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Agenda item 3

COMPILATION OF AVAILABLE METADATA FOR THE PROPOSED HEADLINE INDICATORS OF THE DRAFT MONITORING FRAMEWORK FOR THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

Note by the Executive Secretary

1. The Executive Secretary is pleased to circulate herewith, for the information of participants in twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, an information document containing a compilation of available metadata for the proposed headline indicators of the draft monitoring framework for the post-2020 global biodiversity framework. The note has been prepared by the United Nations Environment Programme World Conservation Monitoring Centre in collaboration with the Secretariat to the Convention on Biological Diversity and with financial support from the United Kingdom of Great Britain and Northern Ireland. The information is provided in the form and language in which it was received by the Secretariat.

Compilation of available metadata for the proposed headline indicators of the draft monitoring framework for the post-2020 global biodiversity framework

Summary
This document has been prepared by the Secretariat to the Convention on Biological Diversity (CBD) and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), in collaboration with partner organisations responsible for collating data.[1] Partner organisations responsible for the delivery or development of the proposed headline indicators in the draft monitoring framework have prepared metadata sheets for each of the currently proposed indicators – a compilation of which is made available here, for review by Parties to the CBD, and other stakeholders. This work was enabled through a financial contribution from the United Kingdom of Great Britain and Northern Ireland.

Background
At the fifteenth meeting of the Conference of the Parties (COP) to the CBD, Parties are expected to adopt a post-2020 global biodiversity framework as a roadmap towards the 2050 Vision of "Living in harmony with nature". In its decision 14/34, the COP adopted a comprehensive and participatory process for the preparation of the post-2020 global biodiversity framework.[2] As part of that process, documents relating to the development of the post-2020 global biodiversity framework have been shared with Parties and stakeholders. A first draft of the global biodiversity framework was made available in 2021,[3] accompanied by a draft monitoring framework.

The draft monitoring framework identifies, *inter alia*, a set of possible indicators that could be used to monitor the implementation of the post-2020 global biodiversity framework at the national level and track progress globally.[4] [5] This includes a suite of proposed headline indicators, which have been identified for possible use in national reporting under the CBD and for high-level global analyses. The monitoring framework builds upon scientific advice included in document CBD/SBSTTA/24/3/Add.1,[6] an initial concept of the monitoring framework included in CBD/SBSTTA/24/3/Add.2,[7] the views expressed during informal preparatory sessions and the first part of the twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-24),[8] including the results of an in-session survey,[9] and the calls for simplification expressed by Parties during the first part of the Third Meeting of the Open-Ended Working Group on the Post-2020 Global Biodiversity Framework (WG2020-3).

[1] These partner organisations include Birdlife International, Food and Agriculture Organisation of the United Nations (FAO), Group on Earth Observations Biodiversity Observation Network (GEO BON), German Centre for Integrative Biodiversity Research (iDiv) iDIV/ sTWIST, International Union for the Conservation of Nature (IUCN), IUCN Species Survival Commission (SSC), Conservation Genetics Specialist Group, IUCN SSC Human-Wildlife Conflict Task Force, Morton Arboretum, Organisation for Economic Co-operation and Development (OECD, TRAFFIC, UNEP, UNFCCC, UN-Habitat, University of Yale, and the UN Statistics Division.

[2] CBD/COP/DEC/14/34

[3] CBD/WG2020/3/3

[4] CBD/WG2020/3/3/Add.1

[5] CBD/WG2020/3/INF/2

[6] CBD/SBSTTA/24/3Add.1

[7] CBD/SBSTTA/24/3/Add.2/Rev.1

[8] Co-chairs' text on item 3 and its annex

[9] CBD/SBSTTA/24/INF/29:

The draft monitoring framework, as updated in the non-paper on proposed headline indicators prepared for consideration by SBSTTA-24,[10] outlines the criteria that were used to identify the currently proposed headline indicators and sets out some general considerations for their identification. In addition, information document CBD/WG2020/3/INF/2 provides further information on possible component and complementary indicators as well as more detailed technical information on some of the proposed indicators.[11]

The proposed criteria for the selection of indicator selection identified in Document CBD/WG2020/3/3/Add.1[12] includes the following:

(a) The indicator is either currently available for use, is under active development and is expected to available soon, or could be developed by Secretariat of the Convention on Biological Diversity and its partners on the basis of existing processes;
(b) The indicator is directly relevant to at least one goal or target in first draft of the post-2020 global biodiversity framework;
(c) The indicator is nationally relevant, and can be disaggregated from global to national levels and/or aggregated from national to global levels without compromising the reliability of the indicator;
(d) The methodology for the indicator is either published in a peer reviewed academic journal or has gone through a scientific peer review process;
(e) The data and metadata related to the indicator are publicly available;
(f) The indicator will be regularly updated with a gap of less than five years between updates.

For headline indicators, two additional criteria are proposed:

(g) Headline indicators should constitute one of the main components of the national reports and support national planning processes.
(h) Headline indicators should use methodologies agreed by Parties and be calculated based on national data provided and/or validated by Parties, including through their national statistical offices.

Introduction to the metadata for the proposed headline indicators

To support the development of the monitoring framework, metadata for the currently proposed headline indicators has been compiled by organisations who are leading the development of a proposed indicator, or are leading the delivery of proposed indicators and have an established methodology in place. The metadata provides detailed information for Parties and stakeholders to better understand each of the proposed indicators, in order to inform discussions on the suitability of the proposed indicators in the monitoring framework.

Metadata sheets are provided for **38 of the proposed headline indicators[13]**. **Full metadata sheets are provided for 23** of the proposed headline indicators, **15 partial metadata sheets are provided**, and no data is provided for one proposed headline indicator.

The full metadata sheets in this document includes the following information:

- The name of the proposed indicator

[10] https://www.cbd.int/doc/c/ae6a/dff8/476045e048e27acf2448c72f/non-paper-item3-monitoring-v1-en.pdf
[11] CBD/WG2020/3/INF/2
[12] CBD/WG2020/3/3/Add.1
[13] 39 headline indicators are proposed in document CBD/WG2020/3/3/Add.1

- Date of the metadata update (versions of the metadata will be made available if changes are made to the metadata during the negotiation period)
- The corresponding draft goal or target for which the indicator is proposed to measure progress
- The rationale for the proposed indicator
- Definitions and concepts associated with the proposed indicator
- Information on how the indicator is calculated, the methodology and data sources
- Information on whether the methodology to calculate the indicator is available and accessible
- The date range for the indicator – the baseline date (year) from which data was gathered, and the latest year of data collection (e.g., 1992 – 2022)
- The organisation (legal entity) responsible for compilation of the indicator and for ensuring the indicator is available for use in monitoring and reporting
- Gaps in data coverage for the indicator – for example taxonomic, thematic, and geographic gaps
- Description of the methodology employed for producing estimates for the indicator when country data are not available
- Geographic scale of coverage – whether data is applicable, at national, regional, or global scales
- Whether the indicator is currently adopted for use to measure progress towards the goals, targets and commitments under other multilateral environmental agreements (MEAs) and processes, such as the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs),[14] the Convention on the Conservation of Migratory Species of Wild Animals (CMS),[15] and the United Nations Convention to Combat Desertification (UNCCD),[16] used in assessments for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (*IPBES*),[17] or peer-reviewed by the Biodiversity Indicators Partnership (BIP).[18]

The content and format of the template used to gather this data follows the metadata template used for indicators adopted to measure progress towards the SDGs.

Proposed indicators under development or in early conceptual stage
For 16 of the proposed headline indicators (41%), a shortened metadata sheet is provided. These indicators are either at a conceptual stage, or at very early stages of development. Therefore, it is not currently possible to provide details of how these indicators would be compiled and what data would be used or be required, or what the indicator would show.

The shortened metadata sheets include the following information about potential indicators:

- The proposed indicator name
- The date that the shortened metadata form was completed

[14] https://unstats.un.org/sdgs/metadata/
[15] https://www.cms.int/en/document/performance-indicators-convention-migratory-species
[16] https://knowledge.unccd.int/knowledge-products-and-pillars/guide-scientific-conceptual-framework-ldn/key-elements-scientific-5#:~:text=Following%20a%20selection%20process%20undertaken,of%20the%20associated%20ecosystem%20services.
[17] https://ipbes.net/assessing-knowledge
[18] https://www.bipindicators.net/

- The corresponding draft goal or target of the post-2020 global biodiversity framework for which the indicator will be developed to measure progress in implementation
- The proposed rationale for the indicator
- The development status of the indicator – how quickly and likely it will be developed for use and what work is underway to develop it
- The proposed timetable for development
- The potential scale of use
- The proposed data sources
- The proposed indicator data compilers

See Table 1 for details of the indicators that fall into this category.

Table 1. Availability of proposed headline for use at the adoption of the post-2020 framework

Draft Goal/ Target	Available for use[19]	In development[20]	Needs development[21]
Goal A	A.0.2 Species Habitat Index	A.0.1 Extent of selected natural and modified ecosystems (i.e., forest, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats)	
	A.0.3 Red List Index	A.0.4 The proportion of populations within species with a genetically effective population size > 500	
Goal B		B.0.1 National environmental economic accounts of ecosystem services	
Goal C			C.0.1 Indicator on monetary benefits received. **Proposed Indicator name:** C.0.1 Monetary benefits received from utilization of genetic resources as a result of an ABS agreement, including traditional knowledge
			C.0.2 Indicator on non-monetary benefits. **Proposed Indicator name:** C.0.2. Number of research and development products from an ABS agreement
Goal D			D.0.1 Funding for implementation of the global biodiversity framework
			D.0.2. Indicators on funding for implementation of the global

[19] Indicator "Available for use"" refers to indicators that are developed and are currently in use

[20] "Under development" refers to any indicators that are actively being developed and are likely to be ready for use within the next two (2) years – to the best knowledge of UNEP-WCMC (February 2022).

[21] "Needs development" refers to indicators that will not be available for use within this period to the best the knowledge of UNEP-WCMC (February 2022).

Draft Goal/ Target	Available for use[19]	In development[20]	Needs development[21]
			biodiversity framework (aligned with Target 19). **Proposed indicator name:** D.0.2 Indicator on national biodiversity planning processes and means of implementation
Target 1			1.0.1 Percentage of land and seas covered by spatial plans that integrate biodiversity
Target 2			2.0.1. Percentage of degraded or converted ecosystems that are under restoration.
Target 3	3.0.1 Coverage of Protected areas and OECMS (by effectiveness)		
Target 4	4.0.2 Number of plant genetic resources for food and agriculture secured in medium or long-term conservation facilities		4.0.1 Proportion of species populations that are affected by human wildlife conflict
Target 5	5.0.2 Proportion of fish stocks within biologically sustainable levels	5.0.1 Proportion of wildlife that is harvested legally and sustainably	
Target 6		6.0.1 Rate of invasive alien species spread	
Target 7	7.0.1 Index of coastal eutrophication potential (excess nitrogen and phosphate loading, exported from national boundaries)		
	7.0.2 Plastic debris density		
	7.0.3 Pesticide use per area of cropland		
Target 8			8.0.1 National greenhouse gas inventories from land use and land use change
Target 9		9.0.1 National environmental-economic accounts of benefits from the use of wild species	
Target 10	10.0.1 Proportion of agricultural area under productive and sustainable agriculture		
	10.0.2 Progress towards sustainable forest management (Proportion of forest area under a long-term forest management plan)		
Target 11		11.0.1 National environmental-economic accounts of regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people, from ecosystems	
Target 12	12.0.1 Average share of the built-up area of cities that is		

Draft Goal/ Target	Available for use[19]	In development[20]	Needs development[21]
	green/blue space for public use for all		
Target 13			13.0.1 Indicators of operational legislative, administrative or policy frameworks which ensure fair and equitable sharing of benefits, including those based on PIC and MAT
Target 14	14.0.2 Integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental Economic Accounting		14.0.1 Extent to which national targets for integrating biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies and accounts at all levels, ensuring that biodiversity values are mainstreamed across all sectors and integrated into assessments of environmental impacts
Target 15			15.0.1 Dependencies and impacts of businesses on biodiversity
Target 16	16.0.1 Food waste index		
	16.0.2 Material footprint per capita		
Target 17			17.0.1 Indicator of measures in place to prevent, manage and control potential adverse impacts of biotechnology on biodiversity taking into account human health
Target 18	18.0.1 Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated. **Proposed indicator name:** Positive incentives (by type) in place to promote biodiversity conservation and sustainable use.		
Target 19	19.0.1: Official development assistance for biodiversity		19.0.2 Public expenditure and private expenditure on conservation and sustainable use of biodiversity and ecosystems
Target 20			20.0.1 Indicator on biodiversity information and monitoring, including traditional knowledge, for management.
Target 21			21.0.1 Degree to which indigenous peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity
			21.0.2 Land tenure in the traditional territories of indigenous peoples and local communities

Assessment of the metadata

Initial analysis was undertaken on the metadata available so far, based on the criteria for the selection of headline indicators.[22] [23] This initial analysis shows that 16 out of the 39 proposed headline indicators (41%) are available for use[24] at present. Additionally, seven other proposed headline indicators are in development and are likely to be ready for use with the next two years. As noted above, the remaining 16 proposed indicators are in the early stages of development, or development is yet to start. The period of time required for the development of these indicators is unknown, based on the information provided in the metadata for each indicator.

A summary of key attributes of the proposed headline indicators is included at Table 2 in Annex 1.

Geographical scale

Of the total number of proposed headline indicators (including both indicators available now or in development), 17 would be compiled at a global scale and deliver globally relevant data, with the possibility of disaggregating data at the national level. In addition, 17 indicators will be developed from national data – either through collation of data by government bodies, or non-state actors collating data at the national level. There is no data on the remaining indicators in terms of geographical scale, since the indicators are either in early stages for development, or data was not provided.

A methodology to generate the proposed indicator at national level is available for only 14 of the proposed headline indicators. There is limited information in the metadata as to whether a methodology will be available for national application for the remaining indicators, and if so, the timeline for producing a nationally applicable methodology.

Use of proposed by indicators for other MEAs and processes

The metadata provided shows that 18 of the proposed headline indicators are used for measuring progress towards other MEAs and processes. This includes 15 indicators that would measure progress towards the SDGs, and five indicators used in IPBES assessment reports. Two indicators are also cited in the Strategic Plan for Migratory Species (SPMS) under the CMS. However, in this preliminary analysis presented in this document, the actual use, and frequency of use of the proposed indicators for measuring progress towards goals and targets of other MEAs and processes was not undertaken.

In addition, and crucially, no assessment of the use of the proposed indicators (that are currently developed and in use) in CBD National Reports was undertaken for this preliminary analysis.

Next steps

The summary of metadata in this document does not include a full assessment of the suitability of the proposed indicator as a measure of progress towards the corresponding draft goal or target of the post-2020 global biodiversity framework.

[22] CBD/SBSTTA/24/3/Add.1
[23] CBD/SBSTTA/24/INF/16
[24] Information on whether an indicator is available today or under development does not equate to the tier classification of the SDG indicators.

Depending on the discussions and the outcomes of SBSTTA-24 Part II, this document can be available for review by Parties and stakeholders (including the scientific and technical community). Review comments could address the following issues listed in relation to the suitability of the indicators proposed in the draft monitoring framework, including, *inter alia*:

- whether the proposed rationale for the proposed indicator is directly relevant to the corresponding draft goal or target of the post-2020 global biodiversity framework;
- the accuracy or suitability of methodology for indicator calculation, in relation to the corresponding goal or target;
- The required data for the indicator and the existence of national data systems or other data sources for the indicator;
- The format and accessibility of the final indicator output
- The extent and geographical coverage of the proposed headline indicators
- The frequency of updates for the indicator and the time series, in relation to useful measures of the corresponding draft goal or target.

The comments received from a review could be compiled into a preliminary report and used for further analysis. A revised version of the metadata, which also takes into account the outcomes of SBSTTA-24 and the WG2020-03, could then be provided to COP-15.

Annex 1. Table 2. Summary of proposed headline indicators

Goal/ target[25]	Goal/target name in first draft monitoring framework[26]	Indicator name and number in draft monitoring framework	Availability[27]	Time series[28]	Frequency of updates[29]	Data at global scale?[30]	National data[31]	National methodology available[32]	Institution [33]	Other MEAs/ processes [34]	Indicator reviewed by BIP[35]
Goal A	The integrity of all ecosystems is enhanced, with an increase of at least 15% in the area, connectivity and integrity of natural ecosystems, supporting healthy and resilient populations of all species, the rate of extinctions has been reduced at least tenfold, and the risk of species extinctions across all taxonomic and functional groups, is halved, and genetic diversity of wild and domesticated species is safeguarded, with at least 90% of genetic diversity within all species maintained.	A.0.1 Extent of selected natural and modified ecosystems (i.e., forest, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats)	In development	Since 1992	In development	In development	In development	In development	UN Statistics Division	Data pending	N
		A.0.2 Species Habitat Index	Available for use	2001-2020	Annually	Y	Y	Y	GEO BON/ University of Yale	IPBES	Y
		A.0.3 Red List Index	Available for use	1980 – 2021	Annually	Y	Y	Y	IUCN & BirdLife International	IPBES; SDG Indicator 15.5.1; SPMS indicators 5.1, 6.2, and 8.1;	Y

[25] Letter (A-D) of the corresponding goal, or number 1 - 21 of the corresponding draft target in the first draft of the global biodiversity framework (CBD/WG2020/3/3)

[26] Draft text of the corresponding goal or target in the first draft of the post-2020 global biodiversity framework (CBD/WG2020/3/3)

[27] Indicator available today/ under development / needs development / data pending according to metadata provider by data reporters. “Under development” refers to any indicators that are actively being developed and are likely to be ready for use within the next two (2) years – to the best knowledge of UNEP-WCMC (February 2022). "Needs development" refers to indicators that will not be available for use within this period to the best the knowledge of UNEP-WCMC (February 2022). Where data was not provided by data reporters, fields are marked as ‘data pending’. This can refer to instances where indicators are in active development and data is expected to be provided in the next two years, and also to instances where the data fields cannot be completed as the nature of the indicator is unknown. Information on whether an indicator is available today or under development does not equate to the tier classification of the SDG indicators.

[28] Timeframe over which a series of data points for the indicator is available at successive points in time

[29] Frequency of updates to the indicator (new data points) that are made available by the indicator producer/custodian/ responsible institution. This information is not available for indicators measured at the national level.

[30] The data for the indicator is collected by an organisation (at a global / regional level) and at least a proportion of the data can be disaggregated for national use (i.e. the indicator contains data that is collected from some specific countries). For example, the Red List Index, is a global indicator but it can be broken down to regional and national scales

[31] The data can be collected at the national level by a government institution or national statistics office, the data is then shared with an indicator producer/custodian agency to create global indicators. An example is the coverage of protected area indicator. The data is collected by national institutions and shared with UNEP-WCMC (custodian agency), and the indicator can be delivered at national, regional or global scales.

[32] Methodology for producing the indicator at the national level is available, or the indicator is easy to use/self-explanatory, and can be calculated simply at the national level without guidance. In the case of an available methodology, this relates to any methodology available online that allows calculation of the indicator at the national level. This may include methodologies that are suitable for use at the national scale, which have been either published in a peer reviewed publication or been through a scientific peer review process. The availability of any methodology that can be interpreted for use at the national level is displayed as Y. It also includes global scale indicators that can be calculated by entities at the national level. In instances where indicators that can be calculated by countries without guidance (e.g. number of updated NBSAP for countries), these indicators are also displayed as Y in this field, as the indicator can be calculated at the national level.

[33] Name of legal entity or institutions(s) responsible for developing and delivering indicator

[34] Indicators that are used to measure progress towards other biodiversity-related conventions and intergovernmental processes may provide consistent messaging, reduce costs and reduce the reporting burden for Parties. Indicator adopted for use to measure progress towards SDGs and the CMS Strategic Plan for Migratory Species 2015-2023 are included here. Information for other MEAs and processes (such as IPBES), will be included here, subject to available resources

[35] The indicator is included and promoted by the Biodiversity Indicators Partnership (BIP). Indicators included in the BIP are those that meet certain standards, including being policy relevant; accessibility and availability of data, including time series with regular updates, thresholds on geographical coverage; and the use of standard and validated methods and definitions. Please see here for more information: https://www.bipindicators.net/about/join-the-bip

Goal/ target[25]	Goal/target name in first draft monitoring framework[26]	Indicator name and number in draft monitoring framework	Availability[27]	Time series[28]	Frequency of updates[29]	Data at global scale?[30]	National data[31]	National methodology available[32]	Institution [33]	Other MEAs/ processes [34]	Indicator reviewed by BIP[35]
		A.0.4 The proportion of populations within species with a genetically effective population size > 500	In development	Data pending	In development	In development	In development	In development	Morton Arboretum with GEO BON/ IUCN Conservation Genetics Specialist Group	Data pending	N
Goal B	Nature's contributions to people have been valued, maintained or enhanced through conservation and sustainable use supporting the global development agenda for the benefit of all.	B.0.1 National environmental economic accounts of ecosystem services	In development	Data pending	In development	In development	In development	In development	UN Statistics Division	Data pending	N
Goal C	The benefits from the utilization of genetic resources are shared fairly and equitably, with a substantial increase in both monetary and non-monetary benefits shared, including for the conservation and sustainable use of biodiversity.	C.0.1 Indicator on monetary benefits received. **Proposed Indicator name:** C.0.1 Monetary benefits received from utilization of genetic resources as a result of an ABS agreement, including traditional knowledge	In development	In development	In development	In development	In development	In development	SCBD	N	N
Goal C	The benefits from the utilization of genetic resources are shared fairly and equitably, with a substantial increase in both monetary and non-monetary benefits shared, including for the conservation and sustainable use of biodiversity.	C.0.2 Indicator on non-monetary benefits. **Proposed Indicator name:** C.0.2. Number of research and development products from an ABS agreement	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	SCBD	N	N
Goal D	The gap between available financial and other means of implementation, and those necessary to achieve the 2050 Vision, is closed.	D.0.1 Funding for implementation of the global biodiversity framework	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N
		D.0.2. Indicators on funding for implementation of the global biodiversity framework (aligned with Target 19). **Proposed indicator name:** D.0.2 Indicator on national biodiversity planning processes and means of implementation	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N
Target 1	Ensure that all land and sea areas globally are under integrated biodiversity-inclusive spatial planning addressing land- and sea-use change, retaining existing intact and wilderness areas.	1.0.1 Percentage of land and seas covered by spatial plans that integrate biodiversity	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N

Goal/ target[25]	Goal/target name in first draft monitoring framework[26]	Indicator name and number in draft monitoring framework	Availability[27]	Time series[28]	Frequency of updates[29]	Data at global scale?[30]	National data[31]	National methodology available[32]	Institution[33]	Other MEAs/ processes[34]	Indicator reviewed by BIP[35]
Target 2	Ensure that at least 20% of degraded freshwater, marine and terrestrial ecosystems are under restoration, ensuring connectivity among them and focusing on priority ecosystems.	2.0.1 Percentage of degraded or converted ecosystems that are under restoration.	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N
Target 3	Ensure that at least 30% globally of land areas and of sea areas, especially areas of particular importance for biodiversity and its contributions to people, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	3.0.1 Coverage of Protected areas and OECMS (by effectiveness)	Indicator available today	1819-present	Annually	Y	Y	Y	UNEP-WCMC/ BirdLife International/ IUCN	SDG Indicators 14.5.1, 15.1.2 and 15.4.1.	Y
Target 4	Ensure active management actions to enable the recovery and conservation of species and the genetic diversity of wild and domesticated species, including through ex situ conservation, and effectively manage human-wildlife interactions to avoid or reduce human-wildlife conflict.	4.0.1 Proportion of species populations that are affected by human wildlife conflict Proposed indicator name: 4.0.1 Effective and sustainable management of human-wildlife conflicts and coexistence	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	IUCN SSC Human-Wildlife Conflict Task Force/ partners	Data pending	N
		4.0.2 Number of plant genetic resources for food and agriculture secured in medium or long-term conservation facilities	Indicator available today	2014, 2016, 2017, 2018 and 2019.	Annually	Y	Y	Y	FAO	SDG Indicator 2.5.1	N
Target 5	Ensure that the harvesting, trade and use of wild species is sustainable, legal, and safe for human health.	5.0.1 Proportion of wildlife that is harvested legally and sustainably	In development	In development	In development	In development	In development	In development	TRAFFIC	SDG Indicators 12, 14, 15, IPBES.	Data pending
		5.0.2 Proportion of fish stocks within biologically sustainable levels	Indicator available today	1974-2018 (global/regional level only)	Biennially	Y	N	N	FAO	SDG Indicator 14.4.1; IPBES.	Y
Target 6	Manage pathways for the introduction of invasive alien species, preventing, or reducing their rate of introduction and establishment by at least 50%, and control or eradicate invasive alien species to eliminate or reduce their impacts, focusing on priority species and priority sites.	6.0.1 Rate of invasive alien species spread	In development	1970-present	Annually	Y	Y	In development	GEO BON/ German Centre for Integrative Biodiversity Research (iDiv)	Aichi Target 9; SDG Indicator 15; CMS; IPBES; Ramsar	N

Goal/ target[25]	Goal/target name in first draft monitoring framework[26]	Indicator name and number in draft monitoring framework	Availability[27]	Time series[28]	Frequency of updates[29]	Data at global scale?[30]	National data[31]	National methodology available[32]	Institution[33]	Other MEAs/ processes[34]	Indicator reviewed by BIP[35]
Target 7	Reduce pollution from all sources to levels that are not harmful to biodiversity, ecosystem functions or human health, including by reducing nutrients lost to the environment by at least half, and pesticides by at least two thirds and eliminating the discharge of plastic waste.	7.0.1 Index of coastal eutrophication potential (excess nitrogen and phosphate loading, exported from national boundaries)	Indicator available today for Chlorophyll-a deviations	2005-2019	5 years	Y	Y	Y	UNEP	SDG Indicators 14.4.1 (a)	Data pending
		7.0.2 Plastic debris density	Indicator available today (on Beach litter)	2021 (for Beach litter)	Data pending	Y	Y	Y	UNEP	SDG Indicators 14.1.1 (b)	N
		7.0.3 Pesticide use per area of cropland	Indicator available today	1990-2019	Annually	Y	N?	Y	FAO		N
Target 8	Minimize the impact of climate change on biodiversity, contribute to mitigation and adaptation through ecosystem-based approaches, contributing at least 10 GtCO2e per year to global mitigation efforts, and ensure that all mitigation and adaptation efforts avoid negative impacts on biodiversity.	8.0.1 National greenhouse gas inventories from land use and land use change	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	UNFCCC	N	N
Target 9	Ensure benefits, including nutrition, food security, medicines, and livelihoods for people especially for the most vulnerable through sustainable management of wild terrestrial, freshwater and marine species and protecting customary sustainable use by indigenous peoples and local communities.	9.0.1 National environmental-economic accounts of benefits from the use of wild species	In development	Data pending	In development	In development	In development	In development	UN Statistics Division	Data pending	N
Target 10	Ensure all areas under agriculture, aquaculture and forestry are managed sustainably, in particular through the conservation and sustainable use of biodiversity, increasing the productivity and resilience of these production systems.	10.0.1 Proportion of agricultural area under productive and sustainable agriculture	Indicator available today	Data pending	Triennially	Y	Y	Y	FAO	SDG Indicators 2.3.1, 2.3.2, 2.4.1 and 5.a.1.	Data pending
		10.0.2 Progress towards sustainable forest management (Proportion of forest area under a long-term forest management plan)	Indicator available today	1946 - 2020	Data pending	Y	Y	Y	FAO	SDG 15.2.1.	N
Target 11	Maintain and enhance nature's contributions to regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people.	11.0.1 National environmental-economic accounts of regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people, from ecosystems	In development	Data pending	In development	In development	In development	In development	UN Statistics Division	Data pending	N

