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THEMATIC WORKSHOP ON ECOSYSTEM
RESTORATION FOR THE POST-2020
GLOBAL BIODIVERSITY FRAMEWORK
Rio de Janeiro, 6-8 November 2019

**CONSIDERATIONS ON ECOSYSTEM RESTORATION FOR THE POST-2020 GLOBAL
BIODIVERSITY FRAMEWORK, INCLUDING ON A POSSIBLE SUCCESSOR TO AICHI
BIODIVERSITY TARGET 15**

Note by the Executive Secretary

The Executive Secretary is circulating herewith, a background document to inform participants in the Thematic Workshop on Ecosystem Restoration for the Post-2020 Global Biodiversity Framework to be held in Rio de Janeiro, Brazil from 6 to 8 November 2019.

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1. INTRODUCTION

The aim of this background paper is to support discussions at the thematic consultation on ecosystem restoration to be held in Rio de Janeiro, Brazil, 6-8 November 2019, as part of the preparatory process for the post-2020 global biodiversity framework.¹ Ecosystem restoration is a means of conserving and restoring biodiversity, ecosystem function, services and resilience, given adequate time and investment. In light of the continued loss and degradation of natural ecosystems over the past decade, ecosystem restoration will likely play a key role in achieving the 2050 Vision for biodiversity over the next period of implementation of the CBD.

This consultation will provide a much-needed opportunity for Parties to the Convention on Biological Diversity and stakeholders to discuss the role of ecosystem restoration in the post-2020 global biodiversity framework and start the process of creating a common understanding about potential goals and targets. Expected outcomes are concrete proposals for elements of a potential target on ecosystem restoration to be considered in the further development of the post-2020 global biodiversity framework, as well as considerations related to ecosystem restoration relevant to other targets and goals of this framework.

1.1. Ecosystem restoration and other related concepts

*NB: all terms in **bold** in this section are also defined in the glossary provided in annex.*

Land **degradation** can occur either through a loss of biodiversity, ecosystem functions or services. From an ecological perspective, land degradation could include complete transformation in the class or use of the ecosystem, such as the conversion of natural grassland to a crop field (delivering a different spectrum of benefits, but also degradation of the “natural” or “transformed” system. Natural ecosystems are often degraded prior to being transformed. The transformed ecosystem that results from this conversion can in turn be degraded and see a reduction in the delivery of its new functions (e.g. an agricultural field where soil degradation and reduced soil fertility leads to reduced crops) (See Figure 1).

Degraded natural ecosystems, transformed ecosystems and degraded transformed ecosystems can all be restored towards their original natural state, either completely or partially). The same concepts are applicable *mutatis mutandis* to the degradation of freshwater and marine ecosystems. Degraded natural state in the case of marine fisheries may verge on transformation in some cases, but never to the same extent as land conversion. It may take the form of changed trophic structures in a marine community (through fishing pressure and selective removal of species, transformation of the soft and hard benthos (through repetitive sweeps of contacting gears such as trawls) or artificial reef construction, to cite only a few examples. In the case of aquatic freshwater ecosystems, the construction of dams and reservoirs over river courses or the conversion of natural wetlands into rice paddies are examples of ecosystem transformation.

A pre-degradation baseline is necessary for assessing the magnitude of the damage to the original natural state of the ecosystems, and while the target should be directed towards the pre-degradation state baseline, the pre-degradation state itself need not be the target (IPBES 2018). In practice, the target will often be only partial rehabilitation towards the pre-degradation state, somewhere along the restorative continuum.

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interventions that don't make reference to the pre-degradation state of the ecosystem and aim at replacement, or novel ecosystems, are not regarded by the IPBES as restoration or rehabilitation (IPBES 2015).

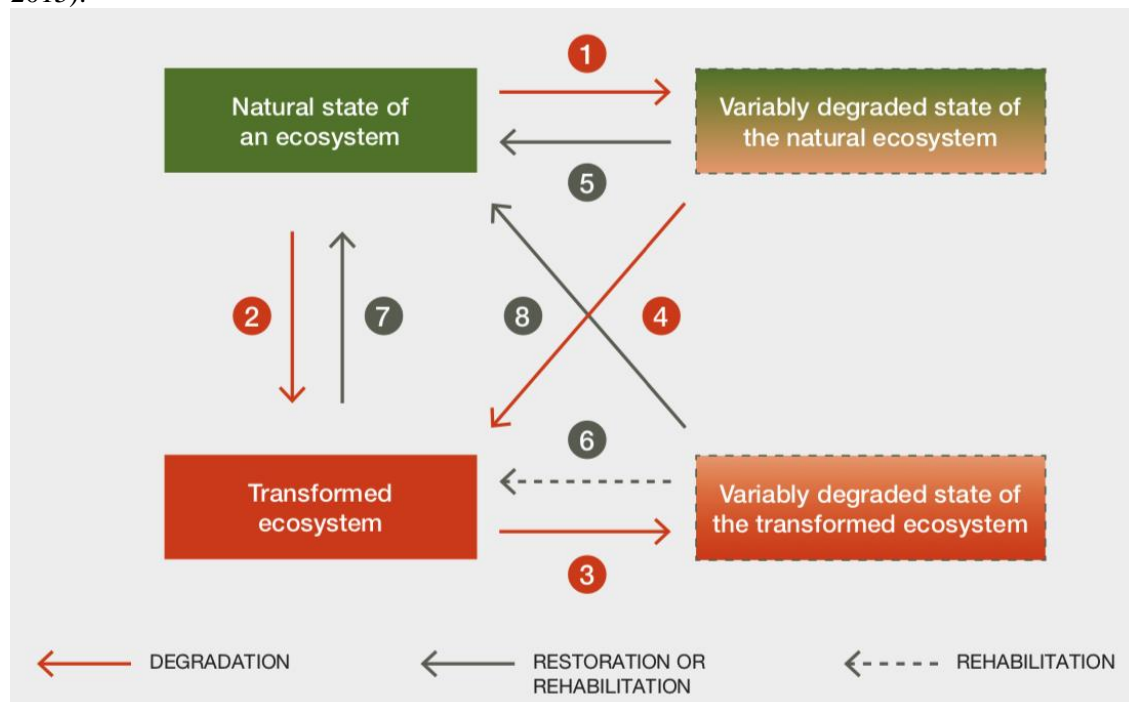


Figure 1 - The processes of degradation, transformation/conversion, restoration and rehabilitation and how they affect the state of an ecosystem (Source: IPBES 2018). Land degradation can occur either through a loss of biodiversity, ecosystem functions or services, without a change in land cover class or use (1), or by the transformation to a derived ecosystem type such as the conversion of natural cover to a crop field (2), delivering a different spectrum of benefits, but also typically involving loss of biodiversity and reduction of some ecosystem functions and services. The transformed ecosystem can also be degraded with respect to the new societal expectations associated with that land use (3). Degraded natural ecosystems can also be transformed to another ecosystem (4), or restored towards their original natural state, either completely or partially (“rehabilitated”) (5). Degraded transformed ecosystems can be rehabilitated towards a less degraded state, with respect to the expectation for a deliberately modified landscape (6). Both degraded and undegraded transformed lands can, under many circumstances, be restored or rehabilitated towards their original natural state (7 and 8).

