



**SUPERB**  
Upscaling Forest Restoration

## Milestone 5.1

Methodological Framework for assessment  
of policy coherence

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## Keywords

Up-scaling, forest restoration, forest ecosystem services, policy coherence



# 1. Introduction

## 1.1 Introduction to this document

This milestone is about providing a **framework guidance document** incl. **examples** that will help researchers and decision makers conduct an analysis of vertical and horizontal policy coherence to implement the mapping of a variety of forest restoration policies. It is implemented within **Task 5.1. Mapping European forest policies** in the EU funded SUPERB project.

**SUPERB project Task 5.1.** will map key **international, EU and (sub-) national policies** relevant for restoration in all project (demo) countries. This milestone / deliverable will assess **policy coherence**, understood as the ability of policies to drive positive transformative change towards effective forest ecosystem restoration in the context of multiple policy objectives.

This assessment will cover analyses of trade-offs and synergies between policies **horizontally** across key policy sectors such as climate mitigation, biodiversity conservation, forestry/sustainable forest management, water protection, agriculture and rural development, and sustainable finance, to name a few.

This assessment will also cover analyses of trade-offs and synergies between policies **vertically** across levels of governance, including the international, EU, national and subnational (regional) levels.

The present document directly implements **Milestone M.5.1** (“Methodological assessment framework”). It will serve as guidance document to implement project deliverable **D5.1. European restoration policies map: Restoration policy and governance framework map** (M36) and contribute to project deliverable **D.5.2. Restoration governance challenges and solutions report** (M42). Both M 5.1 and D 5.1 can also be used to inform the work in the follow up tasks in WP5 Governance and Society, namely **Task 5.2 Supporting restoration governance in the demonstrator regions**, and **Task 5.3. Monitoring societal demands and upscaling tool**.

Further application of the methodological framework can be found in relevant activities in WP2 Stakeholder engagement, WP3 Practical knowledge, WP4 The economics and innovative sustainable financing of restoration, WP 6 Biodiversity and ecosystem management, WP7 Large scale demonstrators, and WP 8 Further Upscaling.

Figure 1 below is showing the interlinkages between the different SUPERB work packages.

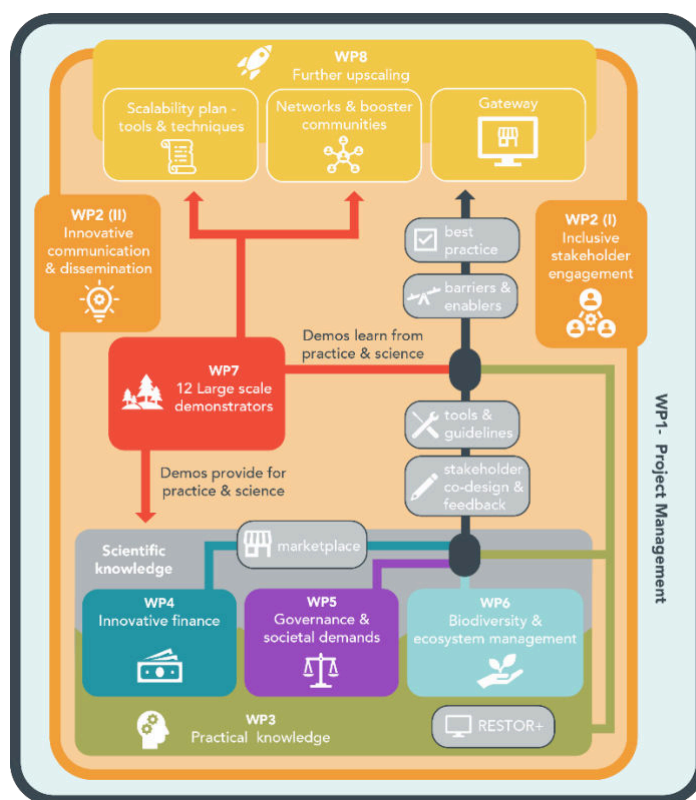


Figure 1. SUPERB at glance: work packages and their interlinkages

## 1.2 The Problem Statement for the Methodological Framework: State of the Art and Knowledge Gaps

Decision-makers, managers and stakeholders across Europe have to address issues of challenging policy coherence and trade-offs in order to meet competing demands for a variety of forest ecosystem goods and services in the context of an uncertain and complex future, as well as in the frame of a threefold crises as regards biodiversity loss, climate change and socio-economic disruptions. There is a need to identify and to implement a variety of policy and management responses that can help anticipate and prepare for what the future has in store. Therefore, addressing policy coherence issues and integrating different societal demands in a balanced approach to forest management for both current and future generations in Europe remains a key objective for restoring forest ecosystems in Europe.

Policy integration and policy coherence have become an important topic of research in policy sciences (Howlett and Rayner, 2007), environmental governance (Jordan and Lenschow, 2010), forest policy studies (Hogl et al., 2016), and several other academic disciplines. They are increasingly recognised as fundamental principles for achieving sustainable development. In particular, they should change sectoral policymaking towards inter-sectoral coordination to address intertwined sustainability issues (Jordan and Lenschow, 2010). They should also help decision makers in policy and practice strike a balance between environmental protection and land use with regard to the fulfilment of current and future economic, environmental and social goals (Briassoulis, 2004). Coherent integration of conservation and sustainable use of natural



resources (e.g., biodiversity, forest, soil and water) is suggested as a must for societies that strive for enhanced sustainability (Kamieniecki, 2000, 186).

Despite their recognition in policymaking and society, recent reviews of the state of the art suggest that achieving (environmental) policy integration and policy coherence remain a challenge (Jordan and Lenschow, 2010; Hogl et al., 2016). Natural resource policymaking is characterised by struggles among competing policy sectors (Sotirov and Memmler, 2012) that often result in policy incoherence (Howlett and Rayner, 2007) and/or policy fragmentation (Winkel and Sotirov, 2016). In particular, an interesting and somewhat paradoxical puzzle of forest policy (dis)integration can be found in Europe. We summarise its basic features in the following.

The treaties establishing the European Union (EU) make no provision for a common EU forest policy, and no Pan-European Legally Binding Agreement on Forests could be agreed thus far (Edwards and Kleinschmit, 2013; Winkel and Sotirov, 2016). Forest policy in Europe largely remains a countries' competency. Sovereignty and long history of national and regional forest laws and regulations remain central.

Established at EU and national levels, other policy sectors including agriculture and rural development, environmental and nature protection, renewable energy, and climate change formulate a variety of legally-binding objectives, rules, and decision-making competencies that are directly relevant to forests and forestry (Pülzl et al., 2013). These forest-relevant EU policies put pressure on domestic forest policy to integrate their specific sectoral objectives that often contradict not only with each other but also with forest policy objectives. For example, regional development and climate change mitigation through afforestation and timber production under the EU Rural Development Regulation can contradict with forest biodiversity conservation within and outside the so-called Natura 2000 protected areas under the EU Habitats and Birds Directives. Bio-energy use through increased woody biomass production and forestry intensification supported by the EU Renewable Energy Directive can contradict with the forest biodiversity policy objectives (Sotirov and Arts 2018; Sotirov and Storch 2018; Baulenas and Sotirov 2020).

Paradoxically, despite various calls for vertical (between EU, national and regional levels) and horizontal (between the forest and the other forest-relevant policy sectors) coordination and integration, European forest policy fragmentation has increased over time (Winkel and Sotirov, 2016; Sotirov et al. 2021).

Over the last two decades, 'sustainable forest management' (SFM) and 'multifunctional forestry' (MFF) are set as main goals of the non-legally binding Pan-European and EU forest strategies as well as several national forest policies and laws (Sotirov et al., 2014). SFM and MFF contain a core belief within forest policy in the possibility to integrate in coherent way economic, ecological and social demands on forests, and strike a just balance between people, forest ecosystems, and other land use sectors (MCPFE, 1993).

However, an increasing body of knowledge reveals major internal obstacles to the delivery on these integrative expectations. According to scientific studies, SFM and MFF prioritise economic objectives of forest policy (timber production) and/or rather mask than balance increasing conflicts with other policy sectors and societal demands (Glück, 1987, 2001; McCool and Stankey, 2004; Wang, 2002; Sotirov, 2010). Recent research shows salient conflicts in several EU countries between demands for timber production on the one hand, and forest biodiversity conservation, energy wood production, and climate protection on the other (Sotirov and Arts 2018; Sotirov and Storch 2018).



These observations reveal an interesting forest policy (dis)integration puzzle. While being exposed to outside pressure by other policy sectors to integrate with their forest-relevant objectives, EU and domestic forest policies apparently lack internal capability to coordinate with them. The observation is that SFM and MFF tend to prioritise sectoral forest policy that is partly at odds with the other policy sectors. This in turn increases the outside integration pressure on forest policy. Thus, policymakers within the forest sector face significant pressure of integrating a variety of often competing forest-relevant policy objectives without producing forest policy disintegration. This puzzle raises open questions of how and why EU and domestic forest policies have responded to integration pressures coming from other policy sectors.