Goal/ target[25]	Goal/target name in first draft monitoring framework[26]	Indicator name and number in draft monitoring framework	Availability[27]	Time series[28]	Frequency of updates[29]	Data at global scale?[30]	National data[31]	National methodology available[32]	Institution [33]	Other MEAs/ processes [34]	Indicator reviewed by BIP[35]
Target 12	Increase the area of, access to, and benefits from green and blue spaces, for human health and well-being in urban areas and other densely populated areas.	12.0.1 Average share of the built-up area of cities that is green/blue space for public use for all	Indicator available today	Existing data from 2020	Every 3-5 years	Y	Y	Y	UN-HABITAT	SDG (11.7.1)	N
Target 13	Implement measures at global level and in all countries to facilitate access to genetic resources and to ensure the fair and equitable sharing of benefits arising from the use of genetic resources and, as relevant, of associated traditional knowledge, including through mutually agreed terms and prior and informed consent.	13.0.1 Indicators of operational legislative, administrative or policy frameworks which ensure fair and equitable sharing of benefits, including those based on PIC and MAT	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	SCBD	Data pending	N
Target 14	Fully integrate biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies, accounts, and assessments of environmental impacts at all levels of government and across all sectors of the economy, ensuring that all activities and financial flows are aligned with biodiversity values. .	14.0.1 Extent to which national targets for integrating biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies and accounts at all levels, ensuring that biodiversity values are mainstreamed across all sectors and integrated into assessments of environmental impacts	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	SCBD	SDG Indicator 15.9.1 (a)	N
		14.0.2 Integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental Economic Accounting	Indicator available today (at country level)	2006, 2014, 2017, 2020, 2021	Annually (on the SEEA implementation)	Y	Y	Data pending	UN Statistics Division	SDG Indicator 15.9.1 (b)	N
Target 15	All businesses (public and private, large, medium and small) assess and report on their dependencies and impacts on biodiversity, from local to global, and progressively reduce negative impacts, by at least half and increase positive impacts, reducing biodiversity-related risks to businesses and moving towards the full sustainability of extraction and production practices, sourcing and supply chains, and use and disposal.	15.0.1 Dependencies and impacts of businesses on biodiversity	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N

Goal/ target[25]	Goal/target name in first draft monitoring framework[26]	Indicator name and number in draft monitoring framework	Availability[27]	Time series[28]	Frequency of updates[29]	Data at global scale?[30]	National data[31]	National methodology available[32]	Institution [33]	Other MEAs/ processes [34]	Indicator reviewed by BIP[35]
Target 16	Ensure that people are encouraged and enabled to make responsible choices and have access to relevant information and alternatives, taking into account cultural preferences, to reduce by at least half the waste and, where relevant the overconsumption, of food and other materials.	16.0.1 Food waste index	Indicator available today (global level); In development (national level)	2019 (global level only)	Data pending	Y	Y	Y	UNEP/ UN Statistics Division	SDG Indicators 12.3.1 (a) and (b), 11.6.1 and 12.5.1.	Data pending
		16.0.2 Material footprint per capita	Indicator available today	1970-2019	Biennially/triennially	Y	Y	Y	UNEP	SDG 8.4.1 and 12.2.1.	Data pending
Target 17	Establish, strengthen capacity for, and implement measures in all countries to prevent, manage or control potential adverse impacts of biotechnology on biodiversity and human health, reducing the risk of these impacts.	17.0.1 Indicator of measures in place to prevent, manage and control potential adverse impacts of biotechnology on biodiversity taking into account human health	Needs development	Needs development	Needs development	Needs development	Needs development	The data so far	Needs development	Needs development	Needs development
Target 18	Redirect, repurpose, reform or eliminate incentives harmful for biodiversity, in a just and equitable way, reducing them by at least 500 billion per year, including all of the most harmful subsidies, and ensure that incentives, including public and private economic and regulatory incentives, are either positive or neutral for biodiversity.	18.0.1 Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated. **Proposed indicator name:** Positive incentives (by type) in place to promote biodiversity conservation and sustainable use.	Indicator available today	Since 1980	Annually	Y	Y	Y	OECD	SDG Indicator 15.a.1	Y
Target 19	Increase financial resources from all sources to at least US$ 200 billion per year, including new, additional and effective financial resources, increasing by at least US$ 10 billion per year international financial flows to developing countries, leveraging private finance, and increasing domestic resource mobilization, taking into account national biodiversity finance planning, and strengthen capacity-building and technology transfer and scientific cooperation, to meet the needs for implementation, commensurate with the ambition of the goals and targets of the framework.	19.0.1: Official development assistance for biodiversity	Indicator available today	Since 1996	Annually	Y	Y	Y	OECD	SDG Indicator 15.a.1	Y
		19.0.2 Public expenditure and private expenditure on conservation and sustainable use of biodiversity and ecosystems	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N

Goal/ target[25]	Goal/target name in first draft monitoring framework[26]	Indicator name and number in draft monitoring framework	Availability[27]	Time series[28]	Frequency of updates[29]	Data at global scale?[30]	National data[31]	National methodology available[32]	Institution[33]	Other MEAs/ processes[34]	Indicator reviewed by BIP[35]
Target 20	Ensure that relevant knowledge, including the traditional knowledge, innovations and practices of indigenous and local communities with their free, prior, and informed consent, guides decision making for the effective management of biodiversity, enabling monitoring, and by promoting awareness, education and research.	20.0.1 Indicator on biodiversity information and monitoring, including traditional knowledge, for management.	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N
Target 21	Ensure equitable and effective participation in decision-making related to biodiversity by indigenous peoples and local communities, and respect their rights over lands, territories and resources, as well as by women and girls, and youth.	21.0.2 Land tenure in the traditional territories of indigenous peoples and local communities	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N
		21.0.1 Degree to which indigenous peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity	Needs development	Needs development	Needs development	Needs development	Needs development	Needs development	Not yet identified	N	N

Annex 2 – Compilation of metadata sheets

The following pages contain metadata sheets for each of the proposed headline indicators.

Note: The metadata provided by data reporters[1] is the intellectual property of the data reporter. UNEP-WCMC and SCBD have not reviewed the accuracy of the data contained in the metadata sheets and takes no responsibility for the scientific or technical accuracy of the data provided.

Individual metadata sheets for each of the proposed headline indicators can be downloaded from: https://www.post-2020indicators.org/

Index of Metadata Sheets for Proposed Headline Indicators

Indicator metadata sheet: A.0.1 Extent of selected natural and modified ecosystems (i.e. forest, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats) 19

Indicator metadata sheet: A.0.2 Species Habitat Index (SHI) 25

Indicator metadata sheet: A.0.3 Red List Index 35

Indicator metadata sheet: A.0.4: The proportion of populations within species with a genetically effective population size > 500 46

Indicator metadata sheet: B.0.1 National environmental economic accounts of ecosystem services 51

Shortened format indicator metadata sheet: C.0.1 Monetary benefits received from utilization of genetic resources as a result of an ABS agreement, including traditional knowledge 56

Shortened format indicator metadata sheet: C.0.2 Number of research and development products from an ABS agreement 58

Shortened format indicator metadata sheet: D.0.1 Funding for implementation of the global biodiversity framework 60

Shortened Format indicator metadata sheet: D.0.2 Indicator on national biodiversity planning processes and means of implementation 62

Shortened format indicator metadata sheet: Indicator metadata sheet: Indicator metadata sheet: 1.0.1 Percentage of land and seas covered by spatial plans that integrate biodiversity 64

Shortened Format indicator metadata sheet 2.0.1 Percentage of degraded or converted ecosystems that are under restoration 66

Indicator metadata sheet: 3.0.1 Coverage of Protected areas and OECMS (by effectiveness) 68

Shortened Format indicator metadata sheet: 4.0.1 Proportion of species populations that are affected by human wildlife conflict 76

Indicator metadata sheet: 4.0.2 Number of plant genetic resources for food and agriculture secured in medium or long-term conservation facilities 78

Shortened Format indicator metadata sheet: 5.0.1 Proportion of wildlife that is harvested legally and sustainably 84

Indicator metadata sheet: Indicator 5.0.2 Proportion of fish stocks within biologically sustainable levels 87

Indicator metadata sheet: 6.0.1 Rate of invasive alien species spread 93

Indicator metadata sheet: 7.0.1 Index of coastal eutrophication potential (excess nitrogen and phosphate loading, exported from national boundaries) 98

Indicator metadata sheet: 7.0.2 Plastic debris density 104

Shortened format indicator metadata sheet: 8.0.1 National greenhouse gas inventories from land use and land use change 109

Indicator metadata sheet: 9.0.1 National environmental-economic accounts of benefits from the use of wild species 111

[1] Data reporter are the organisations responsible for delivery of the proposed headline indicators in the first draft monitoring framework.

Indicator metadata sheet: 10.0.1 Proportion of agricultural area under productive and sustainable agriculture 115

Indicator metadata sheet: 11.0.1 National environmental-economic accounts of regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people, from ecosystems 121

Indicator metadata sheet: 12.0.1 Average share of the built-up area of cities that is green/blue space for public use for all. 126

Shortened Format indicator metadata sheet: 13.0.1 Indicators of operational legislative, administrative or policy frameworks which ensure fair and equitable sharing of benefits, including those based on PIC and MAT 134

Indicator metadata sheet: 14.0.1 Extent to which national targets for integrating biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies and accounts at all levels, ensuring that biodiversity values are mainstreamed across all sectors and integrated into assessments of environmental impacts 136

Shortened Format indicator metadata sheet: 15.0.1 Dependencies and impacts of businesses on biodiversity 140

Indicator metadata sheet: 16.0.1 Food waste index 142

Indicator metadata sheet: 16.0.2 Material footprint per capita..... 147

Indicator metadata sheet: 17.0.1 Indicator of measures in place to prevent, manage and control potential adverse impacts of biotechnology on biodiversity taking into account human health 151

Indicator metadata sheet: 18.0.1 Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated. 152

Indicator metadata sheet: Indicator 19.0.1: Official development assistance for biodiversity 157

Shortened format indicator metadata sheet: 21.0.1 Degree to which indigenous peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity 166

Shortened format indicator metadata sheet: 21.0.2 Indicator metadata sheet 168

Indicator metadata sheet: A.0.1 Extent of selected natural and modified ecosystems (i.e., forest, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats)

1. Indicator name

Full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework

A.0.1 Extent of selected natural and modified ecosystems (i.e., forest, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats)
Data reporter proposes new indicator name: *Extent of natural and managed ecosystems (such as forest, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats)*

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Goal A. The integrity of all ecosystems is enhanced, with an increase of at least 15% in the area, connectivity and integrity of natural ecosystems, supporting healthy and resilient populations of all species, the rate of extinctions has been reduced at least tenfold, and the risk of species extinctions across all taxonomic and functional groups, is halved, and genetic diversity of wild and domesticated species is safeguarded, with at least 90% of genetic diversity within all species maintained.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

N/A

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Ecosystem integrity is defined in the SEEA Ecosystem Accounting as the ecosystem's capacity to maintain its characteristics of composition, structure, functioning and self-organization over time within a natural range of variability. The extent and condition of ecosystems, assessed with respect to its size and characteristics and their changes overtime, underpin its capacity to supply ecosystem services on an ongoing basis
The current indicator on ecosystem extent is essential to address ecosystem integrity which is central to Goal A. The importance to reflect ecosystem condition, which is the quality of an ecosystem measured in terms of its abiotic and biotic characteristics, is also critical to address ecosystem integrity. Ongoing effort is currently undertaken to develop ecosystem-specific condition metrics based the SEEA Ecosystem Condition accounts and standardized them for reporting purpose. Further development on ecosystem condition indicators based on SEEA Ecosystem Accounting is recommended for the systematic monitoring of Goal A.

5. Definitions, concepts, and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The concepts, definitions and classification used have been based on the System of Environmental-Economic Accounting (SEEA) Ecosystem Accounting. The SEEA Ecosystem Type Reference Classification based on the International Union for the Conservation of Nature Global Ecosystem Typology (IUCN GET) forms the classification basis for this indicator. The three upper levels of IUCN GET – realms, functional biomes, and ecosystem functional groups – classify ecosystems based on their functional characteristics (such as structural roles of foundation species, water regime, climatic regime, or food web structure).
Ecosystem extent is the size of an ecosystem asset, which are contiguous spaces of a specific ecosystem type characterized by a distinct set of biotic and abiotic components and their interactions**.** Total extent is the sum of natural and managed (anthropogenic) ecosystems.

Natural ecosystems are predominantly influenced by natural ecological processes characterised by a stable ecological state maintaining ecosystem integrity, ecosystem condition ranges within its natural variability. Examples (with reference to IUCN GET) are primary and old growth forests, natural grasslands, and savannahs, natural and wetlands. Natural ecosystems are defined based on the following IUCN GET biomes:

Realms	**Biomes**
Terrestrial	T1 Tropical-subtropical lowland rainforests
	T2 Tropical-subtropical dry forests and scrubs
	T3 Shrublands & shrubby woodlands
	T4 Savannas and grasslands
	T5 Deserts and semi-deserts
	T6 Polar-alpine
Freshwater	F1 Rivers and streams
	F2 Lakes
Marine	M1 Marine shelfs
	M2 Pelagic ocean waters
	M3 Deep sea floors
Freshwater-terrestrial	TF1 Palustrine wetlands biome
Freshwater-marine	FM1 Semi-confined transitional waters biome
Marine-terrestrial	MT1 Shoreline systems biome
	MT2 Supralittoral coastal systems biome
Marine-freshwater-terrestrial	MFT1 Brackish tidal systems biome

Managed/Anthropogenic ecosystems are predominantly influenced by human activities where a stable natural ecological state is unobtainable and future socio-economic interventions are required to maintain a new stable state. Examples (with reference to IUCN GET) are urban green spaces and croplands, artificial waterbodies, and anthropogenic marine systems. Managed/anthropogenic ecosystems are defined based on the based on the following IUCN GET biomes:

Realms	**Biomes**
Terrestrial	T7 Intensive land-use systems
Freshwater	F3 Artificial freshwaters
Marine	M4 Anthropogenic marine systems
Marine-terrestrial	MT3 Anthropogenic shorelines

The selected ecosystem listed on Goal A can be one-to-one or one-to-many mapped to the three upper levels of IUCN GET.

Ecosystems	**IUCN GET Biomes/ Ecosystem Functional Group**
Forest	T1 Tropical-subtropical lowland rainforests biome
	T2 Tropical-subtropical dry forests and scrubs biome
Savannahs and Grasslands	T4 Savannas and grasslands biome
Wetlands	F1 Rivers and streams biome
	F2 Lakes biome
	TF1 Palustrine wetlands biome
	FM1 Semi-confined transitional waters biome
	MFT1 Brackish tidal systems biome
Mangroves	MFT1.2 Intertidal forests and shrublands
Saltmarshes	MFT1.3 Coastal saltmarshes and reedbeds
Coral reef	M1.3 Photic Coral reefs
Seagrass	M1.1 Seagrass meadows
Macroalgae	M1.5 Photo-limited marine animal forests
	SM1.2 Anchialine pools
Intertidal habitats	MT1 Shoreline systems biome
	MT2 Supralittoral coastal systems biome
	MT3 Anthropogenic shorelines biome

Please refer to the IUCN GET (Keith et.al 2020) for detailed descriptive profiles for each biome and ecosystem functional group listed.

The importance to reflect ecosystem condition, which is the quality of an ecosystem measured in terms of its abiotic and biotic characteristics, is critical to address ecosystem integrity. Ongoing effort is currently undertaken to develop ecosystem-specific condition metrics based the SEEA Ecosystem Condition accounts and standardized them for reporting purpose. Further development on ecosystem condition indicators based on SEEA Ecosystem Accounting is recommended for the systematic monitoring of Goal A.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

The indicators can be compiled using the ecosystem extent accounts from the SEEA framework, which organize data on the extent of different ecosystem types. An ecosystem extent account records the areas and changes in areas, of all of the ecosystem assets within a country, classified by ecosystem type. The structure of an ecosystem extent account is shown in the following table, where the opening extent, closing extent, and additions and reductions in extent for each of the ecosystem types are recorded. Entries are in terms of area using measurement units appropriate for the scale of analysis, e.g., hectares, square kilometres.

	Stylized ecosystem types						
Accounting entries	Forests	Savannahs	Wetlands	Mangroves	Saltmarshes	……	**Total**
Opening extent							
Additions to extent							
Reduction to extent							
Closing extent							

Indicators on the size and the changes in areas covered by specific ecosystem types can then be derived from the ecosystem extent account.

Extent indicators	Unit of measurement
Area covered by natural ecosystems in terrestrial and freshwater realms of the country disaggregated by ecosystem types such as forests, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats	Hectares, square kilometres; % of total area
Change of area covered by natural ecosystems in terrestrial and freshwater realms of the country disaggregated by ecosystem types during an accounting period, such as forests, savannahs and grasslands, wetlands, mangroves, saltmarshes, coral reef, seagrass, macroalgae and intertidal habitats	% of opening

Countries that have their own national classification system of ecosystems should be used for the compilation of extent accounts and indicators. In such cases, developing a bridge or concordance of this national classification system with IUCN GET will facilitate comparison across countries. IUCN GET has 6 levels with the intent that national classifications can be mapped onto the ecosystem functional groups to facilitate national reporting.

When no existing classification and/or map of ecosystem types is available, or deemed suitable for reporting, a country could opt to use an existing tool such as the ARIES for SEEA Explorer to compile extent accounts for reporting purpose. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for the methodology.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size, and the response rate. Hyperlinks to methodologies are acceptable

Data on the indicator will be collected by national authorities. Whenever national data is not available, data will be estimated through global data platforms and mechanisms endorsed by the UN Statistical Commission. Global estimated data will be sent to national authorities for validation.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The SEEA Ecosystem Accounting chapters on ecosystem extent and condition are adopted as part of an international statistical standard on ecosystem accounting by the United Nations Statistical Commission at its 52nd session in 2021.

IUCN GET are published in a peer reviewed location that can be assessed.

ARIES for SEEA Explorer is an open access application

5.e Data sources

Description of all actual and recommended sources of data

National data can be collected through existing sources (databases, maps, reports), including participatory inventories on land management systems as well as remote sensing data collected by national statistics and mapping agencies at the national level.

In the absence of national data sources, regional and global datasets will be collected to complement and support existing national indicators. The ARIES for SEEA Explorer allows to derive a basic ecosystem extent accounting (for the period between 1992 and 2020) in the terrestrial, freshwater, and coastal realms using a multilayer look-up table approach which combines global data sources on land cover and other condition metrics to approximate ecosystem function groups (https://seea.un.org/content/aries-for-seea). Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for the methodology Priority will be given to national data. The recommended use of national data in preference to other sources, using the reference classification (IUCN GET), will facilitate comparison across countries, scale up global reporting and ensure higher quality reporting. The data and information derived from global and regional data sets should be interpreted and validated by national authorities.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc).

THIS INDICATOR IS IN DEVELOPMENT.
In some countries, national data for one or more of the disaggregated indicators are available. The global monitoring process for this indicator, the update frequency and release calendar are currently under development. Data on a selected set of ecosystem extent could be made ready now via the ARIES platform. The year on when a complete set of data covering all ecosystems will be ready is pending.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021

THIS INDICATOR IS IN DEVELOPMENT. ARIES for SEEA has capability to compile the indicator for the period from 1992 with a two-year lag time.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. In the absence of national reporting mechanism, national data will be estimated through ARIES or other international data platforms and mechanisms endorsed by the UN Statistical Commission.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. Missing values for individual countries are imputed using ARIES modelling or another international data platform by the custodian agency using existing global data sources

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)

Data not provided by data reporter

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

Missing values for individual countries can be imputed using ARIES for SEEA or other international data platform using existing global satellite data as the source. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for the methodology.

6 Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator data will be applicable at the global, national, and regional scale. Global scale indicators will be disaggregated for national use based on a common classification and agreement by countries. National data can be collated to form global indicators provided that the underlying classifications can be linked to IUCN GET, noting that further development on aggregation method for combining multiple ecosystem types and across countries is recommended.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

The SEEA Ecosystem Accounting and IUCN GET are available for use at the national level – and will apply to this proposed indicator

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Differences between country produced and internationally estimated data may arise due to differences in spatial resolution of datasets, classification approaches, projection, definition of ecosystem extent and/or contextualization with other indicators, data, and information.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

Regional and global estimates are produced by aggregating country-level data projected in a common spatial reference systems.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

The aggregated data can be assembled using the ARIES platform or other international data platforms.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

The mechanism for collecting data from countries is currently under development.

Developing a bridge or concordance of the national classification system with the IUCN GET will facilitate comparison across countries.

7 Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services – IPBES).

Data not provided by data reporter

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

No.

8 Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

This indicator will be disaggregated by ecosystem type and geographical location.

9. Related goals, targets, and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

N/A

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

United Nations Statistics Division

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Julian Chow (chowj@un.org)

9 References

Links to other literature helpful in understanding, interpreting, and using the indicator. A maximum of ten references is preferred.

1. UN System of Environmental-Economic Accounting: https://seea.un.org/ecosystemaccounting
2. United Nations et al. (2021). System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA). White cover publication, pre-edited text subject to official editing. Available at: https://seea.un.org/ecosystem-accounting.
3. United Nations (2021). Guidelines on Biophysical Modelling for Ecosystem Accounting – version 2.0
4. ARIES for SEEA: https://seea.un.org/content/aries-for-seea
5. Keith, D.A., Ferrer-Paris, J.R., Nicholson, E., and Kingsford, R.T. (eds.) (2020). The IUCN Global Ecosystem Typology 2.0: Descriptive profiles for biomes and ecosystem functional groups. Gland, Switzerland: IUCN

Indicator metadata sheet: A.0.2 Species Habitat Index (SHI)

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

A.0.2 Species Habitat Index (SHI)

2. Date of metadata update

Insert date of metadata update

February 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Goal A. The integrity of all ecosystems is enhanced, with an increase of at least 15% in the area, connectivity, and integrity of natural ecosystems, supporting healthy and resilient populations of all species, the rate of extinctions has been reduced at least tenfold, and the risk of species extinctions across all taxonomic and functional groups, is halved, and genetic diversity of wild and domesticated species is safeguarded, with at least 90% of genetic diversity within all species maintained

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

N/A

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

The integrity of ecosystems relies on the sustained ecological processes by the species that define them. Changes in the quality and connectivity of habitats that affect the health of systems' species impacts this integrity and ecosystem resilience. The SHI measures changes in ecosystem integrity as the degree of change in component species and their associated ecological processes and functions.

The integrity of ecosystems relies on the sustained ecological processes by the species that define them. Changes in the quality and connectivity of habitats that affect the health of systems' species impacts this integrity and ecosystem resilience. The SHI measures changes in ecosystem integrity as the degree of change in component species and their associated ecological processes and functions.

The index captures alterations to the quality and connectivity of habitats at the level of single species and at fine spatial scale, addressing single square kilometre assemblages. When aggregated over a larger geographic unit (e.g., landscape, seascape, mountain region, ecological region, or country), SHI can provide a compound measure of an area's ecological integrity and connectivity. When evaluated over species' geographic ranges, the SHI also informs about trends in the health of species populations and potential changes in their genetic diversity.

The SHI complements the other Goal A Headline Indicators through its capture of key aspects (connectivity, integrity, population distribution, and population size) and its comprehensive relevance to all Goal A elements (Table 1). The SHI has primary or unique pertinence to four of the eight listed elements, and primary or secondary pertinence to the other four. Its combination of biodiversity observations with standard, near-global remote sensing products supports immediacy (e.g., annual updating), geographic comparability and near-global representation, disaggregation to kilometre- and landscape scale, species-level interpretation, and independent national computation.

Table 1: Relevance of the SHI to the different components and elements of Goal A.

Goal Milestones, Components		SHI	SHI Relevance
A1: Natural systems	Area	Captures changes in the area available to the system's individual species in support of its ecological processes.	Secondary
	Connectivity	The SHI measures changes in the connectivity of ecosystems, and specifically the connectivity associated with ecological processes. The index captures the aggregate connectivity of the individual species that define the systems and their ecological	Primary

		functioning. SHI can be subset to address trends in specific ecosystems (e.g., forests, reefs, rivers, mountains) and ecological or functional groups (migratory, frugivore etc.).	
	Integrity	The SHI provides a composite measure of change in the ecological intactness of assemblages (species composition and associated structure and functions) and its departure from conditions during the reference period.	Primary
A2: Species Populations	Extinction rate	The count of species with SHI equal to 0 over time provides an estimate of extinction rate. Full extinction assessments require careful long-term surveys and expert input. The SHI complements this by delivering a temporally more immediate and general measure of potential extinction rate.	Primary / Secondary
	Extinction risk, Threat status	Increases in species extinction risk and threat status are a concave-upward function of decreasing suitable area and connectivity, the two components of SHI.	Secondary
	Population abundance (size)	Changes in species population sizes are directly related the area and connectivity of their habitats, as measured by SHI. Given the impossibility of comprehensive and comparable global population census data for a representative portion of biodiversity, changes to the quality of suitable habitats offer an effective operational proxy to represent national and global population trends across ecosystems and regions.	Primary
	Population Distribution	The area component of SHI directly measures changes in population distribution.	Primary
A3: Species Genetics	Genetic diversity	SHI provides the proposed main genetic diversity indicator "Proportion of populations, or geographic range, maintained within species" to assess potential loss of unique adaptations. In the absence of comprehensive genetic sampling worldwide, SHI offers a consistent and generalizable way to approximate changes in genetically effective population size.	Primary / Secondary

Milestone A.1:
Net gain in the area, connectivity, and integrity of natural systems of at least 5 per cent.
For this milestone SHI addresses all milestone elements, and in particular measures connectivity. It measures changes to the many units, i.e., species, that define ecosystems and drive their ecological processes and integrity. For any defined area, the SHI assesses temporal change in hundreds or thousands of species and provides a compound signal of change in ecosystem integrity.
Indicator "A.0.1 Extent of selected natural and modified ecosystems" is poised to deliver a basic but important capture of the area element of this milestone. Remote sensing enables a high-resolution delineation and tracking of ecosystem modification and areal change. Expert-based quality metrics could add further relevance to indicator A.0.1. But necessarily based on single geographic layers of abutting ecosystems (and thus a single dimension), the A.0.1 extent measure is naturally limited in the capture of ecological connectivity and integrity. The SHI shares similarity with indicators of fragmentation focused on select ecosystems (e.g., forest fragmentation, river fragmentation, mangrove fragmentation), with a more direct measurement of ecological integrity. For example, the change in the connectivity of a region's forest ecosystems as measured with the forest fragmentation index would essentially be the same as that measured with the SHI applied to a single forest species inhabiting that full region (assuming the same landcover change products are used). By including many different forest species of the region and thus accounting for their many functions and roles for the ecosystem, the SHI captures connectivity with direct relevance for the overarching aspiration of Goal A, the ecological integrity of ecosystems.