Synergies between the ecological restoration of natural ecosystems and the rehabilitation of productive ecosystems appear when looking at restoration at the landscape scale: any degree of restoration of degraded ecosystems works towards the increased delivery of essential services to humanity such as food provision or carbon sequestration. In addition, rehabilitating the productivity of crop or pasture lands can in theory “spare” land for ecological restoration by avoiding the need for further conversion of natural ecosystems (Latawiec et al., 2015). Conversely, any degree of restoration of “natural” land can provide useful ecosystem services for crop/pasture land (such as water provision and regulation, protection against soil erosion or pollination).

The concept of forest landscape restoration (FLR) seeks to harness these synergies and find a balance between the rehabilitation of productive land and the restoration of natural ecosystems. FLR is defined as a process to restore ecological functionality of degraded and deforested landscapes at the same time as improving biodiversity conservation, ecosystem services provisioning and local livelihoods in multifunctional, restored landscapes (Besseau et al. 2018; Brancalion and Chazdon 2017).

Ecosystem restoration and ecological restoration are some of the many interventions used to implement FLR, which aims to improve ecological and social conditions across a mosaic of land uses. FLR programs usually comprise a range of activities, the selection of which should be aligned with stakeholder-defined objectives, and often include an emphasis on ecosystem services and sustainability. As such, FLR emphasizes sustainable use of components of biodiversity rather than their conservation per se.

Interventions that support biodiversity conservation may be included with other FLR actions to support multiple objectives within the landscape. The same principles apply to the restoration of non-forest ecosystems at landscape scale.

1.2. Key facts and figures about the state of degradation and potential benefits from restoration

Extensive ecosystem restoration is increasingly seen as central to conserving biodiversity and stabilising the Earth's climate. Notwithstanding high rates of degradation of both terrestrial and aquatic systems, natural ecosystems are exceptionally valuable to people: they provide livelihoods and food for millions of people globally, play essential roles in water and nutrient cycles, prevent erosion, foster soil formation, and support large portions of the world's biodiversity (Chazdon and Brancalion 2019).

The degradation of the Earth's land surface through human activities is estimated to negatively impacting the well-being of at least 3.2 billion people, pushing the planet towards a sixth mass species extinction, and costing more than 10% of the annual global gross product in loss of biodiversity and ecosystem services. Moreover, timely action to avoid, reduce and reverse land degradation can increase food and water security, can contribute substantially to the adaptation and mitigation of climate change and could contribute to the avoidance of conflict and migration (IPBES, 2018).

A global meta-analysis indicated that the restoration of degraded systems enhanced overall biodiversity by 44% and provided a range of benefits across targeted degraded ecosystems (Crouzeilles et al. 2016).

A combination of 20 conservation, restoration and improved land management actions could increase carbon storage and/or prevent greenhouse gas emissions. These solutions could account for 37% of the carbon dioxide mitigation needed, between now and 2030, to have more than a 66% chance of keeping warming below two degrees Celsius (Griscom et al. 2017).

It has been estimated that in the US alone, the ecosystem restoration and reclamation industry generate 126,000 jobs and approximately US\$ 9.5 billion in annual expenditure. Indirectly, it has been estimated to generate US\$ 15 billion in annual expenditure and another 95,000 jobs (BenDor et al. 2015)

A recent study by Strassburg et al. (in review) used a novel restoration optimisation tool (Strassburg et al., 2019) to assess the potential benefits, costs, synergies and priority areas of ecosystem restoration at the global scale across all terrestrial ecosystem types. The key messages from this study are:

- i. Ecological restoration can provide vast benefits for global goals of biodiversity conservation and climate change mitigation: for instance, restoring 15% of converted lands globally could reduce the current global species extinction debt by approximately 65% if concentrated in priority areas for biodiversity. If focused on climate mitigation, the same target (15%) would sequester 326 billion tonnes of CO₂eq., equivalent to 91% of the remaining emissions budget compatible with achieving the Paris Climate Agreement target of limiting global warming to 1.5°C;
- ii. Major synergies exist among these benefits and the goal of limiting costs: if restoration is planned to achieve these multiple objectives, cost-effectiveness can improve sevenfold in comparison with restoration without spatial planning. This highlights the importance of effective coordination across the three Rio Conventions and that these synergies are captured at the planning, financing and implementation stages at multiple levels;
- iii. If multiple objectives are to be achieved, restoration needs to involve multiple biomes: whereas forests are the main ecosystem type for climate mitigation objectives, wetlands are proportionally more important for species conservation, and shrublands are also of high importance for biodiversity. Areas of top global importance for multiple criteria cover all biome types;
- iv. Although restoration can provide major benefits for global goals, these vary considerably depending on the spatial allocation of restoration: for instance, restoring 5% of converted lands can

reduce extinction debt by 5% or by 45%, a ninefold difference depending on the spatial allocation. This highlights the importance of outcome-oriented targets;

- v. Most areas of top 15% global importance for restoration do not coincide with the top 15% areas at national level, highlighting the potential for international collaboration and financing mechanisms (such as the REDD+ mechanism under the UNFCCC) in this context;
- vi. Coordinating restoration with efforts to increase productivity of converted lands could spare up to 55% of the world's converted lands for restoration (or 1.4 billion hectares) without impacting food production, suggesting a scope for more ambitious global restoration targets;

1.3. The policy momentum for ecosystem restoration

The policy momentum for ecosystem restoration has been growing steadily in recent years, including through the adoption of the United Nations Decade on Ecosystem Restoration (2021-2030).