First, questions of forest policy (dis)integration at the Pan-European and EU levels (Winkel and Sotirov, 2016; cf. Edwards and Kleinschmit, 2013) have already been addressed in the scientific literature as shortly summarised above. However, a range of new EU and national policies have developed that leave many open questions about the state of vertical and horizontal forest policy coherence in Europe. Second, national states still hold the main political authority over forest and forest-relevant policy in Europe. In result, much remains unknown about how and why EU and domestic forest policy has responded to integration and coherence pressures from above (international and EU levels) and from below (local and regional levels).

In terms of substantive scope, this guidance framework document analyses the coherence and integration of forestry/sustainable forest management, biodiversity conservation, climate change, water, and agriculture and rural development policies. As outlined above, these are the most relevant policy sectors that put integration pressure on forest policy and forest management with important implications for forest restoration governance in Europe.

## **2. Methodological framework: Key Terms and Definitions**

### **2.1. Defining policy integration and policy coherence**

In the positivist academic literature and non-academic policy support work, policy integration and policy coherence are defined as a “process of [...] coordinating various policies [...] aiming to achieve multiple complementarities and synergies” (Briassoulis, 2004, 13). However, the degree of complementarity and coherence between policy sectors remains a normative and/or empirical question (Bornemann, 2007). From analytical perspective, systematic research into policy integration addresses rather questions of what policy is being integrated into what other policy (content), and how and why these policies are being integrated (outputs, processes) (Jordan and Lenschow, 2010).

Recent scholarship shows that policy integration and policy coherence reassemble a highly political process that pits policy sectors against each other. The quest for policy integration and policy coherence requires transformative changes that “challenge the boundaries of existing policies” (Degeling, 1995, 293). The politics of policy integration hence involves struggles between policy sectors and their actors over shifts in sectoral policies, and their political power (Derkzen et al., 2009; Feindt, 2010; Winkel and Sotirov, 2016). Transformative shifts potentially result in changed goals, instruments, beliefs, actions, and power of policy actors. This is as (sectoral) policies refer to ‘policy paradigms’ (Hall, 1993) that are comprised of specific sets of goals and instruments that reflect distinct actors’ beliefs about problems, causes, and solutions that guide their actions (Sabatier, 1988; Sotirov and Winkel, 2016).



Power is usually defined as the actors' position of formal decision-making authority (e.g., legislative, executive, juridical powers) and/or the ability to influence decision-making through other political resources (e.g., funding, information, public opinion, boycotts) (Sabatier and Weible, 2007). The overall set of policy goals and instruments, institutional rules, the underlying ideas, interests, power and practices of actors refers to a policy regime (May et al., 2006; Hall, 2010).

To describe how forest policies have reacted to integration and coherence pressure and what types of policy changes have emerged over time, an analytical framework suggested by Rayner and Howlett (2009) can be used. Rooted in historical institutionalism (Hall and Taylor, 1996), the framework distinguishes four possible types of policy change outputs and outcomes of policy (dis)integration and policy (in)coherence: 'replacement', 'layering', 'drift' and 'conversion'. These types refer to shifts either in policy goals or instruments, or in both, or shifts through replacement of existing goals and instruments by new ones. The definition and main features of these types are summarised in Table 1.

Consistent with historical institutionalist view on different orders of change (Hall, 1993), the four types differ in their scope of policy change and stability. 'Replacement' is the type of policy integration and policy coherence with the greatest scope of transformative policy change. 'Layering' is also a comprehensive change process; unlike 'replacement', it adds a new policy paradigm to the old one; it does not replace it. 'Drift' is less comprehensive process where goals change, but instruments and/or their use do not. 'Conversion' comes with the smallest scope of change: instruments and/or their use change where goals do not (cf. Mahoney and Thelen, 2010). This ordinal classification potentially shows to which extent one policy is integrated into another one, that is, how transformative a policy integration process is.

	Theoretical foundation	
<b>Types</b>	<i>Policy change theory: Rayner and Howlett (2009); Hall (1993, 2010); Hall, 1993</i>	<i>Institutional change theory: Mahoney and Thelen (2010); Hall (1993, 2010); Hall, 1993</i>
Replacement	A process whereby policies are fundamentally re-structured through the replacement of existing goals and instruments by new ones	The removal of existing rules and the introduction of new ones
Layering	A process whereby new goals and instruments are added to an existing policy regime without abandoning previous ones	The introduction of new rules on top of or alongside existing ones
Drift	A process where the goals of the policy change without changes in instruments or their use	The changed impact of existing rules due to shifts in the external conditions
Conversion	A process that involves changes in policy instruments or their use while holding policy goals constant	The changed enactment of existing rules due to their strategic redeployment

*Table 1. Typology of outputs and processes of policy integration and policy coherence through policy change (adapted from Sotirov and Storch 2018).*

Cross-sectoral and vertical policy integration and policy coherence come with a variety of challenges and chances as regards to the coordination and adaptation of sectoral policy paradigms. This includes conflicts and cooperation in terms of adopting and coordinating





issues, goals, instruments and management approaches, and/or aligning existing ones, to become internally coherent and consistent (Briassoulis, 2005; Stead et al. 2004; Howlett and Rayner, 2007).

**Coherent policy goals** can be simultaneously achieved without any significant trade-offs. **Incoherent policy goals** contain major contradictions where goals cannot be attained simultaneously, thus leading to policy fragmentation, or policy integration failure. **Consistent policy instruments and management practices** work together to support a policy goal, whereas **inconsistent policy instruments and practices** “work against each other and are counterproductive, for example, providing simultaneous incentives and disincentives toward the attainment of stated policy goals” (Kern and Howlett, 2009; cf. Sotirov and Storch in this issue).

In our empirical work, forest policy integration and policy coherence will be assessed through mapping out shifts in **policy outputs (goals, instruments) and practices**. **Policy goals** refer to core beliefs that guide policy and practice (e.g., primacy of timber production vs. nature conservation) and/or operationalised objectives that a policy formally aims at (e.g. 50% mixed forests by 2020; 10% set aside forests by 2020). **Policy instruments** are means and procedures that are applied to achieve policy goals (Cashore and Howlett, 2007). They can be classified into regulatory (obligations, prohibitions, sanctions), financial (subsidies, taxes, tariffs, fines, market incentives), persuasive (information, advise, training) and organisational (structural reforms) instruments (Vedung, 1998). The variety of instruments can be put on a continuum between mandatory ‘hard’ law (e.g., command-and-control regulations, structural reforms) and voluntary ‘soft’ law (e.g., subsidies, markets, information). **Practices** refer to “doings, sayings and things in a specific field of activity” (Arts et al., 2014). They include forest management behaviour. Practices are guided by the policy beliefs that policy actors share and adhere to.

## 2.2. Analysing policy coherence horizontally and vertically

The aforementioned key terms and definitions lead to the identification of four packages of conceptual foci and analytical dimensions for assessing forest policy (dis)integration and (in)coherence. These packages are arranged around topical (horizontal) and spatial (vertical) scales or units of analysis. They are outlined in the following text and summarized in Table 2.

Firstly, forest policy integration and coherence refers to policy change processes and outcomes aimed at achieving, or avoiding **intra-sectoral and/or cross-sectoral forest policy integration across horizontal, topical scales** (Sotirov et al. 2013). Coherent cross-sectoral integration can be observed when issues, goals and instruments are integrated and coordinated among the forestry sector and other forest-relevant land-use sectors such as agriculture, rural development, biodiversity conservation, climate protection, and renewable energy. Intra-sectoral integration applies within the forest sector itself. Examples include efforts to find a balance between the social, economic and ecological dimensions of SFM through integration and coordination of issues, objectives, and instruments.

Secondly, forest policy integration and coherence refers to integrating and coordinating forest **management practices**, including **forest restoration** *within the forest sector itself*, as well as *across forest management and other land-use practices at different local scales* (e.g., individual trees, forest stands, forested landscapes, spatial planning regions). Examples include agro-forestry, urban forestry, forests as part of ‘energy landscapes’ (biomass, solar, wind), integrated forest biodiversity management and restoration under the EU’s Natura 2000



network of conservation sites, and climate mitigation actions by the Land Use, Land Use Change and Forestry (LULUCF) sector. In this context, sustainable, multifunctional and integrated forest management, including forest restoration is expected to be practiced at the local level. It is at this level where political decision-makers, policy officers, landowners, forest managers, forest industries, environmental groups and other stakeholder groups come together to interact and put the variety of integrative policy and management paradigms such as retention forestry, sustainable forest management, multifunctional forestry, close-to-nature forest management, conservation and restoration forest management into action while facing trade-offs of competing forest land-use demands.

