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Crosswalking the EU Nature Restoration Regulation and the Kunming-Montreal Global Biodiversity Framework: A Forest-Centred Outlook

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Abstract: Following the adoption of the Kunming-Montreal Global Biodiversity Framework (KM-GBF) under the Convention on Biological Diversity, the European Union (EU) introduced an EU Nature Restoration Regulation. This study systematically compares the restoration regulation with the KM-GBF, focusing on their implications for forest ecosystems. The paper identifies areas of alignment, divergence, and potential gaps concerning habitat restoration, species protection, climate resilience, and sustainable natural resource use. Employing a grounded methodology, the analysis begins with the 23 KM-GBF targets and proceeds to the 28 articles of the restoration regulation. The findings underscore the need for better alignment between the KM-GBF, the restoration regulation, and other forest-related EU policies. The study emphasises the importance of a coherent and integrated EU policy approach to address the complex challenges and varied policy objectives facing forests. It concludes that amendments to the restoration regulation have significantly diluted its potential impact, limiting the EU Member States' accountability and ability to meet KM-GBF goals and targets. It further stresses the need for strategies to reconcile divergent EU policy pathways, support forest management and restoration efforts, and align with global biodiversity objectives.

Keywords: EU nature restoration regulation; Kunming-Montreal Global Biodiversity Framework; policy implementation; forest restoration; EU forest policy



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1. Introduction

In the wake of the largely unsuccessful global effort to meet the Aichi targets [1,2] set by the Convention on Biological Diversity (CBD), the international community has shifted its focus to the Kunming-Montreal Global Biodiversity Framework (KM-GBF). Ratified by 195 countries during the 15th Conference of the Parties (COP15) to the CBD in 2022, this new framework establishes a revised agenda to halt and reverse biodiversity loss. It covers 23 action-oriented global targets to be met by 2030 and four goals for 2050 [3]. The overarching goals (Appendix A) are linked to “the shared vision of living in harmony with nature” (annex, para. 3) by 2050. The increased ambition of the KM-GBF targets, as compared to the Aichi targets, combined with an accelerating biodiversity and climate crisis [4,5], suggest the need for urgent research and policy action to help guide and improve international and national efforts in stemming and reversing global biodiversity loss [6,7].

Following the adoption of the KM-GBF, the European Union (EU) recently reached an agreement on a nature restoration regulation. The initial proposal for a restoration regulation was published in 2022 [8] as an integral part of the Biodiversity Strategy for 2030 [9]. It is considered a key instrument to “help the EU reach its international commitments, in particular the UN Kunming-Montreal global biodiversity framework” [10]. The regulation is an integral component of the European Green Deal, aimed at combating environmental degradation [11], seeking to establish binding restoration targets for specific ecosystems and species, thereby ensuring recovery and long-term resilience. The regulation's objectives are, as such, intrinsically connected with the goals and targets set out in the KM-GBF,

representing an EU-wide effort to halt and reverse biodiversity loss and a regional response to the global call for action communicated within the KM-GBF.

Considering the EU's efforts to address global biodiversity loss, the interplay between the restoration regulation and the KM-GBF, particularly in the context of forest ecosystems and the forest-based sector, emerges as a relevant area for analysis. As an important reservoir of biodiversity, forests occupy a central role in the restoration regulation and the KM-GBF. Moreover, the focus on forests within the EU's legislative framework on restoration is representative of the global recognition of the need to prioritise forest ecosystems. Zooming in on forests, this paper will consider how the restoration regulation aligns with and supports the global biodiversity goals and targets, specifically those related to forest ecosystems. Focusing on forests will allow for a detailed review of the regulation's potential to drive meaningful change in forest conservation and restoration.

The objective of this paper is twofold. First, it will set out to identify and crosswalk relevant provisions within the EU Nature Restoration Regulation alongside the goals and targets of the KM-GBF. As noted above, to delimit the analysis, the focus will be on articles, goals, and targets that can be considered relevant to forest ecosystems and the forest-based sector. Second, the paper will evaluate the potential efficacy of the EU Nature Restoration Regulation in fulfilling forest-relevant goals and targets established under the KM-GBF. The paper will also assess potential gaps in the EU Nature Restoration Regulation that might be addressed through other EU forest-relevant policy instruments. The review will not address the KM-GBF monitoring framework (e.g., headline, component and complementary indicators) being considered by the Ad Hoc Technical Expert Group on Indicators (AHTEG), as set out in CBD decision 15/5 [12].

2. Background

2.1. Kunming-Montreal Global Biodiversity Framework

The KM-GBF is a multilateral treaty that addresses the three objectives of the CBD in an integrative manner: (1) the conservation of biological diversity, (2) the sustainable use of its components, and (3) the fair and equitable sharing of benefits arising from genetic resources [3]. The KM-GBF's development, its relationship with the Aichi targets, its own goals and targets, and the role of the AHTEG are key to understanding its implementation strategy:

- The KM-GBF was developed in response to the mixed success of the Aichi targets [2,4,13], which were part of the Strategic Plan for Biodiversity 2011–2020 [1]. The KM-GBF can be conceptualised as an evolution of the Aichi targets to address the gaps and challenges faced during its implementation. The KM-GBF has tried to fix these failings by establishing more ambitious targets, emphasising that biodiversity considerations should be integrated into all economic sectors while emphasising the accountability of state and non-state actors. This shift towards more actionable, quantifiable, and inclusive conservation reflects a more adaptive governance paradigm.
- The KM-GBF is to be implemented based on the ecosystem approach of the CBD (Decision V/6), based on scientific evidence and traditional knowledge and practices (annex, para. 19), guided by the principle of intergenerational equity (annex, para. 21), with consideration of the One Health Approach (annex, para. 25). It further stresses the need for transformative actions (annex, para. 4) that can address biodiversity loss, including changes in consumption patterns, land-use practices, and economic systems that undervalue natural capital.
- While acknowledging different value systems associated with biodiversity (e.g., par. 7(b)), the KM-GBF predominantly aligns with anthropocentric perspectives, such as in targets 9 and 11. It focuses on nature restoration to “maintain and enhance nature's contributions to people” (target 11) while being “guided by the principle of intergenerational equity” (par. 7(n)). This deviates from ecocentric or biocentric viewpoints, suggesting it is geared towards human-centric (or anthropocentric) outcomes.

