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**Planning, monitoring, reporting and review:
monitoring framework for the Kunming-Montreal
Global Biodiversity Framework**

Update on the support provided by the Food and Agriculture Organization of the United Nations and its partners for the further development and operationalization of headline indicators 2.1, 5.1, 7.2, 10.1, 10.2 and 22.1**

Note by the Secretariat

1. The Secretariat is pleased to provide herewith an update on the support provided by the Food and Agriculture Organization of the United Nations (FAO) to the further development and operationalization of several of the headline indicators in the monitoring framework for the Kunming-Montreal Global Biodiversity Framework. The update provides, for each headline indicator that FAO is supporting, the actions which have been taken to further develop the methodology for the indicator, support data collection and use, and the use of the headline indicators by Parties. Information on planned next steps is also included where relevant.
2. The report is circulated in the form and language in which it was received by the Secretariat of the Convention.

* CBD/SBSTTA/28/1.

** The present document is being issued without formal editing.

Headline Indicator 2.1 – Area under restoration

3. In resolution [A/RES/73/284](#) proclaiming the United Nations (UN) Decade on Ecosystem Restoration, the General Assembly invited the United Nations Environment Programme and FAO to lead the implementation of the Decade, in collaboration with the secretariats of the Rio conventions, other relevant multilateral environmental agreements and entities of the United Nations system, including by identifying and developing possible activities and programmes, within their mandates and existing resources, and through voluntary contributions, as appropriate. The UN Decade on Ecosystem Restoration was officially launched at the World Environment Day in 2021. The Conference of the Parties to the Convention welcomed the resolution in its decision [15/13](#).
4. FAO is leading the Task Forces on Monitoring and on Best Practices under the United Nations Decade on Ecosystem Restoration. The Secretariat of the Convention, as a collaborating agency under the Decade, has been a member of the task force on monitoring since its inception in 2021.
5. With the adoption of the Kunming-Montreal Global Biodiversity Framework (decision 15/4) and its Target 2, Parties agreed to ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.
6. FAO is the responsible agency for the metadata of headline indicator 2.1 (“Area under restoration”) of Target 2, including curating the methodology and technical solutions to support countries in tracking ecosystem restoration progress¹. The Framework for Ecosystem Restoration Monitoring (FERM)² has been developed in the context of the UN Decade’s task force on monitoring and in line with the Target 2 headline indicator reporting methodology to assist in reporting by providing a framework for compiling data related to areas under restoration across all ecosystems.³ To scale this support and respond to the needs of Parties, FAO has partnered with United Kingdom of Great Britain and Northern Ireland to launch the Accelerating Innovative Monitoring for Nature Restoration (AIM4NatuRe) initiative⁴ in 2025.

I. Target 2 Road Map: Supporting reporting on the headline indicator 2.1

7. Initiated in 2023, the Target 2 Road Map was developed based on input from a global workshop⁵ held in FAO headquarters, which brought together more than 100 restoration experts from governments, scientific and technical agencies, major groups, multilateral environmental agreements and United Nations agencies. In-depth consultation on the challenges, needs and experiences of countries regarding the setting of targets, implementation and monitoring of restoration in terrestrial, inland water, and coastal and marine ecosystems provided a foundation for the Target 2 resource guide, which was peer-reviewed by the Parties to the Convention and experts. The Guide was published in 2024 under the title: *Delivering restoration outcomes for biodiversity and human well-being: Resource guide to Target 2 of the Kunming-Montreal Global Biodiversity Framework*.⁶
8. Surveys conducted by the Secretariat indicate the scale of the national needs: 70 per cent of countries report gaps in institutional coordination and analytical support for the headline indicator, 80 per cent lack the capacity to collect data for Target 2 reporting, and all countries surveyed have indicated a need for assistance in adapting global methodologies to their national contexts⁷.
9. The Target 2 Road Map, which was officially launched at twenty-seventh meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, responds to these needs and

¹ Information document: [CBD/COP/16/INF/3/Rev.1](#)

² More information on the Framework for Ecosystem Restoration Monitoring is available at: <https://ferm.fao.org/>

³ Report on progress of the United Nations Decade on Ecosystem Restoration 2021–2030 contained in document: [CBD/COP/16/INF/13](#).

⁴ More information on AIM4NatuRe available at: <https://www.fao.org/ecosystem-restoration-monitoring/aim4natuRe/en>

⁵ Meeting summary is available at: www.cbd.int/meetings/006412.

⁶ The Target 2 Resource Guide publication is available in English: <https://doi.org/10.4060/cd2925en> and in Spanish: <https://doi.org/10.4060/cd2925es>

⁷ Information document CBD/COP/16/INF/4

challenges by bringing together representatives of national governments, multilateral environmental agreements and technical partners around common guidance, methodologies and tools, facilitating peer exchange and connecting national needs with global expertise, with the objective of supporting countries in strengthening institutional coordination and translating restoration commitments into information that can be used for decision-making, implementation and monitoring of restoration activities as well as domestic and international reporting.

10. Several areas of progress have been made under the Road Map. In addition to the Target 2 Resource Guide, an accompanying e-learning⁸ course and Target 2 Self-Assessment Tool⁹ were published in 2024 and all are available in English and Spanish, providing practical guidance on setting restoration targets, implementing restoration actions and monitoring progress across all ecosystem types. Ecosystem-specific guidance for freshwater restoration contributing to Target 2¹⁰ has been developed through the working group of the Road Map, responding to the need for tailored methodological support for freshwater ecosystems. The Target 2 Road Map also includes a working group on indigenous led restoration to support the recognition of Indigenous led restoration efforts and support monitoring and data collection efforts by indigenous communities. Another working group of the Target 2 Road Map focused on supporting cross-regional learning on restoration monitoring and reporting and is currently consolidating the gaps and needs identified by countries and is facilitating coordination mechanisms to address them drawing from the support of the regional and subregional technical scientific cooperation (TSC) support centres.

11. A series of regional and subregional workshops have been organized jointly by FAO, the Secretariat of the Convention, the TSC support centres and other partner institutions to strengthen national capacities for planning, monitoring and reporting on ecosystem restoration in line with Target 2. The workshops covered topics such as establishing degradation baselines, applying the reference periods, setting the objectives of effective restoration, and collecting data for tracking progress of restoration initiatives. The workshops also included a session on the headline indicator metadata and guidance on monitoring restoration using FERM, and reporting the optional disaggregations. Held across the regions of Asia, Africa, and Latin America and the Caribbean, the workshops brought together representatives from 40 countries, major stakeholder groups, and 14 TSC support centres, serving as a platform to share knowledge and experiences, identify methodological challenges, exchange good practices and make better use of available tools and data. In addition to the in-person workshops, the FAO monitoring team also presented on Target 2 reporting methodology and technical solutions in six sub-regional workshops organized by the Convention's Secretariat and the TSC support centres, in Cameroon, Fiji, Samoa, Spain, South Africa, Suriname and Thailand.

12. To continue knowledge sharing after the in-person events, FAO has organized a webinar series in English, French and Spanish, in collaboration with the TSC support centres, to support CBD national focal points and government technical staff in using FERM and the Convention's Online Reporting Tool (ORT) in preparation for the submission of seventh national reports. A total of eight webinars were held in January and February 2026, with 364 participants from 46 countries.

13. A significant technical development under the Target 2 Road Map has been the establishment of an application programming interface (API) linking data compiled through the FERM directly to the Convention's online reporting tool. Additionally, a template reporting spreadsheet with the Target 2 headline indicator and its suggested disaggregation has been developed to assist countries in applying the FERM methodology, compiling national restoration data and submitting information through the ORT.

⁸ Target 2 Resource Guide e-learning in English: <https://elearning.fao.org/course/view.php?id=1195>

⁹ Target 2 Self-Assessment Tool Guide: <https://openknowledge.fao.org/handle/20.500.14283/cd2792en>

¹⁰ Enabling consistent reporting and monitoring for freshwater (inland waters) restoration under Target 2 of the Kunming-Montreal Global Biodiversity Framework available at: <https://openknowledge.fao.org/items/8e52e624-4bf9-4e31-8445-394d865c6ea2> <https://doi.org/10.4060/cd5046en>

14. Through the integration between FERM and the online reporting tool, countries can access default restoration data and benefit from new functions that facilitate the review and validation of national restoration data. Parties have been encouraged to integrate national restoration datasets into FERM and to submit their results through the ORT, streamlining the reporting workflow, reducing manual data entry and improving the consistency and comparability of information submitted. Through FERM, it is possible to submit geospatial information in addition to tabular data, improving the quality of the data used for national reports and global review. As of 9 March 2026, 125 Parties have submitted their seventh national report under the Convention, of which 62 reported data for Target 2.

15. Furthermore, under the AIM4NatuRe initiative targeted technical assistance has been provided to four pilot countries to strengthen national restoration monitoring frameworks in ways that reflect each country's institutional and legislative context.

16. In Brazil, this support has been linked to the National Plan for the Recovery of Native Vegetation (PLANAPEG 2025–2028) and has encompassed improvements to the national approach to restoration monitoring, technical discussions on how restoration areas should be accounted for in line with national legislation, and the application of those parameters to national datasets. Preliminary results were presented by Brazil's Ministry of Environment and Climate Change at the thirtieth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in November 2025 and were subsequently used for reporting on Target 2 in the country's seventh national report submitted in March 2026.

17. In Peru, the initiative has supported national efforts to advance the country's restoration road map and strengthen monitoring and reporting arrangements, contributing to discussions on institutional coordination and to the inclusion of both qualitative and quantitative restoration information in the seventh national report.