Forest management, including forest restoration can be practiced either by segregative or integrative management strategies (Sotirov et al., 2013; Fischer et al., 2014; Borrass et al., 2017). **Segregative forest management** strategies usually refer to spatial differentiation and prioritization among single-product zones of different forest land-uses. Examples include forest areas designated and primarily managed as even-aged monocultures for timber production located next to old-growth forest areas designated as nature reserves to maintain and/or restore forest habitat and species for biodiversity conservation, or specific forest zones designated and intensively used for recreation and leisure. While this type of forest management is understood as segregative approach from a forest stand perspective, it can be nonetheless regarded as an integrative one if seen from a wider landscape perspective.

**Integrative forest management** strategies, such as close-to-nature forestry, multi-functional forestry, Pro-Silva forestry, retention forestry, seek to simultaneously provide a wide range of forest ecosystem services at each forest management unit. Still, from the perspective of single trees, these types of integrative forest management approaches can become segregative. This can be observed when (old) habitat trees are becoming unavailable for economically-oriented forest land uses (e.g., fuelwood, timber production) or when dead trees, that are left standing or laying in a forest stand for the sake of deadwood-dwelling species, become at odds with social forest land uses for recreation or education due to safety issues.

Therefore, the nature of ‘segregative’ and ‘integrative’ forest management highly depends on the scale of analysis and the particular perspectives and motivations of analysts and strategists alike. Therefore, the different forest management approaches, including forest restoration have to acknowledge the priority need to identify, discuss, manage, and learn about inherent trade-offs, and explore synergies between forest ecosystem services at different scales. This is a crucial precondition for striving and achieving coherent integration by forest policy- making and forest management practices (Sotirov et al., 2013).

Finally, **the vertical links** between forest policy integration and integrated forest management practices refer to issues of coherent integration and co-ordination across spatial scales, including the international, EU, national, subnational, local levels. It is at the level of regional or local practices where political decision-makers, policy officers, landowners, forest managers, forest industries, environmental groups and other stakeholder groups have to implement integrative policy paradigms and put policy decisions into action (Briassoulis, 2005). This is not only challenging due to sustainable forest management as a “wicked problem” that is characterize by high stakes and variety of societal claims for competing forest land-uses. It is also challenging given the paradoxes, incoherencies and inconsistencies inherent to forest related policy-making outlined above.



Dimensions and scales of policy integration and coherence		
Spatial (vertical)	Topical (horizontal)	
	Intra-sectoral	Cross-sectoral
Policy (international, EU, national, regional)	Integration of sustainability dimensions (economy, ecology, social) within forest policy	Integration of forest policy in other, more salient, land use policies (agriculture, biodiversity, climate, water, energy) and vice versa
Management (local)	Provision of a wide range of forest ecosystem goods and ecosystem services (supporting, provisioning, regulating, cultural) by forest management practices	Integration of forest management practices in other land use management practices (e.g. agroforestry, management of Natura 2000 forest sites, urban forestry, LULUCF) and vice versa

Table 2. Analytical dimensions for the assessment of policy integration and coherence (adapted from Sotirov and Arts 2018)

## 3. Exemplary application of the methodological framework: illustrative mapping forest restoration policies

### 3.1. International level

There is no single institutional locus for providing a policy framework and guidance on how to achieve policy coherence as to sustainably manage and conserve forest ecosystems available at the global level. Forest biodiversity and nature conservation aspects of a sustainable use of forests are governed through legally-binding multilateral United Nations (UN) conventions on 'global environmental commons' which are expected to help achieving the broader and forest-specific **Sustainable Development Goals (SDGs)** formulated under the UN Global Agenda 2030. They mainly include the **Convention of Biological Diversity (CBD)** and the **UN Framework Convention on Climate Change (UNFCCC)**. Non-legally binding international forest policy under the UN such as the **UN Forum on Forests (UNFF)** and the **International Arrangement on Forests (IAF)** and economic and trade-focused international policies such as the **International Tropical Timber Agreement (ITTA)** and **Forest Law Enforcement, Governance and Trade (FLEGT)** provide another important foundation for global action at the forest biodiversity nexus. International forest certification standards, such as the **FSC and PEFC**, that have emerged from private initiative to increase market transparency are a further relevant aspect of global forest governance (Rayner et al. 2010; Sotirov et al. 2020).

#### The International Arrangement on Forests (IAF)

Following the 1992 United Nations Conference on Environment and Development (UNCED) and the repeated failures to agree on a Global Forest Convention (Dimitrov 2005), the so-called 'International Arrangement on Forests' (IAF) has developed. It consists of several sub-elements that are based on international soft law on forests. In the early stage, countries participating in the UNCED adopted two documents directly related to forests: the 'Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management,



Conservation and Sustainable Development of All Types of Forests’ (known as the ‘Forest Principles’), and Chapter 11 (‘Combating Deforestation’) of the Agenda 21. The latter highlighted forest loss as a recognised concern, but contained no goals committing national countries to its reversal (Rayner et al. 2010). In 2007, the participating countries adopted the UN Non-Legally Binding Instrument on all types of forests (NLBI) which was renamed as the United Nations Forest Instrument (UNFI) in 2015. In 2017, the UN Strategic Plan for Forests 2030 (UNSPF) was adopted. The main policy aim of the IAF – as specified in the ‘Forest Principles’, NLBI/UNFI, and UNSPF – refers to strengthening political commitment and action at all levels to effectively implement Sustainable Forest Management (SFM) for all types of forests.

The IAF recommends countries, on a voluntary basis, to present national implementation progress reports towards SFM, and suggests the elaboration and implementation of National Forest Programmes (NFPs) that strive to render forest policy decision-making participatory, more rational, more oriented to the long term, and better coordinated across sectors (Sotirov et al. 2020), as well as the development and application of criteria and indicators (C&I) for SFM. In this context, regional processes of C&I for SFM have flourished.

### **The Convention on Biological Diversity (CBD)**

The CBD is an international environmental legally binding treaty agreed by national governments that entered into force in 1993. It stipulates a comprehensive approach towards the preservation and use of biological diversity, which is further substantiated by decisions of the Conference of the Parties (COP) to the CBD, such as the 2020 Aichi Biodiversity Strategic Goals and Targets (CBD 2010).

The CBD’s main impact results from legally-binding goals without compliance mechanisms that are taken up, and implemented respectively, in national policies by signatory states (Umhauer and Sotirov 2019). National biodiversity strategies, plans, or programmes (NBSAPs) and the programme of work (POW) on forest biological diversity are the main CBD policy tools concerning forests. Their impact depends greatly on how far they are integrated into other policy sectors (e.g. forestry, agriculture) and across sectors (e.g. sustainable development), and facilitated by consultative mechanisms for implementation, monitoring, evaluation, and periodic revision (CBD 2002).

However, a review of actions towards implementing the NBSAP (UNEP 2018), the main CBD instrument, shows that by the deadline of December 2015, almost half of all parties had not submitted their post-2010 NBSAP at all or did submit NBSAP, but without consideration of the 2020 Aichi Targets according to the new Strategic Plan for Biodiversity (CBD 2010).

### **Transnational forest sustainability certification**

Sustainability certification of forest management, later to also include sustainability certification of timber supply chains, has emerged since the 1990s. It is a supply side, non-state market-based instrument for ensuring SFM at the management unit level and resulted from a cooperation between environmental NGOs, forest-based industries, and scientists, often supported by distinct national governments. It builds on third party auditing against private stipulations consisting of SFM standards, principles and C&I, and a corresponding labelling of economic operators. The auditing is carried out by experts accredited by the non-state rule-setting organisation, and, depending on the scheme, the labelling provides access to ecologically sensitive consumer markets in developed countries (e.g. Europe) implying improved firm reputation, a social license to operate granted by NGOs, and possibly even price premiums (Cashore 2002; Rametsteiner and Simula 2003).



Two main approaches to forest certification have emerged globally. The Forest Stewardship Council (FSC) was introduced first (Auld et al. 2008). Although the forest industry was included in the definition of its standards, the decision-making power it granted to social and environmental interests were seen as a threat by many forest producers (Cashore et al. 2004). Consequently, the Programme for the Endorsement of Forest Certification – initially named ‘Pan European Forest Certification’ – (PEFC) was initiated mainly by forest owner associations. The FSC generally has more stringent environmental requirements and restricts certain economic activities, such as, e.g. the use of genetically modified organisms, which are permitted by PEFC schemes. However, significant variations in national standards and implementation practices within the FSC and PEFC programmes makes comparisons difficult without accounting for these differences (Clark and Kozar 2011). The impact of forest certification on forest biodiversity remains somewhat unclear, as a systematic scientific evaluation of such effects is lacking (Visseren-Hamakers and Pattberg 2013).

