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FRAMEWORK FOR ECOSYSTEM RESTORATION MONITORING

Convention on Biological Diversity

INFO NOTE

Monitoring and reporting suggestions for Target 2 of the post-2020 Global Biodiversity Framework

A contribution of the Task Force on Monitoring of the UN Decade on Ecosystem Restoration

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Contents

Abbreviations and Acronyms

ABT	Aichi Biodiversity Target
BIP	Biodiversity Indicators Partnership
CBD	Convention on Biological Diversity
FAO	Food and Agriculture Organization of the United Nations
FERM	Framework for Ecosystem Restoration Monitoring
GBF	Global Biodiversity Framework
GCRMN	Global Coral Reef Monitoring Network
GPG	Good Practice Guidance
GPI	Global Peatlands Initiative
GRO	Global Restoration Observatory
ICRI	International Coral Reef Initiative
IUCN	International Union for Conservation of Nature
NBSAP	National Biodiversity Strategy and Action Plan
Ramsar	Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SDG	Sustainable Development Goal
SEEA	System of Environmental Economic Accounting
SEPAL	System for Earth Observation Data Access, Processing and Analysis for Land Monitoring
SER	Society for Ecological Restoration
UNCCD	United Nations Convention to Combat Desertification
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
WCMC	World Conservation Monitoring Centre

Summary

This Information Document is prepared by the Food and Agriculture Organization of the United Nations as part of the UN Decade on Ecosystem Restoration Task Force on Monitoring, in collaboration with BIP, CBD, GRO, ICRI, IUCN, Ramsar, SER, UNCCD and UNEP-WCMC. It contains two main parts: Part 1 provides relevant background information on Target 2 of the post-2020 global biodiversity framework (GBF) and monitoring guidance; Part 2 proposes a draft methodology based on the guidance.

Part 1: Background information

1. Introduction

At the fifteenth meeting of the Conference of the Parties (COP) to the CBD, Parties are expected to adopt a post-2020 global biodiversity framework[1] as a roadmap towards the 2050 Vision of "Living in harmony with nature". In its decision 14/34[2], the COP adopted a comprehensive and participatory process for the preparation of the post-2020 global biodiversity framework. As part of that process, documents relating to the development of the post-2020 global biodiversity framework have been shared with and negotiated by Parties and stakeholders.

The negotiated formulation of Target 2 of the post-2020 global biodiversity framework after Open Ended Working Group (OEWG) 4th meeting in Nairobi, 21-26 June 2022 is:

> *"Ensure that [at least] [20] [30] [per cent]/ [at least [1] billion ha] [globally] of [degraded] [terrestrial,] [inland waters,] [freshwater], [coastal] and [marine]] [areas] [ecosystems] are under [active] [effective] [ecological] restoration [and rehabilitation] [measures] [, taking into account their natural state as a baseline [reference]], [with a focus on [restoring] [nationally identified] [[priority [areas] [ecosystems]] such as [threatened ecosystems] and [areas of particular importance for biodiversity]]] in order to enhance [biodiversity and ecosystem functions and services] [[ecological] integrity, connectivity and functioning] and [biocultural ecosystems managed by indigenous peoples and local communities] [, increase areas of natural and seminatural ecosystems and to support climate change adaptation and mitigation], [with the full and effective participation of indigenous peoples and local communities] [*] [and through adequate means of implementation] [*]"*
>
> *Headline Indicator 2.0.1: [Percentage][Area] of degraded [and] [or] converted ecosystems that are under [ecological] restoration*
>
> *Component indicator 2.2.1: Maintenance and restoration of connectivity of natural ecosystems*

The Twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to the CBD[3] was held in Geneva from 14 to 29 March 2022 to discuss a proposed list of indicators, including for Target 2, for consideration in developing the monitoring framework for the post-2020 global biodiversity framework. SBSTTA-24 recommended to establish an ad hoc technical working group to advise on further operationalization of the monitoring framework for the post-2020 global biodiversity framework[4].

The Secretariat of CBD has requested FAO, under the mandate of the UN Decade on Ecosystem Restoration Task Force on Monitoring, to prepare this Information Document with methodological guidance for monitoring Target 2.

2. Relevant initiatives supporting restoration monitoring

The Strategic Plan for Biodiversity 2011-2020, composed of 5 strategic goals and 20 targets (collectively known as the Aichi Biodiversity Targets), was adopted during CBD COP10 in 2010. It served as a flexible and overarching framework guiding the previous UN Decade on Biodiversity (2011-2020). In its mission, the Strategic Plan pointed out that "pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used". Parties have been actively developing National Biodiversity Strategies and Action Plans (NBSAPs) and strengthening capacities to address the biodiversity targets. The following sections present several ongoing initiatives supporting restoration monitoring, starting from the UN Decade on Ecosystem Restoration.

2.1. UN Decade on Ecosystem Restoration

On the 1st of March 2019, under Resolution 73/284, the United Nations General Assembly (UNGA) proclaimed 2021–2030

1 https://www.cbd.int/doc/c/914a/eca3/24ad42235033f031badf61b1/wg2020-03-03-en.pdf
2 https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-34-en.pdf
3 https://www.cbd.int/doc/c/f191/8db7/17c0a45b42a5a4fcd0bbbb8c/sbstta-24-l-10-en.pdf
4 https://www.cbd.int/doc/recommendations/sbstta-24/sbstta-24-rec-02-en.pdf

to be the United Nations Decade on Ecosystem Restoration (hereafter 'the UN Decade'), with the primary aim being to prevent, halt and reverse the degradation of ecosystems worldwide. To support implementation and scaling up, the UN Decade has established 10 principles serving to underpin restoration efforts[5]. Principle 9 'Monitoring and Management' highlights the importance of effective monitoring and reporting and is also essential to all three of the pathways described within the UN Decade Strategy, namely, building a global movement, generating political support, and building technical capacity (United Nations, 2021).

Monitoring the UN Decade's progress has the overall objective of contributing to the implementation of the UN Decade as well as to the UN Secretary-General's reporting to the UNGA at its eighty-first session (A/RES/73/284) in 2025.

2.2. The Framework for Ecosystem Restoration Monitoring

In March 2020, the UN Decade on Ecosystem Restoration Task Force on Monitoring (hereafter the Monitoring Task Force) was launched. Structured as a core Monitoring Task Force and with three sub-Task Forces (Terrestrial; Aquatic and Transitional; and Socio-Economic), it brings together hundreds of technical experts from over 100 organizations tasked with collaboratively developing a monitoring framework for the UN Decade. The monitoring framework for the UN Decade intends to support monitoring and reporting of the progress and achievements of ecosystem restoration for the UN Decade (2021–2030). The framework was subsequently created and named the Framework for Ecosystem Restoration Monitoring (FERM). A description of the Task Force can be found here: TF link.