Milestone A.2
The increase in the extinction rate is halted or reversed, and the extinction risk is reduced by at least 10%, with a decrease in the proportion of species that are threatened, and the abundance and distribution of populations of species is enhanced or at least maintained.
The SHI, specifically through the area component, uniquely and primarily addresses the second portion of Milestone A.2 by capturing trends in species population abundance and distribution.
For the first milestone part, Indicator '*A.0.3 Red list index'*, and in particular national red-listing efforts, the SHI provides a periodic assessment of 'Extinction risk' and 'Threat status' and, as possible, through expert networks carefully assess "Extinct" status. Species-level SHI values and maps can offer vital information, supporting expert threat assessments by providing temporal immediacy, regional/national specificity, and geographic specificity.

Milestone A.3
Genetic diversity of wild and domesticated species is safeguarded, with an increase in the proportion of species that have at least 90 per cent of their genetic diversity maintained.
In the absence of comprehensive genetic sampling to characterize separate populations and their genetically effective sizes, SHI offers a scalable alternative method to monitor loss of genetic diversity. SHI directly measures the "Proportion of populations, or geographic range, maintained within species", one of two main indicators for measuring genetic diversity recommended by the GEO BON Genetic Diversity Working Group, with support from IUCN Conservation Genetics Specialist Group and others.
The indicator 'A.0.4 The proportion of populations within species with a genetically effective population size > 500' can offer a more direct quantification of genetic diversity when sufficient, range-wide genetic sampling

allows. Where sufficient genetic data are lacking, estimates of changes in the minimum sizes of (connected) populations are recommended as alternative which the SHI area and connectivity components address. While or where range-wide genetic sampling for remains limited to a very specific subset of species, the SHI can be a proxy for trends in genetic diversity for a larger and more representative portion of biodiversity.

5. Definitions, concepts, and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The SHI is given as the average size and connectivity of species' suitable habitat in a specified geographic unit (e.g., country) at a given point in time relative to the reference period (Power & Jetz 2019, Hansen et al. 2021, Jetz et al., 2021). The index is calculated as an aggregate of single 'species habitat scores' (SHS) and is expressed relative to a baseline of SHI = 100. For example, a 6% and 8% decrease, respectively, in habitat size and connectivity of Species A would result in an SHS of 94 for that species (average of 96, for size, and 92, for connectivity). If Species B in a region has SHS = 102 and Species C has SHS = 98, the resulting SHI for the region based on these three species is 98 (average of 94, 102, and 98), a decrease of two percentage points compared to a baseline SHS of 100. In practice, scores from hundreds or thousands of species are aggregated to inform the SHI of a region, and the SHI is thereby sensitive to change in a range of associated functions and processes. To explore patterns, see https://mol.org/indicators/habitat; e.g., https://mol.org/species/habitat-trend/Cephalophus_zebra.

For country reporting, the SHI can additionally take national stewardship for native species into account, i.e., weight more strongly changes in species and ecosystem aspects that occur in few or no other countries. Compared to the *National SHI*, defined as the arithmetic mean of a country's SHS values, *Steward's SHI* is based on a weighted average of SHS values, with the proportion of the global population a country is estimated to hold as weights.

The SHI is calculated and validated using species occurrence data combined with environmental change data informed by remote sensing. Calculations use best-possible predictions of species geographic distributions (Species Populations EBVs), based on a variety of sources combined with species habitat information.

The SHI can be calculated independently with national or subnational information, such as national biodiversity monitoring data or national land-cover products. A full suite of annual country-level indicator values and extensive species-level data and metadata supporting it are made available through GEO BON and its associated Species Population EBV platform Map of Life, and parties can readily use these directly for their reporting or use them to augment their own calculations.

SHI subsets can address specific taxonomic or functional groups, migratory species, groups characteristic of certain habitats and ecosystems (forests, alpine zone, coral reefs, mangroves, etc.), groups of rare or threatened species or groups with particularly rapid recent habitat changes. Such subsets allow measuring change in biological integrity as experienced by these specific systems.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

SHI is calculated in a two-step process. First Species Habitat Scores are calculated, and then these are aggregated to derive the Species Habitat Index.

I. Species Habitat Scores:

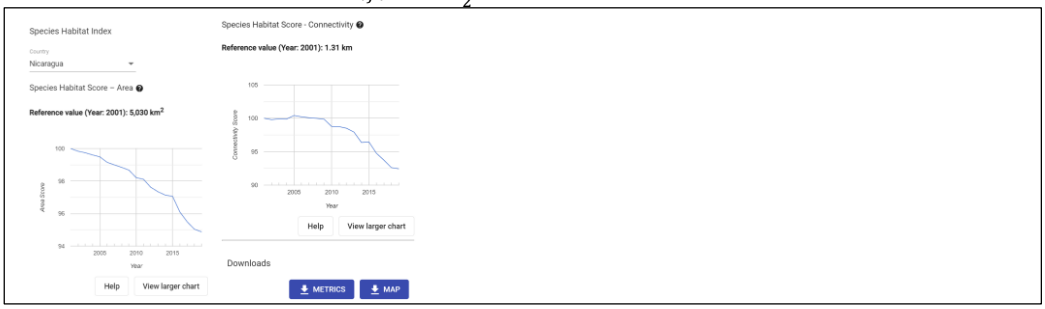
Let s_{hi} represent the suitability of pixel *h* for species i, which is varying from 0 to 1, which could be expressed in binary form (0 or 1). The size of suitable habitat area in region *j* for species i, A_{ji}, is then given by the summed product of the pixel-level suitability of *h* in *j* and the pixel size *a* (assumed constant, e.g., 1 km^2): $A_{ij} = a\sum_h s_{hi}$

The connectivity of suitable habitat area for species *i* in region *j*, C_{ij}, is given by the GIS fragmentation (GISfrag) metric calculated over a binary version of the pixel-level suitability map. First, for each of the *p* suitable pixels the distance d_{hi} to the closest edge pixel is calculated (edge includes any non-passable, natural, or artificial barriers). The GISfrag metric is the average of these distances: $C_{ij} = \frac{\sum_j d_{hi}}{p}$

For a particular year *k* both metrics are then set relative to the reference year of k = 1. The area score (*AS*) and connectivity score (*CS*) for year *k* is given as:

$$AS_{jk} = 100\frac{(A_{j1} - A_{jk})}{A_{j1}} \text{ and } CS_{jk} = 100\frac{(C_{ji} - C_{jk})}{C_{j1}}$$

The Species Habitat Score *SHS* for species *i* in region *j* and year *k* is then defined as the mean of these Area and Connectivity scores for that year: $SHS_{ijk} = \frac{(AS_{jk}+CS_{jk})}{2}$



II. Species Habitat Index:
National SHI of country *j* in year *k* is given as the average of the *n* Species Habitat Scores in that year:

$$SHI_{jk} = \frac{\sum_i SHS_{ijk}}{n}$$

Steward's SHI is calculated similarly, but as weighted average using national species' stewardship weights. Let the global habitat-suitable range area of species i in the reference period be $A_i = \sum_j A_{ij}$.
The *stewardship weight* of country j for species i is then given by $w_{ji} = \frac{A_{ij}}{A_i}$,
and represents the proportion of the global habitat-suitable range of species i found in country j.
Steward's SHI of country j in year k is then simply given as a weighted average using these stewardship weights:

$$SHI_{jk} = \frac{\sum_i w_{ij} SHS_{ijk}}{\sum_i w_{ij}}$$

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

See above for description of data inputs. Data collection methods include primary species occurrence data, literature-based or model-supported species distribution predictions, literature or data-derived habitat associations, land cover and ecosystem extent change information.

Independent national SHI calculations can replace the nationally disaggregated global calculations. Indicator data for each species and country combination are available through GEO BON (see above) and can be partly or fully replaced. Countries can use national biodiversity monitoring or map datasets and national land cover data and apply the same methodology. National SHI values calculated with national data consistently over time can be fully interpreted temporally and harmonized with global, disaggregated SHI values. To support harmonization and interpretation of national difference, national calculations should include metadata on the species and datasets used.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The Species Habit Index was peer-reviewed and published in Powers & Jetz (Nature Climate Change, 2019), with further peer-reviewed descriptions and extensions in Hansen et al. (2021) and Jetz et al. (2021). The methodology has been used in the IPBES global assessment and the indicator is part of the Biodiversity Indicators Partnership (BIP) indicator suite. See reference list. For additional description of the SHI methodology see CBD/WG2020/3/INF/6.

The methodology is laid out in further detail in this present document to support full replicability at the national and regional scale. The methodology can be repeated by other scientists and agencies. Use of the same publicly available data inputs will yield the same overall results. The same methodology can be used at national and regional scale with partially or fully separate data inputs, such as national biodiversity or land cover data. It may be applied to coastal and marine data.

5.e Data sources

Description of all actual and recommended sources of data

At the global scale:
Map of Life (MOL, https://mol.org/indicators/habitat); habitat-suitable range maps, habitat-suitable range area and connectivity calculations, country SHS values.
Global Biodiversity Information Facility (GBIF, https://www.gbif.org) through its national nodes.
European Space Agency (ESA); e.g., through its global CCI land cover product https://www.esa-landcover-cci.org.

NASA/USGS/U Maryland: e.g., through the Landsat Satellite program supporting the production of annual land cover and tree cover data (https://landsat.gsfc.nasa.gov).
Marine and coastal habitats: maps of ecosystem extent as available for coral reefs, mangroves, and other marine ecosystems and seascapes. Maps of human impacts (Halpern et al. 2015).
River barriers (Grill et al. 2015, 2019), with non-passable dams defining range edges for, e.g., freshwater fishes.

At the national scale:
As available: National biodiversity occurrence and map data, National land cover products,

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc). If the indicator is not operational, please add a short description of how it is being made operational.

The indicator is available now. New data on habitat changes are available annually at the global scale from standard remote-sensing supported products. Biodiversity records provided through GBIF and other partners are updated on an ongoing basis, sub-annually. GEO BON through its partner platform Map of Life is committed to extending the data coverage to many more species groups, and specifically to marine, coastal, and freshwater groups, and to delivering standardized SHI products for countries annually. Countries using national data may select different time intervals for updates.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021
2001-2020 (for a more limited version: 1993-2020)

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.
See also data sources.

At the global scale:
GEO BON infrastructure Map of Life (MOL, https://mol.org/indicators/habitat); habitat-suitable range maps, habitat-suitable range area and connectivity calculations, country SHS and SHI values.
Global Biodiversity Information Facility (GBIF, https://www.gbif.org) through its national nodes
European Space Agency (ESA); e.g., through its global CCI land cover product https://www.esa-landcover-cci.org.

NASA/USGS/U Maryland: e.g., through the Landsat Satellite program supporting the production of annual land cover and tree cover data (https://landsat.gsfc.nasa.gov)

At the national scale:
As available

National biodiversity occurrence and map data

National land cover products

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].
GEO BON. The indicator is calculated from Species Population Essential Biodiversity Variables (EBVs). Species Population EBVs are based on globally available biodiversity data, e.g., as provided through the Global Biodiversity Information Facility (GBIF), and global satellite remote sensing products, as provided through NASA and European Space Agency, and calculated and provided through GEOBON infrastructure Map of Life (MOL). The global datasets combined with the indicator standard methodology enable predictions for any country that can then support global aggregation.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)
SHI is currently based on several tens of thousands of terrestrial vertebrate species that characterize all land ecosystems. The inclusion of select invertebrate and plant groups is in progress.
SHI calculations are in development for marine ecosystems and expected for late 2022, based on ca. 13,000 marine fish and mammal species (see Rinnan et al., 2021). Currently available inputs on habitat change address coral reefs, mangroves, seagrass (see Goal A ecosystem extent indicator) and from Halpern et al. (2015) for additional human impacts.
The SHI methodology can be applied to freshwater species, with data on dams and other barriers (Grill et al. 2015, 2019) defining edge pixels for species with impacted movement.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator
See 5.i

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The SHI can be calculated at national scale and aggregated to form a global indicator. Conversely, global scale SHI calculations can be disaggregated to the level of small regions. Generally, the SHI can be calculated and aggregated at spatial levels ranging from 1 km to small regions, countries, biomes, and the whole planet. The SHI can be calculated with purely national data and the methodology allows countries which prefer calculating the SHI independently to nationalize the indicator.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

In addition to using index calculations or species-metrics provided through GEO BON, CBD Parties can directly calculate country-level SHI by leveraging national data, expertise, and biodiversity change assessment capacity. GEO BON, through its working groups, and national and thematic Biodiversity Observation Networks, can provide capacity support. The calculation follows these specific steps:

Step 1: Determine baseline species distributions. At the most basic level, this can include expert range maps, acknowledging their high false presence rate. Preferably, predictions are based on species distribution models (SDMs) that follow best-possible data integration practices and leverage raw occurrence data and remote-sensing supported environmental layers. Parties can develop these national distribution predictions entirely independently or use existing predictions (e.g., https://mol.org/species/range/Cephalophus_zebra), further modified or as provided.

Step 2: Calculate SHS metrics and SHI for the baseline period. The species distribution data are combined with remote-sensing supported layers of environmental conditions, such as land-cover, and the data-driven associations species associations have with them. This delivers continuous or binary pixel-level species habitat suitability for the reference period. Via standard GIS processing, this supports for each species estimates of country-wide i) total suitable habitat area (summed pixel suitability) and ii) habitat connectivity (average distance to edge of suitable habitat area, GISfrag metric [Ripple et al. 1991]). See e.g., https://mol.org/species/habitat-trend/Cephalophus_zebra. These 'Species Habitat Scores' (SHS) are combined for all evaluated species in a country as simple average (National SHI) or as average weighted by the proportion of global population the country is estimated to hold (Steward's SHI).

Step 3: Calculate change in core metrics and SHI. Through standard GIS processing, changes to the baseline levels of suitability of each species-pixel combination are assessed for different time steps using the same or different environmental layers used in Step 2. These layers currently include standard global land-cover and marine change products but can also comprise national change products or a combination of remotely sensed environmental change signals with high spatial and spectral resolution. Distribution gains beyond the baseline (e.g., through extensive restoration or climatic shifts) are addressed through a rerun of Step 1. For each point in time Step 2 calculations are repeated. SHI is given as the average change in area and connectivity, expressed as percent difference to the reference period, set at SHI = 100.

Country 1

Species	*Steward*	Area	Connectivity
A	*0.86*	81	87
B	*1.00*	102	101
C	*0.30*	60	76
National SHI		**81**	**88**
Steward's SHI		**87.8**	**92**

Country 2

Species	*Steward*	Area	Connectivity
C	*0.70*	80	86
D	*1.00*	130	120
National SHI		**105**	**103**
Steward's SHI		**109**	**106**

Example SHI calculation for two countries based on five species. The countries share species C. Steward: country stewardship value, used as weight for Steward's SHI.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Differences between nationally and internationally (globally) produced SHI values may arise from the use of different input data sources, e.g., national biodiversity or landcover data

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

Aggregation of country-level SHI values to larger regions or the globe is possible through a simple arithmetic mean. Aggregate SHI for a set of *n* countries 1 to *j* in year *k* is given as follows:

$$SHI_k = \frac{\sum_j SHI_{jk}}{n}$$

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

Regional and global SHI values are directly aggregated from national values (see 6.d.1). The globally harmonized annual SHI calculation that is provided by GEO BON is conducted at national level and thus provides national, regional, and global values. Nations can additionally apply the same standard SHI methodology to their own datasets. These nationally developed SHI values might not be perfectly comparable among countries that use different national inputs (e.g., land cover maps based on different sources or methodology). But with this caveat in mind regional and global aggregation of such nationally developed SHI information are equally straightforward and a simple average of national values.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

IPBES

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

Y; https://www.bipindicators.net/indicators/species-habitat-index

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

By species, species group (taxonomic, functional) and any sub-national regional area down to 1 km^2 size.

9. Related goals, targets, and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

Related indicators

- "Extent of selected natural and modified ecosystems", Headline Indicator for Goal A: The SHI adds important measures of ecological integrity and connectivity within and across ecosystems. More than using basic ecosystem maps to assess patterns, the SHI assesses the ecological quality and connectivity of ecosystems through their biological species elements.

- "Red List Index", Headline Indicator for Goal A: The SHI complements this indicator by providing for the Species Populations milestones an observation-based quantitative measure, temporal immediacy, and national/geographic specificity.

- "The proportion of populations within species with a genetically effective population size > 500'", Headline indicator for Goal A: In the absence of comprehensive genetic sampling to characterize separate populations and their genetically effective sizes, the SHI offers a robust, scalable alternative method to monitor changes in genetic diversity. Specifically, estimates of changes in the minimum sizes of (connected) populations are a recommended avenue for measuring changes in genetic diversity and directly addressed by the Area and Connectivity components of SHI. As range-wide genetic sampling will for some years remain limited to a small and atypical subset of species, the SHI offers a general and effective proxy to monitor trends in genetic diversity for a large and representative portion of biodiversity.

- "Species Protection Index (SPI)", Component Indicator for Target 3: The same map information used in the SHI underpins the SPI which assesses ecological representation in conservation areas.

- Complementary indicators "Forest fragmentation index", etc. The SHI shares similarities with fragmentation indicators focused on select ecosystems, and uses the same input (change in landcover, barriers) to support a more direct measurement of ecological integrity. For example, the change in the connectivity of a region's forest ecosystems as measured with the forest fragmentation index would essentially be the same as that measured with the SHI applied to a single forest species inhabiting that full region (assuming the same landcover change products are used). By including many different forest species of the region and thus accounting for their many functions for the ecosystem, the SHI captures connectivity with direct relevance for the overarching aspiration of Goal A, the ecological integrity of ecosystems.

Related Targets:

- Target 1 (Planning): The SHI measures the success of spatial planning activities in retaining the existence and ecological integrity of natural areas

- Target 2 (Restoration): The SHI measures the success of restoration activities in regaining connectivity and supporting the ecosystems with highest priority for healthy species populations

- Target 3 (Area-based conservation): The SHI measures the effectiveness and success of area-based conservation activities in delivering connected protected area networks and stemming the loss of ecological integrity in protected areas.

- Target 4 (Species management): The SHI measures the success in the recovery and conservation of species and their genetic diversity by assessing improvements in the availability and quality of the specific habitats they require.

- Target 5 (Species use): The SHI subset to species harvested, traded, or otherwise used measures the sustainability of these uses with view to the population size and survival of the affected species.

- Target 6 (Invasive Alien Species, IAS): The SHI applied to IAS measures their current or potential future spread, the SHI applied to species known to be impacted by IAS addresses the scope for additional ecological impact.

9. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

Yale University with GEOBON

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Walter Jetz (walter.jetz@yale.edu) and GEO BON Secretariat (info@geobon.org)

11. References

Links to other literature helpful in understanding, interpreting, and using the indicator. A maximum of ten references is preferred.

Jetz, W. et al. Essential biodiversity variables for mapping and monitoring species populations. Nature Ecology & Evolution 3, 539-551, https://doi.org/10.1038/s41559-019-0826-1 (2019).

Navarro, L. M. et al. Monitoring biodiversity change through effective global coordination. Current Opinion in Environmental Sustainability 29, 158-169, https://doi.org/10.1016/j.cosust.2018.02.005 (2017).
Hansen, A. J. et al. Toward monitoring forest ecosystem integrity within the post-2020 Global Biodiversity Framework. Conservation Letters n/a, e12822, https://doi.org/10.1111/conl.12822 (2021).

Jetz, W., McGowan, J., Rinnan, D.S., Possingham, H.P., Visconti, P., O'Donnell, B. & Londoño-Murcia, M.C. (2021) Include biodiversity representation indicators in area-based conservation targets. Nature Ecology & Evolution. https://doi.org/10.1038/s41559-021-01620-y

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Indicator metadata sheet: A.0.3 Red List Index

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

A.0.3 Red List Index

2. Date of metadata update

Insert date of metadata update

04/01/2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Goal A. The integrity of all ecosystems is enhanced, with an increase of at least 15% in the area, connectivity and integrity of natural ecosystems, supporting healthy and resilient populations of all species, the rate of extinctions has been reduced at least tenfold, and the risk of species extinctions across all taxonomic and functional groups, is halved, and genetic diversity of wild and domesticated species is safeguarded, with at least 90% of genetic diversity within all species maintained.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

N/A

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

The world's species are impacted by a number of threatening processes, including habitat destruction and degradation, overexploitation, invasive alien species, human disturbance, pollution, and climate change. This indicator can be used to assess overall changes in the extinction risk of groups of species as a result of these threats and the extent to which threats are being mitigated.

The Red List Index value ranges from 1 (all species are categorized as 'Least Concern') to 0 (all species are categorized as 'Extinct'), and so indicates how far the set of species has moved overall towards extinction. Thus, the global Red List Index allows comparisons between sets of species in both their overall level of extinction risk (i.e., how threatened they are on average), and in the rate at which this risk changes over time. A downward trend in the global Red List Index over time means that the expected rate of future species extinctions is worsening (i.e., the rate of biodiversity loss is increasing). An upward trend means that the expected rate of species extinctions is abating (i.e., the rate of biodiversity loss is decreasing), and a horizontal line means that the expected rate of species extinctions is remaining the same, although in each of these cases it does not mean that biodiversity loss has stopped. An upward global Red List Index trend would indicate that the SDG Target 15.5 of reducing the degradation of natural habitats and protecting threatened species is on track. A global Red List Index value of 1 would indicate that biodiversity loss has been halted.

The name "Red List Index" should not be taken to imply that the indicator is produced as a composite indicator of a number of disparate metrics (in the same way that, e.g., the Multidimensional Poverty Index is compiled). The Red List Index provides an indicator of trends in species' extinction risk, as measured using the IUCN Red List Categories and Criteria (Mace et al. 2008, IUCN 2012a), and is compiled from data on changes over time in the Red List Category for each species, excluding any changes driven by improved knowledge or revised taxonomy.

The Red List Index was used as an indicator towards the 2011–2020 Strategic Plan for Biodiversity (CBD 2014, Tittensor et al. 2014, CBD 2020a), the Convention on Biological Diversity's 2010 Target (Butchart et al. 2010) and Millennium Development Goal 7. It has been proposed as a Headline Indicator in the draft post-2020 Global Biodiversity Framework (CBD 2020b).

5. Definitions, concepts, and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

Definition: The Red List Index measures change in aggregate extinction risk across groups of species. It is based on genuine changes in the number of species in each category of extinction risk on The IUCN Red List of Threatened Species (www.iucnredlist.org) and is expressed as changes in an index ranging from 0 to 1.

Concepts: Threatened species are those listed on The IUCN Red List of Threatened Species in the categories Vulnerable, Endangered, or Critically Endangered (i.e., species that are facing a high, very high, or extremely high risk of extinction in the wild in the medium-term future). Changes over time in the proportion of species threatened with extinction are largely driven by improvements in knowledge and changing taxonomy. The indicator excludes such changes to yield a more informative indicator than the simple proportion of threatened species. It therefore measures change in aggregate extinction risk across groups of species over time, resulting from genuine improvements or deteriorations in the status of individual species. It can be calculated for any representative set of species that have been assessed for The IUCN Red List of Threatened Species at least twice (Butchart et al. 2004, 2005, 2007). To calculate the Red List Index for individual countries and regions, each species contributing to the index is weighted by the proportion of its global range within the particular country or region. The resulting index therefore shows the aggregate extinction risk for species within the country or region relative to its potential contribution to global species extinction risk (within the taxonomic groups included).

Unit of measure: The Red List Index for a particular country or region is an index of the aggregate extinction risk for species within the country or region relative to its potential contribution to global species extinction risk (within the taxonomic groups included), measured on a scale of 0 to 1, where 1 is the maximum contribution that the country or region can make to global species survival, equating to all species being classified as Least Concern on the IUCN Red List, and 0 is the minimum contribution that the country or region can make to global species survival, equating to all species in the country or region having gone extinct.

5.b Method of computation
Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

The Red List Index is calculated at a point in time by first multiplying the number of species in each Red List Category by a weight (ranging from 1 for 'Near Threatened' to 5 for 'Extinct' and 'Extinct in the Wild') and summing these values. This is then divided by a maximum threat score which is the total number of species multiplied by the weight assigned to the 'Extinct' category. This final value is subtracted from 1 to give the Red List Index value.

Mathematically this calculation is expressed as:
RLIt = 1 – [(Ss Wc(t,s) / (WEX * N)]
Where Wc(t,s) is the weight for category (c) at time (t) for species (s) (the weight for 'Critically Endangered' = 4, 'Endangered' = 3, 'Vulnerable' = 2, 'Near Threatened' = 1, 'Least Concern' = 0. 'Critically Endangered' species tagged as 'Possibly Extinct' or 'Possibly Extinct in the Wild' are assigned a weight of 5); WEX = 5, the weight assigned to 'Extinct' or 'Extinct in the Wild' species; and N is the total number of assessed species, excluding those assessed as Data Deficient in the current time period, and those considered to be 'Extinct' in the year the set of species was first assessed.

The formula requires that:

- Exactly the same set of species is included in all time periods, and
- The only Red List Category changes are those resulting from genuine improvement or deterioration in status (i.e., excluding changes resulting from improved knowledge or taxonomic revisions), and
- Data Deficient species are excluded (or treated according to the procedure described above).

In many cases, species lists will change slightly from one assessment to the next (e.g., owing to taxonomic revisions). The conditions can therefore be met by retrospectively adjusting earlier Red List categorizations using current information and taxonomy. This is achieved by assuming that the current Red List Categories for the taxa have applied since the set of species was first assessed for the Red List, unless there is information to the contrary that genuine status changes have occurred. Such information is often contextual (e.g., relating to the known history of habitat loss within the range of the species). If there is insufficient information available for a newly added species, it is not incorporated into the Red List Index until it is assessed for a second time, at which point earlier assessments are retrospectively corrected by extrapolating recent trends in population, range, habitat and threats, supported by additional information.