- The framework sets specific targets (Table 1), for example, to conserve at least 30 per cent of the global land and sea areas by 2030 (targets 2 and 3), reduce pollution (target 7), and address the impacts of climate change on biodiversity (target 8). Key to its implementation strategy is mainstreaming biodiversity across government policies, the private sector, and societal actions.

Table 1. Crosswalking KM-GBF targets with articles in the restoration regulation.

KM-GBF Targets *	Articles in the Regulation on Nature Restoration	Notes
Target 1: Reducing biodiversity loss.		<ul style="list-style-type: none"> • Aim to restore at least 20% of land by 2030 (art. 1, para. 2). • Contribute to the EU's overarching objective for land degradation neutrality (art. 1, par. 1 (b)).
Target 2: Restoring degraded ecosystems.		<ul style="list-style-type: none"> • Restoration measures must be taken for at least 30% of habitat types (listed in Annex I) that are not in good condition by 2030, 60% by 2040, and 90% by 2050 (art. 4, par. 1).
Target 3: Conserving biodiversity.		<ul style="list-style-type: none"> • The target may be lowered if 3% of the national territory contains the habitat type listed in Annex I (derogation), lowering the overall target to "one-third of that percentage by 2030" (art. 4, par. 1a and 2b).
Target 4: Halt and reverse extinction.	<p>Article 1. Subject matter.</p> <p>Article 4: Restoration of terrestrial, coastal and freshwater ecosystems.</p> <p>Article 10: Restoration of forest ecosystems.</p> <p>Article 10a: Planting of three billion additional trees. **</p> <p>Article 11: Preparation of the national restoration plans.</p>	<ul style="list-style-type: none"> • Restoration measures in Natura 2000 sites will be given priority until 2030 (art. 4, par. 1). • Show a continuous improvement in the condition of the habitat types (art. 4, par. 6 and 10) and prevent significant deterioration (art. 4, par. 7). • Restoration measures to enhance the biodiversity of forest ecosystems are in addition to other measures (art. 10, par. 1), including the commitment to planting three billion trees by 2030 (art. 10a, par. 1). • Restoration measures for species listed in the Habitats and Birds Directives (92/43/EEC and Directive 2009/147/EC) (art. 4, par. 3). • Sustainable afforestation, reforestation and tree planting and the greening of urban areas (art. 10a, par. 2). • Trade of wild species is not addressed.
Target 5: Sustainable use, harvesting and trade of wild species.		<ul style="list-style-type: none"> • Restoration measures to enhance the biodiversity of forest ecosystems are in addition to other measures (art. 10, par. 1), including the commitment to planting three billion trees by 2030 (art. 10a, par. 1). • Restoration measures for species listed in the Habitats and Birds Directives (92/43/EEC and Directive 2009/147/EC) (art. 4, par. 3). • Sustainable afforestation, reforestation and tree planting and the greening of urban areas (art. 10a, par. 2). • Trade of wild species is not addressed.
Target 6: Invasive alien species.	<p>Articles 11 and 12: National restoration plans.</p>	<ul style="list-style-type: none"> • Removal and control of invasive alien species are only noted as possible restoration measures (annex VII, par. 22).
Target 7: Reduce pollution risks and impacts.	<p>Annex VII: Restoration measures.</p>	<ul style="list-style-type: none"> • Pollution is noted in preparing national restoration plans and associated EU regulations, such as Directive 2016/2284 (art. 11, par. 7(e), annex VII, par. 28 and 30).
Target 8: Minimise the impact of climate change.	<p>Article 4: Restoration of terrestrial, coastal and freshwater ecosystems.</p> <p>Article 5a: Energy from renewable sources.**</p> <p>Article 10: Restoration of forest ecosystems.</p> <p>Article 10a: Planting of three billion additional trees. **</p> <p>Articles 11 and 12: National restoration plans.</p>	<ul style="list-style-type: none"> • Mainly relevant for Natura 2000 sites in cases where habitat transformations are directly caused by climate change (art. 4, par. 9). • Exceptions included for energy production from renewable sources (art. 5a). • Obligations are non-binding for the restoration of forest ecosystems if habitat transformations are directly caused by climate change (art. 10, par. 2b).

Table 1. Cont.