- In 2011 parties to the CBD adopted the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets, including Aichi Biodiversity Target 15 with calls for the restoration of 15% of degraded ecosystems
- In 2015, the United Nations Convention to Combat Desertification (UNCCD) Conference of the Parties (COP) 12 adopted its 2030 agenda for Land Degradation Neutrality.
- In 2015, all United Nations Member States adopted the 2030 Agenda for Sustainable Development (SDG), with specific restoration targets of life below water (SDG 14) and life on land (SDG 15).
- In 2016, Parties to the Convention on Biological Diversity (CBD) adopted decision XIII/5 on ecosystem restoration (Short Term Action Plan).
- In 2016, The Fourth Ramsar Strategic Plan 2016–2024 included targets for the restoration of wetlands, with priority to wetlands that are relevant for biodiversity conservation, disaster risk reduction, livelihoods and/or climate change mitigation and adaptation
- In 2017, the United Nations Strategic Plan for Forests set a global goal for a 3% increase in global forest cover by 2030.
- In 2018, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) global assessment on land degradation showed the dire consequences of the continued degradation of the Earth's ecosystems, as well as the clear economic case for restoration.
- 2030 is the year for the achievement of the Bonn Challenge and New York Declaration on Forests that have set ambitious forest landscape restoration targets totalling over 350 million hectares of land under restoration by 2030, of which 170 million hectares are already pledged by national and sub-national governments.

2. CURRENT STATE OF AICHI BIODIVERSITY TARGET 15

2.1 State of progress

In 2016, the CBD presented in information document [UNEP/CBD/COP/13/INF/12](#) an updated assessment of progress towards Targets 5 and 15 and outlook for their advancement by 2020, drawing mainly on a review of national biodiversity plans and 5th national reports to the CBD for 22 countries in Latin America, 23 countries in Asia and 17 countries in West Africa, with the aim of assessing nationally set targets; information gaps; and tools, guidance and other resources offered to countries to advance their commitments by 2020 (Bodin et al 2016).

This assessment presented a number of conclusions organized by “elements” of ABT 5 and 15. The text for the two elements under ABT 15 and the element of Target 5 regarding degradation are drawn upon and expanded below:

- *Significantly reduce the rate of degradation and fragmentation (from Target 5)*

Measuring the degradation and fragmentation of ecosystems requires tracking, monitoring and assessment tools and indicators, as well as associated data collection, which are specific to the structure, composition and function of the ecosystem under consideration, and can cover many aspects ranging from species richness to the provision of ecosystem services to human populations. Moreover, views of degradation are highly subjective and influenced by personal or collective value systems. A reduction in rates also requires that rates are actually measured in the past and the present based on relevant indicator variables. Those variables are often not obvious and may not be robust proxies for degradation (Ghazoul and Chazdon 2017). The diversity of variables that can be considered to assess degradation challenges the development of globally consistent indicators that could be readily used at the national scale. This diversity and complexity could also explain the low rates of national reporting and target setting on this component of Target 5, highlighting the crucial need for developing capacity, through tools to help improve human capital, interest and technical skills in this area. It may be helpful to focus targets and indicators on degradation of specific aspects of biodiversity and/or ecosystem services such as carbon storage.

- *Ecosystem resilience has been enhanced, through conservation and restoration, thereby contributing to climate change adaptation and to combating desertification (from Target 15)*

The analysis of national reports and NBSAPs shows that most countries make explicit references to the concept of ecosystem resilience (or to connected concepts such as ecosystem vulnerability). However, these references often lack specificity and are rarely associated with clear implementation actions to ensure a contribution to ecosystem-based adaptation and/or disaster-risk reduction. References to the implementation of the United Nations Convention to Combat Desertification (UNCCD) and its goal of Land Degradation Neutrality, for example, also frequently suffers from the same lack of specificity.

- *The contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation (from Target 15)*

Few Parties included clear quantitative metrics in the assessment of the current state of ecosystem degradation in their national target setting and in their reports of progress under ABT 15. The most common metric used in the national reports and NBSAPs for measuring and setting targets on degradation was the area of degraded ecosystems, especially for terrestrial ecosystems such as forests. Variables related to the degree of degradation were seldom presented and related to ecosystems other than forests (freshwater quality in lakes or rivers) rather than being used in combination with information on the area of terrestrial degraded ecosystems.

In the context of the implementation of the Strategic Plan on Biodiversity 2011-2020, Parties are free to interpret the ABTs in their national context. Of the 62 countries reviewed (CBD 2016), 50% had set a national target that clearly aligned with the objective of ABT 15, and fewer had included a quantitative element in their national target. In the rare cases where countries have set a quantitative target under Target 15, they have either set it by referring to the area (in hectares) that will be placed under restoration measures, especially with regard to forests, or used a target percentage for the restoration of degraded ecosystem without explaining how this percentage would be measured.

Out of the 62 countries reviewed, 44% set a quantitative national target for restoration using an area-based metric. After area, carbon stock was the second-most used metric for the setting of a quantitative national target for restoration, with 34% of countries using this metric (CBD 2016).

Forty-two percent made use of at least one indicator of the degree of degradation of ecosystems, often in relation to water quality in freshwater ecosystems and forest composition. However, despite the presentation of this information, no quantitative national target was found that explicitly referred to the degree of restoration to be achieved, based on an indicator of ecosystem function (CBD 2016).

2.2 Challenges and lessons learned from the design and implementation of ABT 15

A clear challenge that emerged from the implementation of Aichi Biodiversity Target 15, as attested by the reporting from Parties to the Convention, pertains to the fact that degradation and restoration are complex, multidimensional processes. By contrast, the text of the target introduced a quantitative target as a single percentage value.

Degradation presents at least two dimensions: the extent of degraded area and the degree of degradation in each location. The same rationale applies to restoration: the extent of restored area and the degree of recovery from a baseline. Quantifying restoration efforts with a single percentage metric is ambiguous, because this objective could, in theory, be realized by restoring a small area from a fully degraded to a fully restored state or a bigger area from a partially degraded to a partially restored state (FAO and WRI 2019; Kotiaho 2015). Another dimension in restoration is time, hence the frequency of 'area under restoration' as an indicator rather than 'restored area', which implies completion for which a date may yet be uncertain.

- **In practice, many metrics of degradation (and therefore restoration) are possible and a reference to area does not give any information as to the baseline and target degree of degradation/restoration to be achieved through these measures (e.g. the density of biomass carbon stocks, species richness, or degree of fragmentation). In addition, metrics are very ecosystem-specific: for example, in savanna ecosystems, forest regeneration (encroachment) is degradation (Ghazoul and Chazdon 2017).**

Restoration is always more expensive than preventing degradation in the first place. As noted in CBD COP decision XIII/5: “Priority should be given to conserving biodiversity and preventing the degradation of natural habitats and ecosystems by reducing pressures and maintaining ecological integrity and provision of ecosystem services [...]. Ecosystem restoration is not a substitute for conservation, nor is it a conduit for allowing intentional destruction or unsustainable use.”