## **Transnational Public-Private Partnerships**

### **UNFCCC and REDD+**

After years of difficult negotiations, coalitions of developed and developing states and IGOs participating in the UNFCCC agreed in Article 5 of the 2015 legally-binding Paris Agreement on two goals: That they (i) should conserve and enhance sinks and reservoirs in forests and (ii) encourage themselves to take action to implement and support the existing framework for **REDD+** (UN 2015). The acronym stands for **reducing emissions from deforestation and forest degradation (REDD)**, and **the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks (+)** in developing countries. Already in 2010, and after years of expert and political debates, the 2010 Cancun Agreements on REDD+ were adopted. Primarily, the Cancun Agreement provided states, IGOs, NGOs, firms, and scientists with guidance on a phased implementation approach: From plans and implementation through project and national-level “readiness” activities (phase 1 and 2) to results-based activities (phase 3) - and listed the systems and information that developing countries need to undertake REDD+ activities. These included a national plan, a national reference emission level, a robust and transparent national forest monitoring system, and a system for providing information for how “safeguards” - such as respecting indigenous peoples’ rights and avoiding harm to biodiversity - are being addressed and respected (UNFCCC 2011). However, state and non-state actors’ actions largely remain outside of the UNFCCC until discussions about appropriate methods for tracking and financing national mitigation actions are completed. REDD+ is the first global regulatory governance process that promises to directly address the variety of direct drivers of deforestation and forest degradation contributing to climate change (McDermott 2014; Sotirov et al. 2020).

The intervention logic is to make the maintenance of tropical forests (economically) more valuable than their conversion to alternative land-uses such as agriculture, food production, and bioenergy—hence deterring deforestation and forest degradation—by creating a financial value for the carbon stored (UN 2010). In return, countries participating in REDD+ would receive payments for verified/certified emission reductions and removals, either through a market-based or governmental-based mechanism (Glück et al. 2010). The “safeguards”, as stated in the main text and elaborated on in an appendix of the Cancun Agreements (UNFCCC 2011), should address controversies over and risks in the prioritization of carbon forestry and economic preferences over environmental and social values (McDermott 2014). These concerns for environmental integrity were raised by a (tacit) coalition of NGOs, CSOs, and (industrialized) states’ and IGOs’ biodiversity experts. They referred to issues of whether REDD+ would incentivize the centralization of state authority, fuel corruption, favor intensive



forestry and fast-growing tree plantations over biodiversity in natural forests, and lead to land grabbing by the state and private sector at the expense of indigenous and local community rights (Angelsen 2008; Kelly 2010; Sotirov et al. 2020).

REDD+ has pursued the “phased approach” as a main policy tool to address these challenges over time. Displacing decisions about REDD+ over time and across levels of governance has led to their de facto displacement across a number of state and non-state organizations outside the UNFCCC, each with different rules and procedures (McDermott 2014). IGOs such as the UN Development Program (UNDP), the UN Environment Program (UNEP), the Food and Agriculture Organization of the UN (FAO), the World Bank, and developed states (e.g., Australia, Germany, Norway, the UK, and the US) offer REDD+ programs and funds to support regional and bi-lateral partnerships with developing countries for “readiness” activities (Arts et al., 2019). In addition, NGOs and the private sector are involved in designing and investing in REDD+ projects, developing certification schemes to verify carbon and non-carbon performance, as well as working with governments on voluntary standards for REDD+ (McDermott et al. 2011; Sotirov et al. 2020).

### **Forest Landscape Restoration Initiatives**

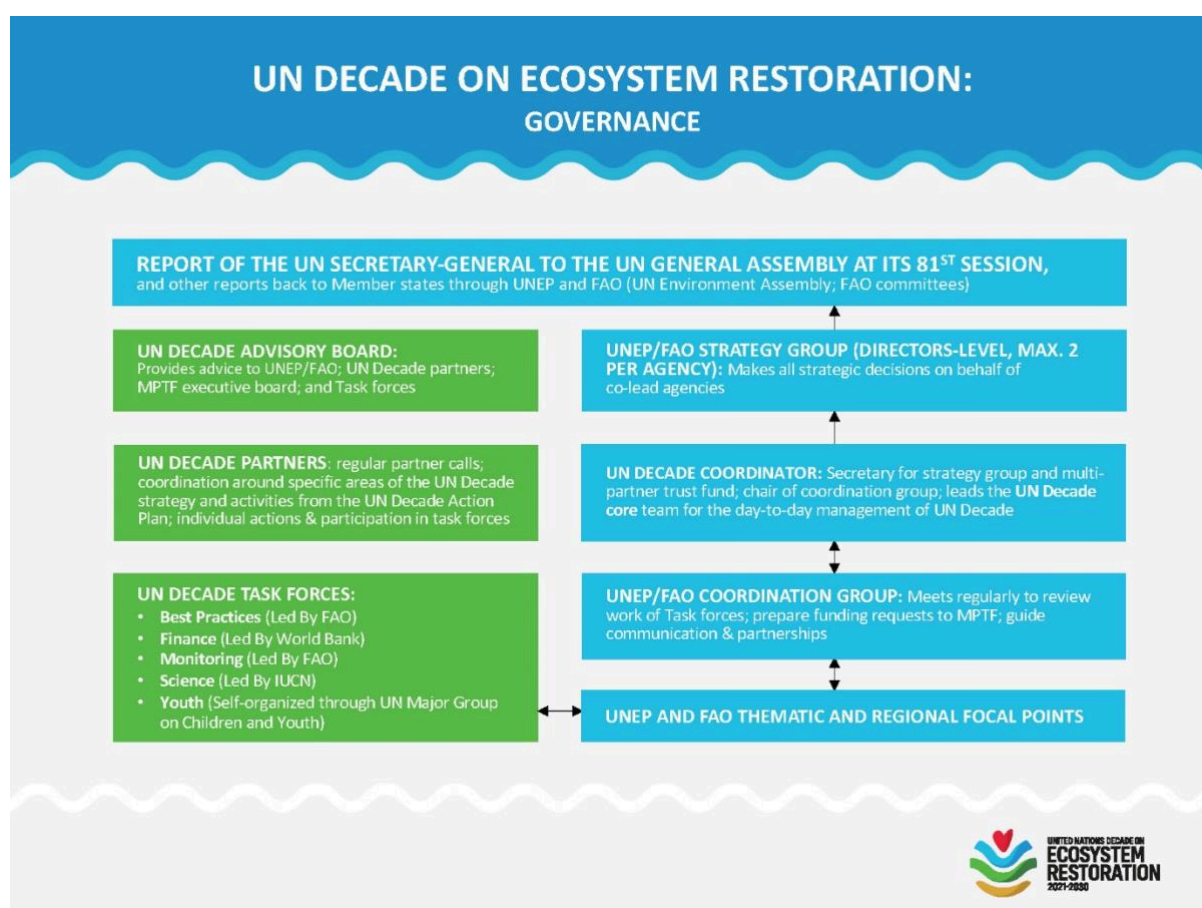
**The Bonn Challenge** is one of the leading transnational Forest Landscape Restoration approaches. It is a transnational collaborative partnership that was launched in 2011 by the German Federal Ministry of Environment Protection and the International Union for the Conservation of Nature (IUCN). Later, their coalition with the CBD, the World Resources Institute, and other like-minded actors successfully set the partnership on the political agenda, receiving strong political momentum through endorsement at the 2014 UN Climate Summit (Brancalion et al. 2016). Based on an informal declaration of intent and core belief in a gigantic (environmental and socio-economic) restoration potential of 2 billion hectares globally (WRI 2017), the main policy aim of the Bonn Challenge is a global effort to restore 160 million hectares of the world’s degraded landscapes and forestlands by 2020, and 350 million hectares by 2030. The Bonn Challenge is not a new global commitment, but rather a practical approach of realizing many international sustainability commitments, including the CBD Aichi Target 15, the UNFCCC REDD+ goal, the Rio + 20 land degradation neutrality goal, the SDG 15 goal, and the 2014 NYDF. It is seen as a contribution to national priorities such as water and food security and rural development while contributing to the achievement of international climate change, biodiversity, and land degradation commitments (IUCN 2019; Sotirov et al. 2020).

The main governance approach is the Global Partnership on Forest Landscape Restoration (GPFLR). It brings together industrialized and developing states, IGOs, and non-state actors working towards the restoration of degraded and deforested lands. Its main intervention logic is to gather knowledge on restoration, facilitate assessments, and support the Bonn Challenge commitments. Through active engagement, collaboration, and the sharing of ideas and information, the GPFLR seeks to promote an integrated forest landscape restoration approach (FLR). This approach highlights the need to align competing sectoral interests and values such as biodiversity conservation or commodity production in the management of land at multiple scales and across various sectors. Collaborative multi-stakeholder processes should bring together all relevant stakeholders to talk, plan, and decide, thereby ensuring political buy-in from state and non-state actors. The approach is to restore ecological integrity and improve human well-being through (i) reforestations integrated into mosaic landscapes of forestry, agriculture, water management, biodiversity conservation, and urban settlement, or (ii) wide-scale restoration for conservation in remote areas (Reinecke and Blum 2017; Sotirov et al. 2020).