KM-GBF Targets *	Articles in the Regulation on Nature Restoration	Notes
Target 9: Sustainable management and use of wild species.	Article 4: Restoration of terrestrial, coastal and freshwater ecosystems.	<ul style="list-style-type: none"> Restoration measures for species listed in the Habitats and Birds Directives (92/43/EEC and Directive 2009/147/EC) (art. 4, par. 3).
Target 10: Sustainable land-use.	Article 8: Restoration of pollinator populations. Article 9: Restoration of agricultural ecosystems. Annex IV: Biodiversity indicators. Annex VII: Restoration measures.	<ul style="list-style-type: none"> Ensure sustainable agricultural production (art. 9, par. 1). Sustainable agroforestry systems are part of the biodiversity indicators for agricultural ecosystems (annex IV). Increase the agricultural area subject to agro-ecological management approaches (annex VII, par. 16).
Target 11: Restore/enhance ecosystem functions and services.	Article 1. Subject matter. Article 4: Restoration of terrestrial, coastal and freshwater ecosystems. Articles 11 and 12: National restoration plans. Annex VII: Restoration measures.	<ul style="list-style-type: none"> Aim to restore at least 20% of land by 2030 (art. 1, para. 2). Aim at optimising ecosystems' ecological, economic, and social functions (art. 11, par. 9). Ecosystem function is a factor in selecting a restoration area (art. 4, para. 4). Enhance the development of old-growth native forests and mature stands favouring autoregulatory functions (annex VII, par. 14).
Target 12: Connectivity and access to urban green and blue spaces.	Article 4: Restoration of terrestrial, coastal and freshwater ecosystems. Article 6: Restoration of urban ecosystems. Article 10: Restoration of forest ecosystems. Article 10a: Planting of three billion additional trees.** Articles 11 and 12: National restoration plans. Annex VII: Restoration measures.	<ul style="list-style-type: none"> Increased urban green space (e.g., urban tree canopy cover), including buildings and infrastructure (art. 6, par. 1–2), and including restoration measures (annex VII, par. 29). Greening of urban areas (art. 10a, par. 2). Connectivity mainly in terms of improved ecological coherence and connectivity of habitats (art. 4, par. 3 and 5, art. 10a, par. 2, art. 11, par. 2 (b)). Forest connectivity is a target indicator (art. 10, par. 2a (d)). Identify/map urban ecosystems and forest areas for restoration, particularly areas that need enhanced connectivity and landscape diversity (art. 11, par. 2b-4).
Target 13: Use of genetic resources.	Annex VII: Restoration measures.	<ul style="list-style-type: none"> Only noted in improving connectivity and genetic exchange (annex VII, par. 21).
Target 14: Integration of biodiversity into policies, regulations, planning and development processes.	Articles 11 and 12: National restoration plans.	<ul style="list-style-type: none"> Restoration measures are prioritised based on synergies with CC mitigation and adaptation, land degradation neutrality, and disaster prevention (art. 11, par. 5). Identify synergies with agriculture and forestry (art. 11, par. 5a). Co-benefits for CC mitigation and land degradation neutrality associated with restoration (art. 12, par. 2 (j)).
Target 15: Enable business.		<ul style="list-style-type: none"> Not applicable: see Appendix C.
Target 16: Sustainable consumption choices.		<ul style="list-style-type: none"> Not applicable: see Appendix C.
Target 17: Strengthen capacity for biosafety measures.		<ul style="list-style-type: none"> Not applicable: see Appendix C.
Target 18: Phase out or reform incentives harmful to biodiversity.		<ul style="list-style-type: none"> Not applicable: see Appendix C.

Table 1. Cont.

KM-GBF Targets *	Articles in the Regulation on Nature Restoration	Notes
Target 19: Increase the level of financial resources for biodiversity.	Article 8: Restoration of pollinator populations. Article 11: National restoration plans. Article 18: Reporting.	<ul style="list-style-type: none"> Promotes financing of citizen science (art. 8, par. 3a). Promotes the use of private or public support schemes for implementing restoration measures (art. 11, 5c). Under the CAP, CFP, or other funding programs, no reprogramming of funding is required (art. 11, par. 5b). Funding gaps will only be addressed in the multiannual financial framework post-2027 (art. 18, par. 6a (d)). Countries must report whether they have met financing needs (art. 18, par. 2 (e)).
Target 20: Strengthening scientific research, cooperation, and monitoring capacities.	Article 4: Restoration of terrestrial, coastal and freshwater ecosystems. Article 17: Monitoring.	<ul style="list-style-type: none"> Does not address cooperation on forests (only for marine ecosystems), and research only covers site selection and monitoring. Research/scientific evidence for selecting restoration sites (art. 4, par. 4). Research/scientific evidence to identify restoration measures (art. 11, par. 1). Promoting citizen science (art. 8, par. 3a, art. 17, par. 8).
Target 21: Access to data and knowledge.	Article 8: Restoration of pollinator populations. Articles 11 and 12: National restoration plans. Article 17: Monitoring. Article 18: Reporting.	<ul style="list-style-type: none"> Monitor high-diversity landscape features (art. 11, par. 4a) and forests (art. 17, par. 5). Monitoring of pollinator diversity and populations (art. 8, par. 2, 3(a)). Identification and monitoring of restoration measures/sites (art. 11, par. 1, art. 12, par. 2(ca) and (h), art. 17, par. 1–8, art. 18, par. 2 (b)). Access and use of data (art. 17, par. 7–8, art. 18, par. 7).
Targets 22 and 23: Gender equality and representation.		<ul style="list-style-type: none"> Not applicable.

* Complete targets can be found in the KM-GBF [3]. ** Numbering of articles likely to change in the published version.

2.2. The EU Regulation on Nature Restoration

The EU Nature Restoration Regulation proposal in 2022 was a policy effort by the European Commission (EC) for legally binding EU targets to restore nature and repair damaged ecosystems, aiming to cover 30 per cent of the EU's land and sea areas by 2030 [8]. In a nutshell, the restoration regulation set out to achieve long-term and sustained recovery of biodiverse land and sea areas, contributing to relevant biodiversity and climate objectives as well as supporting economic recovery and resilience.

- Work on the restoration regulation started as part of the EU Biodiversity Strategy for 2030 [9], a core component of the European Green Deal [11]. The EC proposed this regulation to set binding restoration targets for specific habitats and species, such as binding targets on pollinators, wetlands, rivers, forests, marine ecosystems, urban areas, and peatlands. The aim was to cover most of the EU's land areas and water bodies (freshwater and marine environments). The development process involved scientific research, stakeholder consultations, and impact assessments to ensure an achievable regulation.
- By trying to set legally binding restoration targets, the EU aimed to contribute to the global goal of restoring 30 per cent of degraded ecosystems by 2030. This was later reduced to 20 per cent by the European Parliament in 2023 [14]. The regulation establishes specific targets for various ecosystems, including forests. It emphasises the restoration of biodiversity-rich habitats, the re-establishment of natural processes, and the recovery of species populations. The regulation sets out a mix of mandatory and voluntary measures to achieve these objectives, supported by financial mechanisms

and technical assistance to EU Member States (EU MSs). It also includes mechanisms for monitoring, reporting, and evaluating progress towards the targets.