Through an extensive consultative and analytical process, a set of 20 headline indicators were identified from existing formal country data collection processes. The report on headline indicators (FAO and UNEP, 2022), was launched at the XV World Forestry Congress in May 2022 and will also be presented in the High-Level Political Forum on Sustainable Development (beginning of July 2022). Headline indicators will allow monitoring of the progress of the decade using existing country statistical data collected through SDG reporting processes and will be reassessed on an annual basis by the Monitoring Task Force for relevant updates. Additionally, the FERM registry was launched at the XV World Forestry Congress to harmonize and collect information on ecosystem restoration projects and programs (**https://ferm.fao.org/**). The FERM data visualization geoportal has been developed to visualize progress and provide indicators and data to help practitioners to monitor ecosystem restoration (**https://data.apps.fao.org/ferm/**).

5 **https://www.decadeonrestoration.org/publications/principles-ecosystem-restoration-guide-united-nations-decade-2021-2030**

2.3. Global Forest Resources Assessment and Restoration Monitoring

FAO Global Forest Resources Assessment (FRA) is a well-established country-driven process of collection and compilation of and reporting on global forest resources, their management and uses. The FRA is based on official statistical data reported by the countries through a global network of FRA National Correspondents. The full FRA reporting cycle is five years, but FAO has been requested to develop a more flexible reporting process that would allow countries to provide more frequent voluntary updates on the key indicators.

FAO is the UN custodian agency for 21 SDG indicators. FRA is directly responsible for compiling the data for and reporting on the indicators 15.1.1 and 15.2.1 and leads the data production and reporting for the indicator 15.4.2.

At the 25th session of COFO in 2020, countries requested that "FAO in cooperation with Country Programming Framework (CPF) members and other restoration initiatives, prepare an information note for the 26th session of COFO that analyzes if and how reporting on restoration-related indicators to future FRA reports can streamline reporting for countries between multiple restoration initiatives". The information note[6] aims at assessing the potential value of using the FRA process to collect data on restoration potential, pledges, and implementation. Such reporting through the FRA could contribute to the improved monitoring and reporting mechanism of ecosystem restoration, an overall objective of the UN Decade and more specifically to the FERM.

2.4. UNCCD Land Degradation Neutrality Targets and National Reporting Process

The UNCCD 2018-2030 Strategic Framework[7] contributes to the 2030 Agenda for Sustainable Development, in particular to SDG 15 and target 15.3: "by 2030, combat desertification, restore degraded land, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world". Land degradation neutrality is defined as a "state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems[8]". It promotes a dual-pronged approach of measures to avoid or reduce degradation

6 The information note is available at: **https://www.fao.org/3/nj879en/nj879en.pdf**

7 UNCCD decision 7/COP.13 (**https://www.unccd.int/sites/default/files/sessions/documents/2019-08/7COP13_0.pdf**)

8 UNCCD decision 3/COP.12 (**https://www.unccd.int/sites/default/files/sessions/documents/2019-08/3COP12_0.pdf**)

of land, combined with measures to reverse past degradation. As of December 2021, 129 countries had committed to set their voluntary targets for achieving land degradation neutrality, and in 106 countries, governments had already officially endorsed these targets.

Through the UNCCD national reporting process, country Parties regularly report information on the proportion of land that is degraded over total land area (i.e. SDG Indicator 15.3.1), beginning in 2018 and every four years thereafter. In addition, starting from the 2022 reporting process, country Parties will be urged to report geospatial information on the location and extent of their voluntary land degradation neutrality targets and related implementation actions, thereby ensuring that they are quantifiable, spatially explicit and time-bound. National reporting is facilitated through the Performance Review and Assessment of the Implementation System, now at its fourth edition (PRAIS 4).

2.5. Group on Earth Observation Land Degradation Neutrality initiative

The Group on Earth Observation (GEO), with its over 100 national governments and over 100 Participating Organizations, is supporting country efforts to monitor land degradation through the Group on Earth Observation Land Degradation Neutrality (GEO LDN) Initiative. Launched at the GEO Week in 2018, the GEO LDN Initiative promotes collaborative development, and supports provision and use of Earth Observation datasets, quality standards, analytical tools and capacity building to avoid, reduce, and reverse land degradation with the aim of achieving LDN in all countries by 2030. With the GEO LDN Initiative, they have taken on one of the most difficult challenges countries face: harmonizing the myriad of data options and analytical tools into a work stream that is open to all, and capable of meeting the needs for international comparability while ensuring national ownership.

Tools such as such as Trends.Earth - an open-source GIS plugin which supports the computation of SDG Indicator 15.3.1 and its sub-indicators - help countries adhere to global standards while taking end-to-end ownership of the monitoring process, even when local capacity for analysis may be limited. Through the working groups of the GEO LDN Initiative, additional support tools that are inter-operational with Trends.Earth are being developed, such as the System for Earth observations, data access, Processing and Analysis for Land monitoring (SEPAL) module for SDG indicator 15.3.1. These aim to broaden the utility of SDG Indicator 15.3.1 and its sub-indicators for environmental analysis and decision support at the global, national and sub-national levels.

2.6. Group on Earth Observation Biodiversity Observation Network

In addition to GEO LDN, the Biodiversity Observation Network within the GEO family (GEO BON) represents biodiversity and is recognized as a partner by the CBD. One of its goals for 2025 is to foster and make functional a strong, balanced and sustained biodiversity observation community, based on shared resources and increased capacity.

Together with its scientific partners, GEO BON has introduced a set of global indicators integrating biodiversity observations, remote sensing data, and models to address important gaps in the understanding of biodiversity change across local, national and global spatial scales. One such indicator that directly addresses restoration is the Global Ecosystem Restoration Index (GERI). It is a composite index that integrates structural and functional aspects of the ecosystem restoration process. It was created to monitor and assess Aichi Biodiversity Target 15: Restoration of 15 percent of degraded ecosystems.

Currently, GEO BON is focusing its efforts on the implementation and adoption of the Essential Biodiversity Variables (EBVs) and related monitoring guidelines and interoperable data management systems and through targeted capacity building efforts at the national and regional level. By 2025, GEO BON aims to facilitate the development or enhancement of at least 25 national biodiversity observation systems that can contribute to regional and global biodiversity assessments.