To avoid spurious results from a biased selection of species, Red List Indices are typically calculated only for taxonomic groups in which all species worldwide have been assessed for the Red List, or for samples of species that have been systematically or randomly selected.
The methods and scientific basis for the Red List Index were described by Butchart et al. (2004, 2005, 2007, 2010).

Butchart et al. (2010) also described the methods by which Red List Indices for different taxonomic groups are aggregated to produce a single multi-taxon Red List Index. Specifically, aggregated Red List Indices are calculated as the arithmetic mean of modelled Red List Indices. Red List Indices for each taxonomic group are interpolated linearly for years between data points and extrapolated linearly (with a slope equal to that between the two closest assessed points) to align them with years for which Red List Indices for other taxa are available. The Red List Indices for each taxonomic group for each year are modelled to consider various sources of uncertainty:

i) Data Deficiency: Red List categories (from Least Concern to Extinct) are assigned to all Data Deficient species, with a probability proportional to the number of species in non-Data Deficient categories for that taxonomic group;

ii) Extrapolation uncertainty: although RLIs were extrapolated linearly based on the slope of the closest two assessed point, there is uncertainty about how accurate this slope may be. To incorporate this uncertainty, rather than extrapolating deterministically, the slope used for extrapolation is selected from a normal distribution with a probability equal to the slope of the closest two assessed points, and standard deviation equal to 60% of this slope (i.e., the CV is 60%);

iii) Temporal variability: the 'true' Red List Index likely changes from year to year, but because assessments are repeated only at multi-year intervals, the precise value for any particular year is uncertain.

To make this uncertainty explicit, the Red List Index value for a given taxonomic group in a given year is assigned from a moving window of five years, centred on the focal year (with the window set as 3-4 years for the first two and last two years in the series). Note that assessment uncertainty cannot yet be incorporated into the index. Practically, these uncertainties are incorporated into the aggregated Red List Indices as follows: Data Deficient species were allotted a category as described above, and a Red List Index for each taxonomic group was calculated interpolating and extrapolating as

described above. A final Red List Index value was assigned to each taxonomic group for each year from a window of years as described above. Each such 'run' produced a Red List Index for the complete time period for each taxonomic group, incorporating the various sources of uncertainty. Ten thousand such runs are generated for each taxonomic group, and the mean is calculated.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size, and the response rate. Hyperlinks to methodologies are acceptable

A detailed description of the Red List Assessment process is provided at https://www.iucnredlist.org/assessment/process.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

See references in section 11, and https://www.iucnredlist.org

5.e Data sources

Description of all actual and recommended sources of data

The Red List Index is based on data from The IUCN Red List of Threatened Species (www.iucnredlist.org), in particular the numbers of species in each Red List category of extinction risk, and changes in these numbers over time resulting from genuine improvements or deteriorations in the status of species. Data on species' distribution, population size, trends and other parameters that underpin Red List assessments are gathered from published and unpublished sources, species experts, scientists, and conservationists through correspondence, workshops, and electronic fora.

Red List Assessments are checked before submission to IUCN by Assessors and Red List Authority Coordinators, to ensure that all of the required supporting information is provided in the appropriate format, distribution maps follow the required mapping standards (https://www.iucnredlist.org/resources/mappingstandards, and the IUCN Red List Criteria have been applied

appropriately and consistently following IUCN Guidelines (IUCN SPSC 2019). For further details, see https://www.iucnredlist.org/assessment/process. All submitted assessments must be reviewed by at least one Reviewer designated by the Red List Authority. For more details on the review process, see the Rules of Procedure (https://nc.iucnredlist.org/redlist/content/attachment_files/Rules_of_Procedure_for_IUCN_Red_List_2017-2020.pdf).

When Red List Indices are updated each year, the updated index (and underlying numbers of species in each Red List Category) are made available for review by countries prior to submission to the SDG Indicators Database. This is achieved through updating the country profiles in the Integrated Biodiversity Assessment Tool (https://ibat-alliance.org/country_profiles and circulating these for consultation and review to CBD National Focal Points, SDG National Statistical Office Focal Points, and IUCN State Members.

In sum: all Red List assessments are peer reviewed through the relevant Red List Authority for the species or species group in question; and all Red List assessments undergo consistency checks (to ensure consistency with assessments submitted for other taxonomic groups, regions, processes, etc.) by the Red List Unit before publication on the Red List website (http://www.iucnredlist.org/). Finally, the Chair of the IUCN Species Survival Commission (elected each four years by the government and non-governmental Members of IUCN) appoints a Chair for a Standards and Petitions Sub-Committee (https://www.iucn.org/theme/species/about/species-survival-commission/ssc-leadership-and-steering-committee/sub-committees/standards-and-petitions-subcommittee), which is responsible for ensuring the quality and standards of the IUCN Red List and for ruling on petitions against the listings of species on the IUCN Red List.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc). If the indicator is not operational, please add a short description of how it is being made operational.

The Red List Index is updated annually in November-December using the latest data from reassessments on the IUCN Red List.

The IUCN Red List of Threatened Species is updated at least three times per year. Red List Indices for sets of species that have been comprehensively reassessed are usually released alongside the relevant update of the IUCN Red List. Data are stored and managed in the Species Information Service database and are made freely available for non-commercial use through the IUCN Red List website (www.iucnredlist.org). Re-assessments of extinction risk are required for every species assessed on The IUCN Red List of Threatened Species once every ten years, and ideally undertaken once every five years. A Red List Strategic Plan details a calendar of upcoming re-assessments for each taxonomic group.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021

1980 –2021. Updates are released annually

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

National agencies producing relevant data include government, non-governmental organisations (NGOs), and academic institutions working jointly and separately. Data are gathered from published and unpublished sources, species experts, scientists, and conservationists through correspondence, workshops, and electronic fora. Data are submitted by national agencies to IUCN or are gathered through initiatives of the Red List Partnership. The members of the Red List Partnership are listed at https://www.iucnredlist.org/about/partners, and currently include: ABQ BioPark; Arizona State University Centre for Biodiversity Outcomes; BirdLife International; Botanic Gardens Conservation International; Conservation International; Global Wildlife Conservation; Missouri Botanical Garden; NatureServe; Royal Botanic Gardens, Kew; Sapienza University of Rome; Texas A&M University; and Zoological Society of London.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

IUCN

Compilation and reporting of the Red List Index at the global level is conducted by the International Union for Conservation of Nature (IUCN) and BirdLife International, on behalf of the Red List Partnership.

Responsibility for overseeing Red List assessments, which underpin the Red List Index, is assigned to Red List Authorities according to the IUCN Red List Rules of Procedure (https://nc.iucnredlist.org/redlist/content/attachment_files/Rules_of_Procedure_for_IUCN_Red_List_2017-2020.pdf). The role of Red List Authorities is to ensure that all species within their remit are correctly assessed against the IUCN Red List Categories and Criteria at least once every ten years and, if possible, every five years. Further details of the roles and responsibilities of Red List Authorities are provided at https://www.iucnredlist.org/assessment/authorities, and the full list and contact details for all appointed Red List Authorities are available at https://www.iucn.org/commissions/ssc-groups.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)

There are four main sources of uncertainty associated with Red List Index values and trends

a. Inadequate, incomplete, or inaccurate knowledge of a species' status. This uncertainty is minimized by assigning estimates of extinction risk to categories that are broad in magnitude and timing.
b. Delays in knowledge about a species becoming available for assessment. Such delays apply to a small (and diminishing) proportion of status changes and can be overcome in the Red List Index through back-casting (Butchart et al. 2007).
c. Inconsistency between species assessments. These can be minimized by the requirement to provide supporting documentation detailing the best available data, with justifications, sources, and estimates of uncertainty and data quality, which are checked and standardized by IUCN through Red List Authorities, a Red List Technical Working Group and an independent Standards and Petitions Sub-committee. Further, detailed Guidelines on the Application of the Categories and Criteria are maintained (IUCN SPSC 2019), as is an online training course (in English, Spanish and French).
d. Species that are too poorly known for the Red List Criteria to be applied are assigned to the Data Deficient category. For birds, only 0.8% of extant species are evaluated as Data Deficient, compared with 24% of amphibians. If Data Deficient species differ in the rate at which their extinction risk is changing, the Red List Index may give a biased picture of the changing extinction risk of the overall set of species. The degree of uncertainty this introduces is estimated through a bootstrapping procedure that randomly assigns each Data Deficient species a category based on the numbers of non-Data Deficient species in each Red List category for the set of species under consideration, and repeats this for 1,000 iterations, plotting the 2.5 and 97.5 percentiles as lower and upper confidence intervals for the median.

The main limitation of the Red List Index is related to the fact that the Red List Categories are relatively broad measures of status, and thus the Red List Index for any individual taxonomic group can practically only be updated at intervals of at least four years. However, as the overall index is aggregated across multiple taxonomic groups, with groups reassessed asynchronously, it can be updated annually. A further limitation is that the Red List Index does not reflect particularly well the deteriorating status of more common species that remain abundant and widespread but are declining slowly in terms of their range and population.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

At country level
Red List Indices for each taxonomic group are interpolated linearly for years between data points and extrapolated linearly (with a slope equal to that between the two closest assessed points, except for corals) back to the earliest time point and forwards to the present for years for which estimates are not available. The start year of the aggregated index is set as ten years before the first assessment year for the taxonomic group with the latest starting point. Corals are not extrapolated linearly because declines are known to have been much steeper subsequent to 1996 (owing to extreme bleaching events) than before. Therefore, the rate of decline prior to 1996 is set as the average of the rates for the other taxonomic groups.

At regional and global levels
The Red List Index is calculated globally based on assessments of extinction risk of each species included, because many species have distributions that span many countries. Thus, while there is certainly uncertainty around the Red List Index, there are no missing values as such, and so no imputation is necessary.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator is available for use at the national, regional, and global level

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

The data underlying the Red List Index are compiled under the authority of the IUCN Red List Committee, through application of the IUCN Red List Categories & Criteria (https://portals.iucn.org/library/node/10315). This includes submissions of endemics from national red list processes, where these have been conducted following the "Guidelines for application of IUCN Red List Criteria at Regional and National Levels" (https://portals.iucn.org/library/node/10336) and following the "Required and Recommended Supporting Information for IUCN Red List Assessments" (http://goo.gl/O52euG). Assessments may be submitted in all three IUCN languages (English, French and Spanish) and Portuguese. All assessments are peer reviewed through the relevant Red List Authority for the species or species group in question, as documented in the Red List Rules of Procedure (https://cmsdocs.s3.amazonaws.com/keydocuments/Rules_of_Procedure_for_IUCN_Red_List_Assessments_2017-2020.pdf); see in particular Annex 3, the "Details of the Steps Involved in the IUCN Red List Process" (https://cmsdocs.s3.amazonaws.com/keydocuments/Details_of_the_Steps_Involved_in_the_IUCN_Red_List_Process.pdf).

The key document providing international recommendations and guidelines to countries and all involved in application of the IUCN Red List Categories & Criteria (https://portals.iucn.org/library/node/10315) is the "Guidelines for Using the IUCN Red List Categories and Criteria" (in English - http://cmsdocs.s3.amazonaws.com/RedListGuidelines.pdf and in French - http://cmsdocs.s3.amazonaws.com/keydocuments/RedListGuidelines_FR.pdf) accompanied by the "Required and Recommended Supporting Information for IUCN Red List Assessments". For countries (and regions), this is supplemented by the "Guidelines for application of IUCN Red List Criteria at Regional and National Levels" (https://portals.iucn.org/library/node/10336). To support the calculation of Red List Indices for any given country (or region), "Code (and documentation) for calculating and plotting national RLIs weighted by the proportion of each species' distribution within a country or region" is posted online (Dias et al. 2020; https://github.com/BirdLifeInternational/rli-codes).

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Some countries have assessed the national extinction risk of species occurring in the country, and have repeated such assessments, allowing a national Red List Index to be produced. This may differ from the indicator described here because (a) it considers national rather than global extinction risk, and (b) because it takes no account of the national responsibility for the conservation of each species, treating as equal both those species that occur nowhere outside the country (i.e., national endemics) and those with large ranges that occur in many other countries. Any such differences will be smaller for countries within which a high proportion of species are endemic (i.e., only found in that country), as in many island nations and mountainous countries, especially in the tropics. The differences will be larger for countries within which a high proportion of species have widespread distributions across many nations.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

The Red List Index can be downscaled to show national and regional Red List Indices, weighted by the fraction of each species' distribution occurring within the country or region, building on the method published by Rodrigues et al. (2014) PLoS ONE 9(11): e113934. These show an index of how well species are conserved in a country or region to its potential contribution to global species conservation (for the taxonomic groups of species included). The index is calculated as:

RLI(t,u) = 1 – [(Ss(W(t,s) * (rsu/Rs)) / (WEX * Ss (rsu/Rs))

where t is the year of comprehensive reassessment, u is the spatial unit (i.e., country), W_((t,s)) is the weight of the global Red List category for species s at time t (Least Concern =0, Near Threatened =1,

Vulnerable =2, Endangered =3, Critically Endangered =4, Critically Endangered (Possibly Extinct) =5, Critically Endangered (Possibly Extinct in the Wild) =5, Extinct in the Wild =5 and Extinct =5), WEX = 5 is the weight for

Extinct species, r_su is the fraction of the total range of species s in unit u, and R_s is the total range size of species s.

The index varies from 1 if the country has contributed the minimum it can to the global RLI (i.e., if the numerator is 0 because all species in the country are Least Concern) to 0 if the country has contributed the maximum it can to the global RLI (i.e., if the numerator equals the denominator because all species in the country are Extinct or Possibly Extinct).

The taxonomic groups included are those in which all species have been assessed for the IUCN Red List more than once. Red List categories for years in which comprehensive assessments (i.e., those in which all species in the taxonomic group have been assessed) were carried out are determined following the approach of Butchart et al. 2007; PLoS ONE 2(1): e140, i.e., they match the current categories except for those taxa that have undergone genuine improvement or deterioration in extinction risk of sufficient magnitude to qualify for a higher or lower Red List category.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

The Red List Categories and Criteria are applied for each species on The IUCN Red List of Threatened Species and are determined globally and provided principally by the Specialist Groups and stand-alone Red List Authorities of the IUCN Species Survival Commission, IUCN Secretariat-led initiatives, and Red List partner organizations. The staff of the IUCN Global Species Programme compile, validate, and curate these data, and are responsible for publishing and communicating the results. Each individual species assessment is supported by the application of metadata and documentation standards (IUCN 2013), including classifications of, for example, threats and conservation actions (Salafsky et al. 2008).

Red List assessments are undertaken through either open workshops or through open-access web-based discussion fora. Assessments are reviewed by the appropriate Red List Authority (an individual or organization appointed by the IUCN Species Survival Commission to review assessments for specific species or groups of species) to ensure standardisation and consistency in the interpretation of information and application of the criteria. A Red List Technical Working Group and the IUCN Red List Unit work to ensure consistent categorization between species, groups and assessments. Finally, a Standards and Petitions Sub-committee monitors the process and resolves challenges and disputes over Red List assessments.

In addition, IUCN publishes guidelines on applying the IUCN Red List Categories and Criteria at regional or national scales (IUCN 2012b). Based on these, many countries have initiated programmes to assess the extinction risk of species occurring within their borders. These countries will be able to implement the Red List Index based on national extinction risk, once they have carried out at least two national Red Lists using the IUCN system in a consistent way (Bubb et al. 2009). An increasing number of countries have now completed national Red List Indices for a range of taxa (e.g., Gärdenfors 2010, Pihl & Flensted 2011).

While global Red List Indices can be disaggregated to show trends for species at smaller spatial scales, the reverse is not true. National or regional Red List Indices cannot be aggregated to produce Red List Indices showing global trends. This is because a taxon's global extinction risk has to be evaluated at the global scale and cannot be directly determined from multiple national scale assessments across its range (although the data from such assessments can be aggregated for inclusion in the global assessment).

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

IPBES; SDG indicator 15.5.1; SPMS indicator 6.2; SPMS indicator 8.1; SPMS indicator 5.1

The Red List Index has been classified by the IAEG-SDGs as Tier 1. Current data are available for all countries in the world, and these are updated annually. Index values for each country are available in the UN SDG Indicators Database https://unstats.un.org/sdgs/indicators/database/.

Disaggregations of the Red List Index are also of particular relevance as indicators towards the following SDG targets (Brooks et al. 2015): SDG 2.4 Red List Index (species used for food and medicine); SDG 2.5 Red List

Index (wild relatives and local breeds); SDG 12.2 Red List Index (impacts of utilisation) (Butchart 2008); SDG 12.4 Red List Index (impacts of pollution); SDG 13.1 Red List Index (impacts of climate change); SDG 14.1 Red List Index (impacts of pollution on marine species); SDG 14.2 Red List Index (marine species); SDG 14.3 Red List Index (reef-building coral species) (Carpenter et al. 2008); SDG 14.4 Red List Index (impacts of utilisation on marine species); SDG 15.1 Red List Index (terrestrial & freshwater species); SDG 15.2 Red List Index (forest-specialist species); SDG 15.4 Red List Index (mountain species); SDG 15.7 Red List Index (impacts of utilisation) (Butchart 2008); and SDG 15.8 Red List Index (impacts of invasive alien species) (Butchart 2008, McGeoch et al. 2010).

Red List Index graphs and underlying index data are available for each country, SDG regions, IPBES region, CMS region and various thematic disaggregations at https://www.iucnredlist.org/search. Red List Index graphs are also available for each country in the BIP Indicators Dashboard (https://bipdashboard.natureserve.org/bip/SelectCountry.html), the Integrated Biodiversity Assessment Tool Country Profiles (https://ibat-alliance.org/country_profiles), and (for birds) on the BirdLife International Data Zone (http://datazone.birdlife.org/species/dashboard).

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

Y https://www.bipindicators.net/indicators/red-list-index

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

The indicator can also be disaggregated by: ecosystems (terrestrial, freshwater and marine), habitats (forest, wetland etc), various political and geographic divisions (e.g., Han et al. 2014); by taxonomic subsets (e.g., Hoffmann et al. 2011); by suites of species relevant to particular international treaties or legislation (e.g., Croxall et al. 2012); by suites of species exposed to particular threatening processes (e.g., Butchart 2008); and by suites of species that deliver particular ecosystem services (e.g., Regan et al. 2015), or have particular biological or life-history traits (e.g. migratory species). In each case, information can be obtained from The IUCN Red List of Threatened Species to determine which species are relevant to particular subsets (e.g., which occur in particular ecosystems, habitats, and geographic areas of interest). These disaggregations are available on the IUCN Red List website at https://www.iucnredlist.org/search.

9. Related goals, targets, and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

The Red List Index (and relevant disaggregations) can also be used to measure progress towards several other goals and targets of the first draft Global Biodiversity Framework, as indicated in the draft monitoring framework, including:

Draft Target 5*. Ensure that the harvesting, trade and use of wild species is sustainable, legal, and safe for human health.*

- Red List Index (wild relatives of domesticated animals)
- Red List Index (impacts of utilisation),
- Red List Index (impacts of fisheries)

Draft Target 6. *Manage pathways for the introduction of invasive alien species, preventing, or reducing their rate of introduction and establishment by at least 50%, and control or eradicate invasive alien species to eliminate or reduce their impacts, focusing on priority species and priority sites.*

- Red List Index (impacts of invasive alien species)

Draft Target 7. *Reduce pollution from all sources to levels that are not harmful to biodiversity, ecosystem functions or human health, including by reducing nutrients lost to the environment by at least half, and pesticides by at least two thirds and eliminating the discharge of plastic waste.*

- Red List Index (impacts of pollution)

Draft Target 9. *Ensure benefits, including nutrition, food security, medicines, and livelihoods for people especially for the most vulnerable through sustainable management of wild terrestrial, freshwater and marine species and protecting customary sustainable use by indigenous peoples and local communities.*

- Red List Index (species used for food and medicine)
- Red List Index (wild relatives of domesticated animals)
- Red List Index (pollinating species)
- Red List Index (impacts of fisheries)
- Red List Index (impact of utilization)

Draft Target 10. *Ensure all areas under agriculture, aquaculture and forestry are managed sustainably, in particular through the conservation and sustainable use of biodiversity, increasing the productivity and resilience of these production systems.*

- Red List Index (pollinating species)

Draft Target 20. *Ensure that relevant knowledge, including the traditional knowledge, innovations and practices of indigenous and local communities with their free, prior, and informed consent, guides decision making for the effective management of biodiversity, enabling monitoring, and by promoting awareness, education and research*.

- Proportion of known species assessed through the IUCN Red List.
- Number of assessments on the IUCN Red List of threatened species

9. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

International Union for Conservation of Nature (IUCN)
BirdLife International (BLI)

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata

Dr Thomas Brooks (thomas.brooks@iucn.org); Dr Stuart Butchart (stuart.butchart@birdlife.org)

10. References

*Links to other literature helpful in understanding, interpreting, and using the indicator. A maximum of **ten** references is preferred.*

URL: https://www.iucn.org/assessment/red-list-index

These metadata are based on http://mdgs.un.org/unsd/mi/wiki/7-7-Proportion-of-species-threatened-with-extinction.ashx, supplemented by http://www.bipindicators.net/rli/2010 and the references listed below.

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Indicator metadata sheet: A.0.4: The proportion of populations within species with a genetically effective population size > 500

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

The proportion of populations within species with a genetically effective population size > 500

2. Date of metadata update

Insert date of metadata update

2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Goal A. The integrity of all ecosystems is enhanced, with an increase of at least 15% in the area, connectivity and integrity of natural ecosystems, supporting healthy and resilient populations of all species, the rate of extinctions has been reduced at least tenfold, and the risk of species extinctions across all taxonomic and functional groups, is halved, and genetic diversity of wild and domesticated species is safeguarded, with at least 90% of genetic diversity within all species maintained.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A.

N/A

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

This indicator is based on the well-studied principle in conservation biology that genetic diversity is important for species populations to remain healthy and adapt to environmental change. Populations with low genetic diversity suffer negative effects of inbreeding such as unfit individuals, low viability and sterility.

Because genes are passed from one generation to the next, the amount of genetic diversity within a species population is fundamentally related to demographic processes (i.e., birth, death, migration) and to population size. Populations that are small in size (effective population size < 500) are highly susceptible to stochastic fluctuations in genetic diversity, experience rapid loss of genetic diversity and are at high risk of extinction.

This indicator provides a direct measure of the maintenance of genetic diversity within species and allows a feasible, scalable way to assess whether genetic diversity is being maintained within species through an accessible proxy that can be collected for many species per country. The proxy of effective population size is known to relate to genetic diversity loss and is the best evidence available when DNA sequencing is not available (the case for most species globally) for ongoing and contemporary genetic erosion. Maintaining effective sizes above 500 will ensure maintaining at least 90 to 95% of within population genetic diversity for many generations.

Thus, this indicator is directly relevant to Goal A, as it informs on the health and resiliency of species populations and threat of species extinction. Knowledge of a species population's effective size is relevant to Target 4 as it facilitates active management of species, ex situ breeding programs and informs the conservation efforts and recovery process of species populations following an environmental disruption

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The **effective population size (N_e)** is a way to quantify the rate of genetic change, or genetic erosion. Effective population size of a population is related to the number of breeding individuals in a population that contribute

offspring to the next generation, the relative evenness of their offspring production, sex ratio, and other factors. The current state of N_e can be directly interpretable and has important meaning for genetic biodiversity. Any population with N_e below 500 is likely losing genetic diversity fairly quickly, and signals an ongoing erosion of genetic diversity.

The effective population size may be a fraction of the species **census population size (N_c)**, which is the number of adult individuals present in a discrete area.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

Effective population size (N_e) can be calculated for most species through a simple mathematical transformation of the population's census size (N_c). Following the widely accepted rule of thumb of 1:10 census to effective size ratio, the default transformation is multiplication of N_c by 0.1 (Hoban et al. 2020). For example, this would equate to a census size of 5000 having an effective size of 500. However, for some taxonomic groups and for some species, a more refined ratio could be employed (see Step 2 below).

Step 1: Define population boundaries and compile data. For each of the focal species it is first necessary to define 'populations' and to collect data on census population sizes. Many local and national biodiversity monitoring programs (e.g., at species or ecosystem level) may have already defined populations based on geographic isolation, association with a geographic feature like a mountain range or lake, etc. Full guidance on defining populations for a wide variety of organisms will be provided in the guidance manual for this indicator. After defining populations, it is necessary to collect data on census population sizes (or to use genetic data). Again, many biodiversity monitoring programs for priority species will have this data available - in some cases in a centralized national database while in other cases, it may be scattered among different national reports and assessments.

Step 2: Calculate each population's N_e. This entails first choosing a ratio of census-to-effective size and multiplying the population's census size by this ratio to obtain the population's effective size. As mentioned above, the default ratio that we recommend, which is slightly conservative, is 1:10 or 0.1. Alternatively, a taxon-specific ratio can be obtained in one of several ways: (a) from recent reviews of the literature that have compiled average values for groups such as mammals, bony fish, annual plants, trees, etc., (b) from formulas that consider a species' biological characteristics (especially the male-female sex ratio and the variance in offspring production), or (c) from published literature on the species or even populations that are the focus of study. For instance, the ratio in large-bodied mammals is often closer to 0.3. These are all valid ways of obtaining the ratio. To incorporate uncertainty in calculations, the calculation can be repeated using multiple N_e/N_c ratios.

Step 3: Calculate the proportion of populations above the 500 N_e threshold. For each species, count the number of populations with N_e above 500 and the number with N_e below 500; these two added together should equal the total number of populations. The indicator can be reported as a proportion (from 0 to 1) of all populations that are above 500, or in the form of a ratio 'number of populations above 500':'total number of populations.' (Recently extinct populations would have a size of 0 to avoid an increase in the indicator value when populations are lost). To combine across species in a given country or geographic location, a simple average of the proportion from Step 3 for all the relevant species should be performed; alternatively, this can be weighted by the proportion of the species' range within the country. The indicator would range between 0 and 1 (with 1 being the desired state - all populations above an effective size of 500).

Step 4: Temporal change in the indicator can be calculated using multiple time point values of population size. Temporal increases in the proportion of populations with N_e above 500 would indicate improvement in the maintenance of genetic diversity (on average slowing the rate of genetic erosion), decreases would indicate worsening (accelerating rate of genetic erosion), and static values would indicate a stable state of the indicator (stable rate of genetic erosion).

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable.

In most cases, the indicator will be calculated using a transformation of census size (N_c). The guidance manual in development will detail other methods of calculating the indicator when other data are available. The census size of local populations of target species can be obtained from a variety of sources, including national biodiversity monitoring databases and programs, endangered species management and recovery plans, detailed population information contained in some Red List assessments, and expert consultation. Detailed guidance on these calculations and a variety of example calculations will be available through GEO BON in 2022.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales.

Parties can directly calculate country-level values of this indicator by leveraging national data, expertise and biodiversity assessments, and by following the guidance manual that is being developed by the GEO BON Genetic Composition Working Group, in collaboration with a broad coalition of conservationists globally. This guidance manual will be available in 2022.