It should be noted that the text of the provisional agreement on the nature restoration regulation [14], which was revised by the European Parliament (June 2023) and by the Council of Europe (November 2023), is going through the final stages of the ordinary legislative procedure. The regulation has been formally adopted by Parliament (February 2024) and will enter into force in 2024 (or 20 days after adoption by the Council).

3. Materials and Methods

This study employed text-based content analysis to crosswalk two policy documents that mark recent international and regional commitments on biodiversity: the EU Nature Restoration Regulation [14] and the Kunming-Montreal Global Biodiversity Framework [3]. The analysis involved a systematic review and comparison of these policy documents to understand their implications for forest and biodiversity restoration [15,16]. Specifically, the analysis aimed to identify areas of alignment, divergence, and potential gaps, covering key themes such as habitat restoration, species protection, climate resilience, and the sustainable use of natural resources. The comparative analysis took a grounded approach. It started by focusing on the targets in the KM-GBF. Then, it moved on to the articles in the EU Nature Restoration Regulation, which allowed for the emergence of similarities and differences between the documents [17,18].

The analysis began by marking, annotating, and summarising sections relevant to forests in both documents. This process involved noting instances where forest-relevant topics were addressed, directly or indirectly, comparing the language, commitments, and strategies proposed within the respective policy documents. Forest-relevant refers to any information in the documents that may have implications for forests, from direct (e.g., specific references to forestry practices) to indirect (e.g., climate policies and land use strategies) implications.

Given that the analysis principally focused on two policy documents, it was decided to apply a manual approach, marking relevant text in the PDFs and transferring it to an Excel file for further analysis.

The comparative analysis focused on identifying similarities and differences in how each document addresses forest-relevant topics. This process started by listing the targets in the KM-GBF against relevant articles in the restoration regulation to reveal areas of convergence, such as shared goals for habitat restoration and species protection, as well as divergence, particularly in the specificity of targets and mechanisms for implementation and monitoring. Comparing the policy documents side by side made it possible to determine how much they align.

Once it became apparent that the restoration regulation did not address several targets in the KM-GBF, a crosswalk was carried out between the KM-GBF and other EU policy instruments. This was not an in-depth comparison and analysis but simply an additional step to identify what EU policy domains and instruments may be relevant in terms of coverage (Appendix C). It was essentially a topical review whereby policy instruments were identified using the EUR-Lex (see <https://eur-lex.europa.eu/homepage.html>, accessed on 5 June 2024) and relevant EC websites (e.g., DG Env and DG Clima) using keywords from each KM-GBF target (e.g., target 5: trade of wild species).

4. Analysis and Results

4.1. General Comparison

There is a significant legal difference between the restoration regulation and the KM-GBF. Once in force, the restoration regulation will be legally binding for EU MS, whereas the KM-GBF is a non-binding framework. The EU regulation is also region-specific, whereas the KM-GBF has a global focus. More importantly, however, compliance with the restoration regulation can be enforced through relevant EU mechanisms. In contrast, compliance with

the KM-GBF relies on the Contracting Party's commitment to integrate its goals and targets into national policies and actions [6].

The KM-GBF and the restoration regulation offer complementary yet distinct approaches to biodiversity and ecosystem conservation and restoration. The KM-GBF sets out 23 global targets (Table 1) aimed at reducing threats to biodiversity, promoting sustainable use, and facilitating benefit-sharing. It focuses on broad, actionable goals to protect and restore biodiversity on a global scale, including specific targets to prevent species extinction and reduce pollution impacts directly. In contrast, the restoration regulation adopts a more focused strategy, detailing 28 articles (Appendix B) that outline measures for restoring specific ecosystems, which indirectly contribute to broader biodiversity objectives, such as species conservation through habitat restoration and sustainable use via agricultural ecosystem restoration. Nine of these targets concern the delegation of powers, and committee procedures (Chapter V) and final provisions (Chapter VI) and are seen as less relevant [14]. While the KM-GBF explicitly addresses climate change impacts and advocates for sustainable consumption patterns, the restoration regulation emphasises restoration actions that have indirect benefits, like improving ecosystem health, which may, in turn, influence consumption patterns.

The restoration regulation includes detailed monitoring and reporting requirements to support restoration efforts (Chapter IV). In contrast, the KM-GBF emphasises broader monitoring and accessibility of data and knowledge for biodiversity governance [12]. Both frameworks underscore the importance of nature-based solutions—approaches that use natural processes and ecosystems to tackle societal challenges, enhance biodiversity, and improve human well-being—and financial shifts towards sustainability; however, they differ in their directness and specificity of targets. For example, the restoration regulation's focus on specific restoration actions exemplifies nature-based solutions through targeted ecosystem restoration projects. At the same time, the KM-GBF's broader approach includes sustainable resource management and consumption patterns that incorporate nature-based solutions on a larger scale. Additionally, the KM-GBF's explicit targets on genetic resources and harmful subsidies highlight its wider governance perspective compared to the restoration regulation's detailed restoration strategies and monitoring requirements.

4.2. Forests, the KM-GBF, and the Restoration Regulation

4.2.1. Kunming-Montreal Global Biodiversity Framework

- Only one KM-GBF target refers directly to forests. Target 10 sets out a requirement to ensure that areas under “forestry are managed sustainably, in particular through the sustainable use of biodiversity” (p. 10). However, forestry represents a broad range of activities that covers a wide spectrum of sectors, from timber production to non-wood forest products.
- All 23 KM-GBF targets can be considered as having direct and indirect implications for forests and the European forest-based sector (Table 1). For instance, “reducing biodiversity loss” (target 1) is relevant as forests harbour a significant portion of the world's terrestrial species, and “encouraging sustainable consumption choices” (target 16) may affect the demand for forest-based products.
- Based on the crosswalk between the articles of the restoration regulation and the KM-GBF, 17 targets (74%) can be considered as having some degree of importance (Table 1). The remaining six targets (26%) were not included. For instance, the targets on gender (targets 22–23) are not relevant, as the restoration regulation does not address any gender issues, which means these targets were excluded from the crosswalk.
- For the crosswalk between the KM-GBF targets and other EU policy instruments, targets 17, 19, 20, and 22–23 were excluded as they were considered only indirectly important in terms of EU forest-relevant policy, such as addressing technology transfer, biosafety measures, resource mobilisation, and gender equity (Appendix C).