18. In Kenya, AIM4NatuRe has facilitated collaboration among partners around restoration monitoring and data sharing, supported the development of national ecosystem restoration platforms, and encouraged dialogue on how subnational structures can contribute to national reporting.

19. In the Philippines, support has been directed towards strengthening restoration monitoring and reporting under the Philippine Biodiversity Strategy and Action Plan 2024–2040, encompassing government consultations, assessment of baseline data and monitoring tools, and support for compiling and validating restoration data for the seventh national report.

II. Headline indicator metadata update

A. Rationale of metadata

20. The headline indicator for Target 2 is the first global mechanism to compile country-reported, area-based data on ecosystem restoration across all ecosystems. It measures the spatial extent of sites where the previously degraded ecosystem is recovering as the result of a wide array of activities and interventions along the restorative continuum¹¹.

21. The indicator includes restoration areas at all spatial scales (from local site-level to landscape and seascape level) that have ongoing interventions or are under a monitoring scheme when interventions have been completed and the ecosystem continues its recovery. In its current formulation, the headline indicator does not measure biodiversity, effectiveness, restoration results, ecosystem functions and services or connectivity. It does not require reporting geospatial data, but countries are strongly recommended to collect and report spatial data in the FERM to enhance transparency. Therefore, additional indicators and monitoring methods are needed to measure these aspects.

¹¹ Further described in the Target 2 Resource Guide publication, available at: <https://doi.org/10.4060/cd2925en>

22. The metadata¹² was first drafted in 2021 prior to the adoption of the Kunming-Montreal Global Biodiversity Framework and subsequently updated in 2023 and 2026. The objective of developing and maintaining the metadata is to provide information on the key elements of the indicator and guidance on how to monitor and use the available technical solutions and resources to enable reporting progress on Target 2.

B. Review process

23. In its current version, updates for clarity and consistency have been made, including for the rationale, the definitions used, and the method of computation. The metadata suggests a registry approach and includes recommended parameters for a national database and guidance on compiling restoration project data. It also explains FERM and the default data compilation process in the FERM data review functionality, reflecting the new features and functionality of the FERM.

24. Additional guidance has been provided on how restoration data can be submitted through the template on in the ORT, and is supported through the FERM-ORT linkage. The updates to the metadata do not imply any changes to the methodology for the indicator or its overall scope and applicability.

25. The updated metadata reflects the cumulative support provided under the Target 2 Road Map, as described in section III, paragraphs 7 to 19. Lessons drawn from global and regional consultations, capacity-building activities, technical guidance, and countries' experience in applying the reporting methodology for headline indicator 2.1 have informed improvements to the clarity and practical usability of the metadata. Parties and stakeholders have been engaged throughout this process both directly, through workshops, webinars, expert groups and pilot country support, and indirectly, through feedback emerging from the use of FERM and the ORT.

26. The review process was led by FAO and carried out in technical coordination with the Convention Secretariat to ensure alignment in the interpretation and application of the reporting template and related guidance. The draft metadata was shared with the Ad Hoc Technical Expert Group on Indicators, whose inputs and technical suggestions contributed to strengthening coherence across indicator 2.1 and other ecosystems-related headline indicators, including A.1 Red List of Ecosystems, A.2 Extent of natural ecosystems, B.1 Services provided by ecosystems, and 3.1 Coverage of protected areas and other effective area-based conservation measures. An additional opportunity for expert review and input was provided through an online meeting of the UN Decade Task Force on Monitoring in February 2026, which invited the task force members, which includes more than 600 restoration experts, to review the draft and provide feedback.

III. Emerging challenges, needs and opportunities

27. The compilation and analysis of the data submitted in the seventh national report for Target 2 headline indicator revealed several challenges related to reporting, including inconsistent reporting, missing data, lack of reporting disaggregation, and incomplete time series. Examples of inconsistent reporting include: not reporting aggregate estimates for area under restoration, not identifying when the reported data is cumulative and not indicating the units of the reported values. To facilitate the interpretation of the reported values, particularly in cases where inconsistent reporting was identified, FAO contacted the focal points identified in the seventh national reports for 36 countries via email. Responses were received from 22 countries which enabled consistent compilation of data, supporting the preparation of the global report of collective progress in the implementation of the Kunming-Montreal Global Biodiversity Framework by the Secretariat and FAO-led reports such as the State of the World's Forests 2026 edition and the Restoration Progress Report.

28. The optional disaggregations for the headline indicator, which include ecosystems, protected areas and indigenous and traditional territories, and type of restoration activity, were reported by few countries. FAO assessed the data on ecosystem restoration in the seventh national reports submitted

¹² <https://www.gbf-indicators.org/metadata/headline/2-2>

by Parties to the Convention. Of the 125 countries that submitted the seventh national report by 18 March 2026, 62 provided data for the Target 2 headline indicator, totaling 206.5 million hectares of ecosystems are under restoration globally. Among the countries that submitted data, 44 countries disaggregated by ecosystem type, 11 by type of restoration activity, 7 by protected areas, 1 by OECMs and 2 by indigenous and traditional territories. Using the reported information and information provided by countries in the comments, the total estimate was disaggregated by three broad ecosystem realms: terrestrial, inland water and marine and coastal ecosystems. Where ecosystem type was not explicitly reported, other disaggregation categories (e.g. restoration activity) and qualitative information in comments and footnotes were used to infer the ecosystem realm. Activities such as restoration of vegetation cover, forestry, agroforestry, natural regeneration, silviculture, reforestation, afforestation, planted forests and woodlots, sustainable land management, and restoration of pastures were classified as terrestrial ecosystems. In addition, narrative information (e.g. reference to forestry departments as the source of information or to land-based interventions) was used to support classification as terrestrial. Based on this approach, terrestrial ecosystems account for 201.7 million hectares area under restoration, followed by inland waters covering 331 402 hectares and marine and coastal ecosystems covering 7 026 hectares.

29. Countries that did not report data for the headline indicator 2.1 provided comments on challenges or gaps for data reporting. Thirty-eight countries, accounting for 61 per cent of the 63 countries that did not report data on Target 2 headline indicator, noted the lack of national-level data on areas under restoration. Several countries cited the limited availability of reliable information, the absence of official statistics at the time of reporting, or the need to further develop methodologies for reporting on the Target 2 headline indicator. Fifteen countries, representing 24 per cent of countries that did report on the headline indicator, noted having available data but not aggregated at the national level. Nine countries, or 15 per cent of countries that did not report on the indicator, indicated that restoration data is still being consolidated or validated.

30. These challenges identify a need to continue implementing the Target 2 Road Map in collaboration with global and regional partners.

31. Inland waters account for 0.16% of the total area reported (by 13 countries, and one additional country reporting stream length in km) ecosystem restoration data and coastal and marine ecosystems account for 0.003% of reported (by 10 countries) ecosystem restoration data. This highlights the need to accelerate and scale restoration of nonterrestrial ecosystems, improve data collection and monitoring systems in these ecosystems and strengthen capacity in disaggregating restoration data by ecosystem.

32. The regional workshops organized in cooperation with the TSC support centres revealed several common challenges across regions. These challenges include:

- a) Data and degradation baselines per ecosystem types are often limited, outdated, inaccessible or not being collected in a systematic way. Identifying degraded areas is challenging in many contexts, including due to different definitions for ecosystem degradation.
- b) Data sovereignty and appropriate inclusion of indigenous and territorial data require careful consideration, as communities need clarity on how their information will be used, shared and validated.
- c) Limited human resources and capacity in ecosystem restoration remain a challenge, especially for expertise related to wetland and coastal and marine ecosystem restoration. The need for technical guidelines for restoration by ecosystem types was highlighted. While guidance and tools for monitoring and reporting exist, awareness and use of these are often limited.
- d) Limited financial resources and lack of incentives hinder efforts to establish long-term and sustainable monitoring approaches as well as restoration activities.

- e) The lack of harmonization and coordination between national ministries, governance levels and stakeholders undermines restoration efforts, as there are competing interests, conflicting policies across different ministries, and differing jurisdictions and land rights.
33. In the coming years leading to the eighth reporting cycle and 2030, FAO is committed to play its role as the responsible agency of Target 2 headline indicator, providing clear guidance and support tailored to national and global needs.
34. In this context, opportunities have been identified to strengthen synergies across the Rio conventions and other relevant multilateral environmental agreements with a focus on ecosystem restoration. The Target 2 Road Map leads group, which includes the secretariats of the Rio conventions, as well as the Ramsar Convention on Wetlands, provides a collaborative partnership for advancing coordination on restoration monitoring and reporting. Ongoing interoperability efforts between FERM, the UNCCD Performance Review and Assessment of Implementation System (PRAIS), and the Ramsar Sites Information Service (RSIS) support data sharing across conventions, in support of Parties to reduce reporting their burdens, and enhance the coherence and comparability of restoration-related information.
35. Strong national monitoring systems and knowledge sharing will be essential to track ecological and socio-economic outcomes of ecosystem restoration, inform adaptive management and demonstrate impacts. At the national scale, enabling conditions and actions, including improving institutional coordination and engaging a broad range of actors are needed to address the above-mentioned challenges and needs in ecosystem restoration monitoring and reporting on Target 2 and national restoration targets. As monitoring capacities improve and countries refine their restoration tracking systems, more comprehensive reporting from additional countries and progressively more complete datasets are possible in future cycles. To support this outcome the following opportunities and follow-up actions have been identified by the Target 2 Road Map partnership:
- a) Enhance technical capacity at national and local levels on degradation assessment, baseline setting and remote sensing, leveraging stronger governance and collaboration across institutions, relevant multilateral environmental agreements and Indigenous Peoples and local communities.
 - b) Advance the interoperability between national systems and the Framework for Ecosystem Restoration Monitoring, enabling streamlined data exchange, visualization and reporting for Target 2.
 - c) Invest in long-term, sustainable monitoring systems, supported by regional cooperation through TSC support centres and continued engagement of development partners and donors.
 - d) Restoration needs to be undertaken within the national context, considering different ecosystems and human demands.
 - e) Leverage the important role of indigenous peoples and local communities, ensuring their data, knowledge and monitoring practices are appropriately reflected in national frameworks while respecting data sovereignty principles.
 - f) Foster regional learning communities, building on the strong exchange of experiences observed during the dialogue, including peer-to-peer support and follow-up training of trainers.