The United Nations General Assembly has proclaimed **the UN Decade on Ecosystem Restoration 2021-2030** following a proposal for action by over 70 countries from all latitudes. The UN Decade is a global public-private partnership aimed to protect and revive ecosystems all around the world, for the benefit of people and nature. It aims to halt the degradation of ecosystems, and restore them to achieve global goals. It seeks to restore healthy ecosystems that can be used to enhance people’s livelihoods, counteract climate change, and stop the collapse of biodiversity. The UN Decade runs from 2021 through 2030, which is also the deadline for the **UN Sustainable Development Goals** and the timeline scientists have identified as the last chance to prevent catastrophic climate change. Led by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO) of the United Nations, The UN Decade is trying to build a strong, broad-based global movement to ramp up restoration and put the world on track for a sustainable future. That will include building political momentum for restoration as well as thousands of initiatives on the ground. Through communications, events and a dedicated web platform, the UN Decade will provide a hub for everyone interested in restoration to find projects, partners, funding and the knowledge they need to make their restoration efforts a success (UNEP and FAO 2022, Figure 1).

Figure 1: The governance framework of the UN Decade on Ecosystem Restoration (UNEP and FAO 2022)





### 3.2. Pan-European level

At the pan-European level (that includes the 27 EU countries and further Non-EU European states, including Russia) the Ministerial Conference on the Protection of Forests in Europe (MCPFE), later renamed FOREST EUROPE, has significantly contributed to the definition of SFM through resolutions and sets of criteria (including Criterion 4 on Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems) and indicators, about which the member countries have to report periodically (Pülzl and Hogl 2013).

The signatory countries *inter alia* reported about the policy mix applied to promote biodiversity-related management in forests (Forest Europe 2015). According to these reports, regulatory instruments play an essential role, *inter alia* through the EU's biodiversity policy and, specifically, the EU's nature directives (Birds and Habitats Directives), which are considered to be the most important trigger for policy and legal changes at the national level in EU countries. At the same time, and as reported by the countries, specific references to the implementation of commitments in relation to the CBD, the UNFCCC, or the UNFI are scarce (Forest Europe 2015). Grants or subsidies are the most commonly reported financial instruments employed, mostly for forest biodiversity, i.e. protected areas. Financial support is also directed towards forest inventories, management planning, and the protection of soil and water. Informational instruments, such as monitoring, education, and advisory services are also widely applied across all reporting countries to integrate environmental objectives into SFM (Sotirov et al. 2020).

Data from 17 signatory countries in Europe about their total allocations of public expenditure across the six criteria for SFM (Forest Europe 2015) indicate that, on average, around 10 % of all funds are allocated each to health and vitality, biodiversity and socio-economic functions of forests. The countries indicate very different priorities, though (Sotirov et al. 2020).

### 3.3. European Union level

As explained above, EU policy actions having an impact on forest landscapes are primarily associated with other policy areas and forest issues are torn between different sectoral interests whenever new targets evolve outside the forest sector. After a short exemplary mapping of the two main EU policy domains, EU nature protection/biodiversity as well as EU agricultural and rural development policy, including their goals, instruments and policy settings, **Table 3** provides an overview of all EU sectoral policies and instruments that are relevant to be coordinated with EU and national forest policy and forest management in a coherent way. These EU forest related and forest specific policy domains often seek to influence future forest management at the forest stand, management unit and landscape level in line with their sectoral perspectives. Undoubtedly, these policy settings will directly and indirectly impact on how forests are managed and restored in years to come.

#### EU nature protection regulatory policies

The two cornerstones of EU nature conservation policy are the **EU Birds Directive** (EU 2009) and the **EU Habitats Directive** (CEC 1992). The key instrument to meet their biodiversity conservation objectives is the establishment and management of an EU-wide network of special protection areas (SPAs) and special areas of conservation (SACs), called **Natura 2000**. While strict reserves are included, the larger part of Natura 2000 sites are managed sites. Over half of all Natura 2000 sites are forest areas, accounting for 23 % of the total forest





area of the EU-28 (Sotirov 2017). In 2015, the European Commission published a 'Natura 2000 and Forests' guideline (EC 2015). It is one of the latest examples of a ('soft law') governance process geared towards the integration and coherence between nature conservation and forestry.

Another crucial component of the EU nature conservation policy was the **EU 2020 Biodiversity Strategy**. It suggested a mix of measures such as **conservation and restoration of forest habitats and species, integration of biodiversity concerns into forest management plans, and funding and monitoring to improve biodiversity through SFM** (EC 2011). However, the 2015 Mid-Term Review of the EU Biodiversity Strategy to 2020 found no significant progress. Comparing these assessments with that of the previous State of Nature report for the period 2001–2006 reveals that while there is some improvement in knowledge about the conservation status of forest habitats and species, the percentage of forest habitat types assessed as having 'unfavourable' conservation status is even higher than before (80 % as compared to 63 %) (EEA 2015).

One reason for this might be ineffectiveness of conservation policy through cross-sectoral policy incoherence and corresponding implementation challenges that can be identified in almost all EU-28 countries. The domestic implementation of the integrative approach of the Natura 2000 network of conservation sites (for habitats and species conservation) proved to be a lengthy and politically controversial process (Sotirov et al. 2017). The transposition into national law and the establishment of the network of Natura 2000 sites were often substantially delayed or misdirected, which triggered corrective enforcement actions through EU institutions in line with the legal provisions. In many EU member states, Natura 2000 management plans are typically worded rather vaguely or remain non-mandatory for the majority of forest owners (Winter et al. 2014). Effective management of Natura 2000 sites in forests is often compromised when no funding or only limited financial support is made available (Geitzenauer et al. 2016), or when nature conservation objectives threaten to contradict economic objectives of forestry practices (Weiss et al. 2017b; Winkel et al. 2015).

In 2019, the newly appointed EU Commission adopted a Communication on the **European Green Deal (EGD)**, where forest protection in the EU is deemed a political priority in pursuing the new EU's policy objectives in climate policy (55% green-house gas emission reduction by 2030) and biodiversity policy (nature protection of 30% of the EU land area, incl. 10% under strict nature protection by 2030) policy objectives. The EGD, together with the EU Climate Law, the new EU Biodiversity Strategy to 2030 and the new EU Forest Strategy to 2030 call for **a transformative process of change aiming at tackling the biodiversity and climate crisis in an integrated way**. These EU policies recognise that forest ecosystems are under increasing pressure and call for action to improve the quantity and quality of the forests for the EU and its Member States to reach climate neutrality by 2050 and a healthy environment by 2030 (EC 2019).

In the framework of the new **EU Green Deal Policy**, the new **EU Biodiversity Strategy to 2030**, adopted in May 2020, sets out three key objectives that need to be reached until 2030: (i) **to legally protect at least 30 % of EU land area** (an extra 4 % for land as compared to today) and integrate ecological corridors, as part of a true Trans-European Nature Network; (ii) **to strictly protect at least a third of the EU's protected areas representing 10 % of EU land**, including **all remaining EU primary and old-growth forests**; and to (iii) **effectively manage all protected areas**, defining clear conservation objectives and measures, and monitoring them appropriately.

The new EU Biodiversity Strategy to 2030 contains a **Chapter on actions on forests**, requiring the **strict protection of all remaining EU primary and old-growth forests and**



increasing the forested area by planting at least 3 billion additional trees in the EU by 2030. It also aims at increasing the share of forest areas covered by management plans and developing **guidelines on biodiversity-friendly practices on afforestation and closer-to-nature forestry**. Furthermore, to counter the pressure of the increased demand for biomass on forests, the **use of whole trees for energy production should be minimised, and bioenergy should focus primarily on wood waste and residues**. Last, but not least, an **EU Nature Restoration Plan** will set **legally binding conservation targets to restore degraded terrestrial (forest) eco-systems, landscapes, and forest-related water bodies, to enhance sustainable management and resilience**. The Plan demands measures to increase the quantity, quality and resilience of managed and protected forests in the EU-27. This refers to restoration measures such as **biodiversity-friendly afforestation, reforestation and tree planting, closer-to-nature-forest management as a biodiversity-friendly practice, integration of biodiversity and restoration objectives in management plans of forest owners**. The Plan also aims at creating jobs, reconciling economic activities (e.g., forestry) and biodiversity objectives, and ensuring long-term productivity and value of the natural capital (EC 2020).

As an initiative of the European Green Deal, and by building on the EU Biodiversity Strategy for 2030, the Commission adopted a **new EU Forest Strategy to 2030 (EU-FES)**. The main objectives of the EU-FES are **effective afforestation and forest preservation and restoration in Europe, to help to increase the absorption of CO<sub>2</sub>, reduce the incidence and extent of forest fires, and promote the sustainability of forest-based bioeconomy in full respect for ecological principles favourable to biodiversity**. It also aims to **strictly and effectively protect all primary and old-growth forests** in the EU. Most importantly, the EU-FES demands that **clearcutting practices in the EU countries should be approached with caution, generally avoided and used only in duly justified cases**, for example when necessary for environmental or ecosystem health reasons, and include environmental and ecosystem concerns (EC 2021).