4.2.2. EU Regulation on Nature Restoration

- The restoration regulation emphasises restoration measures to enhance forest biodiversity, considering risks such as forest fires, while aiming for an “*increasing trend at national level of the common forest bird index*” (article 10). It further sets out measures (annex VII) and indicators related to deadwood, forest structure, connectivity, carbon stock, and species diversity (article 17, annexes IV and VI).
- Seven articles (1, 4, 5a, 6, 10, 10a, and 17) can be considered directly relevant for forests and the forest-based sector, particularly article 5a on energy from renewable resources, article 10 on the restoration of forest ecosystems, and article 10a on the planting of three billion additional trees [14].
- Six articles can be considered indirectly relevant, covering the restoration of rivers’ natural connectivity and the natural functions of the related floodplains (article 7); restoration in agricultural contexts, which also indirectly affects forest ecosystems, emphasising biodiversity and organic soil restoration (article 9); and articles associated with the development and adoption of restoration plans (articles 11 to 14).

4.3. Crosswalking the Targets and Articles in the KM-GBF and EU Regulation on Nature Restoration

The analysis of the KM-GBF and the restoration regulation reveals some complementary approaches in the context of forest restoration and sustainable practices (Table 1). Generally, the KM-GBF provides broad targets for biodiversity, which are not forest-specific. In contrast, the restoration regulation sets out concrete forest-relevant measures (e.g., tree planting and establishing riparian forests) that are quantifiable and attached to a detailed monitoring framework (as set out in articles 17 and 18), including forest-specific biodiversity indicators (annex VI). Furthermore, the restoration regulation’s focus on enhancing ecosystem services and connectivity supports the KM-GBF’s aim for improved connectivity, human well-being, and sustainable land use indirectly (e.g., goal A, targets 2–3 and 12). However, while the restoration regulation notes measures for forest ecosystems, there may be gaps in addressing targets, such as those related to invasive species and pollution reduction. This would suggest the need for enhanced alignment, particularly with other relevant EU policy instruments, to translate the global targets into specific regional actions (Appendix C).

Article 1 of the restoration regulation calls for EU MSs to have restoration measures in place by 2030 in “*at least 20% of land and 20% of the sea areas and, by 2050, all ecosystems in need of restoration*” (para. 2) is a Union target. This means it is not a commitment on the EU MS level but refers to an EU-wide average. Moreover, as part of the first reading, the negotiations in the European Parliament resulted in two significant amendments that essentially watered down the restoration regulation. First, the original restoration target was reduced from 30 to 20 per cent. This effectively means the restoration regulation does not reach the 30 per cent target set out in the KM-GBF (targets 2 and 3). Arguably, the EU Biodiversity Strategy for 2030 may help to address this concern, as it sets out to legally protect at least 30 per cent of the EU’s land and sea area [9]; however, this is a soft (non-binding) policy instrument as compared to the restoration regulation. Second, several articles were changed from hard commitments to subjective aims. For example, articles (e.g., 4 to 6) were amended to note that EU MSs only need to “aim” to ensure that relevant measures are in place, which principally turn these policy objectives into non-binding targets. This implies that the restoration regulation will not ensure that EU MSs reach several KM-GBF goals and targets listed in Table 1. It also raises concerns about whether individual EU MSs, all signatories to the CBD, can reach these area-based conservation targets.

Specific to forests and the restoration regulation, Parliament also added an article relating to the production of energy from renewable sources (article 5a). From a climate perspective, there may be some grounds for this addition [19–21]; however, the article also allows for restoration and conservation targets to be overridden for energy production as it

is presumed to be an “*overriding public interest*”. Moreover, increasing bioenergy sourced from forest biomass for renewable energy production conflicts with forest conservation goals [22–24]. For example, a recent study by Stubenrauch and Garske [25], which analysed the trade-offs between renewable energy targets and forest conservation in Europe, demonstrates that subsidised energy use of biomass by the renewable energy directive (RED III) endangers carbon sinks and forest biodiversity.

Another climate-related issue, recognised in the restoration regulation, concerns EU objectives regarding the accounting of emissions and removals from land use, land use change and forestry (‘LULUCF’). For the LULUCF sector, “*it is important that ecosystems in all land categories, including forests, grasslands, croplands and wetlands, are in good condition in order to be able to effectively capture and store carbon*” (para. 18). While the need for restoration is highlighted, increasing carbon sequestration may not mean it is good for biodiversity [20,26–28]. Moreover, efforts to maximise carbon sequestration in forests for climate change mitigation, such as afforestation or reforestation, may conflict with other forest management objectives, such as timber production [29]. This raises concerns about whether conflicting policy objectives may allow the restoration regulation to be overridden in pursuing carbon neutrality [20,21,29].

Finally, from a forest perspective, the restoration regulation notes that some restoration measures “*may in certain cases require the removal of forest in order to reinstall conservation-driven management*” (para. 29a). Examples include restoring original habitat types, such as grasslands, heaths, or wetlands, which have been converted into forests. This highlights the complex interplay between competing conservation goals and land-use priorities. While this approach may align with the broader objectives of the KM-GBF, it also presents a dilemma for forest management, as it will require a balancing act between maintaining forest cover, which is important for carbon sequestration and climate regulation, and restoring forest ecosystems that have been identified as priorities for biodiversity conservation. This represents an important trade-off between biodiversity conservation and forest management interventions and stresses the need to consider multiple objectives [30–32]. It also emphasises the need for clear guidelines and criteria to determine whether, when, and where forest removal for restoration purposes is justified.