2.7. The G20 Global Initiative on Reducing Land Degradation and Enhancing Conservation of Terrestrial Habitats

Launched at the G20 Leadership Summit in November 2020, the initiative sets a collective ambition of 50% reduction in degraded land by 2040[9]. The communiqué summarizing the agreed focus of the Initiative explains that it aims to support existing efforts to prevent, halt, and reverse land degradation and habitat loss through sharing of knowledge and best practices on protecting, conserving, sustainably managing, restoring, and rehabilitating degraded land, and by showcasing and disseminating publicly available data and information on degraded lands and conservation/restoration efforts[10]. The initiative will also contribute to capacity building and encourage greater private sector support and public engagement in land restoration efforts. The initiative focuses

9 See para 30 in the G20 Leaders Declaration: **http://www.g20.utoronto.ca/2020/2020-g20-leaders-declaration-1121.html**

10 See para 9 in the G20 Environmental Ministers Communiqué: **http://www.g20.utoronto.ca/2020/2020-g20-environment-1122.html**

on complementing and supporting existing efforts while striving to avoid any duplication of efforts. The Initiative will seek synergies with existing relevant initiatives including the UN Decade on Ecosystem Restoration and the implementation of the post-2020 Global Biodiversity Framework.

This vision has been supported by a decision taken by the UNCCD Conference of the Parties, at its fifteenth session (COP15) in May 2022, which requests the UNCCD secretariat to collaborate with appropriate secretariats and other initiatives, as well as relevant scientific and technical partners, to produce an interactive report on the total global ambition for land restoration, including all measures to avoid, reduce and/or reverse land degradation, aggregated from the array of area-based commitments (quantifiable in hectares and spatially explicit with a clear reference year, or in a percentage that is translatable into hectares) countries have made under different conventions, goals and targets[11].

2.8. Ramsar Strategic Plan 2016 – 2024

In 2016 the 4th Ramsar Strategic Plan[12] was launched after countries agreed, in 2015, for the first time a set of coherent policies, frameworks, and commitments across the international community. The aim of the 4th strategic plan is to be congruent both with all the SDG goals, particularly SDG targets 14.2 and 15.1 and with the Aichi Biodiversity Target 15 (many of which have in turn been incorporated into the SDGs) (Ramsar Convention Secretariat, 2016).

Among the different Ramsar Strategic Plan Targets, Target 12 specifically contributes to the restoration of the wetland ecosystems with the following definition:

"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."

Ramsar provides baselines in terms of a) 68% of Parties that have identified priority sites for restoration and b) 70% of Parties have implemented restoration programmes, both as informed through national reports to COP12. The convention suggests using indicators to monitor the progress of wetland restoration by measuring a) % of Parties that have established restoration plans or activities in the priority sites or b) % of Parties that have implemented effective restoration projects. It is also suggested further development on indicators that can measure the extent of wetland restoration possibly using remote sensing techniques (Ramsar Convention Secretariat, 2016).

2.9. International Coral Reef Initiative

The International Coral Reef Initiative (ICRI) is a global partnership with a membership of countries and organizations to preserve the world's coral reefs and associated ecosystems. The 45 member countries are custodians of over 75% of the world's coral reefs. ICRI has engaged with the CBD Post-2020 Global Biodiversity Framework since 2018. In the ICRI Resolution on Restoration (2019) "ICRI recognises that reef restoration is a valid management option in areas when natural recovery is eroded, and that restoration can complement other actions to support reef resilience". Within the Recommendation on inclusion of coral reefs within the Post-2020 GBF (2020) ICRI reiterated the important role that restoration must play in achieving the objectives of the GBF.

In 2021, ICRI adopted an addendum to its consensus recommendation for the inclusion of coral reefs in the GBF in 2020. The addendum focuses on the relevance of Target 2 to coral reef ecosystems and in particular recommended the inclusion within the monitoring framework of an indicator to measure the integrity of the area of coral reefs under restoration "Live Coral Cover in restored coral reef areas". This proposed indicator is a composite indicator that combines information from the Live coral cover metric (already recommended by ICRI and reported on by the Global Coral Reef Monitoring Network (GCRMN) In the 2020 Status of Coral Reefs of the World Report, an Essential Ocean Variable identified by the UNESCO Intergovernmental Oceanographic Commission's Global Ocean Observing System (GOOS) and widely implemented and included within the draft GBF monitoring framework), with the Restored Reef Areal Dimension (RRAD) indicator, which is recommended as a Universal Metric by the Coral Reef Consortium. This indicator provides an approximation of the overall reef area in which corals are planted and the area that restored corals have contributed to increased live coral cover over time. This metric is valuable as it provides guidance for reporting standardized project size and area of restored reef to gauge the overall impact and success of a restoration project.

It is noted this indicator provides valuable initial information on the action aspect of the target, but it is not sufficient to measure an outcome of improved ecological integrity or connectivity. Further guidance is available in the recent ICRI/UNEP publication "Coral Reef Restoration as a strategy to improve ecosystem services –A guide to coral restoration methods[13]" and information available in CRC Coral Restoration Database[14] (Appendix 3), and 2) An Evaluation Tool for Coral Restoration (modified from Lirman *et al.*, 2017).

11 For the advance limited distribution version of this decision, see para 9 in ICCD/COP(15)/CST/L.3: https://www.unccd.int/sites/default/files/2022-03/ICCD_COP%2815%29_CST_3-2202480E.pdf

12 https://www.ramsar.org/sites/default/files/documents/library/hb2_5ed_strategic_plan_2016_24_e.pdf

13 https://wedocs.unep.org/handle/20.500.11822/34810;jsessionid=1AECEACC84CA23FBF90B3AD2373EEECF

14 https://oref.maps.arcgis.com/apps/View/index.html?appid=666410e8008744cab5847421eb5f70d6

3. Monitoring guidance

The CBD acknowledged the challenges of measuring ecosystem restoration, specifically for Aichi Biodiversity Targets (ABTs) 5 and 15[15]. Expanding from the information document **Updated Assessment of Progress Towards Aichi Biodiversity Targets 5 and 15**, relevant practical challenges and lessons learned are highlighted:

Many different metrics (very eco-specific) exist to measure degradation and restoration, but baselines and targets are needed.

- Restoration cannot be achieved without addressing the underlying drivers of degradation.
- Separate targets might be needed for the reduction of ecosystem loss and degradation and for the restoration of ecosystems.
- A successor target to ABT 15 could focus on benefits for biodiversity and other benefits expected from ecosystem restoration, rather than area alone.
- A successor target to ABT 15 could include sub-targets for the restoration of a variety of ecosystems, avoid the transformation of natural ecosystems or to the notion of representativeness of a variety of ecosystems in the restoration process.
- A successor target to ABT 15 could use several rather than one single metric to set the bar of global ecosystem restoration efforts.