In June 2022, the EU Commission presented a legislative proposal for an **EU Nature Restoration Law**. If/when adopted, the EU nature Restoration Law aims to (i.) **restore at least 20% of land and sea by 2030**, and all ecosystems in need of restoration to 2050; (ii.) request EU Member States to develop **National Restoration Plans** taking account of national circumstances, (iii.) build on EU nature laws, focusing on **all natural habitats**, and not just those protected under the **EU Birds and Habitats Directives (Natura 2000)**, and (iv) demonstrate **EU leadership in protecting and restoring nature**, and set the bar for global action ahead of the Biodiversity COP15 of the CBD (EC, 2022). As regards restoration of forest ecosystems, the EU Nature Restoration Law (June 2022 draft) will request EU Member States to implement restoration measures necessary to enhance biodiversity of forest ecosystems, in addition to Natura 2000 forest areas. Member States shall also achieve an increasing trend at national level of each of a set of indicators in forest ecosystems until 2030, and every three years thereafter, until satisfactory levels are reached. The set of indicators include (a) standing deadwood; (b) lying deadwood; (c) share of forest with uneven-aged structure; (d) forest connectivity; (e) common forest bird index; and (f) stock of organic carbon (EC 2022).

### **EU rural development funding policies**

Beyond the project-based EU funding scheme under the **LIFE+ instrument for the environment**, the majority of the potentially available EU-level funding for nature conservation is provided by the **EU Rural Development Policy (RDP)**. Following an integrated approach,



the RDP funds should compensate landowners and forest managers for the costs associated with the implementation of **conservation measures in the designated Natura 2000 sites in (managed) forests**. Yet, research shows that different factors related to implementation (particularly the short time horizon for planning and monitoring) prevents the use of these funding opportunities for biodiversity conservation (de Buren et al. 2016), and moreover, countries tend to prioritize competitiveness of the agricultural and forest sectors rather than biodiversity conservation in their allocation of the available resources (Geitzen auer et al. 2017; Sarvašová et al. 2017; Sarvašová et al. 2018; Weiss et al. 2017a). No data exists, however, to quantify the biodiversity effects of forest management practices supported by EU rural development funds (Alliance Environment 2017). This situation results in a funding gap that is not filled sufficiently by national or alternative funding sources and existing funds. For the EU programming period 2014–2020, there are two relevant financial measures from RDP available: one specifically for **Natura 2000 forest areas** (M12.2) and another more general one **for forest protection and the provision of forest ecosystem services** (M15). However, by the end of 2017 M12.2 had been chosen to be implemented in only 10 EU Member States (Weiss et al. 2017a). There are also problems in defining the baseline forest management requirements (above which compensation payments are calculated) making implementation even more difficult (Alliance Environment 2017). Hence, the effectiveness and efficiency of EU rural development funding in terms of supporting an integrated approach towards forest biodiversity conservation remains a challenging endeavour (Sarvašová et al. 2017).

*Table 3: Overview of EU policies and instruments relevant to forests and forest management, in the order of their maturity*

Policy Area	Policy Instruments		
	<i>Legally binding</i>	<i>Non-legally binding</i>	<i>Financial</i>
Rural development	<ul style="list-style-type: none"> <li>• CAP Reform (2013)</li> <li>• EU Regulations on rural development for 2014-2020</li> </ul>	<ul style="list-style-type: none"> <li>• Communication on sustainable food (2013)</li> <li>• European Innovation Partnership on Agricultural Productivity and Sustainability (2012)</li> </ul>	EAFRD, ERDF, ESF, EMFF
Nature Conservation	<ul style="list-style-type: none"> <li>• Birds Directive (1979/ 2009)</li> <li>• Habitats Directive (1992)</li> <li>• NATURA 2000 case law (2011)</li> <li>• EU Nature Restoration draft law (2022)</li> </ul>	<ul style="list-style-type: none"> <li>• No Net Loss Initiative (2015)</li> <li>• Communication on Green Infrastructure and Restoration (2012)</li> <li>• EU Biodiversity Strategy 2020 (2011)</li> <li>• Natura 2000 and Forest Guidance Document (2015)</li> <li>• EU Biodiversity Strategy 2030 (2019)</li> <li>• EU Forest Strategy 2030 (2021)</li> </ul>	LIFE Programme (2014-2020); EAFRD, ERDF, Horizon 2020
Protection of water and soils	<ul style="list-style-type: none"> <li>• Water Framework Directive (2000)</li> </ul>	<ul style="list-style-type: none"> <li>• Blueprint on water (2012)</li> <li>• Innovation partnership on water efficiency</li> <li>• Guidelines on best practice to limit, mitigate or compensate soil sealing (2011)</li> <li>• Soil Thematic Strategy (2012)</li> </ul>	LIFE Programme (2014-2020), Horizon 2020
Climate	<ul style="list-style-type: none"> <li>• Emissions Trading Scheme Directive (2003/2014)</li> <li>• Effort Sharing Decision (2009)</li> <li>• LULUCF Accounting Rules Regulation (2013)</li> <li>• A policy framework for climate and energy in the period from 2020 to 2030 (2014)</li> <li>• EU LULUCF Regulation (2018)</li> </ul>	<ul style="list-style-type: none"> <li>• EU Strategy on adaptation to climate change (2013)</li> <li>• Communication on LULUCF in the EU climate change commitments (2011)</li> <li>• Low Carbon economy 2050 roadmap (2011)</li> <li>• Review of EU air quality policy (2013)</li> <li>• Revision of the legislation on monitoring and reporting of GHG (2011)</li> </ul>	EAFRD, Cohesion Fund, Horizon 2020, LIFE Programme, Connecting Europe Facility



	<ul style="list-style-type: none"> <li>• EU Climate Law (2021)</li> </ul>	<ul style="list-style-type: none"> <li>• EU Green Deal 2019</li> </ul>	
Bioenergy	<ul style="list-style-type: none"> <li>• Renewable Energy Sources Directive (2009)</li> <li>• Proposal for a new Directive on advanced biofuels (2012)</li> <li>• Biofuels Directive (2003)</li> <li>• Energy Efficiency Directive (2012)</li> <li>• Directive on energy performance of buildings (2010)</li> </ul>	<ul style="list-style-type: none"> <li>• A policy framework for climate and energy in the period from 2020 to 2030 (2014)</li> <li>• Energy 2020: A strategy for competitive, sustainable and secure energy (2011)</li> <li>• European Energy Efficiency Plan 2020 (2011)</li> <li>• Renewable Energy Road Map (2007)</li> <li>• EU Strategy for Biofuels (2006)</li> <li>• EU Biomass Action Plan (2005)</li> </ul>	EAFRD, Cohesion Fund, Horizon 2020, LIFE Programme, Connecting Europe Facility
Forest Governance / Timber Trade	<ul style="list-style-type: none"> <li>• EU FLEGT Action Plan (2005)</li> <li>• EU Timber Regulation (2010)</li> </ul>	<ul style="list-style-type: none"> <li>• FLEGT Voluntary Partnership Agreements (VPAs)</li> <li>• Voluntary third party certification / forest certification schemes</li> </ul>	
Bioeconomy and the circular economy	No legally binding instruments	<ul style="list-style-type: none"> <li>• EU Bioeconomy Strategy and Action Plan (2012)</li> <li>• Action Plan towards a sustainable bio-based economy by 2020 (2011)</li> </ul>	Horizon 2020

### 3.4. National level

The implementation of biodiversity conservation and restoration measures in forest management depends on several conditions at the national and regional level, such as different ecological (climatic, topography, vegetation) conditions, different forest policy priorities and socio-economic developments, forest ownership structures, and forest management traditions (Schulz et al. 2014; Winkel et al. 2011; Winkel and Sotirov 2016). In this context, national and even sub-national forest policy frameworks evolved over decades and different variants of an SFM paradigm have been formulated in **domestic forest law** and reinforced in **national forest strategies** to meet the variety of increasing and often competing societal demands towards the forest. SFM, which is often put on equal footing with the paradigm of ‘Multifunctional Forestry’ (MFF), also known as ‘Multi-Purpose’, ‘Multifunctional’ or ‘Multiple Services’ Forestry (Borrass et al. 2017; Wiersum 1995; Winkel et al. 2011) is the key management and behavioural principle at the **operational level in forestry practice** (MCPFE 1993).

Figure 2 illustrates the important variety in the understandings of those forest policy paradigms amongst the different regions of Europe, which can be characterised by a ‘segregation–integration’ continuum. The first approach towards forest biodiversity in the 1980s followed a segregative paradigm: forest areas were taken out of utilisation (Bennett 2015). In some European countries adhering to the ‘sustainable timber production tradition’ (e.g. parts of France, Ireland, Lithuania, Latvia, Sweden, Finland), this is still the dominant approach.