5. Discussion and Conclusions

The crosswalk between forest-relevant provisions in the EU Nature Restoration Regulation and the Kunming-Montreal Global Biodiversity Framework reveals different legal and operational approaches taken by the two policy instruments. The former is legally binding and region-specific, while the latter serves as a non-binding global framework. The analysis reveals the potential efficacy of the restoration regulation in addressing forest-relevant targets under the KM-GBF (Table 1), and it shows some of the potential gaps in the restoration regulation that might be addressed through other forest-relevant EU policy instruments (Appendix C). Aside from legal differences, the crosswalk further highlights that the KM-GBF represents broad and action-oriented goals and targets, focusing on reducing threats to biodiversity, sustainable use, and sharing benefits. In contrast, the restoration regulation specifies detailed measures and targets for restoring specific ecosystems, indirectly supporting the broader biodiversity goals through focused restoration actions.

The reduction of the restoration regulation’s target (from 30 to 20 per cent) and the shift from binding commitments to aims suggests that EU MSs may not be willing (or able) to meet the KM-GBF targets. Amendments by the European Parliament weakened the prospective enforcement mechanisms of the regulation, undermining EU MS accountability in fulfilling biodiversity commitments. Even more, countries can now weigh economic factors in restoration planning (article 11), which may lead to uneven commitment levels across EU MSs. Countries may also choose to apply the derogation rule (e.g., articles 4, 11, and 12) for habitat types that cover more than three per cent of their European territory, allowing countries to be exempted from certain requirements under specific conditions. This could lead to prioritising restoration efforts, whereby certain forest habitats, despite

their ecological significance, are sidelined based on geographical prevalence. Parliament introduced both exemptions during negotiations [14], which the Council later approved. The substantial changes to the restoration regulation [8] suggest a significant dilution regarding its original intent and enforcement capacity. This will likely affect the regulation's impact and, more importantly, its efficacy in aligning with and implementing the goals and targets of the KM-GBF.

EU forest-related policies currently stand at a crossroads, where entrenched and conflicting policy objectives are, arguably, affecting forest use and management [33,34]. For example, the availability of suitable land for afforestation is limited due to competing land-use demands. This refers to the availability of suitable land for afforestation and the competition for land between different land uses, such as forests, agriculture, and urban development. This complexity can be exemplified by the Common Agricultural Policy (CAP), which inadvertently promotes agricultural expansion while improving agricultural productivity, potentially at the expense of afforestation measures. This dynamic emphasises some inconsistencies between the farmland-focused, climate change-focused, and protected area-focused goals of relevant EU policy instruments, such as the CAP, the restoration regulation, and the climate law [35]. Supporting this perspective, Rolo et al. [36] have demonstrated a positive correlation between forest coverage in a landscape and ecosystem services, both provisioning and regulating, in contrast to negative correlations observed with increased agricultural land use. This finding highlights the importance of achieving a balanced integration of policy objectives that do not compromise long-term biodiversity conservation and climate change mitigation.

These discrepancies have broader implications for the global biodiversity agenda and the KM-GBF. The amendments to the restoration regulation weaken the regulation's enforcement mechanism and reduce the ambition of the EU's restoration efforts, which may lead to a fragmented approach to forest restoration across EU MSs. The EU's incoherence and reduced ambition in forest restoration may affect global efforts to halt and reverse biodiversity loss. In other words, the EU's commitment to the KM-GBF, particularly targets related to sustainable forest management and ecosystem restoration, risks being compromised, which would have knock-on effects regarding global objectives. Unfortunately, with the restoration regulation being adopted, it is no longer possible to strengthen the legal and implementation framework to ensure binding commitments and EU MS accountability.

Conclusions

Despite some gaps in coverage, the KM-GBF and the restoration regulation are largely complementary. However, better alignment is needed between the KM-GBF, the restoration regulation, and other forest-relevant EU policy instruments. Considering the varied regional challenges and EU policy objectives, a more integrated policy approach is essential. The alignment between these EU frameworks would support a strategic consolidation of efforts towards forest conservation and restoration in Europe. In addition, it needs to be recognised that the efficacy of future forest measures has been significantly undermined by the EU's reduced regulatory ambitions, as seen in the amendments to the restoration regulation. This will ultimately limit the EU's ability to hold countries accountable and to meet the global biodiversity targets set out in the KM-GBF. It is, for this reason, imperative that the EU look beyond individual policy silos and that steps are taken to ensure that measures targeting forests are coherent and effective, accounting for divergent EU policy pathways and objectives.

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Appendix A

Goals of the Kunming-Montreal Global Biodiversity Framework.

GOAL A

The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050;

Human induced extinction of known threatened species is halted, and by 2050, the extinction rate and risk of all species will be reduced tenfold, and the abundance of native wild species is increased to healthy and resilient levels;

The genetic diversity within populations of wild and domesticated species is maintained, safeguarding their adaptive potential.

GOAL B

Biodiversity is sustainably used and managed, and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050.

GOAL C

The monetary and non-monetary benefits from the utilisation of genetic resources, digital sequence information on genetic resources, and traditional knowledge associated with genetic resources, as applicable, are shared fairly and equitably, including, as appropriate, with indigenous peoples and local communities, and substantially increased by 2050, while ensuring traditional knowledge associated with genetic resources is appropriately protected, thereby contributing to the conservation and sustainable use of biodiversity, in accordance with internationally agreed access and benefit-sharing instruments.

GOAL D

Adequate means of implementation, including financial resources, capacity-building, technical and scientific cooperation, and access to and transfer of technology to fully implement the Kunming-Montreal global biodiversity framework are secured and equitably accessible to all Parties, especially developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, progressively closing the biodiversity finance gap of 700 billion dollars per year, and aligning financial flows with the Kunming-Montreal Global Biodiversity Framework and the 2050 Vision for Biodiversity.

Appendix B

Articles in the EU Regulation on Nature Restoration.