I. Large-scale, quantitative, spatially-explicit conservation planning exercises help to evaluate where conservation activities can achieve the greatest benefits and identify scenarios with different alternatives.

Observing these limitations and recommendations, although not responding to all the needs, this section proposes a methodological approach with the use of indicators that can respond to some of the needs to report on restoration in all ecosystems.

3.1. Definitions

It will be necessary to use a common definition at least of the following concepts to allow for a joint and manageable monitoring and reporting process, and comparable results.

a. Ecosystem[16]:

Within the article 2 of the CBD, ecosystem is defined as:

"Dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit."

b. Degraded ecosystem:

No definition was found from the CBD or other conventions, it is defined by (Dunster and Dunster (1996) as:

"An ecosystem where, due to any process or activity, the viability of ecosystem functions and processes, and hence biodiversity, have been removed or lessened."

c. Ecosystem restoration:

Within the UN Decade, ecosystem restoration is defined as:

"The process of halting and reversing degradation, resulting in improved ecosystem services and recovered biodiversity. Ecosystem restoration encompasses a wide continuum of practices, depending on local conditions and societal choice (UNEP, 2021).

Within the CBD post-2020 process, ecosystem restoration is described as follows[17]:

"Restoration may include: (a) restoring converted areas back to natural states; (b) improving the ecological integrity of degraded natural areas; and (c) rehabilitating converted and degraded areas (e.g. degraded agricultural lands) to improve both productivity and integrity."

d. Ecological restoration:

Ecological restoration is one specific type of ecosystem restoration. According to CBD, it is defined as:

"The process of managing or assisting the recovery of an ecosystem that has been degraded, damaged or destroyed as a means of sustaining ecosystem resilience and conserving biodiversity."

The Society for Ecological Restoration (SER) defines ecological restoration as ***"the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed."*** (Gann *et al.*, 2019).

The CBD Secretariat and SER have provided a glossary to help distinguish different versions of restoration and explain how they intersect (CBD Secretariat and SER, 2019).

15 https://www.cbd.int/doc/c/fcd6/bfba/38ebc826221543e322173507/post2020-ws-2019-11-03-en.pdf

16 https://www.cbd.int/kb/record/article/6872?RecordType=article

17 https://www.cbd.int/doc/c/e823/b80c/8b0e8a08470a476865e9b203/sbstta-24-03-add2-rev1-en.pdf

e. Rehabilitation:

Management actions that aim to reinstate a level of ecosystem functioning on degraded sites, where the goal is renewed and ongoing provision of ecosystem services rather than the biodiversity and integrity of a designated native reference ecosystem (Gann *et al.*, 2019).

Rehabilitation is another type of ecosystem restoration. A way to distinguish ecological restoration and rehabilitation is to distinguish between ecosystems that are in their natural state and transformed ecosystems.

f. Ecological connectivity is defined as[18]:

"The unimpeded movement of species and the flow of natural processes that sustain life on Earth".

g. Ecosystem integrity definition[19]:

"An ecosystem is generally understood to have integrity when its dominant ecological characteristics (e.g. elements of composition, structure, function, and ecological processes) occur within their natural ranges of variation and can withstand and recover from most perturbations."

Ecosystem integrity is an essential element in Goal A. Discussion is going on regarding whether to have it in the final negotiated version of Target 2. Parties to the CBD are also working to adopt a consistent and accurate method to define, measure and operationalize it.

3.2. Time period for monitoring

Monitoring area under restoration is planned for a 10-year period (2021-2030) in accordance with the duration of the UN decade on Ecosystem Restoration. This period coincides with the one proposed by the post-2020 GBF to stabilize the trends that have exacerbated biodiversity loss in the next 10 years (by 2030), and therefore allow for the recovery of natural ecosystems in the following 20 years, with net improvements by 2050 to achieve the Convention's vision of "living in harmony with nature by 2050[20]".

3.3. Proposed technical options

- To the extent possible, restoration monitoring workflow should build on existing and well-established reporting processes, practices and principles. Methodological guidance, training materials and integration into existing reporting procedures, will facilitate linkages between existing reporting processes. The reporting should be country-driven and based on best available data. The indicators should have reasonably good global and regional coverage and they should be reported using standard quality flags of the SDG reporting.

- Spatial data is important for calculating total area and connectivity. To support [spatially explicit] country reporting, FAO could compile country-validated data through the existing reporting procedures and make available relevant geospatial and other data. These data could include:

1. Extent of restoration initiatives in all ecosystems evaluated based on compilation of spatially explicit data available in the FERM registry (e.g. flagship initiatives, formally submitted by countries), and in coordination with other restoration platforms ensuring interoperability.

2. Connectivity metrics calculated for restoration areas as identified in the previous point.

- Reporting of restoration results is recommended to be centralized through the FERM registry, which aligns with other restoration platforms and inter-governmental processes under MEAs aiming to remove duplicity.

- Interim to the formal 5-yearly reporting, a dashboard of progress will be used to show annual progress using existing country data (20 headline indicators) and voluntary information on restoration initiatives, such as the Restoration Flagships submitted by countries and regional, governmental entities through the FERM Registry.

- FAO and partners will provide assistance to activate the necessary capacity building actions, platforms and methodologies to support the reporting of target 2 and the communication of results.

- Non-official data from scientific literature and other platforms could also be potential data sources. The FERM registry can compile such data for country validation before reporting. For example, resources developed by ICRI's ad hoc committee (guidelines, restoration database etc.) on restoration to highlight best practices and guidance on coral reef restoration as well as monitoring protocols, which are made available via the ICRI Restoration Hub. This will increase technical capacity. The GCRMN may be able to support this further to validate the indicators.

18 https://www.cms.int/sites/default/files/document/cms_cop13_res.12.26_rev.cop13_e.pdf
19 https://www.cbd.int/doc/c/e823/b80c/8b0e8a08470a476865e9b203/sbstta-24-03-add2-rev1-en.pdf
20 https://www.cbd.int/doc/c/abb5/591f/2e46096d3f0330b08ce87a45/wg2020-03-03-en.pdf

3.4. Monitoring ecological connectivity

After the Twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) held in Geneva in March 2022, an expert workshop (Ecological connectivity –Insights for application and measurement from 20 to 21 of April 2022) was held to discuss indicators for ecological connectivity. The indicators proposed were divided into component and complementary.