Headline Indicator 5.1 – Proportion of fish stocks within biologically sustainable levels

Indicator overview

1. Decision 15/5 at COP15 adopted the Sustainable Development Goal (SDG) Indicator 14.4.1, *Proportion of fish stocks within biologically sustainable levels*, as the headline Kunming-Montreal Global Biodiversity indicator 5.1 for Target 5. This indicator measures the sustainability of the world's marine capture fisheries by the abundance of the exploited fish stocks with respect to maximum sustainable yield (MSY).
2. FAO is the custodian agency for SDG Indicator 14.4.1, and its methodology has evolved over several decades to support implementation of international fisheries instruments, including the United Nations Convention on the Law of the Sea (UNCLOS), the United Nations Fish Stocks Agreement (UNFSA), and the FAO Code of Conduct for Responsible Fisheries. Building on FAO's regional and global assessments of the status of the world's marine fishery resources conducted since the 1970s, the methodology was first formalized in FAO (2011) and subsequently adopted as the basis for reporting under the Sustainable Development Goals. Recognizing the need to strengthen national ownership and improve consistency across reporting scales, FAO initiated the development of a national reporting framework in 2017 through a series of intergovernmental expert consultations involving FAO Members, regional fisheries bodies, fisheries management organizations, and international scientific experts. Dedicated expert workshops held in 2017 and 2019 refined the analytical framework for national reporting while ensuring that it was scientifically robust, operationally feasible and adaptable to countries with varying levels of assessment capacity. This work culminated in the introduction of country-level reporting in 2019, enabling Members to assess and report the status of fish stocks under their national jurisdiction using standardized methods.
3. Since then, FAO has continued to refine the methodology through an extensive, partnership-based and consultative process involving national fisheries administrations, regional fisheries bodies, international organizations, academic institutions and independent scientific experts. The most recent methodological update (Sharma et al., 2025) reconciles and links the national, regional and global assessments through a common Reference List of Stocks framework, providing a consistent methodology across all reporting scales. The revised approach was developed through 19 regional workshops and online consultations involving approximately 650 fisheries experts from around 90 countries and 200 organizations. Capacity development was embedded throughout the process, particularly to support data- and capacity-limited countries, ensuring that national institutions actively contributed to methodological development while strengthening their own stock assessment capabilities. This highly collaborative and transparent process has improved harmonization of assessment approaches, enhanced country ownership of the indicator, and strengthened the scientific credibility and international acceptance of the SDG 14.4.1 methodology.

Methodology and data sources

4. The indicator measures the proportion of fish stocks from a reference list of stocks having a known status and an abundance above the level capable of producing Maximum Sustainable Yield (MSY), which is considered to be biologically sustainable. Previously, the global and regional indicators were calculated from a reference list of ~450 stocks, incorporating stock assessments from regional fisheries bodies as well as FAO-led estimates of stock status, while countries report on nationally managed and shared stocks using standardized criteria and quality assurance procedures.
5. The 2025 methodological update expanded and harmonized the global reference lists to 2570 different stocks, including many nationally-reported stocks, creating a hierarchical framework that strengthens consistency and linkages across national, regional and global reporting (Sharma et al. 2025). There is high correspondence between the global SDG Indicator 14.4.1 results from the SOS index (64.5 percent in 2021 and 62.4 percent in 2023) and the average indicator of high-quality reporting countries (62.5 percent in 2023 from SDG questionnaires) (FAO, 2026).¹³ However,

¹³ <https://openknowledge.fao.org/server/api/core/bitstreams/7cb2534a-9886-418b-aa43-0ee679842b4f/content>

regional discrepancies exist between the SOS (Sharma et. al. 2025) and the SDG indicators by region (see SOFIA 2026). Detailed methodology is available in the SDG indicator metadata¹⁴ and supporting CBD information documents .

FAO support to countries

6. To support implementation and raise awareness of the indicator, since 2020, FAO has delivered an extensive programme of regional in-person workshops, global webinars and technical training courses on SDG 14.4.1 and data-limited stock assessment methods, reaching more than 750 participants from over 100 countries. To complement these activities, FAO developed a dedicated e-learning course¹⁵ through the FAO eLearning Academy and cloud-based i-marine Virtual Research Environments (VREs), including the Stock Monitoring Tool, which provides access to data-limited assessment methods such as length-based indicators, length-based spawning potential ratio (LBSPR), ELEFAN/Yield-per-Recruit, CMSY and SPiCT, together with an online RStudio environment for more advanced analyses, eliminating software installation barriers and providing information and technical guidance. The VRE community now includes more than 1,200 registered users worldwide, providing a collaborative platform for technical exchange, training and computational resources. Throughout each reporting cycle, FAO further supports countries through a multilingual help desk, providing tailored technical consultations on stock assessment methodologies, construction of national reference lists of stocks, data preparation, quality assurance and interpretation of results. These integrated capacity development efforts have contributed to measurable improvements in national reporting rates and questionnaire quality. To sustain and expand this support, FAO has also launched the Global Capacity Development Programme on Fisheries Data Collection and Stock Assessment,¹⁶ which coordinates training, technical assistance, methodological development and knowledge sharing to further strengthen fisheries data systems and countries' capacity to generate robust evidence for SDG Indicator 14.4.1.

Reporting coverage, latest data

7. National reporting for SDG Indicator 14.4.1 is conducted on a biennial cycle. Countries submit completed questionnaires to FAO, which undertakes a comprehensive quality assurance and validation process, including verification of stock lists, assessment methods, data consistency and indicator calculations, followed by bilateral consultations with reporting countries where required. Validated national indicator values are transmitted to the United Nations Statistics Division (UNSD) for publication in the global SDG Database and are disseminated annually through the FAOSTAT SDG Data Portal.¹⁷

8. To date, 130 of the 181 countries and territories invited to report have submitted data at least once (72 percent), with approximately half participating in each reporting cycle and the highest reporting rate achieved during the 2021 round following global awareness-raising workshops. Reporting rates are highest in Central and Southern Asia, Europe and Northern America, and Eastern and South-Eastern Asia, while participation remains more limited in Oceania, sub-Saharan Africa, and Latin America and the Caribbean due to persistent data and capacity constraints. The quality of national submissions has also improved substantially over successive reporting cycles. Of the 94 reports reviewed for the 2023 reporting round, 48 were rated as high quality (an increase of 54.8 percent compared with 2019), 9 as medium quality, 31 as low quality, and only 6 failed quality assurance, representing a reduction of about 70 percent compared with previous cycles. At the same time, the proportion of reported stocks classified as unassessed or of unknown status declined from 47 percent in 2019 to 36 percent in 2023, reflecting strengthened national monitoring systems and stock assessment capacity.

¹⁴ <https://unstats.un.org/sdgs/metadata/>

¹⁵ <https://elearning.fao.org/course/view.php?id=502&lang=en>

¹⁶ <https://openknowledge.fao.org/server/api/core/bitstreams/e869aedd-3a96-44ef-b7ba-bddfd526ccfd/content>

¹⁷ <https://www.fao.org/sustainable-development-goals-data-portal/data/>

Headline Indicator 7.2 - Aggregated Total Applied Toxicity

I. Background

36. Through the adoption of the KMGBF ([decision 15/4](#)) and specifically its Target 7b, Parties agreed to reduce pollution risks and the negative impacts of pollution from all sources by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects, including (b) by reducing the overall risk from pesticides and highly hazardous chemicals by at least half, including through integrated pest management, based on science, taking into account food security and livelihoods.

37. In 2022, at its fourth meeting, the Open-ended Working Group on the Post-2020 Global Biodiversity Framework circulated an information document providing scientific information on the proposed targets and goals of the post-2020 Global Diversity Framework and associated indicator and monitoring issues ([WG2020/4/INF/2/Rev.2](#)). The document was prepared by the bioDISCOVERY program of Future Earth and the Secretariat of the Group on Earth Observations Biodiversity Observation Network, and included information on monitoring and indicators for Target 7, based on the deliberations of a specially convened expert group.

38. In 2023, at its third meeting, the Ad Hoc Technical Expert Group on Indicators for the KMGBF reported ([IND/AHTEG/2023/3/2](#)) that for Target 7b, no international entity was developing an indicator on pesticides. The AHTEG recommended that collaboration with FAO could be explored by the Secretariat to progress this indicator, noting that testing would be required to ensure that the indicator captures the potential impacts on biodiversity.