- **In practice, this means that the objectives of the CBD cannot be achieved by restoration only, if the underlying drivers of degradation are not addressed and ecosystem loss and degradation continue unabated.**

Targets expressed in net area of “natural ecosystems” are used by some Parties to define a common target for the goals of reduction of ecosystem loss and ecosystem restoration, expressed under ABT 5 and 15, respectively. This solution was also retained under the UN Strategic Plan on Forests, which contains a single quantitative target of a 3% increase in global forest cover. However, this type of target has limitations: gains for biodiversity from restoration are not the “mirror-image opposite of loss” and an area targeted for restoration cannot be considered to “cancel” the loss of an equivalent area of natural habitat (Chazdon 2014; Brown and Zarin 2013). Degradation and restoration operate at different time scales (e.g. old-growth forests can be destroyed suddenly and forests undergoing restoration may take decades to reach pre-disturbance ecosystem attributes or may never reach them).

- **‘Net natural area targets’, even if they were achieved might still result in significant impacts on biodiversity, meaning that separate targets might be needed for the reduction of ecosystem loss and degradation and for the restoration of ecosystems.**

Targets focused solely on area restored are likely to be sub-optimal and may even lead to perverse outcomes by focusing restoration efforts on lowest opportunity cost areas rather than areas of importance for biodiversity².

- **A successor target to ABT 15 could focus on benefits for biodiversity (reduced extinction debt, increased species populations, increased habitat connectivity etc) and other benefits (ecosystem services) expected from ecosystem restoration, rather than area alone.**

Many national ecosystem restoration targets set under the CBD focus exclusively on forests. This is likely because there is a greater availability of information on the state and trends of forest ecosystems. This bias in the data creates a risk that quantitative targets are only set for forests, at the potential expense of other ecosystems (Miles and Kapos 2008), and inadvertently promote afforestation of non-forest ecosystems, and overlook serious degradation in other systems such as wetlands which may threaten biodiversity conservation in some of the most species-rich ecosystems on Earth (Veldman et al. 2015a). The inclusion of multiple ecosystem types is essential for achieving multiple benefits (Strassburg et al., under review).

- **A successor target to ABT 15 could include sub-targets for the restoration of a variety of ecosystems or could refer to the need to avoid the transformation of natural ecosystems or to the notion of representativity of a variety of ecosystems in the restoration process.**

Certain indicators of ecosystem degradation/restoration such as water quality or soil erosion cannot be measured using area alone. Other tracking and monitoring tools, and indicators, could be developed to measure other various aspects of ecosystem function, within and outside the areas designated for reducing degradation or promoting restoration. Some countries are already using indicators of the degree of degradation of various ecosystems, such as water quality, carbon stocks, fish stocks, richness and density of species. Where time series exist for these indicators, it may be possible to set individual targets that aim at achieving a certain value or trend for the indicator (e.g. at least 25% of species of fish stock show a population increase, and no more than 25% of them show a decrease between 2015 and 2020). These indicators are particularly useful if they reflect a tipping-point in resilience where values below the threshold changes the system to an alternative stable state.

Finally, since the CBD is implemented at the national scale through the individual efforts of its Parties, a global target on ecosystem restoration will only be achieved if Parties to the CBD are able to set national targets that are least as specific and quantitative as the global target. The assessment conducted in 2016 indicates that in the context of the limited capacity (human, technical or financial) of many developing countries, scientific and technical cooperation efforts would likely need to be greatly increased for a SMART global target on ecosystem restoration to be achieved.

- **A successor target to ABT 15 could use several rather than one single metric to set the bar of global ecosystem restoration efforts. However, the inclusion of further metrics should be balanced against the complexity of the assessments needed to adequately establish baselines, set national targets and measure progress against these quantitative elements.**

The need to further develop the capacity of countries to undertake quantitative, spatially explicit assessments of ecosystem restoration priorities was highlighted in the Pan-African Action Agenda on Ecosystem Restoration for Increased Resilience adopted at the recent Africa Biodiversity Summit concomitantly with CBD COP 14 in November 2018. The document mentions that by 2025 “relevant

² see data presented in section 1.2, bullet point iv, from Strassburg et al., 2019

tools, technologies and innovative solutions developed or mobilized are made available to assist Member States and partners to effectively design, implement, monitor and report on ecosystem restoration initiatives”, that “land and ecosystem restoration should maximize multiple benefits (biodiversity, resilience to climate change and climate change mitigation/adaptation, economic and livelihood benefits)”, and that “ecosystem restoration activities should be planned at various scales and implemented using the best available science and traditional knowledge”

- **Large-scale, quantitative, spatially-explicit conservation planning exercises are powerful approaches for evaluating where conservation activities can achieve the greatest benefits, for quantifying trade-offs among objectives and identifying good compromise solutions, for quantifying and reducing risk in the context of uncertainty, and for exploring the outcomes of a variety of ‘alternative futures’ in scenario analyses. Such analyses could be used to inform the level of ambition of a successor target to Aichi Biodiversity Target 15, as well as the implementation of this target at the national scale.**

2.3 Opportunities for synergies with other global policy frameworks that include objectives on ecosystem restoration

Independently of national targets set under their NBSAPs, several Parties to the CBD have pledged actions related to ecosystem restoration under a number of international initiatives that seek to support ecosystem services and meet social and economic development goals. These initiatives represent a great potential to bolster actions towards the achievement of ABT 15 and its potential successor under the post-2020 global biodiversity framework.

In many cases, few details are provided on how these related national objectives will be implemented on the ground, and therefore their potential to contribute to an ecosystem restoration target that would support the objectives of the CBD. There is a clear potential for all these initiatives and various expressions of ambition to contribute to progress under ABT 15; however, the exact extent of this contribution will be determined by the specific actions that countries are taking to implement them and where these actions take place.

Current national reporting to the CBD shows that most countries have yet to make explicit links between these global initiatives and ABT 15. Countries that have made area-based pledges for restoration under voluntary platforms such as the Bonn Challenge often do not include a quantitative commitment under ABT 15. This may be explained by the fact that these ambitions were only recently expressed or may have been expressed by different agencies. The following section reviews a number of global frameworks that contain targets of relevance to ecosystem restoration.

