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Legally binding and ambitious biodiversity protection under the CBD, the global biodiversity framework, and human rights law

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Abstract

Beyond climate change, the planet faces several other environmental challenges that are at least as threatening, such as the loss of biodiversity. In each case, the problems are driven by similar factors, such as fossil fuels and intensive livestock farming. This paper presents a legal analysis concerning the binding nature of the Convention on Biological Diversity's (CBD) overarching objective to halt biodiversity loss, within the framework of international environmental and human rights law. Using the established legal techniques encompassing grammatical, systematic, teleological, and historical interpretations, the article demonstrates that the CBD's objective to halt biodiversity loss is indeed legally binding and justiciable. This conclusion is directly drawn from interpreting Article 1 CBD. Furthermore, a comparable obligation emerges indirectly from international climate law. The imperative to curtail biodiversity loss also finds grounding in human rights law, albeit necessitating a re-evaluation of certain aspects of freedom, similar to what has been explored in the context of climate protection. Moreover, the article underscores that various other biodiversity-related regulations within international law, including those laid out in the CBD, the Aichi Targets, and the Kunming–Montreal Global Biodiversity Framework, also carry partial legal significance. Nonetheless, it is crucial to note that these regulations, including the Kunming–Montreal Framework, do not modify the obligation mandate to halt biodiversity loss, which was established at the latest when the CBD entered into force in 1993. Because this obligation has been violated since then, states could potentially be subject to legal action before international or domestic courts for their actions or inactions contributing to global biodiversity loss.

Keywords Biodiversity loss, Convention on biological diversity, Human rights, IPBES, Climate change, International law, Kunming–Montreal global biodiversity framework

Background

In society, politics and science, the debate about anthropogenic climate change often overshadows other ecological problems, such as biodiversity loss, disturbed nitrogen and phosphorus cycles, pollution, or scarcity of fresh water. In everyday language, the terms environmental crisis and climate crisis are sometimes even used synonymously. This seems to make little sense, for several reasons. First, the various environmental problems interact and are often shaped by the same drivers, such as the use of fossil fuels and livestock farming [1–3]. Second, when comparing various ecological issues, it is evident

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that the carrying capacity of individual ecological factors, as indicated by the planetary boundaries framework, is exceeded to a much greater extent in problems other than climate change [4–6]. This applies, for example, to the loss of biodiversity and ecosystems [5–9].

This article aims to substantiate the thesis that international law and human rights law require the loss of biodiversity to be halted. Prior to this, we show the status and drivers of species extinction to adequately grasp the possible content of a legally required limit to biodiversity loss. In doing so, we continue the efforts of the previous three articles, which have shown that compliance with the 1.5 °C limit in Art. 2 para. 1 lit. a of the Paris Agreement (PA) is an obligation under both international law and human rights law; this requirement thus leaves even less room for a greenhouse gas budget for Western industrialized countries than estimated by the IPCC [10–12]. In this context, we will examine the extent to which legal arguments on climate change can be applied to the issue of biodiversity loss. Because of the interaction between the two environmental problems, this also includes a discussion of the possible indirect effects of human rights provisions on climate protection on biodiversity. All of this is particularly relevant in light of the new international biodiversity rules that will complement the CBD by the end of 2022 through the Kunming–Montreal Global Biodiversity Framework (GBF) (on this see also [9]).

Materials and methods

Legal interpretation and literature review

This article assesses the global biodiversity policy framework. For this assessment, a legal interpretation of international biodiversity law and human rights in international law is applied. The legal interpretation is combined with a review of the current natural scientific discussion on biodiversity and biodiversity loss. We combined the legal interpretation with the literature review as the findings of latter frequently have direct implications for the legal interpretation. For example, the findings on the consequences of biodiversity loss emphasize the importance of biodiversity for fulfilling the human rights for life, health, and subsistence. Against this backdrop, we extensively reviewed natural science research on biodiversity and biodiversity loss. We started the literature search by scanning comprehensive biodiversity reports including reports from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the CBD secretariat's Global Biodiversity Outlook (GBO), and The Economics of Ecosystems and Biodiversity report (TEEB). We then reviewed recent as well as relevant older international scientific publications on the interplay of biodiversity with ecosystems and

their services, the status quo of biodiversity as well as the drivers and consequences of biodiversity loss. The results of this literature review can be found in the following sections.

A further section contains the results of the legal interpretation. Legal documents are interpreted grammatically, systematically, teleologically, and historically. A legal interpretation considers linguistic aspects, legal context, purpose and history of a document [3, 13]. Usually, grammatical and systematic interpretation are applied, because the other two approaches have several issues. In addition, we will reflect on the (future) role that courts and jurisprudence may play as regards the relevant obligations. We will show that Article 1 CBD contains a legally binding obligation to stop and reverse biodiversity loss since the Convention's entering into force in 1993. We will further assess how the two previous action-oriented biodiversity frameworks specified that obligation and investigate why the frameworks failed to catalyse any considerable state action. Following this, we will analyse the new GBF and its legal provisions in detail. We will close the respective section by emphasizing two points: first, the new framework contains more legally binding elements than commonly assumed and thus cannot be easily disregarded by states. Second, however, the GBF cannot be construed to mean that states now have time until 2030 to halt and reverse biodiversity loss, as the obligation under Article 1 CBD has been in effect since 1993 and requires states to take much faster and more ambitious action immediately.

The meaning of biodiversity and its ecosystem services

The common definition of the term biodiversity or biological diversity [introduced by 14, see also 15] stems from Art. 2 CBD, according to which “biological diversity means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems”. Hence, biodiversity is comprised of three levels: the genetic variation within species, the richness of species and the diversity of ecosystems [see 16, 17]. Genetic diversity means the degree of variability within and between species, whereas genes in the DNA of individual plants and animals encode the information on biodiversity [18, 19, see also 15, 20]. Species diversity refers to the variety of species. In 2021, IUCN Red List listed 2.13 million species that have been described. The total number of species is estimated 8.75 million. However, estimates of the total number of species on earth vary from a few to 100 million [15, 21, 22]. Ecosystem diversity goes beyond single species and includes the variety of communities of organisms within

particular habitats and the physical conditions under which they live [15, 20]. These levels are linked to each other. First, the genetic diversity is the precondition for evolution and thereby for species diversity. Second, ecosystems serve as living spaces for species and thereby impact species diversity. Finally, diverse species in turn affect ecosystems [23–29].

There is a broad consensus among researchers that biodiversity has a positive and stabilizing effect on ecosystems [25, 29–38]. In contrast, biodiversity—as mentioned earlier—is identified as one planetary boundary whose transgression can cause higher vulnerability of ecosystems to unwanted change, e.g., regarding the climate [4–6]. By contributing to functioning ecosystems, biodiversity provides a variety of essential services for living beings, such as ensuring the resilience and stability of ecosystems, regulating climate, keeping air and water clean, enabling soil formation, and protecting against natural disasters, such as floods and erosion [16, 39–44]. The importance of biodiversity for humans and its conservation is thus derived from ecosystem services [introduced by 45], i.e., “the benefits people obtain from ecosystems” [41]. Ecosystem services may be divided into provisioning services (food, water etc.), regulating services (protection from floods and diseases, climate regulation, securing of water quality), cultural services (fostering and enabling of recreation, nature tourism, aesthetic or spiritual experiences, inspiration) and supporting services (soil formation, maintenance of nutrient cycling, conservation of genetic diversity, primary production through photosynthesis) [20, 41].

The inter-relationships within ecosystems, between different ecosystems and the effects of changes in ecosystems or in biodiversity on the provision of ecosystem services are highly complex and, in some cases, difficult to grasp or not yet fully understood [30, see, e.g., 46, 47]. Therefore, in the public debate, nature conservation, biodiversity protection and the protection of ecosystems are widely understood as synonyms, while the extent of biodiversity loss is unknown and not understood. In general, biodiversity is characterised by heterogeneity and complex and dynamic cause–effect relationships [16, 31, 48–53]. Complexity might also be contributing to the reasons why science and administrations by now fail to create a simple equivalent to measure biodiversity loss and action, such as the emissions equivalent that serves as indicator in the field of climate protection. Yet, despite all complexity, the impact of biodiversity loss on humans is unquestioned (see, e.g., [44]).

Biodiversity—and even more so “nature”—is not only a heterogeneous, complex and non-constant good over time. Nor is it inherent in the term itself as to which biodiversity and which nature are to be protected. When

talking about biodiversity or ecosystem protection as a whole, it may still be clear that not only individual species or biotopes are meant. However, it is not clear which point in time marks the state of biodiversity worth protecting or restoring when talking about biodiversity protection or ecosystem protection. This is not very surprising, given that flora and fauna have changed considerably over the course of millennia (or even millions of years). If, for example, one asks about the “natural” ecosystem state in Central Europe, one could fall back on the state after the last ice age; or the situation 1000 years ago; or 500 years ago; or 50 years ago; or many other constellations. In contrast, the more concrete institution of halting biodiversity loss seems relatively clear-cut. If such a requirement is found in a legal statute, no further deterioration of biodiversity may occur from now on. Rather, the extinction of species must then be stopped.

Status quo and drivers of biodiversity loss

Globally, biodiversity has been decreasing in such an unprecedented rate, “faster than at any time in human history” [39], that it has been referred to as “the sixth mass extinction” in the earth’s history [4, 39–41, 54–63]. In principle, biodiversity can renew itself, but if it is overexploited or if tipping points are exceeded, ecosystems can collapse and thus be irreversibly damaged or destroyed [about the debate on tipping points in nature see [64], on tipping points of the terrestrial biosphere, see [65], on planetary biodiversity tipping points, see [61, 6]. Besides, coextinction, i.e., the loss of species as a direct or indirect result of other extinctions, amplifies the effect of primary extinction, significantly contributing to global biodiversity loss [63]. Besides, exceeding the planetary boundary for biodiversity loss can have pervasive effects on other planetary boundary levels [4].