5.e Data sources

Description of all actual and recommended sources of data.

GEO BON, through its working groups, and national and thematic Biodiversity Observation Networks, is able to provide capacity support, training and consultation. Considering that currently the workflow is manual rather than fully automated, the indicator would be calculated for a relatively small number of representative species per country. This may range from dozens on the low end to 1000 or more on the high end, but for many countries will be on the scale of 100 species. As noted above, data sources include national biodiversity monitoring databases and programs, endangered species management and recovery plans, detailed population information contained in some Red List assessments, and expert consultation. Detailed guidance on these calculations and a variety of example calculations will be available through GEO BON in 2022.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc).

In development. To be made available in 2022.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021.

Dependent on data quality at the national scale.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

Expert organizations, scientific societies, national and public repositories (e.g., Global Biodiversity Information Facility, GBIF).

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

GEO BON – The Morten Arboretum

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)

Expected taxonomic gaps include cryptic species, micro-organisms, fungi, invertebrates. However, the indicator can be calculated at the population level or species level in any species, and (weighted) averages can be calculated across populations or species considering range sizes. Expected thematic and geographic gaps include species from understudied realms and areas (e.g., deep sea, mountains, and islands).

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator.

Species with missing data may be aggregated with taxonomically-related species, or species with similar characteristics and life history traits

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

Data is applicable at the local, national, regional and global scales.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

The guidance document in development will explain national methodology. Underlying data will be accessible and usable by countries.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

The guidance document in development will explain national methodology.

6.d Regional and global estimates & data collection for global monitoring

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

Methods for aggregating at these scales, and for weighting countries are in development.

6.d.1 Description of the methodology

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.2 Additional methodological details

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

6.d.3 Description of the mechanism for collecting data from countries

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

No

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.).

Species, taxa.

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

Relevant to target 4 and informed by target 4 proposed indicators:

Target 4. Ensure active management actions to enable the recovery and conservation of species and the genetic diversity of wild and domesticated species, including through ex situ conservation, and effectively manage human-wildlife interactions to avoid or reduce human-wildlife conflict.
4.0.1 Proportion of species populations that are affected by human wildlife conflict.
4.0.2 Number of plant genetic resources for food and agriculture secured in medium or long-term conservation facilities.

Relevant to proposed indicator A.0.2 Species Habitat Index

9. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata.
The Morton Arboretum with GEO BON

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Sean Hoban (shoban@mortonarb.org)
Linda Laikre (linda.laikre@popgen.su.se)
GEOBON (info@geobon.org)

10. References

Links to other literature helpful in understanding, interpreting, and using the indicator. A maximum of ten references is preferred.

Frankham, R. (1995). Effective population size/adult population size ratios in wildlife: a review. *Genetic Research*, 66, 95–107.

Hoban, S., Bruford, M., D'Urban Jackson, J., Lopes-Fernandes, M., Heuertz, M., Hohenlohe, P.A., et al. (2020). Genetic diversity targets and indicators in the CBD post-2020 Global Biodiversity Framework must be improved. *Biological Conservation*, 248, 108654.

Hoban, S., Paz-Vinas, I., Aitken, S., Bertola, L., Breed, M.F., Bruford, M., Funk, C., Grueber, C., Heuertz, M., Hohenlohe, P., Hunter, M., et al. (2021). Effective population size remains a suitable, pragmatic indicator of genetic diversity for all species, including forest trees. *Biological Conservation*, 253, p.108906.

Hoban, S., Bruford, M., Funk, W.C., Galbusera, P., Griffith, M.P., Grueber, C.E., Heuertz, M., Hunter, M.E., Hvilsom, C., Kalamujic, S.B., Kershaw, F., et al. (2021). Global commitments to conserving and monitoring genetic diversity are now necessary and feasible. *BioScience*, 71, 964–976.

Laikre, L., Hohenlohe, P.A., Allendorf, F.W., Bertola, L.D., Breed, M.F., Bruford, M.W., Funk, W.C., Gajardo, G., González-Rodríguez, A., Grueber, C.E., Hedrick, P.W., et al. (2021). Authors' Reply to Letter to the Editor: Continued improvement to genetic diversity indicator for CBD. *Conservation Genetics*, pp.1-4.

Laikre, L., Nilsson, T., Primmer, C.R., Ryman, N. and Allendorf, F.W. (2009). Importance of genetics in the interpretation of favourable conservation status. *Conservation Biology*, *23,* 1378-1381.

Indicator metadata sheet: B.0.1 National environmental economic accounts of ecosystem services

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

National environmental economic accounts of ecosystem services

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Goal B. Nature's contributions to people have been valued, maintained or enhanced through conservation and sustainable use supporting the global development agenda for the benefit of all.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

N/A

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

The System of Environmental-Economic Accounting (SEEA) Ecosystem Accounting framework adapts the concepts developed on ecosystem services measurement and the conceptual framing of the nature's contribution of people to foster an understanding of the relationship between nature and human.

Goal B, which monitors nature's contribution to people and benefits from ecosystem and biodiversity, and their sustainable use, can be informed by indicators from physical and monetary ecosystem services flow accounts of the SEEA Ecosystem Accounting.

Flows of ecosystem services in the SEEA Ecosystem Accounting, which describe the contributions that ecosystems make to benefits used in economic and other human activity, are a central part of describing nature's contribution to people. These contributions extend well beyond those of marketed goods, such as timber and fish, and include services such as air filtration, water purification, global climate regulation and recreation-related services. Indicators derived from the ecosystem services flow account provide a clear description of the range of these services, the spatial heterogeneity of their delivery, and the local to global beneficiaries of these services, in order that this information can be readily compared between and connected to the different ecosystems that supply the service

Countries will select their prioritized ecosystem services based on needs and data availability and evaluate ecosystem service models that would be the best fit for a particular ecosystem service and policy question. An ecosystem service supply and use table in physical and monetary term will then compiled by overlaying and allocating the modelling results of each selected ecosystem services.

5. Definitions, concepts, and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The concepts, definitions and classification used have been based on the System of Environmental-Economic Accounting (SEEA) Ecosystem Accounting. **Ecosystem services** are the contributions of ecosystems to the benefits that are used in economic and other human activity**. Final ecosystem services** are those ecosystem services in which the user of the service is an economic unit – i.e., business, government or household.

The physical ecosystem services flow accounts describe the ecosystem services generated by ecosystem assets in volume terms. The ecosystem services are grouped as provisioning, regulating and maintenance, and cultural services. Metrics from the accounts commonly focus on the ecological supply side of ecosystem service flows in physical units such as cubic meters and tons. Indicators are then compiled from the accounts and measured in terms of their percentage change over an accounting period or with respect to the baseline period determined by countries.

The reference list of selected ecosystem services in the SEEA Ecosystem Accounting is structured at the highest level into three broad categories: provisioning services; regulating and maintenance services and cultural services. Within each of these broad groups, several ecosystem service types are included with some sub-types also listed. To ensure that the coverage of the ecosystem accounts is as comprehensive as possible, compilers are encouraged to include as many types of ecosystem services as possible. A progressive expansion in the range of ecosystem services included in the accounts over time may be appropriate, considering data and resource availability and the relative significance of the ecosystem services. Please refer to the SEEA Ecosystem Accounting handbook for the detailed description of each ecosystem services in the reference list (United Nations et al. 2021).

Many of these indicators may also be expressed in monetary terms where valuation is also undertaken. The monetary ecosystem services flow accounts describe the ecosystem services generated by the ecosystem asset in monetary terms. Aggregate indicators in monetary terms, namely Gross Ecosystem Product (GEP) can be derived using relevant entries of ecosystem services in the monetary ecosystem services flow account. Metrics of monetary units are measured in terms of dollar or local currency. Indicators are measured in terms of their percentage change over an accounting period or with respect to the baseline period determined by countries.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

Countries will select their prioritize ecosystem services based on needs and data availability and evaluate ecosystem service models that would be the best fit for a particular ecosystem service and relevant policy questions. An ecosystem service supply and used table in physical and monetary terms will then compiled by overlaying and allocating the modelling results of each selected ecosystem service. The following list is suggested to be covered considering they are related to relevant Target in the monitoring framework

- Global climate regulation services (Target 8)
- Wild fish and other natural aquatic biomass provisioning services (Target 9)
- Wild animals, plants, and other biomass provisioning services (Target 9)
- Nursery population and habitat maintenance services (Target 9)
- Crop provisioning services (Target 10)
- Livestock provisioning services (Target 10)
- Aquaculture provisioning services (Target 10)
- Wood provisioning services (Target 10)
- Air filtration services (Target 11)
- Water flow regulation services (Target 11)
- Landside mitigation services (Target 11)
- Flood control services (Target 11)
- Storm mitigation services (Target 11)

Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for details on the modelling approach of selected ecosystem services, noting that the modelling approaches for several ecosystem services are currently under development.

To ensure that the coverage of the ecosystem accounts is as comprehensive as possible, compilers are encouraged to include as many types of ecosystem services as possible. A progressive expansion in the range of ecosystem services included in the accounts over time may be appropriate, considering data and resource availability and the relative significance of the ecosystem services.

Aggregate measures of ecosystem services in monetary terms can be derived by summing total supply or use of a single service for each ecosystem type. The aggregate measure gross ecosystem product (GEP) is equal to the sum of all final ecosystem services at their exchange value supplied by all ecosystem types located within an ecosystem accounting area over an accounting period less the net imports of intermediate services. In cases where the net imports of intermediate services are small, GEP may be assumed to be the sum of final ecosystem services supplied by the ecosystem accounting area.

All indicators for this Goal are measures in terms of their percentage change over an accounting period or with respect to the baseline period determined by countries

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

Data on the indicator will be collected by national authorities. Whenever national data is not available, data will be estimated through global data platforms and mechanisms endorsed by the UN Statistical Commission. Global estimated data will be sent to national authorities for validation.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The SEEA Ecosystem Accounting chapters on ecosystem services are adopted as part of an international statistical standard on ecosystem accounting by the United Nations Statistical Commission at its 52nd session in 2021.

ARIES for SEEA Explorer is an open access application.

5.e Data sources

Description of all actual and recommended sources of data

National data can be collected through existing sources (databases, maps, reports), including participatory inventories on land management systems as well as remote sensing data collected by national statistical offices and mapping agencies at the national level.

In the absence of national data sources, regional and global datasets will be collected to complement and support existing national indicators through global data platforms and mechanisms endorsed by the UN Statistical Commission. Global estimated data will be sent to national authorities for validation. The ARIES for SEEA Explorer (https://seea.un.org/content/aries-for-seea) allows for compilation of ecosystem services account through an existing ecosystem services modelling platform. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for details, noting that global data sources of several ecosystem services are not yet available and under development.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc).

Indicators are in development. The global monitoring process for this indicator, the update frequency of update and release calendar are currently under development. The year on when the first round of data will be ready is pending.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021

Indicator not yet developed

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. In the absence of national reporting mechanism, national data can be estimated through ARIES or other biophysical modelling platforms. The functionality of existing modelling platforms will require further development and expansion in the coming years for the reporting of this indicator.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. Missing values for individual countries are imputed using ARIES or another international data platform by custodian agency using existing global data sources.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps

Indicator not yet developed

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

Missing values for individual countries can be imputed using ARIES for SEEA or other international modelling platform using existing global data as the source. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for the methodology.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator data is applicable at the global, national, and regional scale. National data can be collated to form global indicators provided that the underlying classifications are harmonized across countries.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

No data provided by data reporter

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Differences between country produced and internationally estimated data may arise due to differences in spatial resolution and projections of datasets, classification and modelling approaches, definition of ecosystem extent and/or contextualization with other indicators, data and information

6.d Regional and global estimates & data collection for global monitoring

6.d.1 Description of the methodology

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

Regional and global estimates are produced by aggregating country-level data.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.
The mechanism for collecting data from countries is currently under development

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

7.b Biodiversity Indicator Partnership

I*s the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.*

No

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

This indicator can be disaggregated by ecosystem types, ecosystem services and geographical location.

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

Target 8: National greenhouse gas inventories from land use and land use change
Target 9: National environmental-economic account of benefits from the use of wild species
Indicators related to Target 10 focusing on measuring ecosystem services of the managed/anthropogenic ecosystems
Target 11: National environmental-economic accounts of regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people, from ecosystem.

9. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata
United Nations Statistics Division

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.
Julian Chow (chowj@un.org

10. References

Links to other literature helpful in understanding, interpreting, and using the indicator. A maximum of ten references is preferred.

UN System of Environmental-Economic Accounting: https://seea.un.org/ecosystemaccounting

United Nations et al. (2021). System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA). White cover publication, pre-edited text subject to official editing. Available at: https://seea.un.org/ecosystem-accounting.

United Nations (2021). Guidelines on Biophysical Modelling for Ecosystem Accounting – version 2.0

ARIES for SEEA: https://seea.un.org/content/aries-for-seea

Shortened format indicator metadata sheet: C.0.1 Monetary benefits received from utilization of genetic resources as a result of an ABS agreement, including traditional knowledge

1. Proposed Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

C.0.1 Monetary benefits received from utilization of genetic resources as a result of an ABS agreement, including traditional knowledge*

2. Date of metadata update

Insert date of metadata update

February 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Goal C. The benefits from the utilization of genetic resources are shared fairly and equitably, with a substantial increase in both monetary and non-monetary benefits shared, including for the conservation and sustainable use of biodiversity.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A
N/A

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

This indicator would aim to measure the number of monetary benefits received by countries from the implementation of access and benefit-sharing instruments during the reporting period. This indicator could compile, *inter alia*, monetary benefits received by countries from the implementation of ABS under the Convention, the Nagoya Protocol and other ABS instruments, such as the International Treaty on Plant Genetic Resources for Food and Agriculture and the WHO Pandemic Influenza Preparedness (PIP) Framework. This indicator would not be relevant for all CBD Parties, as several countries do not require prior informed consent for access to genetic resources and/or do not otherwise receive benefits from ABS agreements. Possible ways to disaggregate the indicator, without adding undue complexity for reporting, would need to be defined (e.g., amount for genetic resources and for traditional knowledge, amount per type or gender of beneficiaries).

5. Current level of development (including methodology, data, spatial coverage)

Indicator at conceptual stage.

The template for the interim national report under the Nagoya Protocol included a question and free text box to indicate monetary benefits received since the entry into force of the Protocol. However, as the question was not mandatory, it does not provide a sufficient baseline for this proposed indicator.
Reporting on headline indicators will be included as a mandatory component of the revised format of the national report under the Nagoya Protocol and the template for the seventh and eighth national report under the Proposed timetable for development

Convention, to be adopted respectively by MOP4 and COP15. Data sources related to the International Treaty on Plant Genetic Resources for Food and Agriculture and the WHO PIP Framework would need to be clearly identified in collaboration with the respective Secretariats of these instruments.

6. Proposed timetable for development

Indicator is at conceptual stage. The indicator would need to fully be developed following the fifteenth meeting of the Conference of the Parties to the Convention (COP15), once the submission deadline and the formats of the national reports under the Convention and under the Nagoya Protocol are agreed by their Parties. The data

release for this indicator would closely follow the national reporting cycle under the Convention and the Nagoya Protocol.

7. Proposed scale of use

National data to be collated to form global indicator (as relates to the Convention and the Nagoya Protocol). The indicator could be used at different levels (national, regional, global) to assess trends in monetary benefit-sharing over time.

8. Proposed data source

National reports under the Convention on Biological Diversity, national reports under the Nagoya Protocol on Access and Benefit-sharing and data sources to be identified for the International Treaty on Plant Genetic Resources for Food and Agriculture and the WHO PIP Framework. Additional work is needed to determine how data from multilateral ABS systems could be incorporated in the indicator.

9. Proposed data compiler

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

None identified

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

Secretariat of the Convention on Biological Diversity

10.b Contact person(s)

Jillian Campbell, SCBD, cambell7@un.org
Julie Roy, SCBD, julie.roy@un.org

11. References (if available)

None available

Shortened format indicator metadata sheet: C.0.2 Number of research and development products from an ABS agreement

1. Proposed Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

C.0.2 Number of research and development products from an ABS agreement

2. Date of metadata update

Insert date of metadata update

February 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Goal C. The benefits from the utilization of genetic resources are shared fairly and equitably, with a substantial increase in both monetary and non-monetary benefits shared, including for the conservation and sustainable use of biodiversity.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A
N/A

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

The importance of non-monetary benefits in ABS processes and their contribution to the conservation and sustainable use of biodiversity and to sustainable development is increasingly acknowledged and documented. This indicator, as a possible proxy for non-monetary benefits, would aim to measure the number of publications and research results arising from the implementation of access and benefit-sharing instruments. This indicator would require the development of a methodology to extract information from publications or other databases used in research at the global level, which could then be disaggregated and compiled for use by Parties at the national level. Some Parties to the Convention are already making use of such methods (e.g., advanced keyword searches, systematic literature reviews).

5. Current level of development (including methodology, data, spatial coverage)

Not yet developed – indicator at conceptual stage. Additional resources and expertise would be needed to explore the development of such a methodology, should the indicator be retained.

An adequate unit of measurement would need to be defined for this indicator. The text of the annex to the Nagoya Protocol provides an indicative list of non-monetary benefits which includes: sharing of research and development results; collaboration, cooperation and contribution in scientific research and development programmes; participation in product development, collaboration, cooperation and contribution in education and training; admittance to ex situ facilities of genetic resources and to databases; transfer of knowledge and technology under fair and most favourable terms; strengthening capacities for technology transfer; institutional capacity-building; human and material resources to strengthen the capacities for the administration and enforcement of access regulations; training related to genetic resources with the full participation of countries providing genetic resources, and where possible, in such countries; access to scientific information relevant to conservation and sustainable use of biological diversity, including biological inventories and taxonomic studies; contributions to the local economy; research directed towards priority needs, such as health and food security, taking into account domestic uses of genetic resources; institutional and professional relationships and subsequent collaborative activities; food and livelihood security benefits; social recognition; and joint ownership of relevant intellectual property rights.

6. Proposed timetable for development

To be determined

7. Proposed scale of use

Global data would be disaggregated for national use (to be determined).

8. Proposed data source

To be determined

9. Proposed data compiler

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

To be determined

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

Secretariat of the Convention on Biological Diversity

10.b Contact person(s)

Jillian Campbell, SCBD, cambell7@un.org
Julie Roy, SCBD, julie.roy@un.org

11. References (if available)

None available

Shortened format indicator metadata sheet: D.0.1 Funding for implementation of the global biodiversity framework

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

D.0.1 Funding for implementation of the global biodiversity framework

2. Date of metadata update

February 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Draft Goal D: The gap between available financial and other means of implementation, and those necessary to achieve the 2050 Vision, is closed.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

N/A

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Draft Goal D relates to the means of implementation for the post-2020 global biodiversity framework. The post-2020 framework will need to be implemented primarily through activities at the national and/or subnational levels, with supporting action at the regional and global levels. However, the capacity for implementing the Convention in terms of human, technical and financial resources is limited in most countries, especially in developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition. Reaching the 2050 Vision for biodiversity will require that the necessary means of implementation are available to enable Parties and stakeholders to undertake the necessary actions.

Inadequate funding levels are a major impediment to effective biodiversity conservation in many countries and may be associated with failures to meet global targets. Conservation investment has been demonstrated to reduce biodiversity loss. Spending on biodiversity provides a very high social return on investment. Thus, while increased biodiversity resource mobilization from all sources is not only necessary to reduce, halt and reverse biodiversity loss (i.e.to bend the curve on biodiversity loss) it is also likely to generate net economic benefits for both present and future generations. Current global biodiversity finance is of the order of $100 billion per year, while estimates of funding needs for a comprehensive post 2020 global biodiversity framework are of the order of $800 billion per year, giving a funding gap of the order of $700 billion per year. This indicator will monitor the extent to which the gap between available financial resources and those necessary to achieve the 2050 Vision, is closed.

5. Current level of development

This proposed indicator is not yet developed, it is at the conceptual stage. An organization(s) to develop it and to support its operationalisation needs to be identified.

6. Proposed timetable for development

This proposed indicator is not yet developed. On the basis of information provided in the national reports (depending on their agreed format) and/or additional surveys of Parties to the Convention on Biological Diversity, reporting information related to this indicator would be feasible for the sixteenth meeting of the Conference of the Parties.

7. Proposed scale of use

This proposed indicator is not yet developed. However, it would most likely need to be developed on basis on national data which could then be aggregated to the global level.

8. Proposed data source

No methodology for this indicator is currently available. Data sources, including definitions and data collection methods, need to be identified. Information could be provided through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

9. Proposed data compiler

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

This proposed indicator is not yet developed. An indicator provided needs to be identified. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

Secretariat of the Convention on Biological Diversity

10.b Contact person(s)

Jillian Campbell, SCBD, cambell7@un.org
Julie Roy, SCBD, julie.roy@un.org

11. References (if available)

Indicator not yet developed. To be identified

Shortened Format indicator metadata sheet: D.0.2 Indicator on national biodiversity planning processes and means of implementation

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

D.0.2 Indicator on national biodiversity planning processes and means of implementation

2. Date of metadata update

February 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

Draft Goal D: The gap between available financial and other means of implementation, and those necessary to achieve the 2050 Vision, is closed.

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

N/A

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Draft Goal D relates to the means of implementation for the post-220 global biodiversity framework. The post-2020 global biodiversity framework will need to be implemented primarily through activities at the national and/or subnational levels, with supporting action at the regional and global levels. However, the capacity for implementing the Convention in terms of human, technical and financial resources is limited in most countries, especially in developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition. Reaching the 2050 Vision for biodiversity will require that the necessary means of implementation are available to enable Parties and stakeholders to undertake the necessary actions.

Currently, aside from information related to financial resources, there is no globally comprehensive information or indicator on the extent to which national biodiversity planning processes and means of implementation are available. This indicator would help to address this gap.

5. Current level of development

This proposed indicator is not yet developed. An organization(s) to develop it and to support its operationalisation needs to be identified.

6. Proposed timetable for development

This proposed indicator is not yet developed. On the basis of information provided in the national reports (depending on their agreed format) and/or additional surveys of Parties to the Convention on Biological Diversity, reporting on this indicator would be feasible for the sixteenth meeting of the Conference of the Parties.

7. Proposed scale of use

This proposed indicator is not yet developed. However, it would most likely need to be developed on basis on national data which could then be aggregated to the global level.

8. Proposed data source

No methodology for this indicator is currently available. Data sources, including definitions and data collection methods, need to be identified. Information could be provided through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

9. Proposed Indicator compiler

This proposed indicator is not yet developed. An indicator provided needs to be identified. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

Secretariat of the Convention on Biological Diversity

10.b Contact person(s)

Jillian Campbell, SCBD, cambell7@un.org
Julie Roy, SCBD, julie.roy@un.org

9. References (if available)

Indicator not yet developed. To be identified

Shortened format indicator metadata sheet: Indicator metadata sheet: Indicator metadata sheet: 1.0.1 Percentage of land and seas covered by spatial plans that integrate biodiversity

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

1.0.1 Percentage of land and seas covered by spatial plans that integrate biodiversity

2. Date of metadata update

Insert date of metadata update

28 January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3a. Goal

Provide the corresponding draft goal name, draft goal number, or N/A
N/A

3b. Target

Provide the corresponding draft target name, draft target number, or N/A

Draft Target 1. Ensure that all land and sea areas globally are under integrated biodiversity-inclusive spatial planning addressing land- and sea-use change, retaining existing intact and wilderness areas.

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Draft target 1 relates to land-use and sea-use change, a major direct driver of biodiversity loss. To achieve the 2050 Vision and the proposed Goals, the loss of existing intact and wilderness areas through land/sea use change must be avoided, reduced and reversed. More effective and widespread spatial planning, which accounts for biodiversity and the objectives of the Convention, will be crucial in accomplishing this. Therefore, an indicator tracking the percentage of land and seas covered by spatial plans that integrate biodiversity would be directly relevant to this target and help to monitor progress towards its attainment.
Biodiversity inclusive spatial planning is also relevant for most of the other proposed targets in the draft post-2020 global biodiversity framework. Given competing demands for land and sea areas and potential trade-offs comprehensive and biodiversity-inclusive spatial planning across all landscapes and seascapes (i.e., marine spatial planning) will be needed to allow socioeconomic development to continue while also conserving biodiversity and maintaining ecosystem services in line with the levels of ambition suggested above, and to ensure connectivity between natural habitats.

Currently spatial planning is practiced variously and unevenly among countries and currently there is no global synthesis available to assess the proportion of the earth that is considered to be “under spatial planning”. This is partly because there is no standard definition of what constitutes a spatial plan and a range of approaches and tools for planning are used at different scales.

Currently there is no indicator tracking progress on the land and sea area under biodiversity inclusive spatial planning which is operational or under development. However, there are SDG indicators related to marine spatial planning and intercoastal zone management (14.2.1), integrated water resource management (6.5.1), sustainable agricultural area (2.4.1), urban planning (11.a.1) and sustainable forest management (15.2.1) which incorporate elements of spatial planning and could be brought together. As such this represents a gap which needs to be addressed. There is some limited information related to conservation strategies, ecoregional plans and integrated coastal zone management. However, how up to date this information is and the extent to which these plans are operational is uncertain. Similarly, the extent to which such plans can be considered representative of spatial planning more generally is also uncertain.

5. Current level of development

This proposed indicator is not yet developed. An organization(s) to develop it and to support its operationalisation needs to be identified.

6. Proposed timetable for development

This proposed indicator is not yet developed. On the basis of information provided in the national reports (depending on their agreed format) and/or additional surveys of Parties to the Convention on Biological Diversity, reporting on this indicator would be feasible for the sixteenth meeting of the Conference of the Parties.

7. Proposed scale of use

This proposed indicator is not yet developed. However, it would most likely need to be developed on basis on national data which could then be aggregated to the global level.

8. Proposed data source

No methodology for this indicator is currently available. Data sources, including definitions and data collection methods, need to be identified. Information could be provided through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

9. Proposed Indicator compiler

This proposed indicator is not yet developed. An indicator provided needs to be identified. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

Secretariat of the Convention on Biological Diversity

10.b Contact person(s)

Jillian Campbell, SCBD, cambell7@un.org

11. References (if available)

Indicator not yet developed. To be identified

Shortened Format indicator metadata sheet 2.0.1 Percentage of degraded or converted ecosystems that are under restoration

1. Proposed Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

2.0.1 Percentage of degraded or converted ecosystems that are under restoration

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3a. Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3b. Target

Provide the corresponding draft target name, draft target number, or N/A

Target 2. Ensure that at least 20% of degraded freshwater, marine and terrestrial ecosystems are under restoration, ensuring connectivity among them and focusing on priority ecosystems.

4. Proposed rationale

The first draft monitoring framework names the UN Decade on Ecosystem Restoration Task Force on Monitoring ("the Task Force") as the lead organisation to develop an indicator for draft Target 2. However, the Task Force (the data reporter) notes that they are not currently developing and indicator for this target. An indicator for this target is not known to be in development.