2.3.1 UN Strategic Plan for Forests

The UN Strategic Plan for Forests 2017-2030 was adopted by the UN Economic and Social Council on 20 April 2017, together with a quadrennial programme of work for the United Nations Forum on Forests (UNFF) for the period 2017-2020. The strategic plan provides a global framework for action at all levels to sustainably manage all types of forests and trees outside forests and halt deforestation and forest degradation. At the heart of the strategic plan are six Global Forest Goals and 26 associated targets to be achieved by 2030, which are voluntary and universal.³

³ The following Goals and targets are relevant to ecosystem restoration: Global Forest Goal 1: Reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation and contribute to the global effort of addressing climate change.

1.1 Forest area is increased by 3 per cent worldwide

Member States may, on a voluntary basis, determine their contributions towards achieving the global forest goals and targets, taking into account their national circumstances, policies, priorities, capacities, levels of development and forest conditions. These voluntary national contributions may include the forest-related contributions members of the Forum intend to make with regard to other international forest-related commitments and goals, such as the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals, the ABT and actions to address climate change under the Paris Agreement.

One consideration is to explore how Parties to the Convention that are also members of UNFF could consider actions under their national biodiversity strategies and action plans (NBSAPs) in the design of their voluntary national contributions towards achieving one or more global forest goals and targets of the strategic plan for forests, and vice-versa to achieve the forest-related ABT.

One key difference in scope between the provisions of the Global Forest Goals on restoration and ABT 15 is that the latter is concerned with the restoration of all ecosystems, whereas the GFGs only concern trees and forests. Attention should therefore be given to situations in which gains in tree cover could cause the loss of other natural ecosystems, including in cases where they are wrongly perceived as degraded (Temperton et al. 2019). This issue has been raised in the context of Reducing Emissions from Deforestation and forest Degradation (REDD+) (Miles and Kapos 2008) and in the context of Forest Landscape Restoration (FLR) (Veldman et al. 2015).

2.3.2 UNCCD Land Degradation Neutrality

At the eleventh meeting of the Conference of the Parties (COP 11) to the UNCCD, in 2013, an intergovernmental working group was created on Land Degradation Neutrality (LDN). After the concept was incorporated into Goal 15 of the SDGs in September 2015, the Parties to the UNCCD, at its COP 12, decided to make the concept a central framework for the implementation of the convention. To achieve LDN, degradation of productive land should be avoided, and lands already degraded should be restored (Stavi and Lal 2015).

The three elements of a monitoring framework for the implementation of the LDN objective – trend in land use/land cover, trend in land productivity and trend in soil carbon stocks – are all relevant for assessing progress on ABT 15. Efforts to collect information under these indicators, at the national scale, could feed into national reports to the CBD and vice versa.

2.3.3 Bonn Challenge on Forest Landscape Restoration

The Bonn Challenge (<http://www.bonnchallenge.org/>), is a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030. The Bonn Challenge is a voluntary initiative to strengthen political engagement to achieve many existing international commitments, including the Strategic Plan for Biodiversity 2011-2020 and several Aichi Biodiversity Targets, including ABT 5, 7, 13, 15, among others (Beatty et. al 2018).

Underlying the Bonn Challenge is the concept of forest landscape restoration (FLR), which aims to restore ecological functionality of degraded and deforested landscapes at the same time as improving biodiversity conservation, ecosystem services provisioning and local livelihoods in multifunctional, restored landscapes (Besseau et al. 2018; Brancalion and Chazdon 2017). To date, the Bonn Challenge has generated 59 pledges from national and subnational jurisdictions as well as other non-governmental actors in almost 170

1.2 The world's forest carbon stocks are maintained or enhanced

1.3 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

1.4 The resilience and adaptive capacity of all types of forests to natural disasters and the impact of climate change is significantly strengthened worldwide

million hectares of deforested and degraded land to be brought under restoration by 2020 and 2030, depending on the pledge.

Since its inception, the concept of FLR has relied on a set of “guiding principles” defined by the Global Partnership on Forest Landscape Restoration (GPFLR). The Secretariat of the CBD took part in the review of the principles initiated by the GPFLR steering committee after its meeting in Bonn in December 2017. The review resulted in amendments to the text of the principle: “Avoid further reduction of natural forest cover”. The changes align the text of this principle more closely with ABT 5 by including the non-conversion of all natural ecosystems.⁴ This inclusion is important given concerns that FLR may be misinterpreted as encouraging the conversion of certain areas of natural grassland (Veldman et al., 2015).

The guiding principles imply that while all FLR processes are distinct, all share the core defining elements of FLR. For the principles to be applied in practice, further frameworks and guidelines may need to be developed to enhance the quality and clarity of landscape-based restoration efforts as well as component ecosystem restoration interventions (FLoRES 2019). Such a framework and guidelines could also ensure that FLR efforts are aligned with a successor target to Aichi Biodiversity Target 15. In turn, given the scale of FLR pledges and commitments, parties may wish to refer to it in their assessment of progress under Aichi Biodiversity Target 15 and in assessing what level of ambition is relevant for an ecosystem restoration target under the post-2020 framework.

2.3.4 Paris Agreement

Ecosystem restoration can provide substantial benefits for climate change mitigation and adaptation (IPCC, 2019). Article 5 of the Paris Agreement, building on a series of decisions from the United Nations Framework Convention on Climate Change (UNFCCC) COP, reiterates that developing countries may receive payments for the results they have achieved to reduce emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of carbon stocks in developing countries (REDD+).

Prior to UNFCCC COP 21, Parties were asked to prepare and submit Nationally Determined Contributions (NDCs), outlining post-2020 actions they intend to take under a new international agreement. NDCs present the actions that Parties are proposing to undertake to mitigate emissions under a variety of sectors. The importance of ecosystem-based climate change mitigation is reflected in the content of many NDCs, which include contributions with regard to emissions from the conversion and degradation of forests under both REDD+ and the broader category of Land Use Land Use Change and Forestry (LULUCF). Article 6 of the Paris agreement explains that if emissions reductions are transferred internationally, as is possible through results-based payments, these should be accounted for only against the NDC of the recipient (purchasing) country.

While not all mitigation actions in the LULUCF sector are aligned with biodiversity objectives, there is a vast scope for synergies between these objectives through restoration planned for multiple objectives (Strassburg et al., 2019). Crucially, substantial adverse impacts for biodiversity can arise from narrow-focused land-based climate mitigation strategies such as afforestation and massive increase in bioenergy crops (IPBES Global Assessment, 2019).

