil organic carbon) or for calibration of remote sensing products with the aim to harmonising national products.

A dashboard on key indicators will be produced and updated yearly for indicators, such from remote-sensing data, that are readily available, while every [X] years for those where more time is needed to consolidate them. This will also contribute to the regular monitoring processes such as. the UN Sustainable Development Goals, the 8th Environment Action Programme and the European Semester. Taking into account the particular risk of

[22] Forest management plans and requirements to such plans already exist in several Member States that the Commissions assessment will build on. See: Summary of forest management plans requirements: fmp table.pdf (europa.eu)

disturbances and the rapidly changing situation in EU forests, forest disturbances and updated risk assessments will also be part of the yearly reports. The European forest science partnership will be involved in the preparation of these reports. Lay summaries will be made available for all FISE reports mentioned above. Civil society or local action groups are invited to make use of these reports and organise public information sessions in their countries or communities, with a view to raise more awareness on European forests.

Citizens and communities will also be involved in monitoring the trees planted as a contribution to the pledge of at least 3 billion additional trees by 2030, through the website MapMyTree. Practical advice on tree planting and care will be made available on a dedicated platform.

5. A strong research and innovation agenda to improve our knowledge on forests

The Commission, through Horizon Europe, will promote a science-based enhance contribution of EU forests to the European Green Deal ambitions of climate neutrality, biodiversity and sustainable growth. The potential of Horizon Europe will be combined with the complementary investment of up to EUR 1 billion in the future Circular Bio-based Europe Joint Undertaking for the period 2021-2027, to help diversify the income of forest managers.

The Commission will

1. Put forward a proposal for a new legislative proposal on EU Forest Planning and Monitoring to ensure a harmonised EU forest monitoring, data collection and reporting system and coordinated and strategic EU forest planning
2. As part of the Forest Information System for Europe (FISE), on the basis of improved Copernicus products and other remote-sensing data strengthen the monitoring of climate effects on forests
3. Prepare and publish regular reports and lay summaries with the support of a broader European forest science partnership
4. Through its Joint Research Centre develop a European forest science partnership, with a view to support the development of new indicators based on remote sensing and the latest research results
5. Enhance transnational cooperation through a dedicated Research and Innovation partnership on forestry
6. Develop a "Planning our Future Forest" research and innovation agenda including: research and forecast of challenges affecting forest in light of climate change, the innovation needs for instance species need as well as piloting and testing of adaptive and resilience enhancing forest management approaches
7. Develop a Citizens' science Programme for forest biodiversity, notably engaging citizens and civil society in monitoring forest biodiversity

6. Inclusive and coherent EU forest governance framework

The wider contribution of forests to the European Green Deal objectives, as presented in the Strategy, including for climate, biodiversity and sustainable bioeconomy, necessitates a more inclusive and better coordinated EU forest governance structure, reflecting all the objectives

of the new EU Forest Strategy and their interlinkages. Reinforced coordination of different policies should be ensured and a multidisciplinary exchange should be facilitated, with the involvement a wide variety of experts and stakeholders. Given the increasing interest of the European public in the future of EU's forests, transparency of the governance should also be guaranteed so that everyone can follow how the Commission and the Member States are assisted in delivering on the objectives of the new EU Forest Strategy.

In this spirit, the Commission will propose an EU forest governance system that promotes policy coherence and synergies between the different functions a sustainable and climate neutral European economy requires forests to deliver, and allow for an inclusive space for Member States, forest owners and managers, industry, academia and civil society to discuss forest policy matters, while avoiding overlapping structures.

Regarding the dialogue with the Member States, building on the extensive experience of and cooperation within the Standing Forestry Committee, but also the valuable work undertaken in the Working Group on Forest and Nature and the Expert Group on Forest based Industries and Sector-related Issues , the Commission will propose an updated governance that brings these three groups together into a single expert group, with a mandate reflecting all the environmental, social and economic objectives of the new EU Forest Strategy and membership ensuring that multiple Member State representatives from different Ministries are members of this group. To make this happen and avoid the creation of an additional structure, the Commission will work with Member States to revise the Standing Forestry Committee rules of procedure, or identify other measures as necessary.

Regarding the engagement with civil society, forest owners and managers, industry and academia, the Commission will take a similar approach and build on the experience of the existing Civil Dialogue Group on Forestry and Cork and the Working Group on Forest and Nature, creating one group with a revised mission statement, broader membership and focus on the implementation of the new EU Forest Strategy.

The Commission will ensure regular joint meetings between the two groups, at least twice a year, and commit to full transparency of the discussions. The Commission encourages also Member States to establish broad multi-stakeholder dialogue platforms to discuss and inform European, national and local forest policies.

Such reinforced governance structure will allow to strengthen the dialogue, break silos and fully reflect, in the spirit of the European Green Deal and the new EU Forest Strategy, the synergies between rural development, sustainable forest bioeconomy and the EU's increased climate and biodiversity ambition.

The Commission will also promote the creation of a "Forest Advisory Services" in the Member States, equivalent to the Farm Advisory services existing under the CAP.

7. Stepping up implementation of existing EU acquis

The implementation of the EU acquis of relevance for forests and forest management issues needs to be stepped up. The Habitats[23] and Birds[24] Directives provide for the conservation of a good range of forest habitats and of forests-related animal and plant species. The EU Timber Regulation[25] lays down obligations of operators who place timber and timber products on the market. The Commission has conducted a Fitness check of this regulation and of the Forest Law Enforcement Governance and Trade Regulation[26].

Illegal logging is particularly worrying when it concerns primary and old growth forests or forest habitats with very small areas left due to the irreversibility of the damage. In addition to stepping up infringement procedures, the Commission will intensify its dialogues with Member States competent authorities and provide support and capacity building for forest monitoring and control, to more effectively fight illegal logging and enforce the rule of law. This can include Member States cooperation activities for enhancing investigative capacity and protection of involved forestry authorities, making increased use of near real time satellite monitoring, involving civil society campaigns….

As cases of illegal logging are being reported also for wood products supposedly sourced from forest certified as managed sustainably, Member States should ensure closer auditing of private certification schemes and the implementation of certified activities the ground.

Furthermore the commission will consider if it is appropriate to set minimum auditing requirements for private certification schemes as well as minimum standards for third party certification schemes.

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[23] Council Directive 92/43/EEC of 21 May 1992

[24] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

[25] Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market

[26] Council Regulation (EC) No 2173/2005 of 20 December 2005 on the establishment of a Forest Law Enforcement, Governance and Trade (FLEGT) licensing scheme for imports of timber into the European Community.