Policy paradigm	Sustainable Timber Production		Multiple Service Forestry		Ecosystem Management	
Goal	Focus on periodic timber yields		Focus on periodic yields in terms of timber and other forest services		Focus on ecological improvement or maintenance of forests	
<b>Regional patterns</b>						
Regions (selected countries distributed approximately)	<b>Northern Europe</b>	<b>Western, Central and Eastern Europe</b>	<b>Western Europe</b>	<b>Southern Europe</b>	<b>Western Europe</b>	
	Sweden Finland Estonia	Parts of France Croatia Romania Austria	United Kingdom Parts of France Parts of Spain and Portugal	Parts of Portugal and Spain Italy Greece	Belgium The Netherlands Luxembourg	
Forest area (relative share)	Large	Medium	Small	Medium	Small	
Economic importance forest sector	Great	Moderate	Little	Little	Little	
Key services of forest ecosystems for society	<b>Wood production</b>  Other services (recreation, biodiversity) mostly in protected areas	<b>Wood production</b>  Other services (recreation, biodiversity) partly integrated in sustainable forest management, partly in protected areas	<b>Wood production</b>  Other services (recreation, biodiversity) or products also important Semi-natural forests for recreation and biodiversity	<b>Different forest products</b> (e.g. game, fuelwood) Other forest services (e.g. soil and water protection)	<b>Nature conservation and recreation</b> <b>Wood production</b>	

Figure 2: Cross-national patterns of forest policy and management across Europe (from Sotirov et al. 2020, adapted after Glück 1994; Kankaanpää and Carter 2004; Rametsteiner et al. 2008; Volz 2002; Winkel et al. 2011, pp. 366–367).

In many other countries, however, the main policy paradigm is to strive for the combined delivery of economic functions of forestry (e.g. timber production) and nature conservation within the same forest areas (spatial integration). Yet, segregation also plays a role in these countries. For instance, the German federal biodiversity strategy of 2007 aims, next to integrated forest management, at setting aside of 5 % of all forests as strict nature reserves. This goal is heavily debated between nature conservation and forestry experts (Umhauer and Sotirov 2019) and also not accepted at some sub-national contexts (e.g. in Bavaria), where a strongly integrative approach is emphasised partially in opposition to segregative nature conservation (Sotirov and Storch 2018). Such integrative forest management concepts have been elaborated since the 1990s, i.e. even before the implementation of the Natura 2000 programme, particularly but of course not exclusively in these contexts (Borrass 2014; Borrass et al. 2017). They are gradually becoming more and more elaborated (compare Selzer 2018, for state forest concepts in Germany) and are also combined with corresponding financial support instruments for the private forest (compare for example Heilingbrunner et al. 2013, for a description of the Austrian Forest Ecology Program).

In the Netherlands, which is rather an example of the ‘ecosystem services management’ tradition, most of the forest area lies within Natura 2000 protection sites or is part of the National Ecological Network. This implies a strong commitment to an integrated forest management approach that emphasizes natural processes, biodiversity conservation and the ‘beauty’ of the forested landscape (Sotirov and Storch 2018).

More recently, ‘Integrated Forest Management’ (IFM) has been promoted as a promising approach to help integrate and find a balance between production and conservation aspects



in forest management at different management levels, e.g. landscapes, forest stands, or single trees (Aggestam et al. 2020; Kraus and Krumm 2013; Lazdinis et al. 2019; Sotirov and Arts 2018). There is no common or shared definition about these scales, and, de facto, integrative forest policy principles are frequently implemented through segregating forest uses at the forest management level.

Examples include the establishment of spatial and functional ‘forest groups’ of biodiversity conservation and water protection in Lithuania (Hinterseer et al. 2014), the extension of forest protected areas in Bulgaria and Slovakia, and also economically-oriented forestry practices or the separation of commercial forest managed for timber production from biodiversity hotspots in Bulgaria, France, Slovakia, and Sweden (Brodrechtova et al. 2018; Brukas et al. 2018; Deuffic et al. 2018). Likewise, Hautdidier et al. (2018) demonstrate that private forest owners, public forest managers and local forest industries in southwestern France (Landes de Gascogne) support *Pinus pinaster* monocultures as part of a cultivated, multifunctional and integrated forest landscape in a shared conviction that timber production is essential for and should be able to pay for a variety of environmental and social forest ecosystem services (biodiversity conservation, climate change mitigation, hiking, mushroom picking).

Circa three thirds or most of all forests in the EU are even-aged and between 20 and 80 years of age (Forest Europe 2020). The even-aged structure of much of the forest resource in the EU countries indicates the widespread legacy and current practice of rotational (or regular) forest management. This includes managing forests through silvicultural systems such as clear-cutting, uniform or strip shelterwood, and coppice forests (Mason et al. 2021). Clearcutting remains the most common forest harvesting method in temperate and boreal forests worldwide in part because it facilitates the man-supported regeneration of light demanding species in forests and in part because it is economically most efficient and commercially attractive (Kimmins 1992; Binkley 1999; Franklin et al. 1999; McDermott et al. 2010).

The dominance of even-aged forests created and managed by uniform clearcutting can also be found in the EU, especially in North, Central-West and Central East Europe (GenTree 2020). Clearcutting is also found to be the second most common forestry practice in the management of mixed forests (composed of two or three tree species) in Europe just after shelterwood silvicultural systems (Pach et al. 2018). Under the clearcutting regime, the main goal has been on the production of timber and the provision of other ecosystem services has largely been a “by-product” of management (Biber et al. 2015).

An overview of the national policy and legal framework in European countries governing clearcuts in forestry and reforestation obligations, by policy/legal approach types and country groups, is provided in Table 4 and Table 5 below.



Table 4: National policy and legal framework governing clearcutting in European countries (EU and EEA): an overview by regulatory types and country groups (Sotirov 2022)

	Type 1	Type 2	Type 3
Policy and legal approach	Clearcutting ban by law (with few exemptions)	Clearcutting allowed by law, but with clearcut size limits or with other specific restrictions	Clearcutting allowed by law, with no general clearcut limits (few specific exemptions), but with procedures
Countries	Bulgaria, Italy, Slovakia, Slovenia, Switzerland	Austria, Belgium, Czech Republic, Estonia, Germany (most <i>Länder</i> ), Latvia, Lithuania, Poland, Romania, the Netherlands	Denmark, Finland, France, Germany (Federal Level, few <i>Länder</i> ), Ireland, Portugal, Spain, Sweden, the UK

Table 5: Specific details of national legal provisions regulating clearcutting and reforestation in European countries (EU and EEA): an overview (Sotirov 2022)

	Clearcutting						Reforestation			
	From area size	Notification required from	max. width	Prohibited?	Max. area allowed	Restrictions?	Obligatory?	From area size	Period in years	Extension possible?
Austria		0,5 ha	50 m	no	2-3 ha	yes	yes	-	5-10 years	5 years
Belgium	0,5-3 ha	-	-	no	10-25; 1-5	yes	-	-	-	-
Bulgaria	(2 ha)	-	-	yes	-	yes	yes	-	1	-
Czech Rep.	-	-	-	no	1-2 ha	yes	yes	-	2	-
Denmark	-	-	-	no	-	no	yes	-	10	-
Estonia	-	-	-	no	-	-	yes	1 ha	3	-
Finland	-	-	-	no	-	no	yes	-	10-25	-
France	1-10 ha	-	-	no	-	no	yes	-	5	-
Germany	-	2 ha	-	no/yes	-	yes	yes	-	3-5	-
Ireland	-	-	-	no	-	no	yes	-	-	-
Italy	-	-	-	yes	(2 ha)	yes	-	-	-	-
Latvia	-	-	50 -100 m	no	5-10 ha	-	yes	-	3	-
Netherlands	0,5 ha	0,5 ha	-	no	-	no	yes	-	-	-
Poland	-	-	-	no	6 ha	-	yes	-	5	-
Portugal	-	-	-	no	(2 ha)	yes	-	-	-	-
Romania	-	-	-	no	3-5 ha	yes	yes	-	2	-
Slovakia	-	-	2 aver. tree length of the parent stand	yes/no	3-5 ha	-	yes	-	2	10 years
Slovenia	-	-	-	yes	-	-	yes	-	-	-
Spain	-	-	-	no	-	no	yes	-	5	-
Sweden	-	0,5 ha	-	no	20-50 ha	no/yes	yes	-	3	-
Switzerland	-	-	-	yes	-	-	yes	-	no	-
UK	-	-	-	no	-	no	yes	-	10	-

First, and on one side of the policy/legal approach spectrum, no clearcutting is legally allowed in (mountainous) European countries such as Bulgaria, Italy, Slovakia, Slovenia and Switzerland. Only few exemptions to these general clearcut bans by domestic forest law are possible, mainly in due consideration of ecological and/or social aspects. Second, and in the



middle of the policy/legal approach spectrum, in some Central (Austria, Belgium, Germany - most federal states/Länder, the Netherlands) and in the most of Eastern (Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania) European countries, clearcutting is allowed by law but (a variety of) clearcut size limits and few specific other limitations apply. For example, clearcutting is permitted by law, but restricted to specific forest types in Romania. Third, and on the one other end of the policy/legal approach spectrum, Nordic (Denmark, Finland, Sweden), Western (Ireland, UK), some Central (France) and Southern (Portugal, Spain) European countries are notable for both their legal permission of clearcuts and the lack of any specified clearcut limits by law. Last, but not least, clearcutting is partly legally allowed, partly legally prohibited, or limited, at the Federal and state levels in Germany, and partly in Italy (Sotirov 2022).