Among the five activities encompassed by REDD+, the enhancement of carbon stocks could be carried out through the restoration of degraded forest ecosystems. The restoration of ecosystems also counts towards reducing deforestation and degradation, as both are based on net measurements. Depending on the specific

⁴ Principle 4 now reads: “4. Conserve and enhance natural ecosystems within landscapes – FLR stops further deforestation and degradation of natural forests and other ecosystems, and enhances the recovery, conservation, and sustainable management of forests and other natural ecosystems. It improves the quality and resilience of forests and other natural ecosystems, particularly with regard to species and genetic diversity.”

actions implemented in support of these activities, as well as their location, REDD+ national strategies may also support a number of other ABT.

To be eligible for results-based payments for REDD+ under UNFCCC, developing countries are expected to submit a summary of information on how the “REDD+ safeguards” specified within the Cancun Agreement are addressed and respected, including safeguard (e)⁵ on natural forests and biodiversity.

A review of nationally determined contributions (NDCs) under the UNFCCC found several examples of quantitative ecosystem-based mitigation targets (including REDD+) but few examples of how these targets relate to NBSAP implementation. As is the case with the Bonn Challenge given the scale of ecosystem-based actions under some of the CBD parties’ NDCs, they may wish to refer to these already existing national commitments in determining what level of ambition is relevant for an ecosystem restoration target under the post-2020 framework.

2.3.5 Ramsar Convention on Wetlands

In 2016, The Fourth Ramsar Strategic Plan 2016–2024 was released with the vision that “Wetlands are conserved, wisely used, restored and their benefits are recognized and valued by all.” Contracting Parties should implement the Strategic Plan at national and regional levels by developing national wetlands policies, strategies, action plans, projects and programmes or other appropriate ways to mobilize action and support for wetlands. This can be part of or supplement to the National Biodiversity Strategy Action Plan. Each Party is encouraged to establish its own priorities within the Strategic Plan, develop its own work plan for implementing them, and consider its own use of its own resources. This strategic plan should be implemented as a contribution to the other internationally agreed environmental goals and targets.

The Goals and targets of the 4th Strategic Plan have been formulated in recognition of the fact that a new approach is needed in order to change the negative direction of the current trends of accelerating degradation and loss of wetlands and shows the synergies between CBD Aichi Biodiversity Targets and Ramsar Targets. Ramsar target 12 in particular is directly related to wetland restoration and ABTs 14 and 15: “Restoration is in progress in degraded wetlands, with priority to wetlands that are relevant for biodiversity conservation, disaster risk reduction, livelihoods and/or climate change mitigation and adaptation.” The indicators are essentially the percentage of Parties that have established restoration plans for Ramsar sites and the percentage of Parties that have implemented effective restoration or rehabilitation projects, using as baseline National Reports to COP 12. Differently from ABT 15, it does not have a specific percentage value in area of degraded ecosystems to be restored by the deadline.

In 2018, the Parties contracting to the Ramsar Convention on Wetlands, at the 13th Meeting of the Conference of the Contracting Parties (COP 13) , adopted Resolution XIII.13, on restoration of degraded peatlands to mitigate and adapt to climate change and enhance biodiversity and disaster risk reduction, and also Resolution XIII.14, promoting conservation, restoration and sustainable management of coastal blue-carbon ecosystems. Both resolutions were proposed in synergy with commitments not only under the Ramsar Strategic Plan but also under different multilateral environmental agreements, such as CBD, UNFCCC and the Paris Agreement, and the United Nations Convention to Combat Desertification.

⁵ (e) Actions are consistent with the conservation of natural forests and biological diversity, ensuring that actions referred to in paragraph 70 of this decision are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits;¹ (¹Taking into account the need for sustainable livelihoods of indigenous peoples and local communities and their interdependence on forests in most countries, reflected in the United Nations Declaration on the Rights of Indigenous Peoples, as well as the International Mother Earth Day).

2.3.6 Sustainable Development Goals

Some elements of restoration-related ABT are reflected in the Sustainable Development Goals (SDGs) and targets, adopted by the UN General Assembly in 2015. SDG 15 in particular is aimed at protecting, restoring and promoting the sustainable use of terrestrial and inland freshwater ecosystems, sustainably managing forests, combating desertification, halting and reversing land degradation and halting biodiversity loss. SDG 14 aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development, including taking action for the restoration of marine and coastal ecosystems.

SDGs has stimulated renewed interest in ecosystem restoration and rehabilitation. There have been analyses for land restoration and rehabilitation achieving the SDGs (IRP, 2019), concluding that both the process of land restoration and rehabilitation, and the restored land, can have significant co-benefits for all the SDGs. Yet, there is an opportunity for this focus for marine and coastal restoration.

Most of the 169 SDG targets have a deadline of 2030. However, 21 of these targets will mature in 2020 (or have no explicit deadline). The reasons for these 2020 deadlines vary but most of these targets are aligned with other UN agreements or plans which have 2020 timeframes. Twelve targets integrate elements of the ABT, and 6 of which are directly related to restoration:

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

This deadline of 21 SDG targets in 2020 represents a first decisive challenge to the success of the 2030 Agenda for Sustainable Development. A plan of action is needed to transition the maturing targets beyond the 2020 deadline in order to maintain the possibility of achieving the SDGs by 2030. In the case of the 12 biodiversity targets, these agreements will include the newly agreed global biodiversity framework to be negotiated at the 2020 Convention on Biological Diversity's 15th session of the Conference of the Parties in China.

There are several options for action on the maturing targets. Excluding scenarios that imply to do nothing or to reopen the SDG framework for negotiation, there are three feasible scenarios for ensuring a future for the maturing targets (WWF, 2019):

1. Extend the delivery date of the maturing targets;
2. Agree on content for extended and updated targets; and
3. Agree on a process to extend and update the targets.

Regardless of the option that is pursued, it is critical that it is aligned with the overarching ambitions and deadlines of the 2030 Agenda and the post-2020 global biodiversity framework. Therefore, the CBD regional and thematic consultation workshops can play a crucial role in this process to address the future of maturing targets.

3. ELEMENTS ON ECOSYSTEM RESTORATION FOR THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

This section is organized around four themes for consideration in relation to a successor to ABT 15 and aspects related to ecosystem restoration relevant to the wider post-2020 global biodiversity framework, each of which will be discussed during the ‘world café’ on Day 2 of the consultation. For each theme, a discussion of concepts and key issues is presented, followed by some ‘guiding questions’ that can be used to structure the discussion of these elements during the workshop.

3.1 Principles to guide the development of goals and targets

This station will discuss the scope and guiding principles of the goal and targets on ecosystem restoration (qualitative elements).