Article 1: Subject matter

Article 2: Geographical scope

Article 3: Definitions

Article 4: Restoration of terrestrial, coastal and freshwater ecosystems

Article 5: Restoration of marine ecosystems

Article 5a: Energy from renewable sources

Article 5b: National defence

Article 6: Restoration of urban ecosystems

Article 7: Restoration of the natural connectivity of rivers and natural functions of the related floodplains

Article 8: Restoration of pollinator populations

Article 9: Restoration of agricultural ecosystems

Article 10: Restoration of forest ecosystems

Article 10a: Planting of three billion additional trees

Article 11: Preparation of the national restoration plans

Article 12: Content of the national restoration plans

Article 13: Submission of the draft national restoration plan

Article 14: Assessment of the national restoration plans

Article 14a: Coordination of restoration measures in marine ecosystems

Article 15: Review of the national restoration plans

Article 17: Monitoring

Article 18: Reporting

Article 19: Amendment of Annexes

Article 20: Exercise of the delegation

Article 21: Committee procedure

Article 21a: Amendment to Regulation (EU) 2022/869

Article 22: Review

Article 22a: Temporary suspension

Article 23: Entry into force

Appendix C

Crosswalk between Forest-Relevant KM-GBF Targets against Forest-Relevant EU Policy Instruments

KM-GBF Targets	Forest-Relevant EU Policy Instruments (Non-Exhaustive)
Target 1: [...] bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030 [...].	<ul style="list-style-type: none"> • Regulation on Nature Restoration (2022/0195 (COD)). • Forest Strategy (COM(2021) 572 final). • Biodiversity Strategy for 2030 (COM(2020) 380 final). • Habitats and Birds Directive, including Natura 2000 (92/43/EEC and 79/409/EEC). • Soil Strategy (COM/2021/699 final). • Water Framework Directive (2000/60/EC). • EU Marine Strategy Framework Directive (2008/56/EC). • <i>Funding programmes</i> (e.g., LIFE, Horizon Europe, and European Maritime and Fisheries Fund).
Target 2: Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration [...].	
Target 3: Ensure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed [...].	
Target 4: Ensure urgent management actions to halt human induced extinction of known threatened species and for the recovery and conservation of species [...].	
Target 5: Ensure that the use, harvesting and trade of wild species is sustainable, safe and legal, preventing overexploitation, minimising impacts on non-target species and ecosystems, and reducing the risk of pathogen spillover, applying the ecosystem approach, while respecting and protecting customary sustainable use by indigenous peoples and local communities.	<ul style="list-style-type: none"> • Timber Regulation (995/2010) and Regulation on deforestation-free products (2023/1115). • Forest Law Enforcement, Governance and Trade (FLEGT) Regulation (2173/2005). • Phytosanitary regulation (2019/2072) • Protection of species of wild fauna and flora by regulating trade therein (338/97). • EU action plan against wildlife trafficking (COM/2022/581 final).
Target 6: Eliminate, minimise, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services [...] reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent by 2030 [...].	<ul style="list-style-type: none"> • Invasive Alien Species Regulation (1143/2014)
Target 7: Reduce pollution risks and the negative impact of pollution from all sources by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects, including: (a) by reducing excess nutrients lost to the environment by at least half, including through more efficient nutrient cycling and use; (b) by reducing the overall risk from pesticides and highly hazardous chemicals by at least half, including through integrated pest management, based on science, taking into account food security and livelihoods; and (c) by preventing, reducing, and working towards eliminating plastic pollution.	<ul style="list-style-type: none"> • Towards Zero Pollution for Air, Water and Soil (COM/2021/400 final). • Waste Framework Directive (2008/98/EC). • Environmental Liability Directive (2004/35/CE). • Single Use Plastics Directive (2019/904). • A Green Deal Industrial Plan for the Net-Zero Age (COM(2023) 62 final). • <i>Instruments on air quality and emissions</i> (e.g., Industrial Emission Directive (2010/75/EU), Ambient Air Quality and Cleaner Air Directive (2008/50/EC), and National Emission Ceilings Directive (2016/2284/EU)).
Target 8: Minimise the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions, including through nature-based solutions and/or ecosystem-based approaches, while minimising negative and fostering positive impacts of climate action on biodiversity.	<ul style="list-style-type: none"> • European Green Deal (COM(2019) 640 final). • European Climate Law (2021/1119). • Fit for 55 package (COM(2021) 550 final) and associated EU legislation. • 2030 climate and energy framework (COM(2020) 562 final). • Land Use, Land Use Change and Forestry (LULUCF) (2023/839). • Renewable Energy Directive (2023/2413). • Climate Adaptation Strategy (COM(2021) 82 final).