Seen from a cross-country perspective, several important differences exist. The most remarkable country differences refer to how detailed clearcutting regulations are given in the national forest policy and law. Often maximum clearcutting patch size limitations, if any, differ greatly across countries, partly with similar forest types, ranging from 0,5 ha to 50 ha. Sometimes, clearcutting is legally prohibited but still allowed up to certain maximum clearcutting patch sizes (2,0-3,0 ha) or due to some socio-economic reasons. Few national policies governing clearcutting also address factors besides maximum patch size. For example, they include “adjacency” requirements that restrict harvest in forest areas adjacent to clearcuts for specified time frames or, until tree regrowth in the clearcut area has reached specified heights (like in Austria). Few other forest laws or by-laws require the retention of individual living trees and/or dead trees (‘snags’), of groups of snags and seed trees, within a cutblock (like in Sweden). This latter practice can in fact lead to conflicting data on the extent of clearcutting, since there is yet no common legal standard on the level of tree retention that divides ‘clearcutting’ from ‘retention forestry’ or ‘uneven-aged forest management’ (McDermott et al. 2010; Fedrowitz et al. 2014; Pach et al. 2018; Sotirov 2022).

Likewise, reforestation is defined obligatory after clearcutting, but regulations concerning natural reforestation are vague, not existing, or might contradict natural successions. In some countries there are no maximum time limits determined for reforestation or definitions for successful regeneration after clearcutting. In some cases, the wording is very general and leaves much space for interpretations or exemptions resulting in a forest policy and law that eventually does not oblige forest owners and forest users to avoid or minimize the effects of clearcutting (Sotirov 2022; cf. Bauer et al. 2014; McDermott et al. 2010).

In terms of commonalities, nearly all legislations of countries include either regulations for obligatory reforestation after final cutting (e.g., clearcutting) or at least the normative idea of avoiding vanishing of forests after (clear) cuttings. Remarkably, despite the lack of legally binding EU forest policy, a common European policy and legal approach on obligatory reforestation after clearcutting and/or loss of forest cover can be identified. It could be formulated as follows: A cleared (e.g., clearcut or burnt) area on forest land shall be reforested in a certain time frame (usually 2-5 years), to be specified further by national forest management authorities. The owner of the forest shall restock forest stands that are lost due to clearcuttings, forest fires, or salvage logging (through clearcutting) after drought, storm and deceases driven damages on forest stands. Restocking can be performed mostly by artificial reforestations or afforestations (species and quality of forest reproductive material to be specified under a separate national and EU legal rules) or by natural means (natural succession) (Sotirov 2022).

However, little thresholds or clear criteria are provided to secure the ecological basis, the climate resilience and the biodiversity friendliness of restocking measures throughout the





European countries. Last, but not least, the change of forest land (e.g. deforestation, forest clearing) into other permanent forms of land use (e.g., agriculture, urbanization, industrial development) is generally allowed but needs a special administrative regulation procedure (Bauer et al. 2004; McDermott et al. 2010).

Figure 3 below provides an overview over the legal provisions and policy instruments, implementation strategies and voluntary concepts that have been or usually are put forward at different levels of government within different contexts.

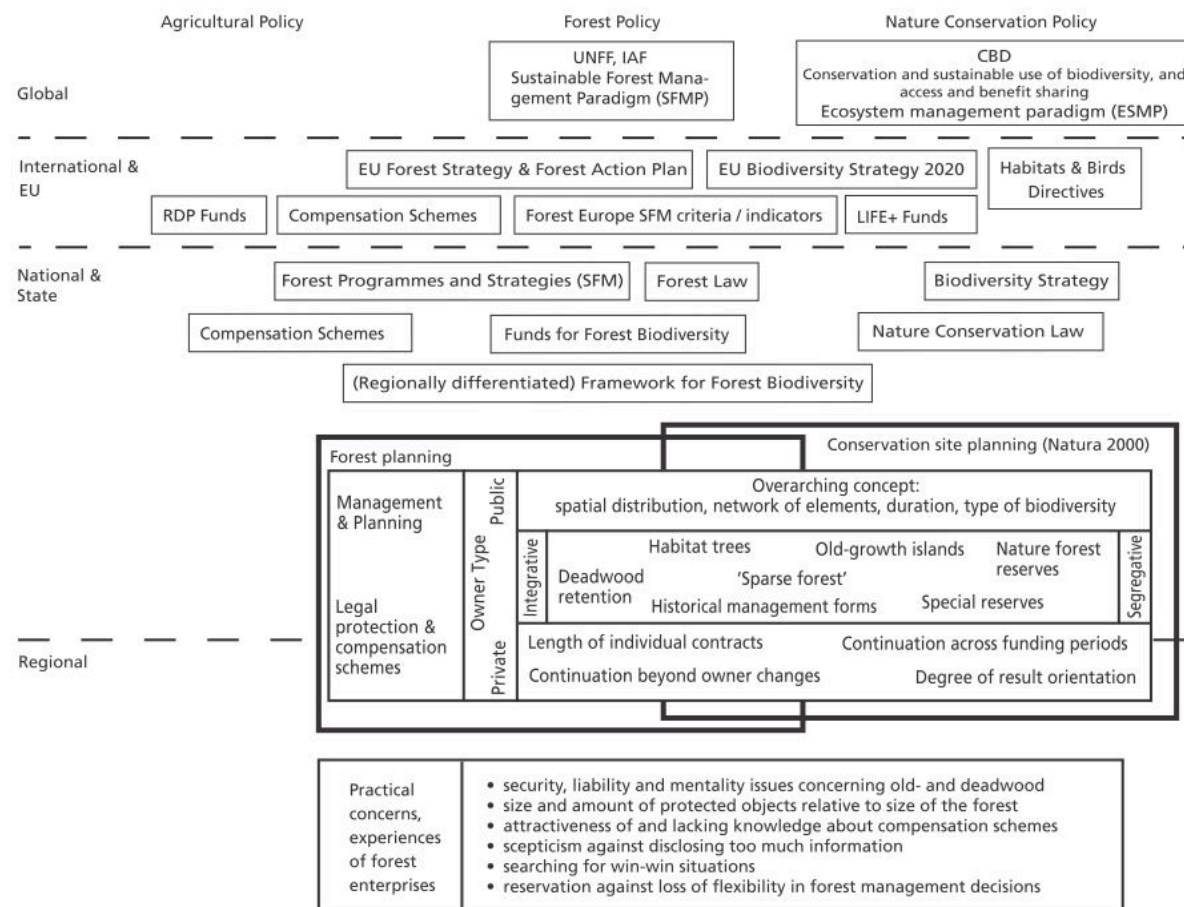


Figure 3: Overview of the forest policy landscape across levels and sectors (from Sotirov et al. 2020)

## 4. Conclusion

This milestone 5.1. provides a framework guidance document to help researchers and decision makers conduct an analysis of vertical and horizontal policy coherence to implement the mapping of a variety of restoration policies. It directly relates to Task 5.1. Mapping European forest policies in the SUPERB project.

This milestone also contains a state of the art review of definitions of policy coherence, that is generally understood as the ability of policies to drive positive transformative change towards effective forest ecosystem restoration in the context of multiple policy objectives. It also reviews and presents the main knowledge in the academic and non-academic state of the art



literature, and outlines important knowledge gaps that both should prove useful to the SUPERB WP5 work.

In particular, this guidance document highlights the need to systematically assess trade-offs and synergies between policies horizontally across key policy sectors such as climate mitigation, biodiversity conservation, forestry/sustainable forest management, water protection, agriculture and rural development, and sustainable finance, to name a few. The document also stresses the need to assess trade-offs and synergies between policies vertically across levels of governance, including the international, EU, national and subnational (regional) levels.

This framework document contains also a first set of exemplary mapping of key international, EU and (sub-) national policies relevant for forest management and restoration in all project (demo) countries in the SUPERB project. This illustrative mapping provides first examples to guide further work as regards which policies to consider and how to do a vertical and horizontal policy coherence analysis.

It is expected that this milestone document will directly connect, inform and contribute to deliverable D5.1. **“European restoration policies map: Restoration policy and governance framework map”** (M36). Both M 5.1 and D 5.1 can be used to inform the work in the follow up tasks in WP5 **“Governance and Society”**, namely Task 5.2 “Supporting restoration governance in the demonstrator regions”, and Task 5.3. “Monitoring societal demands and upscaling tool”.

The methodological framework can be applied also in relevant activities in WP2 “Stakeholder engagement”, WP3 “Practical knowledge”, WP4 “The economics and innovative sustainable financing of restoration”, WP 6 “Biodiversity and ecosystem management”, WP7 “Large scale demonstrators”, and WP 8 “Further Upscaling”.



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