Almost half of the earth’s natural ecosystems have declined globally—relative to their earliest estimated states. 25% of animal and plant species, around one million species, are threatened with extinction, many of them within decades [39, 66], for vertebrates see [67], for pollinators see [68, 69], for carnivores see [70], for mammals and birds see [71, 59], for plants see [72, 47], for marine plants and animals see [73–75], see also the IUCN Red List of Threatened Species [76]. It is estimated that the current rate of species extinction is 100 to 1,000 times higher than the average rate over the last 10 million years and is continuing to increase [4, 39, 55, 58, 61]. In addition to biotic factors, such as animals or plants, biodiversity of abiotic factors such as soils and its functions are likewise declining [29, 77]. If we consider the relevant factors relating to the condition of ecosystems, biodiversity loss has become readily apparent: regarding ecosystems, more than 70% of the land surface has been

significantly altered [78, 79], and 66% of the ocean area is increasingly impacted [80]. Over 85% of all wetlands have been lost, while half of all previously existing forests and coral covers since the 1870s have disappeared [81–83].

These degradation rates have been accelerating in recent decades due to climate change. Concerning species, a decline of at least 20% since 1900 in most major terrestrial biomass is estimated, assuming a further acceleration [84]. Thus, the biomass of the world's vegetation has been halved over human history [85]. Recent studies on the state of insect or bird species, which can serve as indicator species, confirm the collapse of biodiversity [86–91]. Currently, the biomass of humans and their domesticated animals is significantly higher than the biomass of all other wild mammals, which must compete with them for space and resources [55, 85]. At the same time, domesticated species and varieties have been lost as well [15, 39, 92, 93]. The interaction of biodiversity loss and climate change thus has further dimensions; intact ecosystems such as peatlands or soils can also store more greenhouse gases. As will be seen below, the drivers of biodiversity loss and climate change are also closely linked. All this is relevant, because on this basis—in addition to an argumentation directly on biodiversity—a protective effect could also be indirectly derived from climate protection (more details in the human rights chapter below).

Despite uncertainties on biodiversity trends, it is evident that the biodiversity decline is human-induced [39, see also 94, 67, 95] “and the pressures driving this decline are intensifying” [54]. The decline can be traced back to a number of drivers of change in nature, i.e., agriculture, land- and sea-use change, direct exploitation of organisms, climate change, pollution and invasive alien species [8, 39]. These direct drivers emerge due to underlying causes, the indirect drivers of change. A doubling human population, a quadrupling global economy and a tenfold increase in global trade in the last 50 years is driving a growing demand for energy, food and material [8, 39, see also 54].

Since 1970, the most negative impacts on nature have been due to land-use change in terrestrial and freshwater ecosystems [8, 39]. The underlying indirect driver has mainly been agricultural intensification and expansion—over one-third of the changes to the terrestrial land surface have been due to animal husbandry or cropping, e.g., the degradation of forests and biodiversity-rich peatlands [8, 39, 82, 83, 91]. Furthermore, the widespread use of pesticides and other agrochemicals such as synthetic fertilizers has been linked to reductions in abundance and diversity of pollinators [39, 69, 90]. Ultimately, all effects connected to agriculture are to a large extent driven by livestock farming, given that around 75% of global

agricultural areas are directly or indirectly used for livestock production [1]. The direct exploitation—and over-exploitation—of biodiversity resources is another major driver of biodiversity loss including animals, plants, and other organisms. It relates to harvesting, logging, hunting, and fishing. Regarding marine ecosystems, fishing as a form of direct exploitation has had a worse impact than other drivers [8, 39, 74].

In particular, factors driven or interconnected with fossil fuels play a major role. This is the case, e.g., with regard to urbanisation, which caused a doubling of urban area since 1992. An expanding infrastructure led to land-use change. These developments, in turn, can be linked to human population and consumption patterns [39]. Climate change is another driver—again fuelled by fossil fuels and livestock farming—of global nature change, and it increasingly exacerbates other drivers. Climate change is “a risk multiplier that exacerbates the impact of other drivers” [96]. It impacts many aspects of biodiversity, such as species distribution, phenology, population dynamics, community structure and ecosystem function [15, 39, 57, 63, 97–103]. In some areas, air, water, and soil pollution are continuously increasing, e.g., through GHG emissions, untreated urban and rural waste, plastic pollution, pollutants from industrial, mining and agriculture activities, oil spills and toxic dumping. As a result qualities of soil, freshwater, and marine water decrease [39, 104]. Once again, pollution represents a factor that is in large parts driven by fossil fuels (and livestock farming). In addition, there has been an unprecedented and ongoing growth rate of invasive species in global nature. Since 1980, recorded alien species have risen by 40%, and plant and animal invasions have put nearly one fifth of the earth's surface at risk—once again caused by globalised economy and modern mobility, driven by fossil fuels. Alien species negatively impact native species, ecosystem functions and nature's contribution to people, including economies and human health [39, 105–109].

Consequences of biodiversity loss for human beings

The loss of biodiversity has severe consequences for human life and, therefore, possibly for human rights, as it negatively impacts the stability and continuity of ecosystems as well as their provision of the goods and services humanity depends on [8, 31, 58, 110–117]. Robert Watson, former IPBES Chair, declared that with the deteriorating health of ecosystems “we are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide” [118]. Biodiversity is essential for food production, health care, climate change mitigation, and energy demands. Often, the economic value of ecosystem services is underestimated [e.g., the economic effect of pollination

by insects, see [119]. With more than three quarter of global food crop types, including fruits and vegetables relying on animal pollination, biodiversity is indispensable for food production [16, 39–41]. This is also economically relevant, as important cash crops such as coffee, cocoa, and almonds rely on animal pollination [39]. When indicators that measure nature's contributions, e.g., pollinator diversity or soil organic carbon, decline, it drastically impacts economies. For instance, the productivity of the global terrestrial area declined by 23% due to land degradation. Because of pollinators loss, annual crop output worth 235 to 577 billion dollars is at risk. As coastal habitats and coral reefs are lost, coastal protection likewise declines. This increases risks of floods and hurricanes and puts the life and property of 100 to 300 million people living within coastal flood zones at risk [39]. This is particularly relevant as sea levels are rising due to climate change. Biodiversity is also essential for climate change mitigation. In addition, biodiversity is crucial for human recreation, ecotourism [16, see also 23, 41], and nonmaterial contributions of nature to human quality of life [113]. Moreover, biodiversity serves as a model for technical innovation [16, 40].

Even before the COVID-19 pandemic in 2020, the benefits of nature and (physical and mental) human health were emphasized; biodiversity was recognized by the WHO as “a key environmental determinant of human health” [120, on the relation between biodiversity and human health see 121–123]. The IPBES report acknowledged this relation as well: “Nature underpins all dimensions of human health and contributes to non-material aspects of quality of life—inspiration and learning, physical and psychological experiences, and supporting identities—that are central to quality of life and cultural integrity, even if their aggregated value is difficult to quantify” [39, see also 54, 96]. With the pandemic, the importance of biodiversity for human health gained more attention. On one hand, biodiversity services restore and enhance human health: biodiversity is a basis for the development of medicines, and some 70% of drugs against cancer are inspired by nature. Moreover, four billion people rely primarily on natural medicines [16, 39, 41]. On the other hand, the destruction of biodiversity is a serious risk to human health, as emerging infectious diseases can result from human activities affecting biodiversity. Due to human activities that degrade ecosystems and biodiversity, there is a growing risk of diseases to spill over from wild and domestic animals to humans [96, 124]. It is estimated that more than 60% of human infectious diseases are so-called zoonoses [54], diseases jumping from another animal species to humans, to which COVID-19, and

also HIV/AIDS, Ebola, and the Zika virus belong [see 96, 125].

As the effects of extinctions will worsen [60, 94, 126], the high loss of biodiversity will have (further) profound consequences for humanity [33, 42, 127]. A low level of ecosystem resilience can cause a sudden decrease in biological productivity, which in turn can lead to an irreversible loss of ecosystem functions for both current and future generations [128, 129].

Results: legally binding and ambitious character of international biodiversity law

Genesis and core provisions of the CBD in terms of goals

As we have shown above, the major pitfall of protecting biodiversity is its inherent heterogeneity and complexity as well as its elusiveness when it comes to measuring the different relevant indicators [53, 130, 131]. It should come as no surprise that this heterogeneity also plays a significant role when it comes to the protection of biodiversity through international law [132, 133]. Insofar, we have already demonstrated that biodiversity as such is difficult to grasp, whereas it seems possible to understand the concept of stopping the loss of biodiversity.

To date, there are hundreds of instruments and treaties that each deal with specific and narrow issues (not to say niche topics) of biodiversity—for instance, the 1971 Ramsar Convention for the protection of wetlands or the 1979 Bonn convention on migratory species [134]. These international conventions employ a sectoral approach and are complemented by a multitude of regional frameworks with similar limited regulatory scope [135, 136].

During the 1970s and 1980s, it hence became apparent that the sectoral approach was not suitable for a subject of regulation that is of global significance, highly interdependent, and is threatened by transboundary environmental damages [135, 137, 138]. Consequently, both, an overarching convention with a considerably broader mandate and the participation of the large majority of states was needed to combat the rapid degradation of ecosystems around the globe. These considerations, among other things, ultimately led to the adoption of the CBD at the Rio Summit in 1992. The treaty entered into force in 1993 and has currently 196 contracting parties [139], which means that it acquired near-universal participation, although the United States never ratified the Convention and thus remain the notable non-party state [140–142]. The CBD is the first framework convention that seeks to conserve the existing biological diversity as a whole without focusing on specific ecosystems or species. In that regard, it is similar to its “sister” treaty, the United Nations Framework Convention on Climate Change (UNFCCC), which was also adopted during the Rio Summit [12].