- Component: 2.2.1 Maintenance and restoration of connectivity of natural ecosystems
- Complementary indicators:
    - ◊ T2.5 Forest Landscape Integrity Index
    - ◊ T2.9 Connectivity Status Indicator for the World's Rivers
    - ◊ T2.11 Bioclimatic Ecosystem Resilience Index

Part 2: Draft methodology for area-based estimates

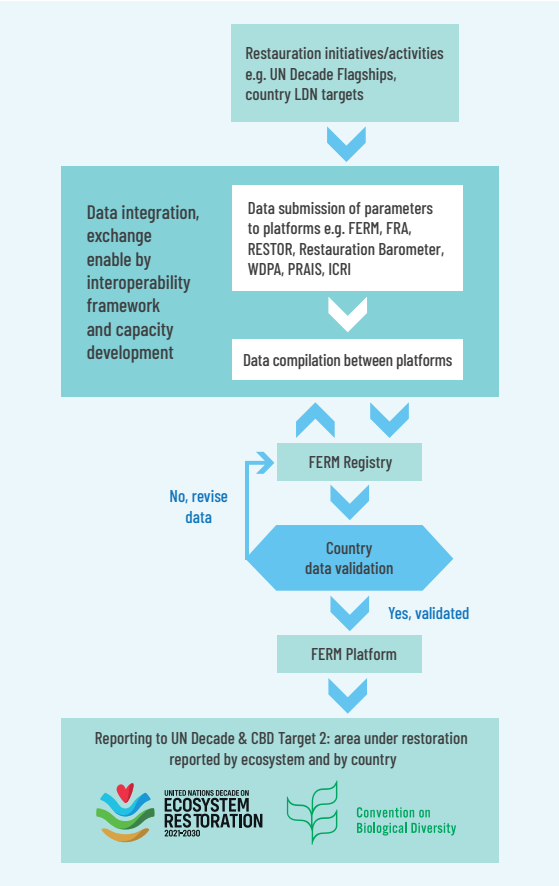
1. Rationale

The UN Decade intends to compile area-based estimates of restoration, with methodological development during 2022, and the first data compilation during 2023, to support annual reporting of restoration progress by December 2023. Monitoring and reporting against CBD post-2020 Global Biodiversity Framework Target 2 (restoration) can also be supported, to remove duplication of effort and to ensure monitoring and reporting alignment between the UN Decade and the CBD restoration target. As identified in the associated Information Note, the UN Decade intends to leverage all existing data collection processes, however, there is currently no single mechanism for collecting area-based information on ecosystem restoration. To fill this gap, the following methodology is proposed to generate area-based estimates for restoration for both the UN Decade and CBD Target 2.

2. Workflow summary

At the moment, there is no mechanism for collecting area-based information on ecosystem restoration. FAO and key partners from the Monitoring Task Force of the UN Decade on Ecosystem Restoration are defining a methodology for data collection, compilation, and reporting (Figure 1).

Figure 1. Workflow for data reporting of area under restoration



The primary platforms and reporting mechanisms for collecting information on restoration areas include the Framework for Ecosystem Restoration Monitoring (FERM), Sustainable Development Goals (SDGs), Restor, Restoration Barometer, UNCCD's Performance Review and Assessment of the Implementation System (PRAIS), World Database for Protected Areas (WDPA), the Global Forest Resource Assessment (FRA), International Coral Reef Initiative (ICRI), Ramsar, UNFCCC and other REDD+ reporting mechanisms.

The Monitoring Task Force will work with platform developers to harmonize the data collected by each platform and ensure that they are collecting the data parameters for reporting on areas under restoration. The Project Information Sharing Framework from the Global Restoration Observatory (GRO)[21] provides a useful framework for interoperability between platforms. The goal of interoperability between the key restoration platforms is to enable the exchange and integration of data from different sources, to have an API that will share data seamlessly between platforms, reducing duplication of effort, reporting burden, and the likelihood of double counting of restoration areas.

Restoration initiatives, led by public entities, private sector, civil society and individuals can share area based data and

21 https://globalrestorationobservatory.com/restoration-project-information-sharing-framework/

additional parameters for reporting area under restoration through any of the key identified platforms. FAO will compile data from the key platforms and harmonize the data through the FERM registry so long as data providers, be they national institutions or private sector, have consented to share those data with the UN Decade. Spatially explicit area information is strongly recommended; as such, information will be used to transparently share the areas under restoration, restoration commitments and areas successfully restored, as well as calculate the connectivity metrics between ecosystems. The additional parameters will assist in avoiding double counting and providing disaggregated estimates for different reporting mechanisms. A quality assurance quality control (QA/QC) procedure in the FERM registry will be defined to include only complete and relevant data in the estimate and avoid double counting.

FAO, jointly with the Task Force and the CBD secretariat, will identify country representatives that will complete the data validation and reporting for Target 2 and UN Decade area based estimates. The country representatives will be presented with a pre-compiled form in the FERM registry, based on the data compilation from the various platforms. Countries will have the opportunity to modify the information in the FERM registry, add additional areas under restoration and define which information is shared through the FERM platform. Additionally, countries that have passive restoration (natural succession) that is not being overseen by a particular entity will be invited to record the area of restoration through the FERM registry. This process is referred to as country validation.

There will be capacity development opportunities for collecting geospatial information on restoration areas and activities and entering data to the FERM registry. Support will be provided to UN Decade Flagships, Global Environment Facility (GEF) projects, and additional funding will be required to expand capacity development efforts.

Depending on the data source, the compiled data by ecosystem is classified into tiers before the country validation process to facilitate transparent communication of where the data originates from and if it has already undergone prior country validation to avoid the duplication of validation efforts. The tier classification will be applied to the data sources for the country validation and only officially validated data will be published in the FERM platform. The tiers for the data sources are defined as:

- Tier 1: Estimated data from non-official sources (e.g. produced by non-government organizations or from scientific literature).
- Tier 2: Estimated data from official sources (e.g. produced by custodian agencies).
- Tier 3: Country data. Country directly reported data.

For the country validation process the data will be aggregated at the national scale by ecosystem, when possible. Possible validation outcomes are: a) country validates as country data; b) approval of publishing the data as estimated data; c) rejection of publishing the estimated data; d) non-response - data reported as estimated data. Validated statistics, aggregated from data validated as country data or estimated data on areas under restoration will be reported to the CBD and in the annual reporting mechanism of the UN Decade.