39. In 2024, responding to the recommendations of the AHTEG, the Secretariat of the CBD, in collaboration with FAO, convened an expert group meeting to define a suitable headline indicator 7.2 (pesticides) for Target 7b. The expert group noted that whereas indicators that directly measure pesticide impacts on biodiversity and ecosystem functions would be preferred, input and risk indicators are currently more feasible based on data availability; noting that data on pesticide usage, trade (sales, imports and exports), and toxicity are available for many, though not all countries. The expert group further noted that science still faces challenges in establishing clear links between pesticides and biodiversity. While experimental toxicology studies are more easily reproducible and allow for the determination of causality, field monitoring and meta-analyses are challenged by complexity, uncertainty and relevance. The expert group recommended that an existing indicator, Total Applied Toxicity (TAT) could form the basis of a suitable headline indicator for target 7b and could be proposed to Parties. The report of the expert meeting on developing a methodology for headline indicator 7.2 under the monitoring framework of the Kunming-Montreal Global Biodiversity Framework was made available at SBSTTA-26 ([CBD/SBSTTA/26/INF/18](#)).

40. Based on the recommendations of the expert group, FAO prepared the initial draft metadata under the title ‘Aggregated Total Applied Toxicity (ATAT)’. The draft noted that the methodology was still incomplete and that the normalization of pesticide applied areas and the effects of weighting by species richness and endemism required further testing; and furthermore, that the adaptation of ATAT to track risk-reduction targets needed to be defined. The methodology was refined in consultation with the expert group and taking account of comments and suggestions by Parties to the CBD, and made available at SBSTTA-26 ([CBD/SBSTTA/26/INF/14](#)) and the Sixteenth meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP16) ([CBD/COP/16/INF/3/Rev.1](#)).

41. In 2025, through Decision [16/31](#), at the resumed session of CBD COP16, Parties adopted headline indicator 7.2 ‘pesticide environment concentration and/or aggregated total applied toxicity’, to assess and monitor the risks of pesticides to biodiversity under Target 7b of the KMGBF. Furthermore, Parties requested the Executive Secretary to work with relevant organizations to further

develop the metadata for headline indicator 7.2, acknowledging FAO's role in facilitating the development and testing of the ATAT indicator.

42. FAO subsequently facilitated a group of indicator experts to finalize and test the ATAT methodology by addressing the existing gaps that were outlined in the draft methodology.

43. In 2026, the indicator experts finalized the ATAT methodology, noting that the indicator was sufficiently robust for national reporting and did not require species group weightings or normalization by area. Furthermore, the headline indicator directly measures percentage variations relative to the proposed 50% reduction target for pesticide risks to biodiversity, while avoiding trade-offs in pesticide impacts across different species groups. The finalized ATAT metadata will be made available in an information document for SBSTTA-28.

III. Reporting Aggregated Total Applied Toxicity

A. Data requirements and calculations

44. Total Applied Toxicity (TAT) is a measure that sums up weighted pesticide use in a country and year, whereby each amount of pesticide used is weighted by its toxicity to a given species group¹⁸. ATAT¹⁹ summarizes the TATs for nine species groups into a single value for a country and year, comparing the annual TAT values against a baseline and tracking progress against the targeted reduction (i.e., 50% according to Target 7b) across species groups. For reporting purposes, mean baseline TAT values for the period 2011-2020 should initially be calculated, along with the proportional changes to TAT values each year from 2021 to 2030, relative to the baseline for each of the nine species groups. The ATAT is the average change in these proportions across all groups, with a limit on the maximum for each group to the target value of 50%.

45. The calculation of ATAT requires data on pesticide outdoor use (including agricultural land, treated forest, locust control, vector management, aquaculture, etc.), by active ingredient (in kg), in a country and year. Some countries publicly report disaggregated pesticide usage, sales or trade through government ministries; however, the indicator experts noted that open-source, national statistics on pesticide usage are either not available or not accessible in many countries.

46. The indicator experts noted that for ATAT calculations there is a strict hierarchy for sourcing input data. Pesticide use by active ingredient is the preferred input data, followed by data on pesticide sales, pesticide availability (pesticide imports + national production – exports), and other crude estimates of pesticide availability use (based on harvested areas, recommended application rates, etc.). Data on crop production (crop varieties, harvested area, yields), which are required for pesticide use estimates in cases where use and sales data are not available, are reported by countries in a disaggregated form to FAO and disseminated through FAOSTAT.²⁰

47. Where possible, national biodiversity coordinators can source information on pesticide use from relevant ministries. Trade data is often available through customs authorities and trade ministries. The methods used to estimate pesticide use should be indicated at the time of reporting to the CBD.

48. The ATAT metadata provides additional information for refining pesticide usage data using available open-source data based on recommended pesticide application rates by crop, and national cropping areas. Data on crop production (crop types, crop acreage, yields), which are required for improved pesticide usage estimates in cases where usage and sales data are not available, can be

¹⁸ For related publications see: <https://www.science.org/doi/abs/10.1126/science.abe1148>; <https://www.frontiersin.org/journals/insect-science/articles/10.3389/finsc.2025.1582496/full>

¹⁹ See associated metadata at <https://www.gbf-indicators.org/>

20 Access to the database is available through: <https://www.fao.org/faostat/en/#home>

obtained for most countries from FAOSTAT, and through national reporting authorities often in a more disaggregated form. The methods used to estimate pesticide usage should be indicated at the time of reporting to the CBD.

49. Changes to national protocols for collecting data on pesticide inputs that occur over the baseline and reporting years can disproportionately affect the estimated total toxicities for certain species groups, thereby distorting TAT and ATAT values. Therefore, data collection protocols should be standardized within reports across the reporting periods. Changes in data collection methods should be recorded and reported by relevant national reporting authorities to better inform potential risk mitigation actions.

50. Pesticide toxicity is expressed as a single Regulatory Threshold Level (RTL), based on laboratory studies, for each pesticide active ingredient and species. Where available, toxicities of adjuvants, solvents or other pesticide components can also be included. The ATAT assesses toxicities for nine species groups, these are: aquatic invertebrates, aquatic plants, fish, terrestrial arthropods (excluding pollinators), pollinators, birds, mammals, soil organisms and terrestrial plants.

51. ATAT calculations for all countries will use a common set of RTL values (for each active ingredient for each species group) compiled by the indicator experts for the purpose of reporting against Target 7b. These RTLs will be made available to Parties and are also publicly available through the Pesticide Properties DataBase ([PPDB](#)). The PPDB is a dynamic database that is regularly updated with toxicity data and derived RTLs.

B. Component indicators and disaggregation

52. The ATAT is a single value expressing relative changes in TATs for nine species groups against the targeted 50% reduction. However, the underlying data used to calculate ATAT, including TAT values for each species group, provide valuable information to inform policy and decision-making around pesticides and biodiversity conservation.

53. The contributions of individual pesticide active ingredients to overall toxicity for each species group can be assessed using the TAT and ATAT methodologies. Furthermore, changes in contributions to toxicities for each species group by specific classes or types of pesticides, for example those listed as Persistent Organic Pollutants (POPs) under the Stockholm Convention²¹, can be monitored to assess the potential impacts of government actions to reduce pesticide risks. Similarly, countries that have identified Highly Hazardous Pesticides (HHPs) and implemented mitigating measures can use the ATAT to monitor the effectiveness of such actions, thereby supporting targets under other international agreements, including the Global Framework on Chemicals²².

54. Where detailed information on pesticide use by crop is available, policy makers can assess the potential risks to biodiversity across different crop species or production systems. Similarly, where information on national pesticide use is georeferenced, management decisions can be supported using the TAT values as component indicators for the protection of targeted species groups (e.g., fish in rice systems or near rivers, or pollinators associated with flowering crops).

C. Support for reporting ATAT and its application to policy

55. The methodology for reporting ATAT will be made available at SBSTTA-28 through the associated metadata. The metadata presents the methodology based on a set of four simple formulas.

²¹ For further information: <https://chm.pops.int/TheConvention/ThePOPs/ListingofPOPs/tabid/2509>

²² For further information: <https://www.unep.org/global-framework-chemicals>

Furthermore, the component indicator, TAT, has been widely used and reported, with examples available in several scientific publications.²³

56. The metadata also outlines data requirements, including the hierarchy of pesticide input data and the standardization of toxicity data. It further provides recommendations for estimating pesticide usage where data might be lacking. The indicator experts will make available a comprehensive set of RTLs specifically for the application of ATAT and for reporting against Target 7b.

57. Despite the relative simplicity of the indicator and the underlying calculations, practical challenges may arise. For example, pesticide active ingredients may be misidentified where Chemical Abstract Service (CAS) numbers are not reported; use data may be reported in units other than mass (i.e., kilograms); and the relative toxicities of certain adjuvants or other ingredients may be difficult to assess when combined with active ingredients in pesticide formulations. The inclusion of pesticide mixtures in calculations can also be challenging. Furthermore, some substances, particularly newer or less-studied compounds, may not have available toxicity data. Support to address these and other potential issues will be provided through forthcoming guidance documents.

58. FAO intends to facilitate reporting of ATAT and troubleshooting by providing guidance to reporting authorities. This will include recommended protocols for managing pesticide data and developing calculation tools. Protocols will also be provided for estimating pesticide use where data gaps exist, along with recommendations for systematically capturing input data. Furthermore, FAO will provide guidance on the disaggregation of ATAT to better inform policy and support the achievement of the target.

59. FAO will work closely with a number of countries to further verify the methodology and test the guidance documents and related training materials, as well as to support the countries in identifying complementary indicators. This will include workshops in which FAO, together with the indicator experts, will work alongside reporting authorities to process the input data, align inputs with the corresponding RTLs, and calculate component TATs and ATAT values. The workshops will also identify potential obstacles to reporting, including data gaps, and explore and develop possible solutions. These national workshops are planned to be held between September 2026 and April 2027.