	KM-GBF Targets	Forest-Relevant EU Policy Instruments (Non-Exhaustive)
2. Meeting people's needs through sustainable use and benefit-sharing	<p>Target 9: Ensure that the management and use of wild species are sustainable, thereby providing social, economic and environmental benefits for people, especially those in vulnerable situations and those most dependent on biodiversity, including through sustainable biodiversity-based activities, products and services that enhance biodiversity, and protecting and encouraging customary sustainable use by indigenous peoples and local communities.</p>	<ul style="list-style-type: none"> • Regulation on Nature Restoration (2022/0195 (COD)). • Biodiversity Strategy for 2030 (COM(2020) 380 final). • Habitats and Birds Directive, including Natura 2000 (92/43/EEC and 79/409/EEC). • Green Infrastructure Strategy (COM(2013) 0249 final) • Pollinators Initiative (COM(2023) 35 final). • Common Agricultural Policy (2021/2115, 2021/2116, and 2021/2117). • <i>See also instruments listed for targets 5 and 6.</i>
	<p>Target 10: Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such as sustainable intensification, agro-ecological and other innovative approaches, contributing to the resilience and long-term efficiency and productivity of these production systems, and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services.</p>	<ul style="list-style-type: none"> • Regulation on Nature Restoration (2022/0195 (COD)). • Common Agricultural Policy (2021/2115, 2021/2116, and 2021/2117). • Farm to Fork Strategy (COM(2020) 381 final). • Forest Strategy (COM(2021) 572 final). • Biodiversity Strategy for 2030 (COM(2020) 380 final). • Water Framework Directive (2000/60/EC). • Bioeconomy Strategy (COM(2018) 673 final). • Natura 2000 Network (92/43/EEC and 79/409/EEC).
	<p>Target 11: Restore, maintain and enhance nature's contributions to people, including ecosystem functions and services, such as the regulation of air, water and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, through nature-based solutions and/or ecosystem-based approaches for the benefit of all people and nature.</p>	<ul style="list-style-type: none"> • Regulation on Nature Restoration (2022/0195 (COD)). • Biodiversity Strategy for 2030 (COM(2020) 380 final). • Green Infrastructure Strategy (COM(2013) 0249 final). • Climate Adaptation Strategy (COM(2021) 82 final). • Soil Strategy (COM/2021/699 final). • Common Agricultural Policy (2021/2115, 2021/2116, and 2021/2117). • Pollinators Initiative (COM(2023) 35 final). • Civil Protection Mechanism (2021/836). • European Climate Law (2021/1119). • Climate Adaptation Strategy (COM(2021) 82 final).
	<p>Target 12: Significantly increase the area and quality, and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, ecological connectivity and integrity, and improving human health and well-being and connection to nature, and contributing to inclusive and sustainable urbanisation and to the provision of ecosystem functions and services.</p>	<ul style="list-style-type: none"> • Regulation on Nature Restoration (2022/0195 (COD)). • Biodiversity Strategy for 2030 (COM(2020) 380 final). • Green Infrastructure Strategy (COM(2013) 0249 final). • Urban Agenda for the EU (Pact of Amsterdam). • Climate Adaptation Strategy (COM(2021) 82 final). • Environment Action Programme to 2030 (2022/591). • EU Cohesion Policy 2021–2027. • Covenant of Mayors for Climate & Energy.
	<p>Target 13: Take effective legal, policy, administrative and capacity-building measures at all levels, as appropriate, to ensure the fair and equitable sharing of benefits that arise from the utilisation of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, and facilitating appropriate access to genetic resources, and by 2030, facilitating a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing instruments.</p>	<ul style="list-style-type: none"> • Access and Benefit Sharing (ABS) Regulation (511/2014). • Plant Reproductive Material (2018/848, new proposal: COM(2023) 414 final). • Forest reproductive material (1999/105/EC, new proposal: COM(2023) 415 final). • European Forest Genetic Resources Programme (FOREST EUROPE resolution S2). • Genetic Resources Strategy for Europe (GenRes Bridge project).

	KM-GBF Targets	Forest-Relevant EU Policy Instruments (Non-Exhaustive)
3. Tools and solutions for implementation and mainstreaming	<p>Target 14: Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, and fiscal and financial flows with the goals and targets of this framework.</p>	<ul style="list-style-type: none"> • Biodiversity Strategy for 2030 (COM(2020) 380 final). • European Green Deal (COM(2019) 640 final). • Strategic Environmental Assessment (SEA) Directive (2001/42/EC). • Environmental Impact Assessment (EIA) Directive (2014/52/EU). • Taxonomy Regulation (2020/852). • Habitats and Birds Directive, including Natura 2000 (92/43/EEC and 79/409/EEC). • Land Use, Land Use Change and Forestry (LULUCF) (2023/839).
	<p>Target 15: Take legal, administrative or policy measures to encourage and enable business, and in particular to [...] disclose their risks, dependencies and impacts on biodiversity [...] promote sustainable consumption patterns [...] compliance with access and benefit-sharing regulations and measures [...].</p>	<ul style="list-style-type: none"> • Taxonomy Regulation (2020/852). • Sustainable Finance Disclosure Regulation (2022/1288). • Non-Financial Reporting Directive (2014/95/EU). • Corporate Sustainability Reporting Directive (2022/2464). • Circular Economy Action Plan (COM(2020)98 final). • Product Environmental Footprint (C(2021) 9332 final). • Action Plan for Nature, People and the Economy. • Eco-Management and Audit Scheme (2018/2026).
	<p>Target 16: Ensure that people are encouraged and enabled to make sustainable consumption choices, including by establishing supportive policy, legislative or regulatory frameworks, improving education and access to relevant and accurate information and alternatives, and by 2030, reduce the global footprint of consumption in an equitable manner, including through halving global food waste, significantly reducing overconsumption and substantially reducing waste generation, in order for all people to live well in harmony with Mother Earth.</p>	<ul style="list-style-type: none"> • Circular Economy Action Plan (COM(2020)98 final). • Farm to Fork Strategy (COM(2020) 381 final). • Waste Framework Directive (2008/98/EC). • Single Use Plastics Directive (2019/904). • Ecodesign Directive (2009/125/EC). • Energy Labelling Directive (2017/1369). • Green Public Procurement (COM(2008) 400 final). • Eco-Management and Audit Scheme (2018/2026). • Consumer Rights Directive (2011/83/EU). • Bioeconomy Strategy (COM(2018) 673 final). • Strategy on Green Finance (COM(2021) 390 final).
	<p>Target 18: Identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least \$500 billion per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity.</p>	<ul style="list-style-type: none"> • Biodiversity Strategy for 2030 (COM(2020) 380 final). • Taxonomy Regulation (2020/852). • Strategy on Green Finance (COM(2021) 390 final).
	<p>Target 21: Ensure that the best available data, information and knowledge are accessible to decision makers, practitioners and the public to guide effective and equitable governance, integrated and participatory management of biodiversity, and to strengthen communication, awareness-raising, education, monitoring, research and knowledge management and, also in this context, traditional knowledge, innovations, practices and technologies of indigenous peoples and local communities should only be accessed with their free, prior and informed consent, in accordance with national legislation.</p>	<ul style="list-style-type: none"> • Regulation on Nature Restoration (2022/0195 (COD)). • Forest Strategy (COM(2021) 572 final). • Monitoring framework for resilient European forests (Proposal: COM(2023)728). • INSPIRE Directive (2007/2/EC).

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