3. Data parameters

The data parameters for area under restoration include information for directly deriving relevant information on area under restoration and additional parameters for ensuring the quality, consistency and transparency of the data reported. Table 1 outlines the data parameters recommended for reporting area under restoration under three broad groups: area, status, and additional information. Area is used to measure the extent of restoration and ecosystem being restored for aggregation and disaggregation. Status provides an indication of whether an area being reported can be counted towards a reporting period. Additional information helps identify potential duplicates from multiple platforms. It is also used for filtering restoration initiatives and areas for different reporting processes.

Specifically:

1. **Committed area to restore** includes pledges, targets or commitments by country or conventions. This parameter will not be counted as area under restoration but will serve as a reference to monitor restoration progress. Therefore, they should be included in the reporting process, when possible. Data type: tabular.

2. **Area under restoration** and **3**. **Ecosystem** describe the area where restoration, whether active or passive, is happening. Area under restoration will be reported by ecosystem and by country (if the area spans multiple boundaries). This parameter is only inclusive of ongoing restoration initiatives with ongoing restoration activities. The source of the area under restoration estimates will be identified based on the platform that the estimates were derived from and will distinguish officially reported data, already validated by countries and unofficial data from non-state actors. Spatially explicit information on restoration areas is highly encouraged but not a requirement. Two data types are accepted, described as the following:

I. Tabular

Tabular value is only allowed if it is **country-level** data compiled from global or regional reporting processes. In this case, only tabular data will be reported for the area under restoration. Disaggregation by ecosystems may or may not be available, depending on the data sources.

II. Spatially explicit

A. If data is directly entered into the registry as a component of an initiative, or compiled from other restoration initiative platforms: **a point location or administrative boundary** (using GAUL administrative level 1 or 2) shall be provided as a minimum requirement. Additional tabular data will be required for the area under restoration by ecosystem, consistent with the reporting ecosystem classification system and by country. The default IUCN ecosystem map will be provided based on the overlay with GAUL and will propose ecosystem options to be confirmed.

B. If spatially explicit information of a restoration initiative is provided and represents the entirety of the area under restoration (i.e. **polygons** of the areas are provided), the restoration area by ecosystem and by country is calculated based on a map overlay. The default IUCN ecosystem map will be provided and recommended for use. If the default map is unsuitable or does not represent the ecosystem under restoration, countries will have the option to provide their own ecosystem map, using the reporting ecosystem classification system.

Full spatially-explicit data is required for calculating the component indicator on ecosystem connectivity.

In exceptional cases, a restoration initiative might have neither tabular nor spatial information on the extent. For example, an initiative that distributes seedlings to residents. It is possible to register such initiatives in the FERM registry, however, area under restoration will NOT be reported.

It is recommended to use a global ecosystem dataset to make the map overlay that covers aquatic and terrestrial ecosystems. Available global ecosystem maps were evaluated and the outcome of the analysis found the most detailed and complete information is provided by the IUCN Global Ecosystem Typology 2.0 (Keith *et al.*, 2022). The IUCN Global Ecosystem Typology 2.0 is the outcome of critical review and input by an extensive international network of ecosystem scientists, containing profiles for 25 biomes and 108 ecosystem functional groups (EFGs). Biomes (level 2 of IUCN typology 2.0) are components of the biosphere united by one or more major assembly processes that shape key ecosystem functions and ecological processes, irrespective of taxonomic identity. There are similarities between IUCN biomes and UN decade ecosystems that allow Biomes to be used for disaggregation by ecosystems for reporting.

4. **Restoration status** will provide an indication of whether the restoration area can be counted towards a reporting period. Restoration status is broken down into four components and an area specifies one status. Each restoration status is characterized by a temporal component, which includes the start date of the restoration activities and end date, if applicable. Information on the start and end date will be compared to the baseline and monitoring reporting periods for CBD reporting and UN Decade reporting and enable reporting to multiple conventions by sub-setting the data by date. Temporal components might be difficult to define for areas with passive restoration and further instructions will need to be provided. The restoration status is characterized by three phases, in preparation, in progress and post-completion monitoring, described as the following:

- **In preparation:** enabling environment, funds committed, area gazetted for restoration, activities have not yet begun and impacts of restoration are not yet measureable.

- **In progress**: ongoing restoration activities and depending on the time that the activities have been ongoing, impacts may start to be measurable.

- **Post-completion monitoring**: restoration activities completed and efforts in place to monitor the restoration results. It is acknowledged that an area will not be restored as soon as activities are completed, therefore, post-completion assessments on the restoration status shall be made periodically. The four possible values are:

  ◊ restored

  ◊ under restoration

  ◊ degrading or degraded

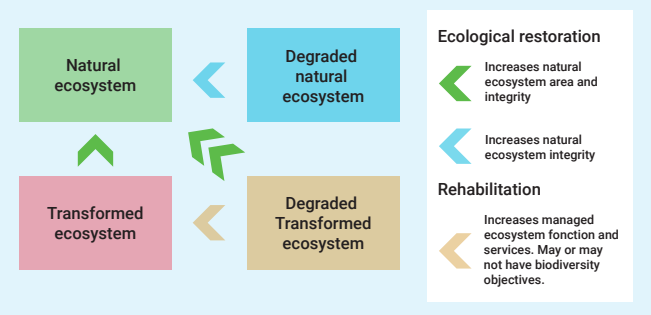
  ◊ unknown - no longer being monitored

Areas that are considered “in preparation” will count towards the area committed to restore. Areas with the status “in progress” and “post-completion monitoring-under restoration” will be reported as “under restoration”. An area can be considered to be “restored” when all key ecological attributes resemble those of the natural ecosystem reference that is the target of restoration, thus requiring high ecological integrity (Gann *et al.*, 2019). For successfully restored areas, it is encouraged to continue monitoring and assessing the status periodically. Efforts should be made to prevent new degradation and maintain the restored status. They will be reported as “area restored” as long as the status remains restored.

5. **Type of restoration**. The possible values are ecological restoration and rehabilitation. This can be determined by analyzing the current and target ecosystem (natural or transformed). Examples of transformed ecosystems are: farmlands, forest plantation and urban ecosystems. As a useful rule of thumb, if the target ecosystem is natural, the restoration will be ecological restoration. If the target ecosystem is transformed, the restoration will be rehabilitation (see Figure 2). It has not been agreed if Target 2 will include both ecological restoration and rehabilitation

or just ecological restoration. However, regardless of whether rehabilitation ends in Target 2, rehabilitation will likely be a part of Target 10[22]. For reporting to the UN Decade, both ecological restoration and rehabilitation will be included. Data type: descriptive.