The Task Force follows the request and mandate given by the United Nations General Assembly (UNGA) in its eighty-first session (resolution A/RES/73/284 from March 2019): "*The General Assembly, (…) 7. Requests the Secretary-General to report to the General Assembly at its eighty-first session on the status of the implementation of the present resolution, including its contribution to the implementation of the 2030 Agenda for Sustainable Development".*

The Resolution refers, in particular, to "*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*", therefore, discouraging from the creation of additional requirements and increasing the reporting burden to the countries.

The UN Decade on Ecosystem Restoration is determined to work with existing indicators and data collection efforts and where appropriate, support and boost existing data collection related to restoration (as per Resolution A/RES/73/284 and the Task Force's Terms of Reference as in this briefing note).

To support countries and other stakeholders' in their monitoring efforts, the Task Force are, however, offering the Framework for Ecosystem Restoration Monitoring (FERM) platform (the FERM Platform and FERM Registry), which encourages and supports the development of resource-efficient and fit-for-purpose monitoring activities.

The FERM helps generate quality data and information, also using existing datasets. The FERM platform combined with capacity development support aim at supporting domestic restoration and reporting processes under stakeholders' strong ownership and guidance. The FERM will support the Task Force in combining useful information for reporting to the UNGA, but it will not, however, be imposing additional indicators or additional reporting burden to countries.

5. Current level of development (including methodology, data, spatial coverage)

The indicator is not being developed by the Task Force

6. Proposed timetable for development

The indicator is not being developed by the Task Force

7. Proposed scale of use

N/A

8. Proposed data source

N/A

9. Proposed Indicator complier.

The first draft monitoring framework names the UN Decade on Ecosystem Restoration Task Force on Monitoring ("the Task Force") as the lead organisation to develop an indicator for draft Target 2. However, the Task Force (the data reporter) notes that they are not currently developing and indicator for this target (see rationale for more information).

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

UN Decade on Ecosystem Restoration Task Force on Monitoring

10.b Contact person(s)

None identified

11. References (if available)

N/A

Indicator metadata sheet: 3.0.1 Coverage of Protected areas and OECMS (by effectiveness)

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]
Coverage of Protected areas and OECMS (by effectiveness)

2. Date of metadata update

Insert date of metadata update

December 2021

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A
Target 3. Ensure that at least 30% globally of land areas and of sea areas, especially areas of particular importance for biodiversity and its contributions to people, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

4. Rationale

Description of the purpose and rationale behind the indicator, noting its relevance to the corresponding draft goal or target

The protected area coverage indicator measures the policy response to biodiversity loss. An increase in protected area and OECM coverage indicates increased efforts by governments and civil society to protect land and sea areas with a view to achieve the long-term conservation of biodiversity with associated ecosystem services and cultural values.

Please note that indicators for 'effectiveness' are currently being reviewed by experts. There is a well-established dialogue on the inadequacies of current methods to assess effectiveness and there would be little merit in simply adding current (flawed) methods into this metadata sheet simply for it to be immediately out-of-date.

5. Definitions, concepts, and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The indicator Coverage of protected areas shows temporal trends in the mean percentage of each important site for biodiversity (i.e., those that contribute significantly to the global persistence of biodiversity) that is covered by designated protected areas and Other Effective Area-based Conservation Measures (OECMs).

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

This indicator is calculated from data derived from a spatial overlap between digital polygons for protected areas from the World Database on Protected Areas (UNEP-WCMC & IUCN 2020), digital polygons for Other Effective Area-based Conservation Measures from the World Database on OECMs and digital polygons for marine Key Biodiversity Areas (from the World Database of Key Biodiversity Areas, including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and other Key Biodiversity Areas). Sites were classified as marine Key Biodiversity Areas by undertaking a spatial overlap between the Key Biodiversity Area polygons and an ocean raster layer (produced from the 'adm0' layer from the database of Global Administrative Areas (GADM 2019)),

classifying any Key Biodiversity Area as a marine Key Biodiversity Area where it had ≥5% overlap with the ocean layer (hence some sites were classified as both marine and terrestrial). The value of the indicator at a given point in time, based on data on the year of protected area establishment recorded in the World Database on Protected Areas, is computed as the mean percentage of each Key Biodiversity Area currently recognised that is covered by protected areas and/or Other Effective Area-based Conservation Measures.

Protected areas lacking digital boundaries in the World Database of Protected Areas, and those sites with a status of 'proposed' or 'not reported' are omitted. Degazetted sites are not kept in the WDPA and are also not included. Man and Biosphere Reserves are also excluded as these often contain potentially unprotected areas. Year of protected area establishment is unknown for ~12% of protected areas in the World Database on Protected Areas, generating uncertainty around changing protected area coverage over time. To reflect this uncertainty, a year was randomly assigned from another protected area within the same country, and then this procedure repeated 1,000 times, with the median plotted.

Prior to 2017, the indicator was presented as the percentage of Key Biodiversity Areas completely covered by protected areas. However, it is now presented as the mean % of each Key Biodiversity Area that is covered by protected areas in order to better reflect trends in protected area coverage for countries or regions with few or no Key Biodiversity Areas that are completely covered.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

See information under other sections, and detailed information on the process by which Key Biodiversity Areas are identified at www.keybiodiversityareas.org/working-with-kbas/proposing-updating. Guidance on Proposing, Reviewing, Nominating and Confirming KBAs is available in KBA Secretariat (2019) at http://www.keybiodiversityareas.org/assets/35687f50ac0bcad155ab17447b48885a.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

See References.

5.e Data sources

Description of all actual and recommended sources of data

Protected area data are compiled by ministries of environment and other ministries responsible for the designation and maintenance of protected areas. Protected Areas data for sites designated under the Ramsar Convention and the UNESCO World Heritage Convention are collected through the relevant convention international secretariats. Protected area data are aggregated globally into the World Database on Protected Areas by the UN Environment World Conservation Monitoring Centre, according to the mandate for production of the United Nations List of Protected Areas (Deguignet et al. 2014). They are disseminated through Protected Planet, which is jointly managed by UNEP-WCMC and IUCN and its World Commission on Protected Areas (UNEP-WCMC 2016).

OECMs are collated in the World Database of Other Effective Area-based Conservation Measures (WDOECM). This database can be regarded as a sister database to the WDPA as it is also hosted on Protected Planet. Furthermore, the databases share many of the same fields and have an almost identical workflow; differing only in what they list. OECMs are a quickly evolving area of work, as such for the latest information on OECMs and the WDOECM please contact UNEP-WCMC.

KBAs are identified at national scales through multi-stakeholder processes, following standard criteria and thresholds. Key Biodiversity Areas data are aggregated into the World Database on Key Biodiversity Areas, managed by BirdLife International.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc). If the indicator is not operational, please add a short description of how it is being made operational.

The indicator of protected area coverage of important sites for biodiversity is updated each November-December using the latest versions of the datasets on protected areas, OECMs and Key Biodiversity Areas.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021

1819 – current year

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

See Data sources.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

UNEP-WCMC, IUCN and BirdLife International

Protected area data are aggregated globally into the World Database on Protected Areas by the UN Environment World Conservation Monitoring Centre, according to the mandate for production of the United Nations List of Protected Areas (Deguignet et al. 2014). They are disseminated through Protected Planet, which is jointly managed by UNEP-WCMC and IUCN and its World Commission on Protected Areas (UNEP-WCMC 2016). Key Biodiversity Areas data are aggregated into the World Database of Key Biodiversity Areas, managed by BirdLife International (2019).

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)

Quality control criteria are applied to ensure consistency and comparability of the data in the World Database on Protected Areas. New data are validated at UNEP-WCMC through a number of tools and translated into the standard data structure of the World Database on Protected Areas. Discrepancies between the data in the World Database on Protected Areas and new data are minimised by provision of a manual (UNEP-WCMC 2019) and resolved in communication with data providers. Similar processes apply for the incorporation of data into the World Database of Key Biodiversity Areas (BirdLife International 2019).

The indicator does not measure the effectiveness of protected areas in reducing biodiversity loss, which ultimately depends on a range of management and enforcement factors not covered by the indicator. A number of initiatives are underway to address this limitation. Most notably, numerous mechanisms have been developed for assessment of protected area management, which can be synthesised into an indicator (Leverington et al. 2010). This is used by the Biodiversity Indicators Partnership as a complementary indicator of progress towards Aichi Biodiversity Target 11 (http://www.bipindicators.net/pamanagement). However, there may be little relationship between these measures and protected area outcomes (Nolte & Agrawal 2013). More recently, approaches to “green listing” have started to be developed, to incorporate both management effectiveness and the outcomes of protected areas, and these are likely to become progressively important as they are tested and applied more broadly.

Data and knowledge gaps can arise due to difficulties in determining whether a site conforms to the IUCN definition of a protected area or the CBD definition of an Other Effective Area-based Conservation Measures. However, given that both are incorporated into the indicator, misclassifications (as one or the other) do not impact the calculated indicator value.

Regarding important sites, the biggest limitation is that site identification to date has focused mainly on specific subsets of biodiversity, for example birds (for Important Bird and Biodiversity Areas) and highly threatened species (for Alliance for Zero Extinction sites). While Important Bird and Biodiversity Areas have been documented to be good surrogates for biodiversity more generally (Brooks et al. 2001, Pain et al. 2005), the application of the unified standard for identification of Key Biodiversity Areas (IUCN 2016) sites across different levels of biodiversity (genes, species, ecosystems) and different taxonomic groups remains a high priority, building from efforts to date (Eken et al. 2004, Knight et al. 2007, Langhammer et al. 2007, Foster et al. 2012). Birds now comprise less than 50% of the species for which Key Biodiversity Areas have been identified, and as Key Biodiversity Area identification for other taxa and elements of biodiversity proceeds, such bias will become a less important consideration in the future.

Key Biodiversity Area identification has been validated for a number of countries and regions where comprehensive biodiversity data allow formal calculation of the site importance (or “irreplaceability”) using systematic conservation planning techniques (Di Marco et al. 2016, Montesino Pouzols et al. 2014).

Future developments of the indicator will include: a) expansion of the taxonomic coverage of marine Key Biodiversity Areas through application of the Key Biodiversity Areas standard (IUCN 2016) to a wide variety of marine vertebrates, invertebrates, plants and ecosystem type; b) improvements in the data on protected areas by continuing to increase the proportion of sites with documented dates of designation and with digitised boundary polygons (rather than coordinates); and c) increased documentation of Other Effective Area-based Conservation Measures in the World Database of OECMs.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

- **At country level**

Data are available for protected areas and Key Biodiversity Areas in all of the world's countries, and so no imputation or estimation of national level data is necessary.

- **At regional and global levels**

Global indicators of protected area coverage of important sites for biodiversity are calculated as the mean percentage of each Key Biodiversity Area that is covered by protected areas and Other Effective Area-based Conservation Measures. The data are generated from all countries, and so while there is uncertainty around the data, there are no missing values as such and so no need for imputation or estimation.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

Global, regional, national, subnational

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

Regional indices are calculated as the mean percentage of each Key Biodiversity Area in the region covered by (i.e., overlapping with) protected areas and/or Other Effective Area-based Conservation Measures: in other words, the percentage of each Key Biodiversity Area covered by these designations, averaged over all Key Biodiversity Areas in the particular region.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

National processes provide the data that are incorporated into the World Database on Protected Areas, the World Database on Other Effective Area-based Conservation Measures, and the World Database of Key Biodiversity Areas, so there are very few discrepancies between national indicators and the global one. One minor source of difference is that the World Database on Protected Areas incorporates internationally-designated protected areas (e.g., UNESCO World Heritage sites, Ramsar sites, etc), a few of which are not considered by their sovereign nations to be protected areas.

Note that because countries do not submit comprehensive data on degazetted protected areas to the WDPA, earlier values of the indictor may marginally underestimate coverage. Furthermore, there is also a lag between the point at which a protected area is designated on the ground and the point at which it is reported to the WDPA. As such, current or recent coverage may also be underestimated.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

This indicator is calculated from data derived from a spatial overlap between digital polygons for protected areas from the World Database on Protected Areas (UNEP-WCMC & IUCN 2020), digital polygons for Other Effective Area-based Conservation Measures from the World Database on OECMs and digital polygons for marine Key Biodiversity Areas (from the World Database of Key Biodiversity Areas, including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and other Key Biodiversity Areas). Sites were classified as marine Key Biodiversity Areas by undertaking a spatial overlap between the Key Biodiversity Area polygons and an ocean raster layer (produced from the 'adm0' layer from the database of Global Administrative Areas (GADM 2019)), classifying any Key Biodiversity Area as a marine Key Biodiversity Area where it had ≥5% overlap with the ocean layer (hence some sites were classified as both marine and terrestrial). The value of the indicator at a given point

in time, based on data on the year of protected area establishment recorded in the World Database on Protected Areas, is computed as the mean percentage of each Key Biodiversity Area currently recognised that is covered by protected areas and/or Other Effective Area-based Conservation Measures.

Protected areas lacking digital boundaries in the World Database of Protected Areas, and those sites with a status of 'proposed' or 'not reported' are omitted. Degazetted sites are not kept in the WDPA and are also not included. Man and Biosphere Reserves are also excluded as these often contain potentially unprotected areas. Year of protected area establishment is unknown for ~12% of protected areas in the World Database on Protected Areas, generating uncertainty around changing protected area coverage over time. To reflect this uncertainty, a year was randomly assigned from another protected area within the same country, and then this procedure repeated 1,000 times, with the median plotted.

Prior to 2017, the indicator was presented as the percentage of Key Biodiversity Areas completely covered by protected areas. However, it is now presented as the mean % of each Key Biodiversity Area that is covered by protected areas in order to better reflect trends in protected area coverage for countries or regions with few or no Key Biodiversity Areas that are completely covered.

6.d.2 Additional methodological details
Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

N/A

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

7. Other MEAs, processes and organisations

7.a Other MEA and processes
Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

SDG 14.5.1, SDG 15.1.2, SDG 15.4.1

7.b Biodiversity Indicator Partnership
Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

Y: https://www.bipindicators.net/indicators/coverage-of-protected-areas-terrestrial-and-marine#national_use

8. Disaggregation
Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)
Can be disaggregated spatially at regional and national scales and temporally by year

9. Related targets, goals and indicators
Description of linkages to other indicators proposed in the first draft monitoring framework

An indicator exists on Protected Area Coverage, and work is underway to provide a measure of effectiveness

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata
- UN Environment World Conservation Monitoring Centre (UNEP-WCMC)
- BirdLife International (BLI)
- International Union for Conservation of Nature (IUCN)

10.b Contact person(s)
Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Heather Bingham Heather.Bingham@unep-wcmc.org

11. References

Links to other literature helpful in understanding, interpreting, and using the indicator. A maximum of ten references is preferred.

These metadata are based on http://mdgs.un.org/unsd/mi/wiki/7-6-Proportion-of-terrestrial-and-marine-areas-protected.ashx , supplemented by https://www.bipindicators.net/indicators/coverage-of-protected-areas-terrestrial-and-marine and the references listed below.

BIRDLIFE INTERNATIONAL (2014). Important Bird and Biodiversity Areas: a global network for conserving nature and benefiting people. Cambridge, UK: BirdLife International. Available at datazone.birdlife.org/sowb/sowbpubs#IBA.

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Shortened Format indicator metadata sheet: 4.0.1 Proportion of species populations that are affected by human wildlife conflict

1. Proposed Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

Proposed name in monitoring framework; Proportion of species populations that are affected by human wildlife conflict

Data reported suggested indicator name: “” 4.0.1 Effective and sustainable management of human-wildlife conflicts and coexistence

As human wildlife conflict is as much a human development and livelihood/wellbeing and social conflict issue as it is for species, the indicator cannot be reduced to only a species-only measurement.

2. Date of metadata update

Insert date of metadata update

February 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3a. Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3b. Target

Provide the corresponding draft target name, draft target number, or N/A

Target 4. Ensure active management actions to enable the recovery and conservation of species and the genetic diversity of wild and domesticated species, including through ex situ conservation, and effectively manage human-wildlife interactions to avoid or reduce human-wildlife conflict.

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Indicator for human-wildlife conflict currently in development by IUCN SSC Human-Wildlife Conflict Task Force and partners.

As HWC is as much a human development and livelihood/wellbeing and social conflict issue as it is for species, the indicator cannot be reduced to only a species-only measurement.

The indicator will need to incorporate both aspects and be qualitative and process-focussed.

5. Current level of development

In development by IUCN SSC Human-Wildlife Conflict Task Force and partners.

6. Proposed timetable for development

Not yet available

7. Proposed scale of use

Global, all parties

8. Proposed data source

To be confirmed. Likely to vary based on country/region/species, with potential data providers including, governments, NGO's, communities etc.

9. Proposed Indicator compiler

IUCN SSC Human-Wildlife Conflict Task Force and partners.

10. Data reporter

Organisation of the contact person(s) for the data or metadata

10.a Organisation

Organisation of the contact person(s) for the data or metadata

IUCN SSC Human-Wildlife Conflict Task Force and partners.

10.b Contact person(s)

Dr Alexandra Zimmermann, Chair, IUCN SSC Human-Wildlife Conflict Task Force
alex.zimmermann@ssc.iucn.org

Dr James Stevens, Programme Officer, IUCN SSC Human-Wildlife Conflict Task Force info@hwctf.org

11. References (if available)

IUCN SSC HWCTF (2021) Information document on the inclusion of a target on human-wildlife conflict in the framework. Available at: www.hwctf.org/policies

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Indicator metadata sheet: 4.0.2 Number of plant genetic resources for food and agriculture secured in medium or long-term conservation facilities

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

Number of plant genetic resources for food and agriculture secured in medium or long-term conservation facilities

2. Date of metadata update

Insert date of metadata update

December 2021

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 4. Ensure active management actions to enable the recovery and conservation of species and the genetic diversity of wild and domesticated species, including through ex situ conservation, and effectively manage human-wildlife interactions to avoid or reduce human-wildlife conflict.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Genetic resources for food and agriculture provide the building blocks of food security and, directly or indirectly, support the livelihoods of every person on earth. As the conservation and accessibility to these resources are of vital importance, medium- or long- term conservation facilities (genebanks) to preserve and make these resources and their associated information accessible for breeding and research have been established at country, regional and global levels. Inventories of genebank holdings provide a dynamic measure of the existing plant and animal diversity and its level of preservation. Data relevant to this indicator facilitate the monitoring of diversity secured and accessible through genebanks and support the development and updating of strategies for the conservation and sustainable use of genetic resources.

The indicator corresponds to the plant component of *2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities*, a Tier I indicator of the SDG monitoring framework adopted by the UNGA in July 2017.

The indicator is also part of the framework endorsed by the FAO Commission on Genetic Resources for Food and Agriculture for monitoring the implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture, in which the status and trends of plant genetic resources are described through globally agreed indicators and regular country-driven assessments.

The number of materials conserved under medium- or long-term storage conditions provides an indirect measurement of the total genetic diversity, which are secured for future use. Overall, positive variations are therefore approximated to an increase in the agro-biodiversity secured, while negative variations to a loss of it.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The conservation of plant genetic resources for food and agriculture (PGRFA) in medium- or long-term conservation facilities (*ex situ*, in genebanks) represents the most trusted means of conserving genetic resources worldwide.

PGRFA conserved in these facilities can be easily used in breeding programmes as well, even directly on-farm.

The measure of trends in *ex situ* conserved materials provides an overall assessment of the extent to which we are managing to maintain and/or increase the total genetic diversity available for future use and thus protected from any permanent loss of genetic diversity which may occur in the natural habitat, i.e., *in situ*, or on-farm.

The plant component is calculated as the number of accessions of plant genetic resources secured in conservation facilities under medium- or long-term conditions, where an 'accession' is defined as a distinct sample of seeds, planting materials or plants which is maintained in a genebank. Genebank Standards for Plant Genetic Resources for Food and Agriculture (accessible at http://www.fao.org/documents/card/en/c/7b79ee93-0f3c-5f58-9adc-5d4ef063f9c7/), set the benchmark for current scientific and technical best practices for conserving plant genetic resources, and support key international policy instruments for the conservation and use of plant genetic resources. These voluntary standards have been endorsed by the FAO Commission on Genetic Resources for Food and Agriculture at its Fourteenth Regular Session (http://www.fao.org/docrep/meeting/028/mg538e.pdf).

Concepts:
Plant genetic resources for food and agriculture (PGRFA): Any genetic material of plant origin of actual or potential value for food and agriculture.

Accession: An accession is defined as a sample of seeds, planting materials or plants representing either a wild population, a landrace, a breeding line or an improved cultivar, which is conserved in a genebank. Each accession should be distinct and, in terms of genetic integrity, as close as possible to the sample provided originally.

Base collection: A base collection is defined as a set of unique accessions to be preserved for a medium to long-term period.

Active collection: An active collection is defined as a set of distinct accessions that is used for regeneration, multiplication, distribution, characterization and evaluation. Active collections are maintained in short to medium-term storage and can be fully or partially duplicated in a base collection.

Medium- or long-term conservation facilities: Biological diversity is often conserved *ex situ*, outside its natural habitat, in facilities called genebanks. Genebanks conserve base collections under medium- or long-term storage conditions, in the form of seeds in cold rooms, plants in the field and tissues *in vitro* and/or cryoconserved.

Unit of measure:
Number of unique accessions of plant genetic resources secured in medium to long-term conservation facilities, where an 'accession' is defined as a distinct sample of seeds, planting materials or plants which is maintained in a genebank.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

The indicator is calculated as the total number of unique accessions of plant genetic resources secured in medium to long-term conservation facilities. This should include all the accessions in base collections, and unique accessions stored in medium term conservation facilities, as active collections, only when these accessions are considered to become part of the base collections. Base collections may include both seed, field, cryo-preserved or *in vitro* collections depending on the species conserved and the available facilities in the country.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

The indicator is related to the agreed SDG monitoring framework as well as the monitoring framework endorsed by the FAO Commission on Genetic Resources for Food and Agriculture in which the status and trends of plant genetic resources are described through globally agreed indicators and regular country-driven assessments. Officially appointed National Focal Points report directly to FAO, using a format agreed by the FAO Commission on Genetic Resources for Food and Agriculture.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

A metadata sheet of the indicator describing the methodology is available at https://unstats.un.org/sdgs/metadata/. Annual raw data are published under the FAO portal of the World Information and Early Warning System for plant genetic resources for food and agriculture - WIEWS (https://www.fao.org/wiews). Metadata are published every year at https://www.fao.org/sustainable-development-goals/indicators/251a/en/.

5.e Data sources

Description of all actual and recommended sources of data

Data are sourced from officially appointed National Focal Points (NFP) (see http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gpa/national-focal-points/en/) and regional and international agricultural research centres holding PGRFA *ex situ* collections. Data providers report either (i) directly to FAO by using the spreadsheet contained in document List of descriptors for reporting on the Plant Component of SDG indicator 2.5.1 (see References) accessible from the WIEWS home page (http://www.fao.org/wiews) or (ii) through published information systems which comply with the standard of the FAO/Bioversity Multi-crop Passport Descriptor List (MCPD) v. 2 (see References), e.g. EURISCO (http://eurisco.ipk-gatersleben.de/) and Genesys (https://www.genesys-pgr.org).

Data are stored in the World Information and Early Warning System for plant genetic resources for food and agriculture (WIEWS - http://www.fao.org/wiews), the FAO platform established to facilitate information exchange as well as periodic assessments of the state of the world's plant genetic resources for food and agriculture.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc). If the indicator is not operational, please add a short description of how it is being made operational.

The data collected as part of the first monitoring cycle of the implementation of the Second Global Plan of Action for PGRFA serve as baseline (number of accessions as of June 2014).

As of February 2021, data on over 5.7 million accessions from 114 countries and 17 international/regional centres are being published. The data collection is carried out annually in January. Continued efforts are made to improve the coverage of countries and international/regional centres, as well as the quality of the information.

Data collection is undertaken on an annual basis in the context of the FAO Commission on Genetic resources for Food and Agriculture.

Data release calendar: First quarter of the year.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021

Data are available in WIEWS for 2014, 2016, 2017, 2018 and 2019. Estimates of the status of the indicator before 2014 are made using the *acquisition date* of the accessions as reported in 2014.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

The officially nominated National Focal Points and managers of regional/international genebanks. For information by country see http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gpa/national-focal-points/en/.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

Food and Agriculture Organization of the United Nations (UN FAO).

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)

A number of countries and existing genebanks have not yet reported largest gaps occurring in Eastern Asia.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

- At country level
  Missing values are treated as such and not replaced by estimates.

- At regional and global levels
  Missing values are treated as such and not replaced by estimate

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator is “nationalized” as it is first calculated at country level. Country level data are then aggregated at regional and global levels.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

Officially appointed National Focal Points and managers of regional or international genebanks are requested to provide the list of accessions conserved in medium- or long-term conservation facilities by filling a spreadsheet contained in document *List of descriptors for reporting on the Plant Component of SDG indicator 2.5.1* (see References) accessible from the World Information and Early Warning System for plant genetic resources for food and agriculture (WIEWS) home page (http://www.fao.org/wiews). Out of the 12 passport descriptors which can be used to characterize each accession, four are mandatory: (i) the name of the genebank (or *holding institute code*); (ii) the *accession number*; (iii) the name of the taxon the accession belongs to (including genus, species and lower taxonomic ranking); and (iv) the type of storage. Reporting on the remaining descriptors is highly recommended, as it allows the analysis of changes in different types of diversity concerned, including changes in the type and origin of the material secured (e.g., *biological status*; *country of origin*; *locations of safety duplications*; etc.) and better describes the composition of the secured materials. The distinction between ‘mandatory’ and ‘highly recommended’ descriptors does not reflect any subjective classification by ‘importance’ of the descriptors. For example, the ‘acquisition date’ or the ‘genebank(s) holding safety duplications’ may be considered critically important in the context of the indicator, however they are not always known and therefore cannot be treated as mandatory. The descriptors have been agreed by the FAO Commission on Genetic Resources for Food and Agriculture (see question 6.2 in the *Reporting format for monitoring the implementation of the Second global Plan of Action for Plant Genetic Resources for Food and Agriculture* http://www.fao.org/3/a-mm294e.pdf). Genebank holdings are counted based on the list of accessions reported. National Focal Points are invited to provide a brief analysis to highlight and explain changes occurred since the previous report.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Sources of discrepancies:
There are no internationally estimated data. Data on this indicator are all produced by countries and regional or international centres.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

There are no internationally estimated data. Data on this indicator are all produced by countries and regional or international centres. Regional data derive from the sum of data from countries and regional centres. Global data derive from the sum of countries and regional centres.