Before analysing the core objectives of the CBD and the obligations emerging from it, we need to elaborate on the nature of framework conventions in international environmental law. Framework conventions are utilized in a two-step process: first, the parties agree on certain overarching objectives and principles that are usually rather ambiguous [143–145]. Then, the parties work on the adoption of protocols to create more substantive and procedural rules which spell out the duties and obligations of the parties in more concrete terms [146, 147]. Consequently, the adoption of the framework convention is not the endpoint but rather the beginning of the legal process [148, 149]. Framework conventions thus contain “sets of implicit or explicit principles, norms, rules and decision-making procedures around which actors’ expectations converge” [150]. To date, the parties to the CBD have adopted two protocols under Article 28 of the CBD—the Cartagena Protocol on Biosafety in 2000 and the Nagoya Protocol on access and benefit-sharing of genetic resources in 2010—which regulate specific topics and established corresponding regulatory regimes [151]. It is clear, however, that the negotiation and subsequent codification of new substantive rules under the ambit of a binding protocol have become increasingly difficult because of the unwillingness of some contracting parties [152, 153]. As a result, decisions of the Conference of the Parties (COP)—the main governing body of the convention which acts as its legislative organ—are now considered to be the CBD’s standard governance instrument [154]. Despite the fact that they are not legally binding per se, unless otherwise provided for in the respective convention in individual cases, they are crucial for the interpretation and implementation of the relevant CBD provisions [155, 156].

The three main objectives, according to Article 1 CBD, are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from the utilization of genetic resources. These objectives are the consequence of a compromise struck between the states of the Global South, which favoured a transfer of financial and technological resources, and countries of the Global North, which generally prioritized conservation during the Rio Conference [131, 143, 152]. The resulting instrument thus tries to balance the need for conservation efforts within and across ecosystems with the objective to use the resources of the biosphere for current and future generations [157].

Although the objectives of the CBD are all-encompassing and rather vague [152, 158, 159], they should not be mistaken as merely hortatory statements. In this context, it is necessary to make a few clarifications on the concept of “legal bindingness” in international environmental law.

First, whether the form of a treaty should be legally binding as a whole depends on the will of the parties under Article 2 lit a. Vienna Convention on the Law of Treaties (VCLT). Second, even a legally binding treaty may contain provisions that do not create obligations, but rather constitute soft law [160]. Third, whether a norm imposes a legally binding obligation depends, *inter alia*, on its prescriptiveness and precision, which in turn may be determined by the rules of interpretation under Articles 31 and 32 VCLT [161]. Moreover, legal bindingness is ultimately ascertained by the “internal point of view” [162] of the interpreters of the law and their “sense that a rule constitutes a legal obligation and that compliance is, therefore, required rather than merely optional” [160].

In the case of the CBD, there is unanimous consensus among states’ representatives and academics that the Convention is a treaty pursuant to Article 2 lit a. VCLT, and therefore, its form is legally binding. The question that now arises is the extent to which Article 1 CBD and its objective to conserve biodiversity is legally binding. Even though the objective, at first glance, does not contain very detailed obligations for contracting parties, we can still deduce that the provision has a significant legal effect on the parties.

As regards the precision of the normative content, we can interpret the “ordinary meaning” of the provision pursuant to Article 31 para. 1 VCLT. The noun “conservation” means “the protection of the natural environment”, while the verb “to conserve” implies “to protect something and prevent it from being changed or destroyed” [163]. According to Article 2 CBD, “biological diversity” means “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.” Hence, the “conservation of biodiversity” requires states to protect the variability among living organisms from adverse changes—namely, a net reduction in biodiversity. This obligation cannot be negated by the fact that Article 1 CBD states that the objectives of the Convention are “to be pursued in accordance with its relevant provisions”. While it is true that Article 1 CBD thus distinguishes between the ends and the means of the Convention, the choice of instruments cannot undermine the normative imperative to prevent a net reduction in biodiversity as required by the objective. Otherwise, the contracting parties could easily contravene the achievement of the objective while claiming to be pursuing measures that are authorized under the Convention, which would be contrary to the good faith obligation under Article 26 VCLT.

Concerning the prescriptiveness of the objective, the verb “shall” typically indicates that a provision contains

legally binding obligations [164, 165]. This is not the case with the objective under Article 1 CBD. However, with respect to Article 1 CBD, we may assume that a treaty's objective has a significant prescriptive effect, as Article 18 VCLT indicates, even if the provision does not contain the verb "shall". As we have argued above, it is not sufficient for contracting parties to merely comply with the other provisions of the Convention, but ultimately fail to prevent a net loss of biodiversity. Hence, from the "internal point of view" of an interpreter of the Convention, the objective to conserve biodiversity must also require compliance. Article 1 CBD, therefore, obliges states to stop and reverse biodiversity loss immediately—which, in the context of the Convention, means in the year 1993—which is when the CBD entered into force. This immediate obligation to stop and reverse biodiversity loss cannot be softened by subsequent legal frameworks that allocate more time to states (such as the Aichi Targets or the GBF), as we will argue in more detail below.

Since Article 1 CBD obliges states to immediately stop and reverse biodiversity loss, we may likewise assume that the contracting parties have failed to meet the CBD's objective. As we have shown above, ecological variability and abundance of species have been continually declining for many decades. The fact that the CBD entered into force in 1993 has not made a measurable dent so far. Thus, it must be argued that states are actively disregarding their obligation under Article 1 CBD to conserve biodiversity. This argument can also not be discounted on the grounds that states have merely emphasized the second subobjective under Article 1 CBD—"the sustainable use of its components" over "conservation of biodiversity". The dominance of one legal interest over another is only valid to the extent that the disadvantaged interest is not entirely undermined [3]. In the present case, while it is clear that parties have favoured the exploitation of biodiversity over conservation efforts, these efforts cannot be labelled "sustainable use", since parties have generally failed to catalyse any considerable action that would satisfy the obligation to conserve biodiversity under Article 1 CBD. Consequently, states are failing to observe a fundamental (and legally binding) principle of the Convention, which could qualify as a breach of "good faith" under Article 26 VCLT [166].

In addition to the three main objectives, the Convention includes several substantive provisions that are designed to advance the implementation of the objectives under Article 1 CBD. The core objective of the Convention is set out in Article 8 CBD and contains a list of 13 obligations that aim to conserve species in-situ, i.e., in their natural habitats [143, 167]. To that end, states are required to "establish a system of protected areas" and "develop [...] guidelines for the selection, establishment

and management of protected areas" under Article 8 lit. a and lit. b CBD. In contrast, the contracting parties only have a secondary obligation regarding ex-situ conservation, since the *chapeau* of Article 9 CBD clarifies that such measures are "predominantly for the purpose of complementing in-situ measures". Ex-situ conservation describes the process of protecting the components of biological diversity outside their natural habitats, e.g., in gene banks or zoos [141, 168].

Although the Convention establishes a plethora of obligations regarding conservation, cooperation, monitoring, and finances, the obligations set forth in the CBD are often restricted by qualifiers [133, 147]. For instance, in substantive provisions, qualifiers such as "as far as possible", "as appropriate", or "subject to national legislation" often appear. This may suggest that the CBD only requires states to accept that biodiversity loss is a serious environmental concern that needs to be addressed in a concerted way but does not oblige them to adopt specific measures [152, 169]. However, the qualifiers cannot be construed as undermining the binding obligations of the Convention [167]. Instead, the relevant provisions and qualifiers must be "interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose", according to Article 31 para. 1 VCLT. When interpreting the ordinary meaning and the object and purpose of the relevant qualifiers, it is clear that the contracting parties do not have unlimited discretion in determining the scope of the obligations that bind them [170]. The adoption of a treaty implies the "legitimate expectation" [171] that the obligations will be observed by the parties and cannot be easily curtailed by qualifiers. If qualifiers could allow states to avoid fulfilling legally binding obligations, this would likely contradict the principle of effectiveness in treaty interpretation [172]. As a result, the qualifications in the CBD rather allow for leeway when the contracting parties aim to implement the Convention's objectives and also account for their different administrative capacities [173].

There is only one provision of the CBD that does not include such a qualifier: Article 26 CBD [152, 174]. It establishes an obligation for contracting parties to issue "reports on measures which it has taken for the implementation of the provisions of this Convention and their effectiveness". These reports are usually delivered via the national biodiversity strategies and plans (NBSAPs) that contracting parties are required to develop under Article 6 CBD [83, 175]. To date, the NBSAPs have become the Convention's main implementation device [135, 176]. The fact that the only CBD provision without any qualifiers is a reporting mechanism primarily focused on future goals is emblematic of the overarching legal structure of

the CBD [132, 133]. However, this should not obscure the fact that the Convention contains several legally binding obligations—notably the obligation to stop and reverse biodiversity loss under Article 1 CBD—even if the contracting parties regularly fail to observe them. Since the COP parties were aware of this implementation gap [142, 177, 178], they have chosen a target-based approach embedded within COP decisions that is more action-oriented than the CBD's wide-ranging and vague provisions [147, 152, 179]. The following section will assess the 2010 Biodiversity Target and the Aichi Biodiversity Targets—both of which adhered to this target-based—and examine their mixed legacies.

The 2010 biodiversity target and the Aichi biodiversity targets

The first agreement in the context of the CBD that employed a target-based approach was the 2010 Biodiversity Target. The idea to use a target to motivate the contracting parties was first discussed at the COP-5 conference in Nairobi in 2000 [180]. The 2010 Biodiversity Target was ultimately adopted as a COP decision during the COP-6 at The Hague in 2002 [181]. Parties to the CBD committed “themselves to a more effective and coherent implementation of the three objectives of the Convention, to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth” [181].

Beyond the overarching target of stopping the rapid decline of biodiversity, the 2010 target did not feature any precise sub-goals or indicators to direct the implementation efforts of the parties. This apparent lack of guidance was the primary disadvantage of the 2010 target, since it only restated the vague objectives of the CBD and provided a year in which the target should be met [152, 182]. Robust indicators were only developed in 2003 when the contracting parties and the Secretariat realized that they needed instruments to measure the progress of biodiversity conservation [183]. In 2004, at the COP-7, the parties agreed on seven sub-goals and instructed the Subsidiary Body on Scientific, Technical and Technological Advice to develop a framework to reliably measure the progress made on each sub-goal [184]. Between 2006 and 2010, the contracting parties were mostly engaged in discussions concerning how the attainment of the sub-goals could be gauged [131, 147]. It is thus not surprising, that the 2010 target was not met which was subsequently acknowledged by the parties in the CBD's 2011–20 Strategic Plan [185].