Figure 2.



Source: Future Earth and GEO BON, 2022.

6. **Restoration activity** describes what is being implemented on the ground in order to achieve restoration objectives. Activities are adapted from the Glossary of restoration interventions of the TEER initiative. They are divided into two main categories (biophysical and enabling) and secondary categories according to the IPBES report (IPBES, 2019). Implementing enabling activities often corresponds to the preparation stage. Data type: descriptive.

7. **Lead entity** and 8. **Tenure status** provide information on the entity leading the restoration effort and legal status of the area under restoration. Information on tenure status should include documentation of Free and Prior Consent (FPIC) to ensure that people's rights are respected in the process of restoration and adherence to the UN Decade principles (FAO, IUCN CEM & SER, 2021) as well as the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) (FAO, CFS 2012). Data type: descriptive.

4. Method for compiling data and calculating total area

The data compiling will take place in a step-wise approach and aim for completeness in terms of coverage by ecosystem and by country.

Table1 is a summary of the data parameters and examples of data sources with corresponding tiers (tiers are defined in Section 5b). The working group will analyze each data source to extract the tabular estimates of area under restoration (ha). Tabular estimates form the basis of reporting and can be strengthened by countries as they develop capacity and ability to report on local spatially explicit data on area under restoration. Spatially-explicit data compilation includes data directly entered into the FERM registry, global reporting frameworks and restoration platforms that collect spatial information. It is required for calculating a component indicator on ecosystem connectivity.

22 Target 10 is currently worded as: Ensure all areas under agriculture, aquaculture and forestry are managed sustainably, in particular through the conservation and sustainable use of biodiversity, increasing the productivity and resilience of these production systems. (CBD/WG2020/4/4)

Table 1. Summary of data parameters and sources.

Group	Data parameter	Data type	Data source examples: official data (Tier 2 & 3)	Data source examples: unofficial data (Tier 1)
Area	Committed area to restore (ha)	Tabular	NDCs, NBSAPs, Bonn Challenge, Ramsar, PBL[23]	Nature Commitments[24], UN Decade Hub[25]
	Area under restoration (ha)*	Tabular	SDGs, FRA, PRAIS, REDD+ reporting mechanisms - LEAF, FCPF and Carbon Fund	
		Spatially explicit	FERM Registry, WDPA, PRAIS	ICRI, Global Mangrove Alliance[26], Restor, SER Restoration Resource Center[27]
	Ecosystem	Descriptive	UN Decade Ecosystems	
		Spatially explicit	IUCN Global Ecosystem Typology 2.0 (biomes)	
Status	Restoration status	Descriptive	FERM Registry, Restoration Barometer, WDPA	
Additional information	Type of restoration	Descriptive	FERM Registry	
	Activity	Descriptive	FERM Registry, TEER, WOCAT	
	Lead entity	Descriptive	FERM Registry	
	Tenure status	Descriptive	FERM Registry	

** Required field*

To calculate the total area under restoration and the coverage using spatially explicit data, UNEP-WCMC and IUCN (2022) provides a simplified methodology. Points will be buffered and merged with polygons on a single layer for calculating coverage. Overlapping areas in the spatially explicit data where the restoration status corresponds to under restoration will be counted only once to calculate the total area under restoration.

5. Quality assurance and quality control

All data submitted directly to the FERM registry or compiled from other platforms will go through a quality assurance/quality control (QA/QC) process. The quality QA/QC does not intend to verify if the area is correctly delineated or has the reported activities. Instead, the objective of QA/QC is to ensure that the data submitted are compliant with standards (minimum required fields, correct data types and formats, etc).

23 PBL Netherlands Environmental Assessment Agency published a report compiling countries' restoration commitments (Sewell A., van der Esch S. and Löwenhardt H., 2020).
24 https://naturecommitments.org/home
25 https://implementers.decadeonrestoration.org/implementers#initiatives
26 https://www.mangrovealliance.org/initiatives/
27 https://www.ser-rrc.org/project-database/

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Ramsar Convention Secretariat, 2016. The Fourth Ramsar Strategic Plan 2016–2024. Ramsar handbooks for the wise use of wetlands, 5th edition, vol. 2. Ramsar Convention Secretariat, Gland, Switzerland.

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Annex

Table 2 shows a comparison between several world ecosystem maps. The IUCN map is the only one with a comprehensive coverage of Earth's biosphere, encompassing terrestrial, subterranean, freshwater, marine and atmospheric environments, which is fundamental to cover all UN ecosystems. It also allows the reporting of area under restoration disaggregated by ecosystems using a standard terminology and definitions to promote consistent application.

The Global Ecological Zones (GEZ) developed by FAO (2012) are:

"A zone or area with broad yet relatively homogeneous natural vegetation formations, similar (not necessarily identical) in physiognomy. Boundaries of the EZs approximately coincide with the map of Köppen-Trewartha climatic types, which was based on temperature and rainfall. An exception to this definition are "Mountain systems", classified as one separate EZ in each Domain and characterized by a high variation in both vegetation formations and climatic conditions caused by large altitude and topographic variation" (Simons, 2001)."

Therefore, GEZ are areas used in the Global Forest Resources Assessments to disaggregate the world's forests, covering the entirety of the terrestrial domain and overlapping with many terrestrial IUCN ecosystems. An equivalence is needed to streamline data on forest under restoration reported in the latest and future FRA.

Table 2. Mapping between UN decade ecosystems, IUCN Biomes and land cover classes used in various legends.

Table rows show how all legends can be harmonized to IPCC classes. The SEEA and GLC Share provide a classification designed to assess the natural capital while the ESA CCI-LC classification is designed around plant functional types for use in Earth system process modeling. [NN] corresponds to the codes in the various sources. Note that aggregation of classes from ESA CCI-LC to IPCC is set out in the Reporting Manual for the 2017-2018 UNCCD reporting process (adapted from: Sims, N.C., Newnham, G.J., England, J.R., Guerschman, J., Cox, S.J.D., Roxburgh, S.H., Viscarra Rossel, R.A., Fritz, S. and Wheeler, I. 2021. Good Practice Guidance. SDG Indicator 15.3.1, Proportion of Land That Is Degraded Over Total Land Area. Version 2.0. United Nations Convention to Combat Desertification, Bonn, Germany.)