6.d.2 Additional methodological details
Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

Caution needs to be paid in the reporting and interpretation of the indicator. An uncontrolled addition of accessions that are in fact duplicates of samples already conserved and accounted for, or, *vice versa*, the deletion from the reported collections of redundant duplicates may lead to wrong interpretations. In order to avoid duplicate counting at the national level, primarily accessions from base collections should be reported. Accessions from an active collection could be reported, only when they have not been already reported in a base collection and the active collection, they belong to serves the function of the base collection. Possible grouping or splitting of accessions also needs to be monitored both while reporting and interpreting the results, as in both cases the variation in the accounted number does not reflect a variation in the genetic diversity conserved and secured. Therefore, it is crucial that reporting countries and regional/international centres together with the accession level information requested, also provide an explanation of the reason for the variation in the number of accessions, in particular when this does not reflect a real loss or gain in the genetic diversity conserved and secured.

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

7. Other MEAs, processes and organisations

7.a Other MEA and processes
Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

The indicator corresponds to the plant component of *2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities*, a Tier I indicator of the SDG monitoring framework adopted by the UNGA in July 2017.

The indicator is also part of the framework endorsed by the FAO Commission on Genetic Resources for Food and Agriculture for monitoring the implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture, in which the status and trends of plant genetic resources are described through globally agreed indicators and regular country-driven assessments.

7.b Biodiversity Indicator Partnership
Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.
No

8. Disaggregation
Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

Geographic disaggregation (national, regional, global) is made. Grouping by sex, age etc. is not applicable.

9. Related goals, targets and indicators
Description of linkages to other indicators proposed in the first draft monitoring framework

No data provided by data reporter

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

FAO

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Stefano Diulgheroff (Stefano.diulgheroff@fao.org)

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

List of descriptors for reporting on the Plant Component of SDG indicator 2.5.1, FAO 2017
http://www.fao.org/fileadmin/user_upload/wiews/docs/SDG_251_data_requirement_sheet_table_EN.docx

Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture:
http://www.fao.org/docrep/015/i2624e/i2624e00.htm

Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture
http://www.fao.org/docrep/013/i1500e/i1500e00.htm

Genebank Standards for Plant Genetic Resources for Food and Agriculture, FAO, 2014
http://www.fao.org/documents/card/en/c/7b79ee93-0f3c-5f58-9adc-5d4ef063f9c7/

Reporting Format for Monitoring the Implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture, FAO 2019,
https://www.fao.org/fileadmin/user_upload/wiews/docs/Reporting_Format_2019.pdf

FAO/Bioversity Multi-Crop Passport Descriptor (MCPD) v. 2
http://www.bioversityinternational.org/fileadmin/user_upload/online_library/publications/pdfs/FAOBioversity_multi_crop_passport_descriptors_V_2_Final_rev_1526.pdf

National Focal Points for monitoring the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture and the preparation of country reports for The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture: http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gpa/national-focal-points/en/

FAO E-learning Course on SDG Indicators 2.5.1 and 2.5.2 - Plant and Animal Genetic Resources
https://elearning.fao.org/course/view.php?id=392

Shortened Format indicator metadata sheet: 5.0.1 Proportion of wildlife that is harvested legally and sustainably

1. Proposed Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

5.0.1 Proportion of wildlife that is harvested legally and sustainably

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Draft goal *OR*

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Draft target

Provide the corresponding draft target name, draft target number, or N/A

Target 13. Implement measures at global level and in all countries to facilitate access to genetic resources and to ensure the fair and equitable sharing of benefits arising from the use of genetic resources and, as relevant, of associated traditional knowledge, including through mutually agreed terms and prior and informed consent.

4. Proposed rationale

The proposed indicator would fill a present gap in a comprehensive headline indicator for Target 5 of the draft Global Biodiversity Framework. Although an index exists for the proportion of fish stocks that are harvested sustainably (FAO https://www.fao.org/sustainable-development-goals/indicators/1441/en/), no similar index exists for terrestrial species of fauna, flora or fungi. The sustainable harvest of terrestrial species whether for domestic or international consumption, subsistence or income generation, is vital for local livelihoods, businesses and national economies. However, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment Report on biodiversity and ecosystem services (2019) estimated that the direct overexploitation is the main cause of marine biodiversity loss and second most significant cause of terrestrial biodiversity loss. Unsustainable harvest threatens not only the species being used and the benefits derived from them (linked to Target 9), but the ecosystems that may themselves provide vital services and those that depend on them.

The IUCN Red List provides a global assessment of species and the threats that are contributing to the extinction risks that they face. Within these assessments each species is evaluated for whether it is used at Local, National and International level as well as whether “biological resource use” including intentional harvesting is a contributing threat to extinction risk. At a global level this can assess whether use is a threat (unsustainable) or not (sustainable) thus giving a proportion of assessed species that are harvested as being sustainably so.

Furthermore, the changing threat from use can be further monitored over time by using a Red List Index for taxonomic groups that have been fully assessed multiple times, and the contribution of the harvest and trade as a threat can be further investigated (see Butchart, 2008).

While this gives an extremely useful overview of species that have been assessed against the IUCN Red List, a large number of species that are harvested are yet to be assessed, many of which may be considered to be of “Least Concern” and not in imminent peril of extinction, but where use may still be unsustainable, which may be masked within this wide category of the Red List.

Furthermore, given the importance of the use of wild species nationally, concerns and warnings over unsustainable use are most likely need to be tackled at a national level before they are elevated to an international level. Therefore, indicators that are nationally based and relevant both to assessing sustainability, but also to highlighting concerns that can be addressed nationally would be particularly useful.

We propose developing a new indicator for sustainable use of wild species, data for which would be collected nationally, with the potential to aggregate up to a regional or global indicator. TRAFFIC will work with others to

develop a framework that would populate with national data and it will be driven by Parties themselves. Given the specific reference to trade in wild species, the intention would be to be able to disaggregate the indicator for species that were traded internationally. This would have relevance to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as well as the implementation of the Sustainable Development Goals 12, 14 and 15 and the IPBES Sustainable Use Assessment.

TRAFFIC have already started reaching out to some Parties for their buy-in and the UK, Mexico, and Georgia have expressed their interest. Others interested in engaging on development include IUCN, UNEP-WCMC, BirdLife, IIED as well as the partners of the Collaborative Partnership on Sustainable Wildlife Management (CITES, CBD, UNEP, CIFOR, FAO). We have also reached out to others that have also expressed an interest in developing indicators for this target, such as UNCTAD.

5. **Current level of development (including methodology, data, spatial coverage)**

The development of this new headline indicator will require substantial resources for development, consultation and capacity building at the national level to ensure standardized data are collected. Once a framework is developed an academic journal

6. Proposed timetable for development

The indicator is in the early stage of development. It is expected that methods will be available by the end of 2023 (conditional on securing resources for its development). The key datasets for this indicator will be submitted by the CBD Parties in their Annual Reports, with information consolidated and reported bi-annually.

7. Proposed scale of use

It is anticipated that the indicator data will be collated at national levels to form the global indicator.
Initial engagement with a selection of Parties (Mexico, Georgia, UK) shows interest and opportunities to develop a nationally constructed indicator, that can be aggregated to the regional and global scale.

8. Proposed data source

Data would need to be gathered at the national level. At the global level, following sources of data will be used:

- IUCN Red List data will provide a source of data
- IUCN Sustainable Use and Livelihoods Specialist Group's Sustainable Use of Species database (under development)
- CITES Trade Database
- TRAFFIC's Wildlife Trade Information System (WiTIS)
- FAO Fisheries and Timber data
- Other global datasets as identified

Data would need to be gathered at the national level under standardized methods. Customs data may also be a source of information.

9. Proposed indicator compiler

TRAFFIC International

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

TRAFFIC International

10.b Contact person(s)

Thomasina Oldfield – Thomasina.oldfield@traffic.org
Anastasiya Timoshyna – Anastasiya.timoshyna@traffic.org

11. References (if available)

Butchart, S.H.M., (2008) Red List Indices to measure the sustainability of species use and impacts of invasive alien species. Bird Conservation International. 18

IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany.

Timoshyna, A. and Rodina, K. (Eds) (2019), Workshop Proceeding: Sustainable Wildlife Management Beyond 2020: Report of the Consultative Workshop.

Indicator metadata sheet: Indicator 5.0.2 Proportion of fish stocks within biologically sustainable levels

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

5.0.2 Proportion of fish stocks within biologically sustainable levels

2. Date of metadata update

I*nsert date of metadata update*

February 2021

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 5. Ensure that the harvesting, trade and use of wild species is sustainable, legal, and safe for human health.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

The United Nations (UN) Convention on the Law of the Sea (UNCLOS), the United Nations Fish Stocks Agreement (UNFSA [UN, 1995]) and the FAO Code of Conduct for Responsible Fisheries (FAO, 1995a) all require maintaining or restoring fish stocks at levels that are capable of producing their maximum sustainable yield (MSY). To fulfil the objectives of these international treaties, fishery management authorities need to undertake assessment of the state of fish stocks and develop effective policies and management strategies. As a UN Agency with a mandate for fisheries, FAO endeavour to provide the international community with the best information on the state of marine fishery resources.

Since 1974, FAO has been periodically assessing and reporting the state of marine fishery resources using a wide spectrum of methods from numerical models to data poor approaches. FAO global and regional estimates were also used as an MDG indicator for Goal 7 on environment during the period 2000-2015. This facilitated its approval as a Tier I SDG indicator by the 2nd IAEG-SDG in October 2015.

The indicator has a peculiar nature compared to more conventional SDG indicators. The indicator estimates the sustainability of fish stocks that often move across national boundaries. This led the indicator to be initially reported only at global and regional levels, with regions not corresponding to continental MDG or SDG regions but to marine regions termed “FAO Major Fishing Areas”.

The Global SDG Indicator Framework is a voluntary mechanism, but countries are required to report if data are available. As a custodian agency, the FAO works to put in action the 2030 Agenda’s emphasis on country ownership and higher the incentive to take actions at country, regional and global levels. FAO has developed, since 2018, a questionnaire approach to allow individual countries to report on the sustainability of fish stocks. The approach 1) provides a framework for meaningful country-level reporting that complements but does not alter the core methodology of SDG indicator 14.4.1 at the global/regional levels (FAO, 2011), and 2) provides countries with simplified methods to carry out fish stock assessment in data-limited contexts, to some extent overcoming the technical barriers that traditional methods presented. This is because country-level reporting will be limited to the assessment of stocks that are found only within a country’s EEZ and/or shared with neighbouring countries’ EEZs, and therefore not include straddling stocks, highly migratory species, or stocks in Areas Beyond National Jurisdiction (ABNJ). As a result, national data alone cannot be meaningfully aggregated

at global/regional levels, but it can be used to inform country progress on fish stock sustainability within the EEZ. The FAO has developed an online platform to facilitate the estimation and a country's own report of the indicator.

The platform provides an E-learning course that help countries to understand the indicator, estimation methodology and report process as well as some simple stock assessment methods that can be used to estimate stock status when only limited data are available to help address the capacity insufficiency faced by many developing countries.

In 2019, the FAO began sending a questionnaire to countries to collect national data with the aim to help countries in the reporting process.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The indicator, Proportion of marine fish stocks within biologically sustainable levels, measures the sustainability of the world's marine capture fisheries by their abundance. A fish stock whose abundance is at or greater than the level that can produce the maximum sustainable yield (MSY) is classified as biologically sustainable. In contrast, when abundance falls below the MSY level, the stock is considered biologically unsustainable.

MSY is defined as the greatest amount of catch that can be harvested continuously from a stock under constant and current environmental conditions (e.g., habitat, water conditions, species composition and interactions, and anything that could affect birth, growth, or death rates of the stock) without affecting the long-term productivity of the stock.

The indicator measures the sustainability of fish resources based a good balance between human use and ecological conservation. MSY-based reference points are the most common type of reference points used in fisheries management today. This is primarily because, for decades, reference points from surplus production models have most often been set based on the concept of MSY and they are the basic benchmarks for the sustainability of fisheries set by the UN Convention on the Law of the Sea (UNCLOS, Article 61(3)).

Unit of measure: Proportion (percentage %)

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

FAO currently reports the global and regional indicators calculated from FAO's assessment of a selected list of fish stocks around the world. The methodology is described in the FAO Technical Paper (FAO 2011).

FAO has been developing the new approach for country-level reporting since 2017, and has consulted with countries in three dedicated expert consultation workshops: In November 2017, FAO convened a workshop to exchange views with national practitioners on the new proposed analytical methods to produce Indicator 14.4.1 at country level1. In February 2019, FAO convened an expert consultation workshop1 on development of the methodologies for the global assessment of fish stock status, with participants from countries and regional fisheries organizations. In October 2019, FAO organized a capacity development workshop on stock status assessment and estimation methods of indicators for the Asia Pacific Region, with participants from 17 countries. However, so far very few countries have started their own estimation and reporting of Indicator

Global/Regional:
Global and regional estimates of stock sustainability have been performed for 584 fish stocks around the world since 1974, representing 70% of global landings. Each stock is estimated using the methodology described in the FAO Technical Paper (FAO, 2011).

National:
The indicator is calculated as the number of stocks with sustainable status divided by the number of stocks with known status in the reference list. This proportion is calculated based on stock numbers, without weighting either by its production volume or stock abundance; that is, every fish stock is considered to have the same importance. Countries are requested to report the status of a reference list of fish stocks, which should be determined based on the significance of a specific stock in a society, either in landings, economic contribution to society, or cultural and traditional values, rather than based on whether stock assessment exists

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

Global/regional:
The fish stocks that FAO has monitored since 1974 represent a wide spectrum of data availability, ranging from data-rich and formally assessed stocks to those that have very little information apart from catch statistics by FAO major fishing area and those with no stock assessment at all. For the purposes of using the best available data and information and maintaining consistency among stocks and assessors, a procedure has been defined to identify stock status information (FAO 2011).

National:
FAO collects national data through a questionnaire sent to the Principal Focal Point (PFP) of each country. The PFP organises an institutional set-up which identifies the competent authorities to develop a reference list of stocks and completes the questionnaire. The information or data collected through the questionnaire from a country will initially only inform individual country progress, also acknowledging the need for a learning curve along the few first questionnaire inquiries. Depending on the evolution and further standardization of country reporting over the next 3-5 years, national data may be used to inform global/regional estimates.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

In each country, the data available for each stock and expertise level to conduct different types of assessments will differ. Some countries may have classic stock assessments already conducted for many of their stocks, while others may have very few or no assessments available.

For some countries, little stock assessment has been done. To help these countries and to facilitate their reporting, FAO prepared online materials and tools, including a selection of methods that can be used to evaluate stock status with data limited methods such as length-based and catch-only methods. The strengths and limitations of these methods are discussed in an eLearning course (Lesson 4), and caveats were also provided to avoid misuse and exercise cautions in practice.
Furthermore, capacity building workshops have been organised to provide support to countries in stock assessment and reporting on the SDG 14.4.1.

eLearning course: https://elearning.fao.org/course/view.php?id=502

5.e Data sources

Description of all actual and recommended sources of data

The MSY-based reference point is often established through a formal stock assessment process. The data to inform stock assessments can come from many different sources, including fishery-dependent and fishery-independent sources. Fishery-dependent data are collected from the fishery itself, using both commercial and recreational sources through reporting or sample-based surveys at sea, at landing sites, or within fishing communities. Data from these sources are generally compiled into fisheries statistics. They can include information on removals of fish from the sea, which can include landings and discards, and information on the fleet such as number of boats, number of tows, time spent on the sea.

Fisheries-independent are obtained in ways not related to any fishing activity and are typically collected by scientists via surveys (often scientific cruises) designed to sample species abundance and biomass over long time series, and over consistent seasons and geographic areas. Typically, fisheries-independent data collect biological information on the species (age, length, weight, maturity, etc.), and habitat and environmental information (temperature, salinity, depth, etc.).

Three primary categories of data inputs are required for stock assessment, including data on life history traits, and time series of catch and fishing effort. Stock abundance is often not known and relative abundance or indices are often used to reflect historical changes in population size. These data can be sourced from fishery-independent surveys, e.g., acoustic or trawl-based sampling, or from fishery-dependent estimates using catch and effort data. Life history parameters provides information on individual growth and stock productivity e.g., fish size, age, reproductive rates, and natural mortality. Catch is the number of fish removed from a stock by all types of fishing.

Global/Regional:
Because of the high data demands of classical stock assessment methods, only a limited number of fish stocks have been assessed. These species account for 17–25 percent of the global catch (Branch et al., 2011), and most are caught by fisheries in developed countries. To balance the global representativeness of the assessment

results and the goal of using the best available information, the FAO uses a wide spectrum of data and methods to extend its assessment to the fish stocks that account for the majority (70-80 percent) of the global catch (FAO, 2005).

National:
For country reporting, a questionnaire was sent out to all FAO member States with marine boundaries (i.e., 165 States) in 2019, and will be resent in 2022, and then on a two-year basis.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc).

National: biennially. The first full publishing of the indicators returned by the countries for the first questionnaire call will be in February 2022 (only partial publishing was performed in February 2021). Next Questionnaire call is planned for 2022.

Global/regional: biennially. The last update was in 2020 (with 2017 reference year), next update will be 2022 (with 2019 reference year). It will be published mid-2022.
Availability of the indicator: : https://unstats.un.org/sdgs/metadata/files/Metadata-14-04-01.pdf (as per this page https://www.fao.org/sustainable-development-goals/indicators/1441/en/)

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021

From 1974 to 2017.
Global/regional level: from 1974 to 2018.
National level: Not available yet (first questionnaire dispatched in November 2019, considered a trial/testing phase).

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

FAO provides global and regional data. National-level data are generally reported by the National Statistics Office or the Ministry of Fisheries and/or Agriculture.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

FAO

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

- At regional and global levels

To ensure completeness of regional and global information on stocks, FAO gathers additional information outside of what is provided by each country, in particular concerning the highly migratory and straddling fishing stocks. For shared stocks, FAO may consult with Regional Fisheries Bodies (RFBs), who are mandated to assess and manage stocks with their contracting parties, in order to receive information and data and conduct stock assessment when necessary.

- At country level

This indicator examines marine fish stocks. If a country has no marine capture fisheries, then the indicator is not calculated for that country. In such case, no imputation is performed to derive estimates. For countries reporting limited marine fish stock data, or data scored of low quality after quality assurance process, these are reported as Low reliability (code “U” of the OBS_STATUS flag) . However, the estimation of the indicator at regional and global levels was estimated not based on country questionnaires, but by the FAO through a systematic assessment of a reference list selected globally.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator data is applicable at global and regional scale as compiled by FAO since 1970. The indicator has become newly available at national scale, independently from the global and regional. No disaggregation can be envisaged from the regional to the national level; and at this stage, national data cannot be collated to form global indicator. Note that FAO plans to work towards an eventual convergence between the national indicators and the regional / global indicators.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

There is no such national/regional methodology available

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Sources of discrepancies:

The indicator is estimated by the FAO based on the methodology developed in the 1980s (FAO, 2011). Although regular updates were carried out to incorporate technical advances and changes in major fish species, some discrepancies between regions may occur in the representativeness of the reference list in practical fisheries.

However, this will not pose a large impact on the reliability of the Global indicator's temporal trends which covers 75% of global landings.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

As explained in the "Rationale" section, national data alone cannot be meaningfully aggregated at global/regional level because country-level reporting will be limited to the assessment of stocks that are found only within a country's EEZ (including stocks shared with neighbouring countries' EEZs), and therefore not include straddling stocks, highly migratory species, or stocks in Areas Beyond National Jurisdiction (ABNJ). Therefore, regional "aggregates" by FAO Major Fishing Area and the global indicator value are calculated with a specific approach, as described in the FAO Technical Paper (FAO 2011)

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

FAO carries out a series of validations to assure that the data and information are provided by countries in line with the questionnaire instructions. The validation process consists of: (i) identification of errors, mistakes and missing value in the data and, (ii) correcting errors, mistakes and missing values in close consultation with the countries concerned. Each country is asked either to confirm that the data provided are correct or to provide remarks and / or revise data accordingly if they identify any errors.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

Data not provided.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

SDG indicator 14.4.1
IPBES Core Indicator

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.
Y - https://www.bipindicators.net/indicators/proportion-of-fish-stocks-in-safe-biological-limits

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

By FAO major marine fishing areas for statistical purposes.
Taxonomically, FAO publishes the indicator separately for straddling stocks (mostly tuna and tuna like).

9. Related goals, targets and indicators

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

FAO

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Focal points Yimin Ye, Marc Taconet (Marc.Taconet@fao.org)

SDG-indicators@fao.org (as per this page https://www.fao.org/sustainable-development-goals/indicators/1441/en/)

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

https://www.fao.org/sustainable-development-goals/indicators/1441/en/

https://elearning.fao.org/course/view.php?id=502

https://unstats.un.org/sdgs/unsdg

https://www.fao.org/publications/sofia/2020/en/

Indicator metadata sheet: 6.0.1 Rate of invasive alien species spread

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

Rate of invasive alien species spread

2. Date of metadata update

Insert date of metadata update

2021

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 6. Manage pathways for the introduction of invasive alien species, preventing, or reducing their rate of introduction and establishment by at least 50%, and control or eradicate invasive alien species to eliminate or reduce their impacts, focusing on priority species and priority sites.

4. Rationale

Description of the purpose and rationale behind the indicator, noting its relevance to the corresponding draft goal or target

The spread and establishment of invasive alien species (IAS) is a main driver of biodiversity loss. Recent extensive analyses of biological invasions show that the documented numbers of IAS have continued to increase over recent decades. Multi-national agreements developed for the purposes of addressing the challenge and negative impacts of IAS require information on the status and trends of IAS spread – within and across countries. Without a repeated data collection process and up-to-date evidence-base, progress to prevent and reduce the consequences of IAS is hindered, and neither the evaluation nor the achievement of policy targets is feasible.

This indicator links the management success of introduction pathways of IAS to the desired outcome to prevent new IAS country establishments. It directly supports Target 6 of the framework on managing pathways for the introduction of IAS, and preventing and reducing their rate of introduction and establishment. It informs prevention and control management actions for species and ecosystems recovery and conservation.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

Rate of invasive alien species spread indicator: The number of invasive alien species that are expected to have established in a new region (i.e., rate of new introductions) compared to the reference period, based on observed trends in IAS observations. The unit of measurement is proportion of species introduced per year – for the reporting period relative to the reference period.

This indicator can be disaggregated by taxon, larger region, country, states, priority areas, pathways or type of impact to prioritize impacts and sites to eliminate or reduce these impacts.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

I. The indicator is calculated from compiled Country Checklists of Introduced and Invasive Species (https://www.gbif.org/publisher/cdef28b1-db4e-4c58-aa71-3c5238c2d0b5), as available via the Global Register of Introduced and Invasive Species (GRIIS; Pagad et al. 2018; soon to be published as a Compendium). The checklists are updatable via the same mechanism and form the backbone of country monitoring frameworks for IAS. The information value of this indicator is dependent on recent data on new IAS established in the country, and ongoing updates to the Country Checklist and Dates of First Record for the country (see next steps; Seebens et al. 2020). It is also informed by ongoing collation of in-country evidence on which species have started to cause harm (have a negative impact) or continue to do so, and this information being fed back into Country Checklists via checklist updates.

II. The indicator can be calculated for different species subsets: (1) Species known to have an impact (i.e., based on the subset of invasive alien species in GRIIS for which there is evidence of impact in at least one country, denoted as 'Invasive' in the 'isInvasive' field of the country checklists); (2) All alien species in a country using GRIIS data or alternative sources; (3) All alien species introduced via a particular pathway of introduction (data currently available via IUCN ISSG and intending to be published as open access).

III. For this subset of 'isInvasive' species in the country, the dates of introduction, estimated dates of introduction, or dates of 'first record' are required (Seebens et al. 2020). These data can be collated from in-country sources, or obtained from the Alien Species First Records Database (Seebens 2021) or similar sources. Date information can be compiled on a taxon-by-taxon basis, starting with those taxa for which the data are most readily available and complete.

IV. Raw data trends can be compiled showing the known number of newly introduced species per year.

V. To estimate the 'Rate of Spread Indicator', the above information is then modelled to estimate new species invasions per year along with an estimate of uncertainty (see McGeoch et al. 2021; the formula and scripts for calculation will be made available shortly).

VI. Stable use of this indicator by Parties relies on the use of the same baseline data set and a consistent method for estimating the rate parameter. Further tools are currently being prepared by GEO BON – Theory and Workflow for Invasive Species Tracking (sTWIST) sDiv working group to assist countries with this step.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

The Global Register of Introduced and Invasive Species by country maintained at Global Biodiversity Information Facility (GBIF): https://www.gbif.org/dataset/search?publishing_org=cdef28b1-db4e-4c58-aa71-3c5238c2d0b5

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The methodology for the indicator, developed by sTWIST (https://www.idiv.de/en/stwist.html), is currently under peer-review, and available as a pre-print (McGeoch et al. 2021). Data to populate the indicator globally and by country are available from the sources outlined above. Parties can contribute to these efforts and to their own IAS spread indicator by updating these data sources where necessary, and over time by ongoing observations of new species introductions and materialization of new evidence of IAS impacts within countries (Latombe et al. 2017). GEO BON is working to produce additional material and tools to further support Parties in using this indicator and will support a baseline indicator calculation that Parties can use in their reporting or replace with their own calculation. Updates on this indicator will be made available at: https://geobon.org/ebvs/indicators/

5.e Data sources

Description of all actual and recommended sources of data

The indicator can be calculated from Country Checklists of Introduced and Invasive Species, which are available via the Global Register of Introduced and Invasive Species (Pagad et al. 2018; https://www.gbif.org/dataset/search?publishing_org=cdef28b1-db4e-4c58-aa71-3c5238c2d0b5). The checklists are updatable via the same mechanism and are the backbone of country monitoring frameworks for IAS. The information value of this indicator is dependent on recent data on new IAS established in the country, and ongoing updating of the Country Checklist and Dates of First Record for the country (Seebens et al. 2020). It is also informed by ongoing collation of in-country evidence on which species have started to cause harm (have a negative impact) or continue to do so, and this information being fed back into checklist updates.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g., annually, every five years etc).

In development. GEO BON Species Population Working Group and sTWIST are currently collaborating to produce indicator values for major taxonomic groups and countries, and to make the calculation and code available in readily usable form. The indicator will be updated annually, although annual updates rely on longer-term trends and interpreting change within the estimated uncertainty bounds.

5.g Time series

Date range for which indicator is available, e.g., 1993 – 2021

Indicator in development. Indicator will be available annually, for 1970-present.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

Expert organizations, scientific societies, national and public repositories (IUCN ISSG, GRIIS, GBIF), GEO BON associated infrastructure (Map of Life).