Even though the target-based approach employed in the context of the 2010 Biodiversity Target was a failure, the CBD parties made another attempt to formulate new

goals to combat biodiversity loss. They hence adopted a more concrete framework of goals and indicators at the COP-10 in Nagoya in 2010 [131, 186]. The twenty Aichi Biodiversity Targets were adopted as a COP decision and divided into five groups that each address a strategic goal that would be met until 2020: addressing the underlying causes of biodiversity loss, reducing the direct pressures on biodiversity, safeguarding ecosystems, species, and genetic diversity, enhancing the benefits to all from biodiversity, and enhancing implementation [185]. To better monitor the goals of the framework, the Aichi Targets were designed to be “SMART”: specific, measurable, ambitious, realistic and time-bound [187]. Several targets—such as Target 11 or Target 15—featured numerical goals that could be measured by the contracting parties [53].

Regardless of the good intentions of the CBD parties and a framing of the Aichi Targets that seems to cover the main issues of the biodiversity crisis, none of the twenty Aichi Targets were fully achieved and only six were partially met [54, 187–190]. While some progress regarding the identification of invasive alien species and the designation of protected areas has been achieved, ecosystems around the world remain threatened (IPBES 2019, 14). Thus, the question arises why the target-based approach once again failed. This issue becomes even more salient if we consider the relative success of the 2015 Paris Agreement (PA) which also constitutes a target-based COP decision—which later became a legally binding treaty [10, 12, 191, 192]—within a framework convention of international environmental law.

Nevertheless, the Aichi Targets were primarily regarded as non-binding soft law [135, 155]. Although the Aichi Targets should be interpreted as containing legally binding clarifications of the Convention's legally binding objective under Article 1 CBD [1, 12], the contracting states generally failed to acknowledge the Aichi Targets as such (!) as hard law or legally binding interpretations of the CBD. As a result, states were able to implement policies that adversely impacted ecosystems without fearing that their actions or omissions could be viewed as a potential breach of legally binding obligations under international law.

Unfortunately, the contracting parties were not obliged to report on the progress that they had made concerning the attainment of the Aichi Targets [190]. Consequently, there was no effective monitoring and compliance mechanism that could be used to motivate a state to adopt suitable domestic policies. Although Target 17 urges parties to adopt and implement their respective NBSAPs, it merely reiterates the already existing obligation under Article 26 of the CBD. Despite the fact that almost all states now regularly submit NBSAPs [193], they remain

aspirational, because the contracting parties do not have to report their achievements but only their future goals. In addition, the majority of the submitted NBSAPs were not able to adequately translate the Aichi Targets into effective national legislation, thereby leaving out crucial aspects [176].

The Kunming–Montreal global biodiversity framework

The work on the Post-2020 GBF officially began at COP-14 in Sharm El-Sheikh in November 2018 with the adoption of the “2050 Vision for Biodiversity” [194]. By then, the contracting parties realized they were unlikely to fully meet any of the Aichi Targets and thus opted to work on an improved framework. The initial plan was to agree on a new framework during the COP-15 meeting scheduled for 2020 in Kunming. Due to the COVID-19 pandemic, the conference had to be postponed. The contracting parties finally met in 2022 in Montreal, where they adopted the GBF as a COP decision after 2 weeks of intense negotiations [195]. In addition to the GBF, the parties accepted several other decision texts, notably on resource mobilization [196] and mechanisms concerning planning, monitoring, reporting, and review [197]. Although the adoption of the new GBF was hailed as a “Paris moment” [198], some commentators expressed disappointment, because they presupposed that the form of the new framework is legally non-binding [199–201]. In the following section, we will analyse the substantive content of the GBF’s provisions, compare them with the Aichi Targets, and assess their potential effectiveness. We will then discuss the salient questions whether the new GBF has some legally binding effect on the contracting parties and whether the GBF constitutes a new standard compared to the one under Article 1 CBD in the subsequent section.

Like the preceding international legal biodiversity frameworks, the Kunming–Montreal GBF does not contain articles but is instead divided into eleven lettered sections (Sections A–J). These sections lay out substantive and procedural provisions, underlying motivations, responsibilities, and implementation considerations. From a legal standpoint, the most critical part of the framework is Section H, which contains 23 “action-oriented global targets” that the parties aim to achieve by 2030. In addition, the contracting parties have defined four “outcome-oriented goals” that are in line with the GBF’s vision of “living in harmony with nature by 2050” [195].

Sections A–D mostly contain introductory provisions with few relevant legal provisions. Section A describes the current state of biodiversity loss, quotes the recent IPBES report, and underlines the importance of biodiversity for human well-being. The next section defines

the purpose of the GBF, which is “to catalyze, enable and galvanize urgent and transformative action by Governments, subnational and local governments, and with the involvement of all of society to halt and reverse biodiversity loss [...]”. Section C includes a plethora of considerations that the contracting parties should observe when implementing the framework. It thus resembles the PA’s preamble but is much more extensive. In this context, the explicit reference to “indigenous peoples and local communities as custodians of biodiversity” is especially relevant, since 80% of the world’s surviving biodiversity hotspots are located on lands managed by indigenous people [202]. Like the PA, the framework’s implementation should also “follow a human rights-based approach” and it expressly “acknowledges the human rights to a clean, healthy and sustainable environment”, which further strengthens the legal status of this emergent human right. Section D subsequently emphasizes the linkages of the framework with the Sustainable Development Goals (on the SDGs see [203]).

Sections E–H are the centrepiece of the new GBF, because they contain almost all relevant substantive legal provisions. The drafters have based the framework on a novel “theory of change” that is explained in Section E. According to this theory, states seek to stabilize the exacerbated biodiversity loss by 2030 and allow for the recovery of natural ecosystems in the following 20 years with net improvements by 2050. The GBF’s long-term vision for 2050 is framed as a catch-all pledge, where all stakeholders value, conserve, restore, and wisely use biodiversity while also “maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people”. In contrast, the mission for 2030 is much more concrete and appeals to the parties “[t]o take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery for the benefit of people and planet by conserving and sustainably using biodiversity [...]”. Even though the drafters’ language is vague, the mission of halting and reversing biodiversity loss may have significant legal implications. At the COP-15 meeting, some participants compared the GBF’s 2030 mission to the temperature limit in Article 2 para. 1 lit. a PA by stating that the equivalent of limiting global warming to 1.5° C is to halt and reverse biodiversity loss by 2030 [199]. Whether or not this comparison is tenable from a legal point of view—given the standard established under Article 1 CBD—will be examined in the following section.

Section G establishes four long-term goals that align with the GBF’s 2050 vision. These goals concern the reduction of threats to biodiversity (Goal A), the sustainable management of biodiversity and ecosystem services (Goal B), the sharing of genetic resources (Goal C), and the provision of adequate means of implementation

(Goal D). In parallel, Section H contains the action-oriented targets that “need to be initiated immediately and completed by 2030”. From a legal standpoint, these targets are most relevant for our analysis, since they closely resemble provisions in other international environmental instruments and, therefore, warrant closer attention. In the following, we will examine the targets that are most specific in legal terms and discuss what their implementation entails.

The first three targets concern habitat loss and the establishment of protected areas. Target 1 urges states to ensure that all land and ocean areas are under “spatial planning and/or effective management processes” and “to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030”. The global spatial planning requirement is essential for achieving several other GBF targets, notably the “30×30” target (see below). For example, habitat loss often occurs because of the uncoordinated allocation of land rights and agricultural development projects [204–207]. Although the contracting parties have agreed that the implementation of this sub-target is key, the CBD’s Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) admits that “[s]patial planning is practiced variously and unevenly among countries and currently there is no global synthesis available to assess the proportion of the earth that is considered to be under spatial planning. This is partly because there is no standard definition of what constitutes a spatial plan” [208]. In addition to lacking clarity concerning the term “spatial planning”, the aim to reduce habitat loss to “close to zero” by 2030 also—at first glance, not taking Article 1 CBD into account—leaves a considerable margin for the parties.

Target 2 addresses the issues of degraded lands and aims to “[e]nsure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration”. Restoring previously degraded ecosystems is not only essential for reversing biodiversity loss but is also a crucial climate mitigation measure, since many ecosystems remove and store CO₂ in natural sinks [82, 83]. Meeting Target 2 likely requires prioritizing areas that need to be restored [208], since it is currently unfeasible to fully restore some ecosystem types within a decade [209]. Regardless, it will be challenging to monitor any implementation efforts, because Target 2 does not specify a baseline level regarding current levels of degraded lands. Moreover, there is no standard legal definition of what qualifies as “degraded” lands.

Target 3 aims to “[e]nsure 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 through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures”. The target has undoubtedly received the most public and scientific attention [210–212]. This is partly because achieving this goal is not only important for biodiversity conservation but is also essential for limiting global warming [213–216], given the relevance of peatlands, forests and soils for negative emissions [82, 83, 217]. Thus, the “30×30” target—much like the GBF’s 2030 mission—has been likened to the 1.5 °C temperature goal under Article 2 para. 1 lit. a PA [199, 212, 218].

Target 3 of the GBF builds on the previous Aichi Target 11, which stipulated that parties should aim to establish protected areas on 17% of terrestrial areas and 10% of marine areas. Unlike most Aichi Targets, the contracting parties were able to nominally achieve the two sub-targets if recent announcements and commitments are taken into account [208]. However, many of these newly protected areas are not linked effectively and are sub-optimally located [54]. Furthermore, there are significant coverage gaps in key biodiversity areas, with only 20% being wholly located within protected areas and 39% lacking any legal protective status [219]. Consequently, the contracting parties aim to close this biodiversity gap by significantly expanding the coverage of protected areas. Yet, while Target 3 has been lauded by many commentators as a milestone [200, 201, 220], the “30×30” target is likely not ambitious enough, since studies estimate that around 50% of the planet’s land and oceans must be protected to stop and reverse biodiversity loss [221, 222]—and drivers of biodiversity loss such as intensive livestock farming and fossil fuels have to be phased out on 100% of the land sooner [1].