60. Based on experience gained from work with countries, FAO will collaborate with relevant Technical and Scientific Cooperation Support Centers (TSCs) to support regional training for the application of the methodology and reporting against the target. The CBD and FAO recommend that the TSCs might subsequently offer further assistance to reporting countries through training and support clinics. Training materials will be made available to support countries in preparation for their eight national reports.

61. FAO can further support countries in mitigating the potential risks from pesticide use to biodiversity through its work on integrated pest and pollinator management, pesticide management, and the promotion of alternatives to pesticides, particularly HHPs. FAO also works with specific value chains and on transboundary pest management to reduce pesticide-related risks.

IV. Outlook

62. The monitoring framework of the KMGBF and the adoption of indicator 7.2, provides a systematic approach to monitoring global risks to biodiversity. The ATAT methodology and its component TAT values offer a practical approach to better understand the potential contributions from different active ingredients to overall pesticide-related risks to biodiversity, and to inform policy aimed at improving the sustainable use and conservation of biodiversity. Furthermore, ongoing

²³ See relevant publications: <https://pubs.acs.org/doi/abs/10.1021/acs.est.2c07251>; <https://www.science.org/doi/abs/10.1126/science.abe1148>; <https://www.frontiersin.org/journals/insect-science/articles/10.3389/finsc.2025.1582496/full>;

efforts to reduce pesticide-related risks in the environment continue to inform policy makers and support the implementation of mitigation measures, the outcomes of which will become evident over successive reporting cycles against Target 7b.

63. In 2026, the ATAT indicator was finalized and will be tested in selected countries as part of FAO's efforts to promote sustainable and productive agri-food systems. In parallel, a series of indicator workshops, supported by the development of training materials, including a guidance document, will provide countries with hands-on experience across diverse contexts and help address potential knowledge and information gaps related to pesticide risks to biodiversity. Furthermore, TSCs will be invited to participate in these workshops to support the application and scaling up of the ATAT indicator. Additional assistance to reporting authorities, including in the form of drop-in support clinics, might further facilitate reporting.

64. The ATAT and its related component indicators can be calculated retrospectively. By the end of the reporting period, countries will therefore have benefited from accumulated reporting experience, supportive guidance and training materials, and a growing network of proficient users. However, any retrospective application of the methodology will depend on the quality of data collected during each reporting year. For this reason, it is essential to promote the systematic and efficient capture of pesticide input data through appropriate tools and protocols.

Headline Indicator 10.1 – Proportion of agricultural area under productive and sustainable agriculture

Indicator overview

65. The headline indicator 10.1 *Proportion of agricultural area under productive and sustainable agriculture* adopted by Parties at COP15, is SDG indicator 2.4.1. *Proportion of agricultural area under productive and sustainable agriculture*. SDG Indicator 2.4.1 assesses the extent to which agricultural land is managed in a manner that is economically viable, environmentally responsible and socially sustainable. The indicator provides a comprehensive measure of agricultural sustainability by evaluating performance across multiple themes and sub-indicators, including productivity, profitability, resilience, soil health, water availability, fertilizer pollution risk, pesticides pollution risk, use of agrobiodiversity supporting practices, land tenure, food security and decent employment. As such, it serves as a key tool for monitoring progress towards SDG Target 2.4, which aims to ensure sustainable food production systems and implement resilient agricultural practices that increase productivity, help maintain ecosystems, strengthen adaptation to climate change and improve land and soil quality.

66. The methodology for SDG Indicator 2.4.1 was developed through an extensive consultative and intergovernmental process led by FAO in its role as custodian agency for the indicator. The development process involved close collaboration with Member States, national statistical offices, ministries of agriculture, international organizations, research institutions and technical experts to ensure that the methodology is scientifically robust, policy relevant and operationally feasible across different agricultural systems and country contexts.

67. The methodology underwent several rounds of technical consultations, expert reviews and field testing before being presented through the established global SDG indicator governance process. Feedback from countries and partner organizations was incorporated throughout the development process, helping to refine the conceptual framework, sustainability criteria and data collection approaches. The final methodology was subsequently reviewed and endorsed through the intergovernmental mechanisms supporting the global SDG indicator framework, including the United Nations Statistical Commission (UNSC).

68. FAO continues to work in partnership with a wide range of organizations to further strengthen implementation of the indicator. These partnerships include collaboration with national governments, regional organizations, the UN system, international research centres, development partners and academic institutions to support methodological refinement, capacity development, data collection and reporting at the national and global levels.

Methodology and data sources

69. The official SDG 2.4.1 methodology measures the proportion of agricultural area under productive and sustainable agriculture through a comprehensive assessment of farm-level sustainability across multiple economic, environmental and social dimensions. The methodology is based on eleven sub-indicators covering aspects such as productivity, profitability, resilience, soil health, water use, fertilizer and pesticide management, biodiversity, decent employment, food security and land tenure. A holding is considered sustainable only when it meets the established criteria across these sub-indicators, making the indicator a direct measure of agricultural sustainability at a holding level, the results are then aggregated at a national level.

70. In response to the limited availability of data required to compile the official SDG 2.4.1 indicator across a sufficiently large number of countries, and to enable broader and more representative monitoring of progress towards SDG Target 2.4, the UNSC agreed on using of a proxy indicator as an interim solution. While the official methodology remains the internationally agreed standard for measuring sustainable agriculture, its implementation requires extensive farm-level data collection and substantial technical capacity, which are not yet available in many countries. As a

result, reporting based solely on the official methodology would currently provide limited global coverage.

71. By drawing on existing country-reported data available through established FAOSTAT reporting mechanisms, the proxy allows for significantly wider country coverage and more frequent reporting than is currently possible using the official methodology. While it does not capture all dimensions of sustainability assessed by the official indicator, it provides a practical and internationally endorsed approach for tracking global trends while FAO continues to support Member States in strengthening their statistical systems and capacities to implement and report on the official SDG 2.4.1 methodology.

72. The proxy methodology is based on seven metrics derived from country-reported data available in FAOSTAT. These data are routinely collected and submitted by Member States through established FAOSTAT reporting mechanisms. Consequently, the proxy serves as an indirect measure of progress towards sustainable agriculture, providing a practical means of monitoring trends and reporting at the global level.

73. The key distinction between the two approaches is therefore one of comprehensiveness and data requirements. The official methodology provides a more robust and internationally comparable measure of sustainable agriculture but requires extensive data collection systems that are not yet available in many countries. The proxy methodology, while less comprehensive, enables broader country coverage and more timely reporting. Recognizing these trade-offs, the UNSC approved the use of the proxy indicator as an interim solution for global reporting while FAO continues to support countries in implementing the official SDG 2.4.1 methodology and strengthening national data collection capacities.

74. Detailed information on the indicator methodology, definitions, computation methods, data requirements and reporting procedures is available in the official SDG metadata maintained by the United Nations Statistics Division²⁴ and FAO SDG 2.4.1 Methodological Resources and Guidance webpage.²⁵ Additional information on the use of SDG Indicator 2.4.1 within the context of biodiversity monitoring and reporting is available through the relevant CBD information documents and guidance materials.

FAO support to countries

75. FAO has developed a range of methodological tools and capacity-development resources to support countries in the implementation and reporting of SDG Indicator 2.4.1.

76. For the **official methodology**, countries have access to detailed methodological guidance covering the indicator framework, data requirements, sustainability criteria, data collection instruments, analysis procedures and reporting protocols. In addition, FAO offers a dedicated e-learning course, *SDG Indicator 2.4.1 – Sustainable Agriculture*,²⁶ which provides training on the indicator's 11 sub-indicators, farm survey design, data collection approaches, analysis and reporting.

77. Detailed background on SDG 2.4.1 can be found in Arabic, English, French, Russian, and Spanish.²⁷ Methodological and support documents are available on this page²⁸ and reported data

²⁴ <https://unstats.un.org/sdgs/metadata/>

²⁵ <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/2.4.1/en>

²⁶ <https://elearning.fao.org/course/view.php?id=503>

²⁷ <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/Indicator2.4.1-proportion-of-agricultural-area-under-productive-and-sustainable-agriculture/en>

²⁸ <https://openknowledge.fao.org/server/api/core/bitstreams/23359560-2b9f-4a49-87d0-3307c93a0894/content>

is accessible in the results section of the official page,²⁹ as well as on UNSDG³⁰ and FAOSTAT³¹ selecting 2.4.1.

78. For the proxy methodology, FAO has developed specific guidance and an accompanying e-learning course, *SDG Indicator 2.4.1 Proxy: Progress towards Productive and Sustainable Agriculture*.³² The course explains the conceptual framework of the proxy, the seven proxy metrics, estimation procedures, and the reporting mechanisms based on existing country-reported FAOSTAT data. Detailed background on the Proxy can be found on its dedicated FAO page,³³ and data can be accessed here,³⁴ as well as on UNSDG³⁵ and FAOSTAT³⁶ selecting 2.4.1 then proxy.

79. Beyond methodological documentation and online courses, FAO regularly provides regional and global training workshops, technical assistance, stocktaking exercises, and country-specific support to help national institutions assess data availability, identify gaps, strengthen data collection systems, and implement both the official and proxy methodologies.

80. Since 2019, FAO has provided technical assistance to develop, strengthen and enhance the knowledge and skills of national counterparts through bilateral engagements with 27 countries (often involving multiple rounds of support), and direct support to 14 countries.