Examples of qualitative principles that may be included in a global goal on ecosystem restoration include:

- i) Representativeness of all terrestrial, freshwater, marine and coastal ecosystems and types of ecosystems to be targeted by ecosystem restoration (e.g. natural habitats, biomes, ecoregions, ecosystems that provide essential services, and degraded ecosystems);
- ii) Desired outcomes of ecosystem restoration, bearing in mind the need to balance the objectives of conservation of biodiversity and sustainable use.
- iii) Connectivity to facilitate species movements between habitat patches and inter-linkages between terrestrial, freshwater, marine and coastal ecosystems;
- iv) Cost-effectiveness to maximize outcomes (benefits) and minimize costs (that is, maximizing return-on-investment);
- v) Integrated landscape/seascape approach to allow for regaining ecological functionality and enhancing human well-being across degraded ecosystems, by reconciling conservation and sustainable production; this principle should address the need for interventions to clearly identify the proportion of restoration of natural ecosystems embedded into wider landscape transformations; and
- vi) Types of restoration strategies to be considered, ranging from natural regeneration to active restoration interventions, depending on the potential of specific locations and ecosystems.

Guiding questions:

- Should specific targets distinguish among terrestrial, freshwater, marine and coastal ecosystems, and among spatial scales, levels of degradation and/or priorities for conservation?
- Which types of restoration strategies should be considered to achieve cost-effective ecosystem and landscape restoration and maximize its benefits?
- Which other qualitative principles should be part of the future targets for ecosystem restoration?

3.2 Global goal and targets for terrestrial, freshwater, marine and coastal ecosystem restoration including baselines and indicators

This station will discuss guiding metrics, baselines and indicators of the goal and targets on ecosystem restoration (quantitative elements). The goal and targets for ecosystem restoration should not be less ambitious than the Strategic Plan for Biodiversity 2011-2020 with the current plan serving as a starting

point. Quantitative elements of a post-2020 target on ecosystem restoration could build on existing list of indicators for which data is already being collected. New metrics, baselines and indicators can be proposed, bearing in mind their feasibility in practice.

Indicators should be: i) **policy relevant and meaningful** by assessing changes in the status of biodiversity (or pressures, responses, use or capacity), related to baselines and agreed policy targets if possible; ii) **biodiversity relevant**, addressing key properties of biodiversity or related issues as state, pressures, responses, use or capacity; iii) **scientifically sound**, based on clearly defined, verifiable and scientifically acceptable data, which are collected using standard methods with known accuracy and precision, or based on traditional knowledge that has been validated in an appropriate way; iv) **broadly accepted** by policy makers, major stakeholders and experts; v) **measurable in an accurate and affordable way** and part of a sustainable monitoring system, using determinable baselines and targets for the assessment of improvements and declines; vi) **based on achievable and quantifiable modelling**, in order to link pressures, state and response indicators; vii) **sensitive** to show trends and, where possible, permit distinction between human-induced and natural changes.⁶

Indicators need not be limited to an area or percentage area value and could include other dimensions of degradation such as levels of fragmentation and connectivity or current threat, population or area of habitat of species.

Outcome-based indicators could also be proposed, focusing either on ecological outcomes such as number of avoided extinctions or tons of carbon sequestered or socio-economic outcomes such as livelihoods and numbers of jobs created, or the value of ecosystem services restored. These outcomes may refer to the objectives of the Convention, so that the target is an expression of how (and to what extent) ecosystem restoration can contribute to the objectives of the conservation and sustainable use of biodiversity, vs other approaches such as protected area designation.

Guiding questions:

- What are the desired outcomes of ecosystem restoration and which indicators should represent them?
- Should there be targets, metrics, baselines (2020) and indicators at the global and regional level, or should these be exclusively at national level?

How should achieving a potential target for 2050 be distributed under milestones for 2030 and 2040 (e.g. should it be constant in the 3 decades, higher earlier on or higher later on?)

3.3 Linkages to other potential thematic areas within the post-2020 global biodiversity framework

This station will discuss the potential alignment and incorporation of goals and targets on ecosystem restoration with other potential goals and targets under the post-2020 global biodiversity framework.

Ecosystem restoration is a means to pursue the overarching objectives of the CBD to conserve biodiversity and ensure its sustainable use. Other targets may also be included under the post-2020 global framework on biodiversity that aim to achieve these objectives and the 2050 vision for biodiversity: targets or goals for area-based conservation measures, for the management of invasive species, or on reducing the loss and degradation of natural ecosystem, all connected to a target on ecosystem restoration.

This station will discuss the conceptual linkages that exist between ecosystem restoration and the overarching objectives of the CBD, and between ecosystem restoration and other measures to pursue these objectives. The aim would be to propose, in addition to elements of a post-2020 target on ecosystem restoration, observations on how targets on other measures may need to take into account a target on ecosystem restoration and vice-versa.

Guiding questions:

⁶ <https://www.cbd.int/indicators/indicatorprinciples.shtml>

- Should the post-2020 ecosystem restoration targets be explicitly linked to other themes (e.g. species conservation, protected areas, invasive species, climate change)? If so, how?
- Which other measures (e.g. capacity building, financing needs, technology transfer) to achieve the objectives of the CBD are linked to ecosystem restoration and how?
- How does ecosystem restoration contribute to the achievement of the objectives of the CBD, possible milestones in 2030 or 2040, as well as the 2050 Vision?

3.4 Integrating existing goals/targets from other international instruments

This station will discuss the integration between goal and targets on ecosystem restoration with other international instruments and conventions (strengthening the potential for ecosystem restoration). It is key to link the goal and targets on ecosystem restoration with other related international instruments and conventions, such as: i) the 2030 Agenda for Sustainable Development; ii) the Paris Agreement; iii) the Rio Conventions; iv) the other biodiversity conventions; v) the Bonn Challenge; and vii) the Ramsar Convention. In this respect there is a need for policy coherence, integration and a holistic approach to the post-2020 global biodiversity framework.

Guiding questions:

- What are the synergies and trade-offs between goals and targets on ecosystem restoration and other international instruments and conventions?
- In order to capture synergies, finance and foster integrated planning, monitoring and reporting on ecosystem restoration, should the Post-2020 framework seek a closer alignment with the Climate Change Convention REDD+ mechanism? If so, how should credits for efforts be shared between financing countries and countries where restoration implementation takes place?
- How to ensure alignment, coherence and synergies between national targets for ecosystem restoration under the post-2020 global biodiversity framework and other international instruments and conventions that may contain ecosystem-based measures?
- How to minimize risks for achieving the goals of the CBD arising from ecosystem restoration-related actions in other international instruments (such as tree-planting in non-forest biomes)?