The implementation of the “30×30” target will be challenging due to the presence of several hurdles that will be difficult to overcome in the next decade. For example, Target 3 explicitly urges states to manage protected areas through effective and equitable governance systems while also prioritizing key biodiversity areas. This wording reflects the fact that some countries—particularly those with biodiversity hotspots—face heightened biodiversity challenges while also lacking the organizational and financial resources necessary for effective conservation measures [210]. International coordination thus will be essential to achieve the global “30×30” target, since some densely populated countries will likely be unable to designate 30% of their terrestrial land area as protected areas. Conversely, some states will likely need to protect more than 30% of their land area, so that the contracting parties can meet their collective target. To facilitate such

a process, the contracting parties could, *inter alia*, agree on a flexible mechanism that rewards states for exceeding the 30% quota and in turn receive financial rewards—akin to the Clean Development Mechanism under the Kyoto Protocol.

Whether or not Target 3 can be achieved will also hinge on the involvement of indigenous communities. During the GBF negotiations, one of the biggest concerns was that indigenous peoples' rights and knowledge would be explicitly recognized, since 80% of the world's surviving biodiversity hotspots are located on lands managed by indigenous people [202]. The GBF now includes such a direct reference to indigenous people to safeguard these communities from potential land grabs and related human rights infringements under the guise of conservation efforts [223]. This aspect is especially important, because evidence suggests that land managed by indigenous peoples has a larger positive impact on biodiversity than the establishment of conservation areas in some regions [224]. Conversely, removing indigenous communities for conservation purposes from their lands has adverse effects on ecosystems [225].

Although many stakeholders hope that the “30×30” target will galvanize support for other conservation measures, the achievement of Target 3 will not be sufficient to address global biodiversity loss. Instead, the contracting parties should be focused on biodiversity outcomes in key biodiversity areas and use indicators that could—in theory—account for uneven global biodiversity outcomes between countries [226]. In this context, indigenous peoples have also criticized current conservation approaches narrowly focused on quantitative outcomes and the refusal to address underlying biodiversity problems, such as rampant overconsumption and the intensification of agricultural practices [9, 211]. They have also alleged that the reference to “sustainable use” in Target 3 may be used as a loophole by parties to advance agricultural or infrastructure developments in protected areas [199]. This problem also underlines the issue that a reversal of biodiversity loss will be improbable if the “30×30” target is met, but the other 70% of the earth's terrestrial and ocean surface are continuously exploited [210].

Even though the issue of invasive alien species (IAS) not received as much attention as the “30×30” undertaking, the containment of IAS is of equal importance, since they are likely the biggest cause of many extinctions during past decades [208, 227, 228]. Recent efforts have largely failed to halt the spread of IAS [229–231]. Accordingly, the contracting parties covered the issue of IAS in Target 6 and in a separate COP decision text [232]. The target urges states to reduce “the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent, by 2030”. This quantifiable

sub-target is a step forward compared to the previous Aichi target, which set the goal that “invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment”. However, other parts of the new GBF target lack legal clarity such as the sub-target of “[i]dentifying and managing pathways of the introduction of alien species” which does not include a meaningful baseline to measure progress against. For this reason, states should focus on the quantifiable sub-target and establish corresponding and reliable indicators [231, 233]. In fact, the contracting parties have started this process by requesting a peer review to assess methods concerning the management of IAS [232].

Excess nutrients, pesticides, and other forms of pollution are all significant drivers of biodiversity loss as seen earlier in the present contribution (see above in Ch. 2). Previously, Aichi Target 8 addressed this issue by stating that “[b]y 2020, pollution, including from excess nutrients, [should be] brought to levels that are not detrimental to ecosystem function and biodiversity”. GBF Target 7 improves on this undertaking by establishing numerical targets according to which the contracting parties should reduce “excess nutrients lost to the environment by at least half including through more efficient nutrient cycling and use; 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 also preventing, reducing, and working towards eliminating plastic pollution”. Although ambitious and still welcomed by many actors as one of the important targets, the draft text was watered down during the COP negotiations, which previously included a proposition to reduce pesticide use by two-thirds per hectare [199]. In addition, the language of Target 7 does not include a reference to baseline levels and is qualified by the repeated reference to “risks”, which replaced prior quantitative reductions on pesticide use and highly hazardous chemicals in the final text. Some parties opposed the direct reference to pesticide use, which is why the GBF only mentions the “overall risk” from pesticides. This wording gives considerable leeway to the parties, since virtually, any policy could qualify as reducing some risk. Furthermore, the monitoring framework adopted at COP-15 does not include indicators that could reliably measure risk reductions [197]. The repeated references to “risk” could, therefore, undermine any adequate progress towards the achievement of Target 7.

Targets 9–13 cover the sustainable use and benefit sharing of biodiversity-related resources, and with it, in Target 10, also the “greening” of agriculture, fisheries,

and forestry. The emphasis on “sustainable use” may have some drawbacks for the overall protection of ecosystems, since the contracting parties may misconstrue “sustainable use” to mean that environmental and social needs can be regularly superseded by economic interests [3, 186]. Moreover, Targets 9–13 are not quantifiable in nature, and only Target 13 includes a reference to the timeframe of achieving “a significant increase of the benefits shared” by 2030. Given the importance of the driver for biodiversity loss, several actors at the COP-15 were disappointed about the phrasing of, e.g., Target 10, describing it as a repetition of the corresponding yet failed Aichi Target.

The final targets (14–23) are characterized as “[t]ools and solutions for implementation and mainstreaming”. While some of these targets are more of a procedural nature, there are several substantive sub-targets. For instance, Target 16 aims to “reduce the global footprint of consumption in an equitable manner, including through halving global food waste” by 2030. In contrast, Aichi Target 4 only urged states and stakeholders to take “steps to achieve or have implemented plans for sustainable production and consumption”. This target is especially relevant, since food production and consumption are responsible for roughly 80% of deforestation, 29% of global GHG emissions [202], 70% of terrestrial loss and 50% of marine biodiversity loss [234]. While it is difficult to measure the global footprint of consumption [235], the sub-target on halving global food waste (on this see [236]) has more potential for legal operationalization—although it lacks a comparable baseline level. The contracting parties also decided to drop references to specific dietary habits, namely, a reduction of livestock farming, which were present in previous drafts [237].

Target 18 deals with harmful subsidies (on this see [238]) and urges parties to “[i]dentify 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 United States dollars per year by 2030, starting with the most harmful incentives”. This GBF target resembles Aichi Target 3—which introduced a vague undertaking to eliminate environmentally harmful subsidies by 2020—but improves it by setting a financial reduction target of at least 500 billion US dollars annually by 2030. This numerical target is an ambitious undertaking, since 1.8 trillion US dollars are currently spent on environmentally harmful subsidies [239], a number that greatly exceeds the financial funds allocated to biodiversity conservation [208]. To tackle this challenge, Target 18 further provides contracting parties with a direct starting point by mandating that the most harmful subsidies should be eliminated first. However, much like Aichi Target 3, GBF

Target 18 lacks concrete legal definitions or a method to determine which subsidies are the most harmful to biodiversity, e.g., those that refer to intensive agriculture in general or fossil fuels and intensive livestock farming in particular. Studies suggest that subsidies that incentivize land-use change, intensive agriculture, and fisheries are likely the most suitable candidates [238, 240–243]. Nevertheless, a direct reference to fisheries and agriculture subsidies was included in an earlier draft of the GBF but was ultimately omitted in the final text [237].

Target 19 concerns the issue of securing sufficient funds for biodiversity protection. At present, around 100 billion US dollars are spent annually for biodiversity finance, while another 700 billion US dollars are needed to cover the costs of conservation interventions and transforming key sectors, such as agriculture, forestry, and fishery [208, 242]. Inadequate funding levels are often listed as one of the most notable impediments to the effective implementation of previous biodiversity targets [244]. Target 19 aims to bridge this financing gap by encouraging states to mobilize at least 200 billion US dollars per year by 2030 and to provide 30 billion US dollars for developing countries annually by 2030. While this target is a step in the right direction, it will be insufficient to address the biodiversity funding gap [220, 245].

The final two sections of the Kunming–Montreal GBF cover implementation, responsibility and transparency. According to Section J, the implementation of the GBF’s goals and targets requires “effective mechanisms for planning, monitoring, reporting and review forming an agreed synchronized and cyclical system”. The GBF’s novel mechanism—also known as “present, review, ratchet”—is spelled out in the COP decision on planning, monitoring, reporting and review [197]. The CBD’s parties were inspired by the PA’s implementation framework, which obliges states to submit so-called nationally determined contributions (NDCs) under Article 4 para. 9 PA, which are reviewed every 5 years. After each stocktake, parties to the PA must ratchet up their commitments accordingly.

The GBF’s implementation mechanism also aims to motivate parties to continuously increase their conservation ambitions. To that end, the GBF is urging parties to revise and align their NBSAPs with the GBF’s goals and targets. This alignment process has to be completed by 2024, when COP-16 will take place [197]. According to the supporting COP document, parties should thereafter submit national reports with agreed headline indicators in 2026 and again in 2029 [197]. Section J also establishes a voluntary peer-review process, according to which countries “may take the outcome of the global reviews into account in future revisions and implementation of their” NBSAPs. This is the so-called “ratchet” part of the

implementation mechanism, although the provision's language does not explicitly indicate that an increase in ambition is mandatory. It will, therefore, be up to the parties and other relevant stakeholders to put pressure on individual countries to ratchet up their commitments.