81. In addition, sustained and targeted capacity development efforts by FAO have resulted in the training of over 1,500 national experts from 127 countries through 20 regional and 14 national training workshops and six seminars reaching more than 2,500 students. These sustained efforts have created a strong country level awareness and increased demand for assistance resulting in steady improvement in response and reporting rates over time for the official indicator, though the momentum should be maintained as a lot still needs to get done to improve country implementation and monitoring of the official indicator.

Reporting coverage, latest data

82. The reporting and validation process for SDG Indicator 2.4.1 follows FAO's established SDG data reporting cycle. Countries submit data to FAO through the relevant data collection mechanisms, after which the data undergo a series of technical validation and quality assurance checks conducted in consultation with national authorities. Once the validation process is completed, countries are given the opportunity to review and confirm the data before finalization.

83. Validated data for SDG Indicator 2.4.1 are released annually through FAO's SDG Data Portal, FAOSTAT, UNSD databases and associated APIs. For each reporting cycle, the validated dataset is typically finalized and made publicly available in first quarter of every year (February-March), ensuring that the latest official country data are accessible for global SDG monitoring, analysis and reporting. The published data are available through both web-based dissemination platforms and machine-readable APIs, supporting their use by countries, international organizations, researchers and other stakeholders. FAO submitted the latest data and API to the CBD Secretariat as soon as available in February 2026 with a request to integrate into the Clearing-House Mechanism Online Reporting Tool.

84. Since the launch of the reporting process in 2020, 196 countries were reached over the 2020–2025 period, 157 countries (80 percent) acknowledged receipt of the questionnaire, 137 countries (70 percent) provided information on data availability, and 58 countries

²⁹ <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/Indicator2.4.1-proportion-of-agricultural-area-under-productive-and-sustainable-agriculture/en>

³⁰ <https://unstats.un.org/sdgs/dataportal/database>

³¹ <https://www.fao.org/faostat/en/#data/SDGB>

³² <https://elearning.fao.org/course/view.php?id=1353>

³³ <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/indicator-241-proxy-progress-towards-productive-and-sustainable-agriculture/en>

³⁴ https://foodandagricultureorganization.shinyapps.io/SDG_241_PROXY/

³⁵ <https://unstats.un.org/sdgs/dataportal/database>

³⁶ <https://www.fao.org/faostat/en/#data/SDGB>

(30 percent) submitted data.³⁷ For the SDG 241 Proxy, data covering 2015-2024 are available for 195 countries, and are annually disseminated in [FAOSTAT](#).

85. In light of current funding constraints affecting SDG 2.4.1 implementation activities, a new round of the full SDG 2.4.1 questionnaire is not currently envisaged for 2027. Instead, efforts will continue to focus on maintaining annual updates of the proxy indicator.

86. Looking ahead, FAO remains committed to supporting countries in strengthening their capacity to report on SDG 2.4.1. This includes enhancing the quality, availability and timeliness of the underlying statistics used for the proxy indicator, while continuing to build national capacities for data collection, reporting and implementation of the official methodology through methodological guidance, technical assistance, training and the strengthening of national data systems. However, the delivery of these activities will be subject to the availability of financial and technical resources. While current resource constraints is affecting the scope, scale and pace of support, FAO remains committed to advancing both the continued production of the proxy indicator and the progressive expansion of data collection, reporting and implementation under the official SDG 2.4.1 methodology.

³⁷ Bangladesh, Belarus, Fiji, Germany, Hungary, Indonesia, Qatar, Timor-Leste, Tunisia and UAE reported on 11 sub-indicators; Colombia, Denmark, France, Georgia, Jamaica, United Kingdom and Viet Nam reported on 10 sub-indicators; Bahrain, Cambodia, Ecuador, Egypt, Mexico, Switzerland and Ukraine reported on 9 sub-indicators; Malawi reported on 8 sub-indicators; Estonia and Mauritius on 7 sub-indicators; Norway and Sweden reported on 6 sub-indicators; Bulgaria, Finland and Liechtenstein on 5 sub-indicators; Greece, Italy, Maldives and Poland on 4 sub-indicators; Brunei Darussalam, Democratic Republic of the Congo, Serbia, Somalia and Uruguay reported on 3 sub-indicators; Bolivia (Plurinational State of), Canada, Kazakhstan, Kenya, Libya, Namibia, Peru, Philippines, Slovakia, Spain and Uzbekistan reported on 2 sub-indicators; Burkina Faso, Croatia, Myanmar, Oman, Türkiye and Uganda reported on 1 sub-indicator.

Headline Indicator 10.2 – Progress towards sustainable forest management

Indicator overview

87. In decision 15/5 on the monitoring framework for the Kunming-Montreal Global Biodiversity Framework, the Conference of the Parties adopted headline indicator 10.2, Progress towards sustainable forest management, for Target 10. The indicator monitors progress towards sustainable forest management (SFM), a central concept of Target 10. When developing the monitoring framework, the Conference of the Parties sought to align the indicators used to monitor the Kunming-Montreal Global Biodiversity Framework with those used for the Sustainable Development Goals. Accordingly, headline indicator 10.2 corresponds to SDG indicator 15.2.1.

88. The reporting methodology for SDG indicator 15.2.1³⁸ was developed by FAO in collaboration with global and regional partner organizations³⁹ and establishes five sub-indicators to monitor progress across the economic, social and environmental aspects of sustainable forest management. The indicator and methodology have been agreed by the Inter-Agency and Expert Group on SDGs (IAEG-SDG).

89. The environmental values of forests are assessed through three sub-indicators that measure change in forest area (“annual forest area change rate”), biomass stock in forests (“above-ground biomass in forest”), and efforts to protect biodiversity and other natural and cultural resources (“proportion of forest area within legally established protected areas”). The other two sub-indicators focus on the economic and social dimensions of sustainable forest management. The presence of forest management plans, as measured by the sub-indicator “proportion of forest area with long-term forest management plans”, reflects a commitment to sustainability, while the area of certified forest, measured by “forest area under independently verified forest management certification schemes”, indicates compliance with national or international management standards, verified by independent certification bodies.

Data sources

90. Data for four of the GBF 10.2/SDG 15.2.1 sub-indicators are collected through FAO’s Global Forest Resources Assessment (FRA) country reporting process, while data for the sub-indicator related to forest certification are obtained from two global certification bodies, the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification.

91. FRA is a long-standing process, with assessments conducted at regular intervals since 1946 and now produced every five years. FRA is the only worldwide assessment based on official national data and is, therefore, the most authoritative global source of data for policymakers, foresters, researchers and anyone wanting to know the past, present and future of the world’s forests. National reports on forest resources status and trends are prepared by officially nominated National Correspondents through an online platform using a standard format, submitted to FAO, reviewed by the FRA secretariat and validated by countries’ heads of forestry. The latest assessment, FRA 2025, was released in October 2025

FAO support to countries

92. FAO provides technical support to countries throughout the data collection process, including through guidance documents, training materials, in-person workshops and targeted online assistance. Preparations for FRA 2025 began in 2021 with an internal evaluation of the FRA 2020 reporting process and a user survey, which informed the scope and content of the new cycle. These were further refined through consultations with the FAO Forestry Division, the FRA Advisory Group, partners of the Collaborative Forest Resources Questionnaire, and the FAO–UNECE Team of Specialists on

³⁸ Metadata for the SDG 15.2.1 is available at <https://unstats.un.org/sdgs/metadata/files/Metadata-15-02-01.pdf>

³⁹ Including CBD, UNFF, FAO, UNFCCC, UNCCD, FOREST Europe, ITTO, Montreal Process, IUFRO, UNDESA, Amazon Cooperation Treaty Organization, and independent experts contributed to the discussion to develop the methodology to develop the methodology.

Sustainable Forest Management. An Expert Consultation in September 2022 provided key inputs for finalizing the reporting framework (Henderson Howat et al., 2022).

93. The reporting process was launched in February 2023, and fourteen (14) regional and subregional workshops were organized in 2023 to provide technical assistance to 310 National Correspondents and their collaborators from 158 countries and areas. Throughout the reporting phase, regional focal points and reviewers provided ongoing technical support. Completed country reports were submitted via the online platform for technical review, involving detailed checks for completeness, methodological consistency and alignment with other sources where needed, with around 30 experts from FAO and partner organizations contributing. A final validation phase sought official clearance from national heads of forestry on a no-objection basis prior to publication.

Reporting coverage

94. FRA 2025 covered 236 countries and areas and approximately 50 variables across several reference years from 1990 to 2025. In total, 194 national reports were compiled by National Correspondents, while desk studies were prepared for the remaining 42 countries and areas that did not submit reports, representing 1.6 percent of the global forest area.

95. For the latest SDG 15.2.1 submission, global data coverage was as follows:

(a) Annual forest area change rate: 236 countries and territories, representing 99 percent of the global forest area.

(b) Above-ground biomass in forest: 210 countries and territories, representing 99 percent of the global forest area.

(c) Proportion of forest area within legally established protected areas: 188 countries and territories, representing 94 percent of the global forest area.

(d) Proportion of forest area under a long-term management plan: 24 countries and areas, representing 88 percent of the global forest area.

(e) Forest area under an independently verified forest management certification scheme: data cover all countries where forests are included under either certification scheme, providing 100 percent coverage.

96. The latest national data submitted and validated by countries, as well as desk studies, are publicly available through the FRA online platform⁴⁰, while SDG 15.2.1 reports and datasets can be found, e.g., through the FAO SDG Indicators Data Portal⁴¹ or in FAOSTAT⁴². As for other SDG indicators, the validated dataset is typically finalized and made publicly available in first quarter of every year February-March. FAO submitted the latest data and API to the CBD Secretariat as soon as available in February 2026 with a request to integrate into the Clearing-House Mechanism Online Reporting Tool.