UN Decade Ecosystems[28]	IUCN Biomes[29]	FAO-GEZ[30]	SEEA[31]	GLC-SHARE[32]	IPCC land use classes[33]	ESA CCI-LC[34]
Forests	T1 Tropical-subtropical forests biome T2 Temperate-boreal forests and woodlands biome	All	[6] Tree-covered areas	Tree-covered areas [04]	[1] Forest Land	• Tree cover, broadleaved, evergreen, closed to open (>15%) [50] • Tree cover, broadleaved, deciduous, closed to open (>15%) [60] • Tree cover, needle leaved, evergreen, closed to open (>15%) [70] • Tree cover, needle leaved, deciduous, closed to open (>15%) [80] • Tree cover, mixed leaf type, closed to open (>15%) [90] • Mosaic tree and shrub (>50%)/herbaceous cover (<50%) [100]
Grasslands, shrublands and savannahs	T3 Shrublands and shrubby woodlands biome T4 Savannas and grasslands biome T5 Deserts and semi-deserts biome	All	[5] Grassland [8] Shrub-covered areas [10] Sparsely natural vegetated areas	Grassland [03] Shrubs covered areas [05] Sparse vegetation [08]	[2] Grassland	• Grassland [130] • Shrubland [120] • Mosaic herbaceous cover (>50%)/tree and shrub (<50%) [110] • Sparse vegetation (tree, shrub, herbaceous cover) (<15%) [150] • Lichens and Mosses [140]
Farmlands	T7 Intensive land-use biome	All except Polar	[2] Herbaceous crops [3] Woody crops [4] Multiple or layered crops	Cropland [02]	[3] Cropland	• Cropland, rainfed: [10] - Herbaceous cover [11] - Tree or shrub cover [12] • Cropland, irrigated or post-flooding [20] • Mosaic cropland (>50%)/natural vegetation (tree, shrub, herbaceous cover) (<50%) [30] • Mosaic natural vegetation (tree, shrub, herbaceous cover (>50%)/cropland (<50%) [40]

28 https://www.decadeonrestoration.org/types-ecosystem-restoration
29 Keith, D.A., Ferrer-Paris, J.R., Nicholson, E. et al. A function-based typology for Earth's ecosystems. Nature 610, 513–518 (2022). https://doi.org/10.1038/s41586-022-05318-4
30 Simons, H., Singh, K. D., Zhu, Z., Davis, R., & Pugliese, P. (1999). FRA (Forest Resources Assessment) 2000: a concept and strategy for ecological zoning for the global Forest Resources Assessment 2000. Interim report. Forest Resources Assessment Programme. Working paper 20.
31 https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf
32 FAO Global Land Cover (GLC-SHARE) Beta-Release 1.0 Database, Land and Water Division, John Latham, Renato Cumani, Ilaria Rosati and Mario Bloise, 2014 (https://www.fao.org/uploads/media/glc-share-doc.pdf)
33 IPCC 2006, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan. (https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_03_Ch3_Representation.pdf)
34 ESA. Land Cover CCI Product User Guide Version 2. Tech. Rep. (2017). Available at: http://maps.elie.ucl.ac.be/CCI/viewer/download/ESACCI-LC-Ph2-PUGv2_2.0.pdf

Peatlands	TF1 Palustrine wetlands biome	All except: Tropical desert, Subtropical desert, Temperate desert, Boreal tundra woodland, Boreal mountain systems and Polar	[9] Shrubs and/or herbaceous vegetation, aquatic or regularly flooded [7] Mangroves	Herbaceous vegetation, aquatic or regularly flooded [06] Mangroves [07]	[4] Wetlands	• Shrub or herbaceous cover, flooded, fresh/saline/brackish water [180] • Tree cover, flooded, fresh or brackish water [160] • Tree cover, flooded, saline water [170]
Urban areas	T7 Intensive land-use biome MT3 Anthropogenic shorelines biome	All	[1] Artificial surfaces (including urban and associated areas)	Artificial surfaces [01]	[5] Settlements	• Urban areas [190]
Mountains	T6 Polar/alpine (cryogenic) biome	Tropical mountain systems, Subtropical mountain systems, Temperate mountain systems, Boreal mountain systems	[11] Terrestrial barren land [12] Permanent snow and glaciers	Bare soil [09] Snow and glaciers [10]	[6] Other Land	• Bare areas [200] • Permanent snow and ice [220]
Freshwaters	F1 Rivers and streams biome F2 Lakes biome F3 Artificial wetlands biome *TF1 Palustrine wetlands biome* *MFT1 Brackish tidal biome* SF1 Subterranean freshwaters biome SF2 Anthropogenic subterranean freshwaters biome *FM1 Semi-confined transitional waters biome*	All	[13] Inland water bodies [14] Coastal water bodies and intertidal areas	Water bodies [11]	[4] Wetlands	• Water bodies [210]
Oceans and Coasts	M1 Marine shelf biome M2 Pelagic ocean waters biome M3 Deep sea floors biome M4 Anthropogenic marine biome *FM1 Semi-confined transitional waters biome* SM1 Subterranean tidal biome MT1 Shorelines biome MT2 Supralittoral coastal biome *MT3 Anthropogenic shorelines biome* *MFT1 Brackish tidal biome*	Not included	[14] Coastal water bodies and intertidal areas	Water bodies [11]	No equivalence	• Water bodies [210]
No equivalence	S1 Subterranean lithic biome S2 Anthropogenic subterranean voids biome	No equivalence	No equivalence	No equivalence	No equivalence	No equivalence

For the ultimate objective of reporting the total area under restoration it is important that all areas of the restoration initiatives are well defined when added together and do not overlap with each other, otherwise it would be an error of double counting. There are also structuring errors that it is important to avoid, such as non-polygon closure, self-intersecting lines and a weak use of data structure or data requirements such as using lines to delineate areas or drawing lines over polygons.

Additionally to allow for a correct flow and consistency in the collection of spatial data, some features widely used today for the representation of spatial information at a global level are also recommended. Table 3 describes some of these recommendations to provide consistency and comparability.

Table 3. Technical recommendations for spatially explicit information

Item	Recommendations
Multiple geometries/features/ points*	It is recommended that the features have been subjected to a topological correction (Ubeda & Egenhofer, 1997). If errors are found in the digitization of the information, it may require correction. In the case of a multipoint feature layer, avoid the overlapping of points with the same location.
Coordinate system*	WGS84 geographic coordinate system (EPSG:4326)
Format*	shapefile (.shp, .shx, .dbf), .kml, or GeoJSON (.json, .geojson)
Units	If this field is provided, specify the units used to calculate the area (ha, km2, acres…). Hectares are the units recommended
Area	Number of units per each polygon/area/feature.
Code	Each polygon/feature/area may have an unique identifier

**Mandator*