The reception of the Kunming–Montreal GBF has mainly been positive, although many commentators have pointed to the framework's various shortcomings [199–201]. On one hand, the new GBF is an improvement compared to the previous Aichi Targets, which lacked clear quantitative targets. For instance, if implemented stringently, the “30×30” target could be a starting point to halt biodiversity loss. Furthermore, the targets concerning the reduction of excess nutrients and pesticides may be an effective tool to address often-neglected environmental issues related to agricultural practices and fertilization. Reducing harmful subsidies by 500 million US dollars annually by 2030 would likewise be a significant step forward, although biodiversity-related finance must also be improved. As regards implementation, the new mechanism—although framed in voluntary language—is much more concrete than the Aichi framework and, for the first time, includes agreed-upon indicators.

On the other hand, the GBF targets on agriculture and land-use change as major drivers of biodiversity loss (see Chapter 2) are particularly vague and thus leave the door open for non-implementation. This is especially worrying, because without a drastic reduction in livestock farming, the new targets will likely not be met—as was the case for the Aichi Targets [1, 3, 246]. Moreover, the targets on overconsumption and pollution are relatively weak and lack a concrete baseline to measure the progress towards their achievement [9, 220]. While the GBF targets were also designed to be “SMART”, the final adopted framework includes targets that are not measurable and do not have a specific timeline. Furthermore, the measurable targets are too narrowly focused on quantitative gains and neglect the fact that biodiversity outcomes do not necessarily scale with quantitative increases. Finally, the problematic inclusion of the notion of “sustainable use” may be exploited by parties to ostensibly comply with the GBF while actually undermining the achievement of the overarching goals.

Another Achilles' heel of GBF is the implementation mechanism. While the implementation mechanism is a major improvement over the Aichi framework, it is severely underdeveloped. Section J does not include a mandatory obligation to adopt NBSAPs that are in line with the GBF's goals and targets. The contracting parties also did not establish a compliance committee responsible for reviewing each party's commitments. Since biodiversity loss is a global crisis, there is an urgent need to introduce a global monitoring mechanism akin to the

mechanism established under Article 15 PA or Articles 10 and 15 of the Aarhus Convention. If states are left to their own devices and forthcoming conservation efforts are not monitored by an independent expert commission, the Kunming–Montreal GBF will most likely not constitute a “Paris Agreement-like” convention for biodiversity protection. Even worse, since the stocktaking of progress in 2026 and 2029 will only be done on a global scale, there is effectively no mandatory country-by-country review on the level of the CBD. This is the most significant difference between the GBF's and the PA's ratchet mechanism, which allows country-by-country review, thereby incentivizing compliance and preventing the diffusion of responsibility. In addition, the GBF's ratchet mechanism is voluntary and does not contain clear rules on how to continuously improve ambition levels.

The legal character of the Kunming–Montreal GBF

Whether or not the parties to the CBD will meet the GBF's goals and targets depends on the willingness of the states involved and their commitment to biodiversity conservation. Some commentators have expressed doubts that the GBF will mark a turning point in international biodiversity law and instead assume that the instrument will suffer the same fate as the 2010 Biodiversity Target and Aichi Targets [200, 247]. This sentiment is primarily supported by the assumption that the Kunming–Montreal GBF merely constitutes a COP decision and is thus regarded as not legally binding. Regardless of the fact that a COP decision may very well become binding upon its parties if there is sufficient consent among the parties—as was the case for the PA [12, 161, 192]—we will demonstrate that the new GBF is legally binding and enforceable to some extent. This is relevant for two reasons. First, it refutes the narrative that the GBF's “30×30 target” is entirely non-binding and that states are, therefore, not bound by it. Even in the absence of enforcement and implementation measures, the legal bindingness of a norms signals stronger commitment to international and domestic constituencies [160, 248]. Second, since the “30×30” target does indeed legally enforceable, states could potentially be subject to legal action—either under international or domestic law—if they fail to implement the target.

To that end, we will first assess whether the GBF can be formally regarded as a binding treaty under the VCLT. If that is not the case, we will further examine whether the GBF does nonetheless contain provisions that establish legally binding obligations upon the parties. We will then consider whether the new framework may be a “subsequent agreement between the parties regarding the interpretation or the application of its provisions” of the CBD under Article 31 para. 3 lit. a VCLT. Finally, we will

examine if the GBF establishes a new legally binding level of protection and responding time horizon to accomplish the targets and goals distinct from the obligation under Article 1 CBD.

To determine whether the Kunming–Montreal GBF can be considered a “treaty” under international law, we must assess whether it meets the criteria set forth under the VCLT, which are considered customary international law [249, 250]. According to Article 2 lit. a. VCLT, a treaty “means an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation”. The Kunming–Montreal GBF is a written document that was adopted by the contracting parties to the CBD. Whether it is an agreement under international law depends on the states’ willingness to be bound by the document pursuant to the procedures under Articles 11–15 VCLT. According to Article 11 VCLT, a state party can express its consent to be bound by a treaty by “signature, exchange of instruments constituting a treaty, ratification, acceptance, approval or accession, or by any other means if so agreed”. For instance, Article 21 para. 1 PA specifies when the agreement should enter into force, thereby indicating that the parties have agreed on a provision that regulates how they may express their consent to be bound by the instrument. In contrast, the new GBF—much like its two predecessors—does not contain any comparable provisions. It also does not include provisions concerning the depositary of the document, possible reservations, or terms of withdrawals—all of which are present in the PA and only make sense if the agreement constitutes a treaty under Article 2 lit. a VCLT [161, 164, 251, 252]. Furthermore, while the official title of the agreement is only an indication of whether states intend to be bound by the document, the title “framework” rarely refers to legally binding agreements. In sum, the Kunming–Montreal GBF does not constitute a treaty under Article 2 lit. a VCLT, meaning that contracting states are *prima facie* not legally bound by the instrument as a whole.

Although the form of the Kunming–Montreal GBF as a whole cannot be considered binding under international law, individual provisions could nonetheless give rise to legally binding obligations [12, 160, 165]. One reason for this is that, in contrast to domestic legal systems, the question concerning the overall legal character of a norm differs from the question of whether the norm can be applied by courts and whether an individual can base a lawsuit on this norm [164]. The latter questions, in turn, depend on, *inter alia*, the prescriptiveness and precision of the actual wording of the provisions—as we have demonstrated for Article 1 CBD. Prescriptiveness

refers to the degree of obligation expressed by the verb used in the provision [161]. For instance, provisions containing the verb “shall” imply precise and legally binding requirements and are, therefore, regarded as hard obligations [164, 165]. In contrast, soft obligations regularly contain verbs like “should” or “may” and thus leave considerable leeway to the contracting parties and may open the door to non-implementation [164, 165, 192]. So-called non-obligations are not of a prescriptive nature and are usually indicated by descriptive verbs [164, 165, 252].

Whether a norm is precise enough depends on two variables. First, a norm must specify a norm addressee [161]. In this context, a norm may establish individual, collective, or institutional obligations [164]. Second, the norm must specify the content of the obligation in question [161]. This can be achieved, *inter alia*, through establishing quantified targets or concrete deadlines. In contrast, the precision of a norm’s content may be curtailed by qualifiers such as “as far as possible” or “as appropriate” [192].

If we examine the language of the Kunming–Montreal GBF, it is apparent that the framework does not contain any provision that uses the verb “shall”, which indicates that no concrete rights or obligations are created. Similarly, “should” and “encourage” are only used occasionally. For instance, Section H—which serves as an introductory provision to the 23 targets—states that “[a]ctions to reach these targets should be implemented consistently and in harmony” with the CBD. Furthermore, most of the GBF’s target start with the verb “ensure”, which indicates a stronger normative commitment than soft law, but not yet a mandatory requirement [164, 192]. There are no other provisions in the GBF that establish an active duty for states to implement the action-oriented targets or overarching goals. Hence, there is a distinct lack of prescriptiveness throughout the GBF’s text—meaning its legal nature is similar to that of its two predecessors (2010 Biodiversity Target and the Aichi Targets).

In contrast to the lack of prescriptive norms, the Kunming–Montreal GBF contains several relatively precise provisions. As we have discussed above, the content of most visions and targets is sufficiently precise in temporal terms, since it prescribes deadlines for 2030 and 2050. In addition, many targets are quantifiable, such as the “30×30” target. However, many quantified targets lack a baseline, thus reducing the precision of the norms. Moreover, some targets include qualifiers (e.g., Targets 13 and 14), and none contain specific, differentiated responsibilities. Regardless of how precise a given GBF target is, this does not change the fact that the GBF only contains soft obligations at best—since they lack prescriptiveness. Hence, the new GBF does not include any stand-alone legally binding obligation.

Even though the GBF is not legally binding as a whole and may not contain legally binding obligations, we will show that the GBF can be interpreted as a clarification of the legally binding provisions of the CBD pursuant to Article 31 para. 3 lit. a VCLT. Consequently, if the contracting parties miss the goals or targets of the GBF or adopt policies that directly or indirectly undercut their achievement, this could provoke a violation of “good faith” under Article 1 CBD in connection with Article 26 VCLT. In the following, we will explain our arguments and show that not only the GBF but also its preceding instruments are more legally binding than previously assumed.

Article 31 VCLT, which is considered to be also part of customary international law [249, 253, 254], is the primary norm for the interpretation and application of all treaties. It specifies the primary rules of interpretation, namely, the ordinary meaning of the term, its context, and the object and purpose of the treaty. Article 31 para. 3 VCLT includes additional tools to determine the context of a provision [249, 253], which have the same importance for interpreting provisions as Article 31 paras. 1 and 2 VCLT [254, 255]. According to Article 31 para. 3 lit. a VCLT, these additional interpretational means can be “any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions”. In 2018, the International Law Commission (ILC) adopted a set of “Draft conclusions on subsequent agreements and subsequent practice in relation to the interpretation of treaties” [254]. The Draft Articles itself are not yet considered customary international law but are a “contribution to the codification and progressive development of international law” [256]. The ILC regards subsequent agreements under Article 31 para. 3 lit. a VCLT as “authentic means of interpretation” and “objective evidence of the understanding of the parties as to the meaning of the treaty” [254]. According to the ILC’s Conclusion 4 para. 1, a subsequent agreement under Article 31 para. 3 lit. a VCLT has three requirements: it is an agreement between the parties, it was reached after the treaty’s conclusion, and it is related to the interpretation of the treaty or the application of its provisions [254].