Recent updates

97. Since 2025, countries have had the possibility to update their national reports on a flexible and voluntary basis when new data are available, outside the five-year FRA reporting cycles, allowing for more up-to-date reporting on GBF 10.2/SDG 15.2.1. Data submitted and validated by countries before September are included in the SDG report for the following year, prepared in February each year.

98. Parties can therefore access their latest validated data at any time on the FRA online platform.⁴³

⁴⁰ <https://fra-data.fao.org/assessments/fra/latest>

⁴¹ <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/1521-sustainable-forest-management/en>

⁴² <https://www.fao.org/faostat/en/#data/SDGB>

⁴³ <https://fra-data.fao.org/assessments/fra/latest>

Key results

99. The latest SDG 15.2.1 report shows that global trends point to tangible progress in sustainable forest management over the past decade, reflected in the growing share of forest covered by management plans, within protected areas and certified by independent schemes, as well as in steady increases in above-ground biomass. However, overall forest area continues to decline, largely driven by agricultural expansion for crop and livestock production, with progress uneven across regions. Ongoing forest loss, and the resulting decline in biodiversity and ecosystem services, underscore the urgent need to scale up sustainable forest management and afforestation, including through restoration, while strengthening efforts to halt deforestation.

100. For more information, please refer to Global Forest Resources Assessment 2025,⁴⁴ available in all UN languages.

⁴⁴ <https://openknowledge.fao.org/items/090d2fbb-32a6-412b-a3b8-1ce5c5905df2>

Headline Indicator 22.1 - Land-use change and land tenure in the traditional territories of indigenous peoples and local communities

101. The update summarizes the process followed by the Food and Agriculture Organization of the United Nations (FAO), in coordination with the International Land Coalition (ILC), Forest Peoples Programme (FPP), World Resources Institute (WRI) and other members of the Technical Working Group (TWG) to support the methodological development and update of Headline Indicator 22.1 of the Kunming-Montreal Global Biodiversity Framework (GBF). The methodological development of the indicator was the result of an iterative technical process that moved from early metadata development, through country and stakeholder consultations, to a formal call for inputs through [CBD Notification 2025-046](#)⁴⁵, followed by synthesis, expert discussion, and targeted methodological revision. Across this process, FAO and the TWG worked to balance three requirements: applicability for global monitoring, practical feasibility for national reporting, and respect for the rights, knowledge systems and data governance principles of Indigenous Peoples and local communities.

102. The revised metadata consolidates headline indicator 22.1 into three substantive components: legal recognition or legally recognized documentation of indigenous peoples and local communities' lands and territories; perceived security of land tenure; and the proportion of indigenous peoples and local communities' lands and territories categorized as non-degraded relative to a baseline year. Where all three are available, these components are aggregated into one final reported value, while retaining a stage-based approach that allows countries to report progressively as their data systems mature. The update also strengthens definitions, clarifies data sources, improves alignment with SDG and Rio Convention monitoring frameworks, and provides a stronger basis for country testing and future reporting.

I. Process chronology

Period / milestone	Main process step	Contribution to the metadata update
January 2024	Initial methodological work and TWG consultations	Development of the first working approach to the eventual headline indicator at the First Traditional Knowledge Indicators workshop, drawing on land tenure, SDG land monitoring and traditional knowledge indicator expertise.
2024 to early 2025	Technical review of indicator	A scientific and technical review of traditional knowledge indicators notes the proposed indicator meets criteria for headline indicator, encouraging further development, while the indicators AHTEG notes its relevance to other area-based indicators. ⁴⁶
3 April – 30 May 2025	CBD Notification 2025-046	The Executive Secretary invited Parties, Indigenous Peoples and local communities to submit inputs to support methodological development of the headline indicator
May – August 2025	Country technical exchanges	FAO, ILC and FPP held technical meetings with countries and partners to explain the draft metadata, clarify the logic of the indicator, and encourage informed submissions.
30 May 2025	TWG submission to SCBD	FAO, ILC and FPP, on behalf of the TWG, submitted consolidated reflections on concepts, scope, disaggregation, CBMIS, responsive reporting and cross-framework alignment.
Late 2025 – January 2026	Synthesis of Party and observer inputs	FAO synthesized inputs from seven Parties and 11 observer organizations, identifying convergences, tensions and changes suitable for integration into metadata.

⁴⁵ <https://www.cbd.int/doc/notifications/2025/ntf-2025-046-kmgbf-en.pdf>

⁴⁶ [SBSTTA/26/INF/11](#) and [SBSTTA/26/INF/14](#)

29-31 January 2026	Second Traditional Knowledge Indicators workshop, Cambridge	The TWG presented the state of the headline indicator, heard country experiences from Kenya, Philippines, Finland and Cameroon, and discussed Target Tracker ⁴⁷ reporting and future operationalization.
February – March 2026	Metadata revision led by FAO in coordination with the TWG	The metadata was updated to reflect the most actionable feedback and improve methodological coherence and usability.
19 March 2026	Updated metadata finalized for submission	The revised metadata sheet and accompanying information note submitted to the secretariat of the CBD for further review and publication.
April 2026 onward	Piloting and implementation planning	FAO, FPP, ILC, WRI and partners began exploring piloting and validation options in countries including Kenya, Philippines, Colombia, Peru and Brazil, with links to Target 2 and related monitoring work.

II. Consultative work of the Technical Working Group

103. The Technical Working Group (TWG) provided the main technical platform for refining the indicator. FAO, FPP, ILC and WRI played core convening and drafting roles, with contributions from LandMark, Prindex, Rights and Resources Initiative (RRI), Indigenous Navigator, and other land monitoring and Indigenous rights actors. The group combined statistical, geospatial, tenure, legal, policy and community-based monitoring expertise. This was important because headline indicator 22.1 sits at the intersection of three domains that are often treated separately: biodiversity monitoring, land tenure governance, and indigenous and community rights.

104. The TWG consultations focused on whether the proposed indicator could be made operational across very different country contexts. Key questions included: what should count as legally recognized land and documentation; how to treat customary, ancestral, pastoral, mobile, sacred, freshwater, coastal and marine territories; how to avoid underestimating the territories of indigenous peoples and local communities that are not yet mapped or officially recognized; how perceived tenure security should be captured under collective tenure regimes; and how global datasets could complement, but not displace, national and community-generated data.

105. These discussions shaped the overall direction of the metadata update. They made clear that a purely cadastral or title-based approach would be too narrow, while an entirely narrative approach would not meet the needs of a headline indicator. The revised approach therefore retains comparable metrics while giving countries a staged pathway to use administrative, geospatial, survey, focus group, key informant, community-based and global datasets, subject to appropriate validation and documentation.

III. Technical support to countries and stakeholders

106. Following CBD Notification 2025-046, the TWG contacted countries and partner organizations to determine whether they intended to provide inputs and relevant information to support the development of the methodology for headline indicator 22.1. These exchanges took place principally between May and June 2025, with further follow-up between June and August 2025. The purpose was not to predetermine national submissions, but to ensure that Parties, indigenous peoples and local communities led organizations and technical partners understood the old metadata, the intent of the indicator, and the kinds of methodological information that could be useful to the Convention.

⁴⁷ <https://target-tracker.org/en>

107. Technical exchanges were held with countries and partners including Kenya, the Philippines, Nepal, Colombia and others. They involved government institutions, often ministries responsible for environment or biodiversity reporting, alongside Indigenous Peoples' and local community organizations or their technical partners. In these sessions, the TWG explained the indicator architecture, the proposed use of legal recognition/documentation and perceived tenure security, the emerging land-use change component, the stage-based reporting approach, and the relationship between national data systems and complementary community-generated evidence.

108. This capacity-support phase was essential for two reasons. First, headline indicator 22.1 is a fairly new headline indicator, and many national biodiversity reporting systems have limited prior experience integrating land tenure, land use, rights-based monitoring and community-generated data. Second, many of the methodological issues are politically and technically sensitive. Parties needed clarity on the indicator before they could provide meaningful feedback, and indigenous peoples and local communities organizations needed reassurance that the indicator would not reduce their territories and governance systems to narrow legal categories or externally imposed land-use classifications.

IV. Inputs received through CBD Notification 2025-046

109. The formal Convention process generated inputs from seven Parties including Brazil, Spain, Sweden, Mexico, Kenya, Norway and Germany, and submissions from a range of observer organizations, including Indigenous Peoples' organizations, community-based monitoring initiatives, research institutions and civil society actors. The observer inputs included contributions from International Indigenous Forum on Biodiversity (IIFB), the CBD Women's Caucus, Indigenous Navigator, NINA, International Working Group of Indigenous Peoples in Isolation and Initial Contact (GTI-PIACI), Partners for Indigenous Knowledge Philippines (PIKP), CNTI-Colombia, ANECAP-Peru and others.

110. The submissions showed broad support for the continued development of HI22.1 and generally treated the earlier metadata as a useful starting point. However, they also converged around the need for refinement. Parties emphasized practical national application, compatibility with existing data systems, use of official sources where available, stage-based reporting, clearer definitions and alignment with SDG indicators and other Rio Convention monitoring processes. They also highlighted the importance of feasible disaggregation, especially by tenure type and, where possible, sex and age.