4. CONCLUSION

Outcomes from the Thematic Workshop on Ecosystem Restoration for the Post-2020 Global Biodiversity Framework will be reported at CBD SBSTTA 23 (in November 2019) and compiled into a report by the Co-Chairs for a meeting of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework as part of the process of developing the post-2020 global biodiversity framework.

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7 ANNEX 1: GLOSSARY

Active restoration (also known as *restoration planting*): The active growth and maintenance of seedlings in nurseries and the planting of seedlings in a systematic way. This includes establishment of restoration plantations, woodlots, agroforestry plots, silvopastoral systems, or biodiversity habitat corridors. Initial plantings often serve to stimulate natural regeneration where it would not otherwise be possible.

Agroforestry systems: According to Santos *et al.* (2019), an agroforestry system as a land management practice where trees, shrubs, agricultural crops, and animals are used simultaneously or sequentially to produce a large range of products such as timber, fiber, fruits, nuts, annual crops, medicinal plants, and oils.

Assisted natural regeneration (see *natural regeneration* below): Restoration strategy in areas that have the socioeconomic and ecological potential to regenerate from the seedbank or neighboring seed sources, but specific conditions impede success, human interventions are used to secure, catalyze, or enrich the process (SER 2019). Such interventions can include fencing, weed and/or fire control and enrichment planting. Farmer-managed natural regeneration, where farmers intentionally manage regrowing trees in their agricultural areas to secure a variety of benefits, is also included here. Assisted natural regeneration does not include intentional and systematic planting of seedlings grown offsite in order to create an agroforestry system

Baseline: A starting point utilized to enable future comparisons between data. In this case, the baseline is the current status of how much has been restored/degraded (Convention on Biological Diversity 1997).

Habitat fragmentation: Defined by Didham (2010) as the process by which habitat loss results in the division of large, continuous habitats into smaller, more isolated remnants

Landscape connectivity: The degree to which the landscape facilitates the movement of organisms (animals, plant reproductive structures, pollen, pollinators, spores, etc.) and other environmentally important resources (e.g., nutrients and moisture) between similar habitats (IPBES 2019).

Restoration cost-effectiveness: the degree to which some restoration action/plan is effective or productive in relation to its cost (Ding et al. 2017).

Ecological restoration is defined by the Society for Ecological Restoration (SER) as “the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed”. Ecological restoration uses the concept of a “native reference ecosystem” as a model for setting and evaluating restoration objectives. This reference model, derived from multiple sources of information, aims to characterize the condition of the ecosystem as it would be had it not been degraded, adjusted as necessary to accommodate changed or predicted change in biotic or environmental conditions, such as increases in temperature or variation in precipitation patterns caused by climate change. The reference model includes information on the community of organisms (flora and fauna) and abiotic components (non-living chemical and physical components of the environment) as well as ecosystem structure, functions, and relationships with the surrounding landscape. Ecological restoration is a process aimed at recovering ecosystem integrity and resilience, while delivering ecosystem services and insuring human well-being. The conservation and restoration of biological diversity is usually a primary goal.

Efficiency: Highest return per investment.

Forest (and) Landscape Restoration (FLR) – This concept emerged in 2000 and has since gained policy relevance, reflected by the adoption of the Bonn Challenge. The Global Partnership on Forest and Landscape Restoration (GPFLR) defines FLR as “a process that aims to regain ecological functionality and enhance human well-being in deforested or degraded landscapes. FLR is not an end in itself, but a means of regaining, improving, and maintaining vital ecological and social functions, in the long-term leading to more resilient and sustainable landscapes.”

Indicators: a measure based on verifiable data that conveys information about more than just itself. This means that indicators are purpose dependent - the interpretation or meaning given to the data depends on the purpose or issue of concern (Biodiversity Indicators Partnership, 2019).

Integrated landscape/seascape approach: the ongoing process of regaining ecological functionality and enhancing human well-being across degraded ecosystems. Types of ecosystems to be covered for terrestrial, freshwater, marine and coastal ecosystem restoration (e.g. natural habitats, biomes, ecoregions, ecosystems that provide essential services, and degraded ecosystems).

Land degradation: The United Nations Convention to Combat Desertification (UNCCD) defines land degradation as the reduction or loss of biological or economic productivity in rainfed cropland, irrigated cropland, or range, pasture, forest, and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as:

- soil erosion caused by wind and/or water;
- deterioration of the physical, chemical, and biological or economic properties of soil;
- long-term loss of natural vegetation.

It can refer to a temporary or permanent loss of productive capacity, a loss or change in vegetative cover, a loss of soil nutrients or biodiversity, or increased vulnerability to environmental and disaster risks.

Landscape approach: According to Sayer et al. (2013), “*Landscape approaches* seek to provide tools and concepts for allocating and managing land to achieve social, economic, and environmental objectives in areas where agriculture, mining, and other productive land uses compete with environmental and biodiversity goals”.

Metrics: represents the different methods used to measure change over time across a number of dimensions or criteria.

Natural regeneration: The spontaneous (meaning unassisted) natural recovery of forest cover from seeds or rootstocks already present in the soil or newly dispersing from neighboring forests. This type of restoration happens without human intervention, including site protection, and is often a by-product of unplanned land abandonment triggered by larger socioeconomic forces. Natural succession happens uninhibited and requires no support.

Representativeness: Include all natural ecosystems and its associated biodiversity and services (Austin and Margules 1986).

Rehabilitation: Refers to restoration activities that move a site towards a natural state baseline in a limited number of components (i.e. soil, water, and/or biodiversity), including natural regeneration, conservation agriculture, and emergent ecosystems (IPBES 2019).

Remediation: Any action taken to rehabilitate ecosystems (IPBES 2019).

Restoration: The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2019) has defined restoration as “any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state.” This definition covers all forms and intensities of the degradation state and in this sense, is inclusive of the definition adopted by the Society for Ecological Restoration (above). The term restoration itself does not have a widely agreed upon definition and can be used to mean a wide variety of activities, not necessarily compatible with each other.

Silvopastoral systems: According to Calle et al. (2013), “silvopastoral systems (SPS) enhance milk and meat production and are instrumental for the productive rehabilitation of degraded lands. Intensive silvopastoral systems (ISPS) combine fodder shrubs planted at high densities (> 10,000 plants ha⁻¹), trees and pastures. Scaling-up such systems requires incentives to address financial and knowledge barriers”.

S.M.A.R.T. target: Targets that are Specific, Measurable, Achievable/Agreed, Realistic and Time-bound.

Targets: an objective or result towards which efforts are directed.

7.1 Glossary references

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