The Kunming–Montreal GBF constitutes such an agreement, because it satisfies these three conditions: first, it was unanimously adopted by all CBD parties in accordance with Article 1 para. 1 lit. g VCLT. Second, it was adopted “subsequently”—meaning well after the CBD’s adoption [257]. Third, the GBF further relates to “the interpretation of the treaty or the application of its provisions” by specifying certain obligations and clarifying legal terms, thereby limiting the contracting parties’ leeway when implementing the Convention (see below).

Some authors argue that there is another requirement related to the agreement: the parties must be aware of the legal clarifications and expressly confirm them [254, 258, 259]. However, this “sole purpose” doctrine relies too much on a subjective element and would deprive Article 31 para. 3 lit. a VCLT of its legal relevance [257]. Instead, we argue that Article 31 para. 3 lit. a VCLT is only inapplicable in cases, where the parties expressly exclude the option that the agreement may specify the interpretation of the treaty and the application of its provisions. In the case of the GBF, the parties have only expressed that the framework should not “modify the rights and obligations of a Party under the Convention” [195]. Since treaty modification and interpretation are two distinct concepts [260], the GBF can be considered a subsequent agreement under Article 31 para. 3 lit. a VCLT. In that context, we may point out that the 2010 Biodiversity Target and the Aichi Targets also satisfy the aforementioned formal requirements [1].

Having demonstrated that the Kunming–Montreal GBF may contain provisions specifying the legally binding obligations of the Convention, we will now examine how selected GBF provisions clarify key CBD obligations. For reasons of brevity, we will highlight only the most salient examples. First and foremost, several GBF targets specify the obligations under Article 8 CBD. Article 8 CBD contains several obligations related to the in-situ conservation of natural habitats and the preservation of threatened species [143]. The much discussed “30×30” target specifies the legal obligation under Article 8 lit. a CBD to “establish a system of protected areas or areas, where special measures need to be taken to conserve biological diversity”. Since the “30×30” target includes a quantifiable target, it is sufficiently precise to clarify the legal content of the CBD’s more general obligation. Similarly, Target 1 of the GBF—concerning the establishment of a global spatial planning requirement—can be interpreted as specifying Article 8 lit. b CBD. Furthermore, GBF Target 2 on the restoration of degraded ecosystems specifies the legal content of Article 8 lit. f CBD, and GBF Target 6 on invasive alien species specifies Article 8 lit. h CBD and Article 8 lit. k CBD. However, some GBF targets can provide more legally binding clarifications than others. According to the ILC’s Conclusion 9 para. 1, the “clarity and specificity” of a subsequent agreement determines how important the agreement is as a means of interpretation [254]. Since some GBF targets lack concrete baselines, they may lack legal precision and thus have less legal value when interpreting and applying the relevant provisions.

In addition to clarifying the legal content of the CBD provisions, the GBF also weakens the effect of the qualifiers used throughout the CBD. For instance, although

Article 8 CBD is binding upon the parties, its *chapeau* includes two qualifiers—“as far as possible” and “as appropriate”. Much like the “common but differentiated responsibilities” principle, the qualifiers in Article 8 CBD account for different structural or administrative capacities of the individual parties [167]. As a result, each party is only required to implement measures that are commensurate with its administrative and financial capacity [173]. Without any subsequent agreement clarifying the content of Article 8 CBD, the parties would have a wide margin of appreciation when implementing the relevant obligations. However, several targets of the GBF now determine the scope of required action. Article 8 CBD in itself is sufficiently prescriptive, since it uses the verb “shall”. The normative content of the obligations is also precise enough, since many GBF targets include quantifiable targets and concrete deadlines (see above). The GBF targets thus limit the effect of the qualifier “as appropriate”, since they specify, in line with the natural sciences, what parties must do to limit biodiversity degradation under Article 8 CBD. The qualifier “as far as possible” still modifies the overall obligation in the sense that states should only carry out obligations that are attainable for them, but this is not a valid justification for the claim that there is no obligation at all. Even if, for example, some were unable to implement the “30×30” target on their territory, they can nevertheless support other countries in doing so through financial assistance and technological cooperation.

The GBF targets as a whole can also be viewed as specifying the CBD’s objectives under Article 1 CBD, namely, the “conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources”. The objective of conserving biological diversity requires the achievement of the 2030 mission and the 2050 vision, as the GBF indicates. Since the 2030 mission can only be achieved if all 23 action-oriented targets are met, we argue that all targets indirectly specify the CBD’s objective under Article 1. Any state action or omission that directly or indirectly prevents the targets’ achievement would then be considered a violation of good faith under Article 26 VCLT in connection with Article 1 CBD. This in turn would imply that the alignment process of NBSAPs under the GBF’s Section J is much more mandatory than the drafters’ language suggests. Moreover, it would limit possible reservations that are incompatible with the GBF’s targets and thus the object and purpose of the Convention under Article 19 lit. c VCLT [155].

Having shown that the GBF specifies the objective under Article 1 CBD, it is necessary to further clarify the relationship between the GBF and the CBD. If we examine both documents closely, an ostensible contradiction

becomes apparent. We have previously posited that Article 1 CBD obliges states to stop and reverse biodiversity loss immediately and that this obligation has been in effect since 1993. In contrast, Section F of the GBF indicates that “[t]he mission of the framework for the period up to 2030, towards the 2050 vision is: to take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery for the benefit of people and planet by conserving and sustainably using biodiversity [...]”. The framework thus appears to set a new timeline, giving states time until 2030 to achieve the overarching mission. However, this interpretation is incompatible with Article 1 CBD, which demands immediate action. It should also be noted that neither the 2010 Biodiversity Goal nor the Aichi Targets have modified the time horizon or level of protection under Article 1 CBD. In any case, the GBF, as a subsequent agreement under Article 31 para. 3 lit. a VCLT cannot conflict with the higher ranking agreement—the CBD—since it can only specify but not modify the Convention’s obligations [253]. Accordingly, the assertion that the GBF’s 2030 mission or Target 3 is comparable to temperature requirements under Article 2 para. 1 lit. a PA is also misleading, since the latter indeed establishes a new legally binding standard [3, 10, 12].

In sum, we have shown that the Kunming–Montreal GBF contains legal clarifications of the CBD pursuant to Article 31 para. 3 lit. a VCLT. These legal clarifications are valid independent of the fact that the Kunming–Montreal GBF as a whole is not legally binding and only contains soft law obligations. It follows that states may be liable under international or domestic law if they fail to implement the “30×30” target accordingly. Much of the recent debate surrounding the GBF’s adoption has focused on its legally non-binding nature and the corresponding intent of the drafters to only agree on soft law targets. However, even the drafters’ original intent cannot override the additional interpretational means under Article 31 para. 3 lit. a VCLT. The preparatory work of the treaty and the circumstance of its conclusion under Article 32 VCLT are only “supplementary means of interpretation” and should only be employed if the means under Article 31 VCLT are fully exhausted [249, 254, 257, 261]. Since Article 31 para. 3 lit. a VCLT provides an avenue for the GBF to provide clarifications of legally binding obligations under the CBD, the intention of the drafters is not decisive in this case.

We note, however, that the legal clarifications established by the GBF do not overwrite or modify the already existing and highly ambitious obligation to stop and reverse biodiversity loss under Article 1 CBD. Likewise, the fact that the new GBF tries to establish two new timelines (2030 for targets and 2050 for goals) does not modify the original obligation under Article 1 CBD,

which required immediate action since the Convention's entry into force in 1993. The same argument can be made regarding the compatibility with human rights law, which we will further expand on in the next section.

Biodiversity protection in the light of human rights law (and climate law)

As we have shown, there is a legally binding obligation under international law to halt biodiversity loss. However, there are also two other legal sources outside of international biodiversity law, which also support the aforementioned obligation. First, the obligation to halt biodiversity loss also follows from an indirect effect of international climate law. If, as described above, climate protection law implies via Article 2 para. 1 PA that intensive livestock farming and fossil fuels have to be phased out on all terrestrial areas in a few years, then this also will have a significant positive effect on biodiversity and other environmental problems—such as disrupted nutrient cycles—because the problem drivers there are the same.

Second, a requirement to stop biodiversity loss could arise from human rights. This is also important for the following reason: the obligation to stop biodiversity loss has existed since at least 1993 when the CBD entered into force. Because it has been violated since then, states can in principle also be sued for this. However, holding states responsible requires individual rights to be affected. Such rights can be human rights. Human rights might not only provide a further foundation of obligation for halting the loss of biodiversity, but also a basis for claims of individuals. In the following, we refer only to human rights under international law, which are in any case roughly congruent in content with the typical national or EU-legal stock of human rights (see also [10, 217]).

When talking about human rights and biodiversity protection, the question arises as to which entity is normatively referred to: nature as such or human beings? Even conceptually, the term human rights underscores that human rights are concerned with the protection of people—i.e., (as far as biodiversity is concerned) with an anthropocentric justification of biodiversity protection, for example, as a precondition for freedom. Therefore, we do not discuss in detail whether animals, plants or ecosystems could have rights as such. It has also been shown elsewhere that there are serious objections to such rights: for example, nature's excessive diversity, heterogeneity, competitiveness and change over time would lead to a completely confusing and irresolvable situation if there were rights of nature [3]. Furthermore, we do not discuss the difficult question of whether there is such thing as a human right to diversity—i.e., in human societies, not biodiversity. This question contributes nothing

to the topic of this article. Furthermore, people can be different in terms of so many characteristics (and each different in so many ways). Consequently, it would be difficult to determine what exactly an obligation on the part of public authorities to diversity would entail. Moreover, liberal democracies only regulate questions of justice, i.e., the collision of spheres of autonomy of different human beings, but not questions of the good life; whether people are homogeneous or heterogeneous or diverse in relation to other people is thus up to everybody's own discretion [3].