111. Observer organizations, especially Indigenous and community-led organizations, placed stronger emphasis on rights-based safeguards. Their comments stressed that customary, ancestral, sacred, biocultural, pastoral, coastal and marine dimensions of territories should not be excluded merely because they are not fully represented in official datasets. They called for Free, Prior, and Informed Consent (FPIC); Indigenous data sovereignty; Collective Benefit, Authority to Control, Responsibility, Ethics (CARE) principles for indigenous data governance; recognition of community-based monitoring and information systems (CBMIS), and a careful distinction between externally driven land-use conversion and customary or sustainable community land use. These perspectives helped prevent the indicator from becoming a technically neat but politically weak measurement tool.

V. TWG submission and methodological priorities

112. FAO, FPP, ILC and WRI submitted a joint contribution to the Secretariat of the Convention on Biological Diversity on 30 May 2025 on behalf of the TWG. The submission documented lessons from prior consultations and identified issues requiring methodological attention. It called for clearer concepts and definitions; better treatment of collective, customary and diverse tenure regimes; consideration of pastoralism, mobility, freshwater, coastal and marine territories; stronger use of indicative mapping layers and claim-based proxies where territories are under-documented; and further guidance on how headline indicator 22.1 could support disaggregation of other GBF headline indicators.

113. The submission also placed strong emphasis on inclusive data and reporting processes. It recommended that CBMIS and citizen-generated data be accommodated within official reporting pathways through transparent protocols, validation arrangements and role clarity among national statistics offices, environmental agencies, community data stewards and rights-holder institutions. It also proposed a modular reporting template, narrative inputs from indigenous peoples and local communities and crosswalks with SDG indicators 1.4.2, 5.a.1 and 15.3.1 to improve interoperability and connect to other global development agenda.

114. Strategically, the submission framed headline indicator 22.1 as more than a single CBD indicator. It pointed to its potential role in connecting biodiversity, land degradation, climate adaptation and tenure security agendas across the Rio Conventions and the SDGs. This framing later became important in the revised metadata, particularly the alignment of the land-use change component with SDG 15.3.1 and SDG 15.4.2 logic, while reporting the inverse value: non-degraded, stable or improving land within the lands and territories of indigenous peoples and local communities.

VI. Second Traditional Knowledge Indicators (TKIs) workshop and Target Tracker discussions

115. The Second Expert Workshop on Traditional Knowledge Indicators, held in Cambridge from 29 to 31 January 2026 and co-organized by FPP and the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), provided a major opportunity to present progress on headline indicator 22.1 and situate the indicator within the broader rights-based monitoring agenda for the Framework. The TWG presented the status of the indicator, the consultation process, the main messages from Parties and observers, the areas of emerging consensus, unresolved tensions, and the proposed path from methodology to implementation.

116. Country experiences were central to the Cambridge discussions. Kenya presented its experience using headline indicator 22.1 to illuminate connections between land governance, biodiversity monitoring and the rights of indigenous peoples and local communities, including ongoing national processes to identify and collate data sources and the role of IMPACT Kenya in community land and biodiversity monitoring. The Philippines presented community mapping and participatory approaches led by PAFID and PIKP. Finland and Cameroon also shared experiences relevant to traditional knowledge and rights-based monitoring. These examples reinforced that countries are starting from different data realities, but that practical entry points exist.

117. During the Cambridge meeting, the TWG also held consultations on data reporting through UNEP-WCMC's Target Tracker and on how headline indicator 22.1 could contribute to broader reporting on progress in monitoring the Framework. The Target Tracker data channel was intended to provide countries with global data generated from the earlier methodology, where feasible, to support national reporting in the seventh national reports. The discussion also clarified that global data should be treated as a support mechanism, not a substitute for country validation, national sources or rights-holder engagement.

VII. changes reflected in the updated metadata

118. Between February and March 2026, FAO led the metadata revision process in coordination with members of the TWG, drawing on the synthesized Party and observer feedback, the TWG submission, and technical learning from Cambridge. The updated metadata, dated 19 March 2026, represents a substantial evolution from the earlier version.

119. First, the indicator architecture was consolidated. The earlier broader structure, which included separate land-use proxies for forest area and natural land, was simplified into three substantive components plus one final aggregate value:

(a) the proportion of indigenous peoples and local communities lands and territories with legal recognition or legally recognized documentation;

(b) the proportion of indigenous peoples and local communities and individuals where tenure is perceived as secure; and

(c) the proportion of indigenous peoples and local communities lands and territories categorized as non-degraded against a baseline year. The final value is reported as the average of the three components.

120. Second, the land-use change component was revised. Instead of relying on separate forest and natural land proxies as the main formulation, the updated metadata focuses on non-degraded land and water within mapped indigenous peoples and local communities territories. This improves alignment with the logic of SDG 15.3.1 and 15.4.2, while allowing national land cover/land use classifications and transition matrices to be applied according to context. Forest area remains relevant as a possible proxy where full land cover/land use analysis is not yet feasible, particularly in forest-dominant contexts.

121. Third, the metadata strengthens definitions and data architecture. It clarifies traditional territories, community lands, indicative areas, legally recognized documentation, land cover/land use change, and non-degraded land. It recognizes local and national sources, LandMark, RRI, Afro-descendant Atlas, Indigenous Navigator, FAO's Global Land Observatory, Prindex, LANDex, ICCA Registry, GLAD/WRI and ESA-CCI-LC as relevant data pathways, depending on the component. It also retains the stage-based approach so that countries with limited data can begin reporting while progressively improving representativity, disaggregation and geospatial precision.

VIII. Current and next phase: piloting, validation and implementation

122. As of early April 2026, FAO and the TWG are moving from metadata revision toward testing and operationalization. Possible pilot and validation processes are being explored in Kenya, the Philippines, Colombia, Peru, Brazil and other interested contexts. The purpose of these pilots would be to test the revised metadata against real national and community data ecosystems; identify practical reporting bottlenecks; validate data flows between official, community and global sources; and refine guidance before wider use in national reporting cycles.

123. Kenya is emerging as a particularly strategic country case because it offers opportunities to connect headline indicator 22.1 with Target 2 on ecosystem restoration, and potentially with Target 3 where protected and conserved areas intersect with indigenous peoples and local communities lands and governance systems. The planned national data mapping and validation workshop would help identify datasets, institutional roles, gaps, reporting options and technical needs. Similar learning could be generated from the Philippines, Colombia, Peru and Brazil, especially in relation to community mapping, indigenous territorial governance, forest and land-use monitoring, and integration of CBMIS with national biodiversity reporting systems.

124. The central lesson from the update process is that headline indicator 22.1 can become a credible and transformative indicator only if implementation preserves the balance achieved in the revised metadata: technically comparable enough for global monitoring; flexible enough for national realities; and rights-sensitive enough to reflect the lands, territories, knowledge, governance systems and data rights of Indigenous Peoples and local communities. Continued technical learning, country testing and dialogue with Parties, indigenous peoples and local communities will therefore be essential to move from a stronger metadata sheet to an operational reporting system.

IX. Documents consulted

125. CBD Secretariat, Notification 2025-046, Invitation to submit inputs and relevant information to support the development of a methodology for headline indicator 22.1, 3 April 2025.

126. FAO, ILC and FPP on behalf of the Technical Working Group, Submission in Response to SCBD Notification 2025-046, 30 May 2025.

127. FAO, HI22.1 Metadata Update for Submission, date of metadata update: 19 March 2026.

128. FAO/ILC/FPP/WRI, Information Note on the Updated Metadata for Headline Indicator 22.1.
129. FAO presentation, Advancing Headline Indicator 22.1: Methodological Review, Process, Timelines and Way Forward, Cambridge, 29 January 2026.
130. UNEP-WCMC and FPP, Second Expert Workshop on Traditional Knowledge Indicators of the GBF, Meeting Report, 29-31 January 2026.

X. Summary of progress

131. The process documented above demonstrates that the updated metadata for headline indicator 22.1 was developed through a structured and consultative pathway, rather than through a purely internal technical revision. It drew on an initial methodology, formal inputs submitted through the CBD process, country-facing technical exchanges, expert discussion at the Cambridge Traditional Knowledge Indicators workshop, and synthesis work led by FAO with the wider TWG.

132. The strongest substantive shift is that the updated metadata now offers a clearer bridge between rights-based monitoring and practical national reporting. It recognizes the importance of official data, but does not treat official data as the only valid source of evidence. It allows countries to combine official, community-generated and global datasets, provided the source, validation status, consent conditions and limitations are clearly documented.

133. The revised metadata also provides a more credible basis for Target Tracker pre-population and national reporting because it clarifies what each component measures, how countries can report at different stages of data readiness, and how missing data should be treated. At the same time, it avoids overstating the maturity of the indicator: further testing is still needed on freshwater, coastal and marine contexts; overlaps between datasets; treatment of under-mapped territories; and the quality dimensions of legal recognition and perceived tenure security.

134. The process can therefore be presented as a practical example of how a rights-based headline indicator can be advanced through collaboration among custodians, technical partners, Parties, indigenous peoples and local communities, and monitoring institutions. It also illustrates the wider contribution of headline indicator 22.1 to implementation of the Framework. It can support target 22 directly, while providing evidence relevant to restoration, conservation, sustainable use and cross-convention reporting where land tenure and land-use change intersect.

Process evidence	Why it matters for headline indicator 22.1
Formal SCBD call and submissions	Provides legitimacy and an auditable basis for methodological revision.
Country technical exchanges	Improves national understanding and makes submissions more informed and usable.
Cambridge workshop and country cases	Tests the methodology against real monitoring contexts and country experiences.
Revised three-component architecture	Improves clarity, comparability and progressive reportability.
Piloting and validation phase	Moves the indicator from metadata to operational reporting practice.