A human rights obligation to protect biodiversity arises indirectly from a human rights obligation to protect the climate, which has been recognized by various courts in recent years (see [10, 262]). With regard to climate protection, human rights contain the obligation to secure elementary preconditions of freedom, such as life, health, and subsistence [263, 264, 264–271]. Because they are rights to freedom, human rights logically imply the right to the elementary preconditions for freedom. These include the right to a relatively stable world climate and environmental conditions that allow people to maintain their livelihoods [10, 272–275]. With the climate protection commitments based on human rights and climate law to a fossil phasing-out and reduced livestock farming, central factors damaging biodiversity are addressed at the same time. Furthermore, climate change and biodiversity loss or climate and biodiversity protection often reinforce each other [276]. For example, the conservation of ecosystems and biodiversity is directly linked to the conservation of the global climate. Forests and peatlands are both biodiversity hotspots and greenhouse gas sinks for negative emissions and can at the same time enable adaptation measures regarding climate change (for more details, see [1, 82, 83, 186, 277]). Land-use changes successively massively reduce the carbon storage potential of these sinks as well as biodiversity [12, 186].

However, there is also a basis for directly applying of human rights principles to biodiversity, without the way via climate protection. Climate change and biodiversity loss are existential threats to humanity [278–281]. Given that biodiversity services are existential for human well-being (as shown at the beginning of our article), there is an inextricable connection between human rights and biodiversity conservation. Only if biodiversity is preserved sufficiently, basic human rights, such as the right to food, to water, to health, and even the right to life itself, can be guaranteed. Or, as David R. Boyd, UN Special Rapporteur on Human Rights and the Environment, puts it: "All human rights ultimately depend on a healthy biosphere. Without healthy, functioning ecosystems, which depend on healthy biodiversity, there would be no clean air to breathe, safe water to drink or nutritious food

to eat” [96, 125]. His predecessor, John Knox, emphasised that “biodiversity contributes to particular ecosystem services that directly support the full enjoyment of human rights” [125].

In court verdicts and literature, human rights concerning the environment have also been ascribed an intertemporal and global, cross-border effect [3, 282]. This is the result of a legal interpretation of who is meant by the term “everyone” in the pertinent human rights catalogues. The most important argument in favour of an intertemporal and global understanding of “everyone”—and one that is possibly relevant for all liberal-democratic constitutions—is that freedom should be effective in any situation, where it is threatened—and today, unlike centuries ago, this threat often extends over great distances and periods of time. This aspect is just as relevant for biodiversity protection as it is for climate protection. Human rights protection for stable biodiversity as an elementary precondition for freedom, therefore, also applies across time and place.

Furthermore, the precautionary principle should be taken into account with regard to human rights. Precaution means taking measures to avoid long-term, cumulative, or uncertain damages [3, 135, 283–286]. This does not totally prohibit the pursuit of an action that risks causing harm (since precaution also implies balancing different risks and opportunities, and even daily life entails various risks) but shows a tendency in this direction when risks tend to cause irreversible and huge harm. Biodiversity loss will lead to such irreversible negative consequences on a global scale and, therefore, needs to be mitigated. Even if some scholars dispute the role of the precautionary principle in general [287, 288], it is clearly codified on several levels in national, EU, and international law, i.e., in Art. 3 para. 3 UNFCCC, in Art. 191 of the Treaty on the Functioning of the European Union (TFEU), or in Art. 20a of the German Constitution. Moreover, the precautionary principle is included in human rights law. Basic human rights protect not only against presently existing dangers, but also against future dangers if the latter are irreversible at the moment of occurrence; and exactly this is the case with biodiversity loss—as it is with climate change [10, 12]. If that was not the case, the protection provided by human rights would have no effect. Human rights thus contain a precautionary principle, even beyond codification [3, 12, 289]. The connection to human rights makes clear: the bigger the impending damage, the more ambitious the necessary protection measures have to be. In dealing with existential dangers, it is, therefore, not enough to accept moderate probabilities on how these dangers may be mitigated,

even if complete certainty about future events can never be achieved. As a consequence, any discourse on causality of the infringements of biodiversity (or the climate) for human rights is rendered moot (see in detail [262]).

The way in which human rights are affected has been elaborated in more detail in the controversies and judgements on climate claims (see on the debate and on the following [3, 10, 262]). These elaborations can be applied to biodiversity loss. In legal terms: the debate on biodiversity and human rights is about:

- (1) An argument on the right to the elementary preconditions of freedom to life, health and minimum subsistence as a protection right obliging the state to protect individuals against their fellow citizens causing biodiversity loss;
- (2) An argument on the same fundamental rights as a defensive right against a state-permitted biodiversity loss (by having harmful subsidies for agriculture, permitting new streets, permitting pesticides, etc.);
- (3) An argument on freedom as a whole in connection with a state objective of environmental protection, which exists in various national and transnational constitutions and regimes as additional tool to protect the preconditions of freedom without being a human right itself; and
- (4) An argument which is based on the protection of freedom as a whole against sustainability policy measures, given that politics by now fails to account for the urgent sustainability policy meaning that later radical freedom-encroaching policy measures to protect biodiversity become likely.

This distinction between “protection from biodiversity loss (arguments 1, 2, and 3) vs. protection from biodiversity policy (argument 4)” is about the two sides of a double threat to freedom, and it is equally relevant for climate and for biodiversity protection. In the case of biodiversity protection, too, public authority has so far accepted the damage, on one hand, and actively promoted it, on the other, through environmentally harmful (e.g., agricultural) subsidies, approvals for nature-destroying projects, and approval for various climate-damaging activities (which then indirectly damage biodiversity as well, etc.). Hence, one can cite here the protection dimension and the defence dimension of the right to life, health and subsistence—against the failure to protect biodiversity as well as against its delay and at some point all the more rapid implementation.

Discussion and conclusions

We have seen that there is a direct international environmental legal requirement to halt biodiversity loss (Article 1 CBD)—as well as indirect effects in the same direction arising from international climate law. Furthermore, we have seen that halting biodiversity loss is also required by human rights directly—and indirectly through human rights obligations on climate change mitigation. The problem with all human rights obligations, however, is that only in the process of balancing conflicting interests can it be determined what democratic majorities are obligated to do nationally and transnationally by human rights. Because of the conflicting freedoms of corporations and consumers, a resulting human rights obligation to address biodiversity loss or climate change is left primarily to political discretion. The real obligation arising from human rights results (also) for biodiversity protection only from the substantive and procedural balancing limits which are derived from human rights guarantees for freedom and preconditions of freedom—such as suitability, necessity, efficiency, polluter-pays principle and more [3, 10, 290]. Similar to climate protection, for example, in the proceedings before the German Federal Constitutional Court, the following substantive and procedural balancing limits can be considered violated:

- Procedurally, there is a violation of the obligation that the parliaments, not the governments, take the essential decisions (which is based on the fact that parliaments can be more easily voted out of office and, therefore, represent a better way to protect freedom). As far as can be seen, there is no comprehensive strategy for biodiversity in any of the states that has been laid down in parliamentary laws and specifies how exactly the loss of biodiversity is to be stopped and within what time frame.
- It also seems possible that the procedural obligation to carefully ascertain the facts about biodiversity loss has been violated (without an obligation to ascertain the facts, any ideal of justice—as represented by the universal concept of freedom and democracy—would run empty). The persistent political inactivity suggests that politicians have so far not taken sufficient note of the dramatic facts of biodiversity degradation while designing the legislation.
- The substantive rules for balancing conflicting spheres of freedom require that trade-offs between different conflicting freedoms cannot be solved manifestly one-sided. However, this is precisely the case when the biodiversity loss has been allowed to continue unchecked for decades to avoid having to impose significant political restrictions on economic activity and consumption.
- Another substantial balancing limit states that the political scope for decision-making ends, where political action or inaction endangers the liberal democratic order as such [266]. This is precisely the effect that unregulated biodiversity loss could have, due to its dramatic consequences [266, 270, 274, 291].

If one agrees on all of this, legislation would be obliged to do significantly more to stop biodiversity loss—and to lay down a comprehensive strategy in parliamentary laws, after comprehensive and careful fact-finding. Of course, biodiversity is the more heterogeneous good to be protected than the global climate. However, it is not a matter of deriving extremely detailed obligations to act from international law or human rights. This would only be possible within relatively narrow limits—for example, if a case were brought before a constitutional court—from the point of view of the separation of powers (for more details, see [262]). For example, (as one can again learn from the climate lawsuits: [262]) it is possible to judicially review whether legislators have chosen instruments that do justice to the level of ambition and whether they have correctly determined the underlying facts—also related to the effectiveness of certain policy instruments. If the policy has violated this, the legislators can be judicially obliged to rectify the situation within a time limit set by the court.

In all this, the picture is similar to that of climate protection: human rights set a level of ambition that is similar to the requirements of international environmental law—a 1.5 °C limit on one hand, and a halt to biodiversity loss on the other. The biodiversity-related limit is actually easier to grasp than the climate-related one: If a commitment to stop biodiversity loss has been in place for at least 30 years and the problem continues to worsen, there is in any case an obligation to take much stronger action. As regards policy instruments, similar to climate protection, much could be achieved if typical drivers of the destruction of (also) biodiversity, such as livestock farming and fossil fuels, were subject to quantity control such as cap-and-trade schemes—although they have to be designed in a much more ambitious way than in the past [1–3, 8]. If, on the other hand, cap-and-trade schemes were established directly for biodiversity, their heterogeneity in the choice of instruments would lead to a problem of depicting [2, 82]. Phasing out fossil fuels and reducing livestock farming, therefore, remain the core strategies for solving various environmental problems.

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Author contributions

FE supervised the project, provided the overall theses and the underlying methodology as well as human rights analysis, transfers from climate law, discussion, introduction and conclusions. PG provided the analysis of international biodiversity law. KHa wrote an earlier draft on the empirical background. BG and KHe provided additional analysis, references, proofreading and formatting. RW provided additional ideas. All authors have read and agreed to the published version of the manuscript.

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