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

GEO BON, sTWIST, IUCN ISSG

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g., taxonomic, thematic, or geographic data gaps)

Expected taxonomic gaps for species with limited data (e.g., micro-organisms, fungi) and under-studied geographic regions (e.g., tropics, deep sea), and developing countries with limited capacity to discover and report on IAS.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

This indicator can aggregate taxonomically-related species groups to estimate rates of introductions for species with missing data. Species poor taxonomic grounds can also be aggregated by introduction pathways (e.g., release, escape, contaminant, stowaway, corridors, and unaided natural dispersal) for rate of spread estimates per pathway.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

Applicable and disaggregated to global, regional, national, and within-country levels

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

National methodology is similar to methods for global application, but further details on national and regional application are under preparation.
For national indicators, data can be accessed at:

1. https://www.gbif.org/publisher/cdef28b1-db4e-4c58-aa71-3c5238c2d0b5
2. Seebens (2020) https://zenodo.org/record/4632335

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Differences between country and international estimates will originate from limited data and the size and impact of IAS interventions and control measures. Filling species data gaps and confirming detections will reduce discrepancies. Because the rate of IAS spread is estimated over several years, the impact of new national, regional, or global prevention and control interventions will take time to manifest as changes in index values at higher levels.

6.d Regional and global estimates & data collection for global monitoring

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

6.d.1 *Description of the methodology*

The indicator is based on a model-estimated change in the number of new introductions per year, taking a sampling effect into account (Belmaker et al. 2009, McGeoch et al. 2012).

Interpretation:
A value of 1.0 means that the rate is equal to that of the reference period.
A value <1.0 indicates progress towards the goal of reducing the rate of IAS spread.
A value of 0.5 would mean that rate of IAS introductions was reduced by 50%.
A value of >1.0 indicates that the rates of establishment are increasing and moving away from the target goal of reducing the rate of IAS spread.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

The production of a compendium of country data to be used for global indicator production is underway.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

Details available in Pagad et al. (2018).

7. **Other MEAs, processes and organisations**

7.a Other MEA and processes

Please note where the indicator is already in use (e.g., by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).
Related to Aichi Target 9, in use (SDG Goal 15, CMS, IPBES Global and Regional Assessments, Ramsar)

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

No. It is different to and a successor of “Trends in the numbers of invasive alien species introduction events” - https://www.bipindicators.net/indicators/trends-in-numbers-of-invasive-alien-species-introduction-events

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

This indicator can be disaggregated by species, taxa, ecosystem, geographic region, and invasion pathway.

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

6.1 Rate of introduction and establishment
6.2 Control or eradicate invasive alien species
6.3 Reducing the impact on priority species and priority sites

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the collated data or metadata

GEO BON (info@geobon.org)
iDIV sTWIST (info@idiv.de)

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

- Melodie McGeoch (M.McGeoch@latrobe.edu.au)
- GEO BON Secretariat - info@geobon.org
- iDIV sTWIST (https://www.idiv.de/en/stwist.html)

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

Belmaker, J., E. Brokovich, V. China, D. Golani, and M. Kiflawi. 2009. Estimating the rate of biological introductions: Lessepsian fishes in the Mediterranean. Ecology 90:1134 - 1141.

Latombe, G., P. Pysek, J. M. Jeschke, T. M. Blackburn, S. Bacher, C. Capinha, M. J. Costello, M. Fernandez, R. D. Gregory, D. Hobern, C. Hui, W. Jetz, S. Kumschick, C. McGrannachan, J. Pergl, H. E. Roy, R. Scalera, Z. E. Squires, J. R. U. Wilson, M. Winter, P. Genovesi, and M. A. McGeoch. (2017). A vision for global monitoring of biological invasions. Biological Conservation 213:295-308.

McGeoch, M. A., D. Spear, E. J. Kleynhans, and E. Marais. 2012. Uncertainty in invasive alien species listing. Ecological Applications 22:959-971.

McGeoch, M.A., Arlé, E., Belmaker, J., Buba, Y., Clarke, D.A., Essl, F., et al. (2021). Policy-relevant indicators for invasive alien species assessment and reporting. bioRxiv [Preprint] https://doi.org/10.1101/2021.08.26.457851.

Pagad, S., Genovesi, P., Carnevali, L., Schigel, D. & McGeoch, M.A. (2018). Introducing the Global Register of Introduced and Invasive Species. *Sci Data*, **5**, 170202.

Seebens, H., D. A. Clarke, Q. Groom, J. R. U. Wilson, E. García-Berthou, I. Kühn, M. Roigé, S. Pagad, F. Essl, J. Vicente, M. Winter, and M. McGeoch. 2020. A workflow for standardising and integrating alien species distribution data. *Neobiota* **59**, 39-59.

Seebens, H. 2021. Alien Species First Records Database (Version 2). Deposited 22 March 2021.*Zenodo*. https://zenodo.org/record/4632335

Indicator metadata sheet: 7.0.1 Index of coastal eutrophication potential (excess nitrogen and phosphate loading, exported from national boundaries)

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

7.0.1 Index of coastal eutrophication potential (excess nitrogen and phosphate loading, exported from national boundaries)

2. Date of metadata update

Insert date of metadata update

20 December 2021

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 7. Reduce pollution from all sources to levels that are not harmful to biodiversity, ecosystem functions or human health, including by reducing nutrients lost to the environment by at least half, and pesticides by at least two thirds and eliminating the discharge of plastic waste.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Coastal areas are areas of high productivity where inputs from land, sea, air and people converge. With over 40 percent of the human population residing in coastal areas, ecosystem degradation in these areas can have disproportionate effects on society (IGOS, 2006). One of the largest pressures on coastal environments is eutrophication, resulting primarily from land-based nutrient input from agricultural runoff and domestic wastewater discharge. Coastal eutrophication can lead to serious damage to marine ecosystems, vital sea habitats, and can cause the spread of harmful algal blooms.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The indicator aims to measure the contribution to coastal eutrophication from countries and the state of coastal eutrophication. Therefore, two levels of indicators are recommended:
Level 1: Globally available data from earth observations and modelling
Level 2: National data which will be collected from countries (through the relevant Regional Seas Programme, where applicable (i.e. for countries that are a member of a Regional Seas Programme)

Monitoring parameters	Level 1	Level 2	Reporting frequency
Indicator for Coastal Eutrophication Potential (N and P loading)	X		Five years
Chlorophyll-a deviations (remote sensing)	X		Annual
Chlorophyll-a concentration (remote sensing and in situ)		X	Four years (aligned with Regional Seas)
National modeling of ICEP		X	
Total Nitrogen of DIN (dissolved inorganic nitrogen)		X	
Total Phosphorus or DIP (dissolved inorganic phosphorus)		X	
Total silica		X	

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

Level 1: Indicator for coastal eutrophication potential
The indicator for coastal eutrophication potential (ICEP), is based on loads and ratios of nitrogen, phosphorus and silica delivered by rivers to coastal waters. This indicator assumes that excess nitrogen or phosphorus relative to silica will result in increased growth of potentially harmful algae (ICEP>0). This indicator is based on loads and ratios of nitrogen, phosphorous and silica delivered by rivers to coastal waters (Garnier et al. 2010) which contribute to the ICEP. The basis for these loads is collected from land-based assessments of land use including fertilizer use, population density, socioeconomic factors and other contributors to nutrient pollution runoff. Given the land-based nature of the indicator, it provides a modelled number indicating the risk of coastal eutrophication at a specific river mouth. The indicator can be further developed by incorporating in situ monitoring to evaluate the dispersion of concentrations of nitrogen, phosphorous and silica to ground-truth the index. The indicator assumes that excess concentrations of nitrogen or phosphorus relative to silica will result in increased growth of potentially harmful algae (ICEP>0). ICEP is expressed in kilograms of carbon (from algae biomass) per square kilometre of river basin area per day (kg C km-2 day-1). The ICEP model is calculated using one of two equations depending on whether nitrogen or phosphorus is limiting.

The equations (Billen and Garnier 2007) are ICEP (N limiting) = [NFlx/(14*16)-SiFlx/(28*20)]*106*12 ICEP (P limiting) = [PFlx/31 – SiFlx/(28*20)]*106*12 Where PFlx, NFlx and SiFlx are respectively the mean specific values of total nitrogen, total phosphorus and dissolved silica delivered at the mouth of the river basin, expressed in kg P km-2 day-1, in kg N km-2 day-1 and in kg Si km-2 day-1.

Level 1: Chlorophyll-A deviation modelling Satellite-based assessments of ocean colour began in 1978 with the launch of the Coastal Zone Color Scanner (CZCS) aboard the NASA Nimbus 7 satellite. Following a decade long break in observations, there has been continuous satellite ocean colour since 1997 with SeaWiFS, followed by MERIS, MODIS (Terra, Aqua), VIIRS (NPP, N20) and now OLCI (S3-A, S3-B). Data gaps from individual sensors are common due to revisit cycles, cloud cover, and spurious retrievals resulting from a host of confounding atmospheric and aquatic conditions. This issue has been addressed by combining data from multiple sensors and creating a consistent, merged ocean colour product (e.g., chlorophyll-a). The ESA Ocean Colour CCI (OC_CCI) project, led by the Plymouth Marine Laboratory (PML), has produced a consistent, merged chlorophyll-a product from SeaWiFS, MODIS, MERIS and VIIRS, spanning 1997 to 2018 (Sathyendranath et al., 2018). A merged multi-sensor product will be updated in both time and with data from additional sensors (e.g., OLCI) under a forthcoming EUMETSAT initiative that will continue the time series on an operational basis.

For this indicator, Chlorophyll-a (4 km resolution, monthly products) will be derived from the OC-CCI project and generated for each individual pixel within a country's Coastal Zone. For generation of a climatological baseline, results are averaged by month over the time period of 2000 – 2004. Pixels with differences from the baseline that are in the 90th percentile of values >0 across the cumulative global EEZ. The percentage of pixels in a country's EEZ that are identified as deviating from the baseline (falling in the 90th percentile) will be calculated for each national EEZ by month. The annual average of these monthly values is then calculated.

Level 2: In situ monitoring of nutrients

Where national capacity to do so exists, national level measurements of Chlorophyll-a and other parameters (including nitrogen, phosphate and silica) (in situ or from remote sensing), should be used to complement and ground truth global remote sensing and modelled data and enable a more detailed assessment of eutrophication. Monitoring of supplementary eutrophication parameters is advisable to determine whether an increase in.

Level 2: National ICEP modelling
Existing ICEP modelling at the national level is limited but could be further developed following the model of a current study analysing basin level data in Chinese rivers (Strokal et al 2016). The study utilises Global NEWS – 2 (Nutrient Export from WaterSheds) and Nutrient flows in Food chains, Environment and Resources use (NUFER) as models. The Global NEWS-2 model is basin-scale and quantifies river export of various nutrients (nitrogen, phosphorus, carbon and silica) in multiple forms (dissolved inorganic, dissolved organic and particulate) as functions of human activities on land and basin characteristics (Strokal et al 2016). Furthermore, the model shows past and future trends.

A full methodology for this indicator is available in the document entitled, “Global Manual on Ocean Statistics for Measuring SDG 14.1.1, 14.2.1 and 14.5.1”.

5.c Data collection method
Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

The custodian agencies propose to collect national data through the Regional Seas Programmes in order to reduce the reporting burden on countries. For countries that are not included in a Regional Seas Programme then UNEP will reach out directly. For globally derived data, UNEP has established a partnership with NOAA and GEOBluePlanet, with the Global Nutrient Management System (GNMS) and with the Scientific Advisory Committee of the Ad hoc and Open Ended Expert Group on Marine Litter. This will facilitate the production of global data products.

5.d Accessibility of methodology
Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For “global indicators” please note whether a methodology is available for use at national or regional scales

The methodology for this indicator is published under the following link:
https://wedocs.unep.org/bitstream/handle/20.500.11822/35086/USO.pdf?sequence=3&isAllowed=y

The data for this indicator is also available on the UN SDG Global database:
https://unstats.un.org/sdgs/UNSDG/IndDatabasePage

5.e Data sources
Description of all actual and recommended sources of data

1. Satellite data
2. Global models: which are based on official data from national governments as collected from UN organizations
3. Data provided by national governments.

5.f Availability and release calendar
Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Available (on Chlorophyll-a deviations). First reporting cycle: 2020

5.g Time series
Date range for which indicator is available, e.g. 1993 – 2021

The reporting on this indicator is described in the table for each sub-indicator. Reporting was initiated in 2020 for the global indicator on Chlorophyll-a deviations (remote sensing) with data from 2005 to 2019. For the other globally derived indicators, reporting will initiate in 2023. National data collection through the Regional Seas already exists for many Regional Seas, this data will be compiled for SDG reporting in 202

5.h Data providers
Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

National Statistical Systems, through the Regional Seas. The Regional Seas Programmes include the CPPS: Permanent Commission for the South Pacific (Southeast Pacific); EU MSFD: European Union Marine Strategy Framework Directive; EU WFD: European Union Water Framework Directive; GEF-TWAP: Global Environment Facility Transboundary Waters Assessment Programme; HELCOM: Helsinki Commission (Baltic Sea); Nairobi

Convention (Western Indian Ocean); NOAA: National Oceanic and Atmospheric Administration; NOWPAP: Northwest Pacific Action Plan (Northwest Pacific); OSPAR: Oslo-Paris Convention (Northeast Atlantic); ROMPE: Regional organization for the Protection of the Marine Environment (ROMPE sea area); UNEP-MAP: UN Environment Mediterranean Action Plan (Mediterranean Sea)). For more information on the Regional Seas see: https://www.unenvironment.org/exploretopics/oceans-seas/what-we-do/working-regional-seas.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

United Nations Environment Programme (UNEP), in collaboration with partners mentioned in the other sections of this metadata.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)

Data for ICEP is not yet available

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

At country level: due to the use of globally derived data for some sub-indicators, it is not expected to have missing data for these sub-indicators. For all other sub-indicators, missing values are not imputed.

6. **Scale**

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator is in development. It will be made applicable at global, regional and national scales

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

The methodology for global (Level I) and national (Level II) indicators (Global Manual on Ocean Statistics for Measuring SDG 14.1.1, 14.2.1 and 14.5.1) is available by following link
https://wedocs.unep.org/handle/20.500.11822/35086

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

For Level I indicators satellite data and global models are used. For Level II indicators national data is used.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

The methodology for global (Level I) and national (Level II) indicators (Global Manual on Ocean Statistics for Measuring SDG 14.1.1, 14.2.1 and 14.5.1) is available by following link
https://wedocs.unep.org/handle/20.500.11822/35086

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

National data collection through the Regional Seas already exists for many Regional Seas, this data will be compiled for SDG reporting in 2022.

7. Other MEAs, processes and organisations

7.a Other MEA and processes
Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).
SDGs: indicator 14.1.1 (*a*) Index of coastal eutrophication; and (*b*) plastic debris density

7.b Biodiversity Indicator Partnership
Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

8. Disaggregation
Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

A geospatial disaggregation of the state of pollution is proposed. For the ICEP loading indicators, this disaggregation should be at the sub-basin level

9. Related goals, targets and indicators
Description of linkages to other indicators proposed in the first draft monitoring framework
N/A

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

United Nations Environment Programme (UNEP)

10.b Contact person(s)
Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Dany Ghafari, dany.ghafari@un.org

11. References
Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

Regional Seas website: https://www.unenvironment.org/explore-topics/oceans-seas/what-wedo/working-regional-seas

UN Environment (2018). Global Manual on Ocean Statistics. Towards a definition of indicator methodologies. Nairobi (Kenya): UN Environment. 46 pp. plus four appendices.

Garnier, J., Beusen, A., Thieu, V., Billen, G. and Bouwman, L. (2010) N:P:Si nutrient export ratios and ecological consequences in coastal seas evaluated by the ICEP approach

Billen, G. and Garnier, J. (2007) River basin nutrient delivery to the coastal sea: Assessing its potential to sustain new production of non-siliceous algae *Marine Chemistry 106(1-2):148-160*

Sathyendranath S., Grant M., Brewin R.J.W., Brockmann C., Brotas V., Chuprin A., Doerffer R., Dowell M., Farman A., Groom S., et al. ESA Ocean Colour Climate Change Initiative (Ocean_Colour_cci): Version 3.1 Data. *Centre for Environmental Data Analysis; Harwell, UK: 2018. Technical Report.*

Indicator metadata sheet: 7.0.2 Plastic debris density

1. Indicator name
Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

7.0.2 Plastic debris density

2. Date of metadata update
Insert date of metadata update

20 December 2021

3. Goals and Targets addressed
Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal
Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target
Provide the corresponding draft target name, draft target number, or N/A

Target 7. Reduce pollution from all sources to levels that are not harmful to biodiversity, ecosystem functions or human health, including by reducing nutrients lost to the environment by at least half, and pesticides by at least two thirds and eliminating the discharge of plastic waste.

4. Rationale
Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Humanity has long used the ocean to dispose of goods and materials regarded as waste, either directly or indirectly (e.g. via run-off). Since the 1950s, when large-scale production of plastics began, an increasing proportion of solid waste in the ocean has consisted of this material, representing up to 80% of marine litter found in surveys (UNEP, 2016). Plastic litter is most obvious on shorelines, where litter accumulates due to current, wave and wind action, river outflows and by direct littering at the coast. However, plastic litter occurs on the ocean surface, suspended in the water column, on the seabed and in association with biota, due to entanglement or ingestion (GESAMP, 2019).

5. Definitions, concepts and classifications

5.a Definition:
Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The indicator Plastic debris density is defined based on the existing internationally agreed Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) guidelines and the existing national data collections, it is recommended that the reporting includes sub-indicators related to beach litter, floating plastic and plastic in the sea column, plastic on the sea floor and additional option indicators. Indicators on micro-litter may also be considered as optional. The proposed global indicators are based on feasibility and relevance. All indicators described below are consistent with the GESAMP guidelines on monitoring marine plastics which were published in 2019.

For this indicator two levels are proposed:
Level 1: Globally available data from earth observations and modelling
Level 2: National data which will be collected from countries (through the relevant Regional Seas Programme, where applicable (i.e. for countries that are a member of a Regional Seas Programme)

Monitoring parameters (and methods)	Level 1	Level 2	Reporting Frequency

Plastic patches greater than 10 meters*	X		Annual
Beach litter originating from national land-based sources	X		Two years
Beach litter (beach surveys)		X	4 years (aligned with Regional Seas)
Floating plastics (visual observation, manta trawls)		X	
Water column plastics (demersal trawls)		X	
Seafloor litter (benthic trawls (e.g. fish survey trawls), divers, video/camera tows, submersibles, remotely operated vehicles)		X	

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

Level 1: Plastic patches greater than 10 meters

Satellite-based global data products make up the statistics for this indicator. NASA and ESA both contribute satellite images to construct information on the plastic patches greater than 10 meters throughout the world's oceans. Multi-spectral satellite remote sensing of plastic in the water column is currently only possible for larger elements (more than 10m) and under good atmospheric conditions (no clouds). This data is being produced in collaboration with ESA and NASA.

Level 1: Beach litter originating from national land-based sources

Modelling of litter movement through the oceans occurs through numerical models using inputs including ocean flow and marine plastic litter characteristics. UN Environment has produced a global model of marine litter using OceanParcels v2.0, a state-of-the-art Lagrangian Ocean analysis framework to create customizable particle tracking simulation using outputs from ocean circulation models. This model was used to estimate where plastics that would be found on the coast likely originated from. As a simple example, for Kenya, based on this model, of the plastic which ends up on Kenya's beaches, 11% likely originated from Kenya, 60% likely came from countries in Africa and 29% likely came from outside the region. This model can be produced annually and updated as better waste emissions data becomes available for countries.

Level 2: Beach litter, plastic in the sea column and floating plastic and plastic on the sea floor (average count of plastic items per km2)

The details for collecting data for beach litter, plastic in the sea column and floating plastic and plastic on the sea floor are in the global manual and in the GESAMP Guidelines (GESAMP 2019). Beach litter is the most available type of data at the national level. National efforts to collect data on beach litter can be supported by campaigns to engage members of the public as volunteers in beach clean-ups (see for example the Ocean Conservancy's International Coastal Clean-up (ICC) initiative) or citizen science programmes (see for example NOAA's Marine Debris Monitoring and Assessment Citizen Science Project). Specific instructions on how to conduct citizen science beach surveys are included in GESAMP 2019. Beyond the tools used to conduct beach litter monitoring, it is important to consider the timing of surveys in order to properly plan effective surveys. The GESAMP Guidelines explain two main types of surveying beaches including rapid assessment surveys and routine shoreline monitoring. Rapid assessment surveys are best conducted in response to natural disasters, to build a baseline for future surveys and/or to identify beach litter hotspots. The average count of plastic items can be computed for each area sampled. A geospatial model is recommended in order to estimate the density across the coastline and to establish a national average.

A full methodology for this indicator is available in the document entitled, "Global Manual on Ocean Statistics for Measuring SDG 14.1.1, 14.2.1 and 14.5.1" by link https://wedocs.unep.org/handle/20.500.11822/35086.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

The custodian agencies propose to collect national data through the Regional Seas Programmes in order to reduce the reporting burden on countries. For countries that are not included in a Regional Seas Programme then UNEP will reach out directly. For globally derived data, UNEP has established a partnership with NOAA and GEOBluePlanet, with the Global Nutrient Management System (GNMS) and with the Scientific Advisory Committee of the Ad hoc and Open Ended Expert Group on Marine Litter. This will facilitate the production of global data products.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The methodology for this indicator is published under the following link:
https://wedocs.unep.org/bitstream/handle/20.500.11822/35086/USO.pdf?sequence=3&isAllowed=y

The data for this indicator is also available on the UN SDG Global database:
https://unstats.un.org/sdgs/UNSDG/IndDatabasePage

5.e Data sources

Description of all actual and recommended sources of data

1. Satellite data

2. Global models: which are based on official data from national governments as collected from UN organizations
3. Data provided by national governments.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Available (on Beach litter). First reporting cycle: 2020

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

The reporting on this indicator is described in the table for each sub-indicator. Reporting has been initiated in 2021 for the global indicator on Beach litter (average count of plastic items per km2) with Citizen Science data from 2015 to 2020. For the other globally derived indicators, reporting will initiate in 2021. National data collection through the Regional Seas already exists for many Regional Seas, this data will be compiled for SDG reporting in 2022.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

National Statistical Systems, through the Regional Seas. The Regional Seas Programmes include the CPPS: Permanent Commission for the South Pacific (Southeast Pacific); EU MSFD: European Union Marine Strategy Framework Directive; EU WFD: European Union Water Framework Directive; GEF-TWAP: Global Environment Facility Transboundary Waters Assessment Programme; HELCOM: Helsinki Commission (Baltic Sea); Nairobi Convention (Western Indian Ocean); NOAA: National Oceanic and Atmospheric Administration; NOWPAP: Northwest Pacific Action Plan (Northwest Pacific); OSPAR: Oslo-Paris Convention (Northeast Atlantic); ROMPE: Regional organization for the Protection of the Marine Environment (ROMPE sea area); UNEP-MAP: UN Environment Mediterranean Action Plan (Mediterranean Sea)). For more information on the Regional Seas see: https://www.unenvironment.org/exploretopics/oceans-seas/what-we-do/working-regional-seas.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

United Nations Environment Programme (UNEP), in collaboration with partners mentioned in the other sections of this metadata.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)

Sub-indicators: *Plastic patches greater than 10 meters, Floating plastics (visual observation, manta trawls), Water column plastics (demersal trawls), Seafloor litter (benthic trawls (e.g. fish survey trawls), divers, video/camera tows, submersibles, remotely operated vehicles)* are not yet available.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

At country level: due to the use of globally derived data for some sub-indicators, it is not expected to have missing data for these sub-indicators. For all other sub-indicators, missing values are not imputed.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

Global, regional and national scales.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

The methodology for global (Level I) and national (Level II) indicators (Global Manual on Ocean Statistics for Measuring SDG 14.1.1, 14.2.1 and 14.5.1) is available by following link https://wedocs.unep.org/handle/20.500.11822/35086.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

For Level I indicators satellite data and global models are used. For Level II indicators national data is used.

6.d Regional and global estimates & data collection for global monitoring

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6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels

The methodology for global (Level I) and national (Level II) indicators (Global Manual on Ocean Statistics for Measuring SDG 14.1.1, 14.2.1 and 14.5.1) is available by following link https://wedocs.unep.org/handle/20.500.11822/35086.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

Level 1: Globally available data from earth observations and modelling
Level 2: National data which will be collected from countries (through the relevant Regional Seas Programme, where applicable (i.e. for countries that are a member of a Regional Seas Programme)

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD), SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).
SDGs: indicator 14.1.1 (*a*) Index of coastal eutrophication; and (*b*) plastic debris density

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.
No

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

A geospatial disaggregation of the state of pollution is proposed.

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

N/A

10 .Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

United Nations Environment Programme (UNEP)

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Dany Ghafari, dany.ghafari@un.org

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

Guidelines for the monitoring and assessment of plastic litter in the ocean [citation not provided]

Shortened format indicator metadata sheet: 8.0.1 National greenhouse gas inventories from land use and land use change

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

8.0.1 National greenhouse gas inventories from land use and land use change

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Draft goal or

Provide the corresponding draft target name, draft target number, or N/A

3.b Draft target

Provide the corresponding draft target name, draft target number, or N/A

Draft **Target 8**. Minimize the impact of climate change on biodiversity, contribute to mitigation and adaptation through ecosystem-based approaches, contributing at least 10 GtCO2e per year to global mitigation efforts, and ensure that all mitigation and adaptation efforts avoid negative impacts on biodiversity.

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Research on the causes and impacts of climate change makes it increasingly clear that the climate and biodiversity are interlinked. A number of ecosystem-based approaches, such as conservation, ecosystem restoration and improved management of agriculture, forestry, fisheries, aquaculture, can contribute to both mitigation and adaptation, while also contributing to biodiversity goals, the provision of ecosystem services and disaster-risk reduction. Conversely the land use and land use change is, in many places, an important source of greenhouse gas emissions. Information based on National greenhouse gas inventories could be used to help monitor progress towards this target to the extent that this information can be disaggregated for emissions resulting from land use change land use change and ecosystem based approaches to mitigation.

5. Current level of development

This proposed indicator would need to be aligned with the UNFCCC indicators as this is collected through the UNFCCC process.

6. Proposed timetable for development

This proposed indicator is described in Chapter 5 of IPCC Guidelines for National Greenhouse Gas Inventories.

7. Proposed scale of use

This indicator should be based on national data which could then be aggregated to the global level.

8. Proposed data source

UNFCCC

9. Proposed indicator compiler

UNFCCC

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

UNFCCC

10.b Contact person(s)

11. References (if available)

Indicator not yet developed. To be identified

Indicator metadata sheet: 9.0.1 National environmental-economic accounts of benefits from the use of wild species

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

9.0.1 National environmental-economic accounts of benefits from the use of wild species

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A
N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 9. Ensure benefits, including nutrition, food security, medicines, and livelihoods for people especially for the most vulnerable through sustainable management of wild terrestrial, freshwater and marine species and protecting customary sustainable use by indigenous peoples and local communities.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Target 9 can be informed by the following sub-indicators from physical ecosystem services flow accounts of the SEEA EA, namely1) A Wild fish and other natural aquatic biomass provisioning services; 2) Wild animals, plants and other biomass provisioning services; 3) Pollination services, and 4) Nursery population and habitat maintenance services. Together they support the monitoring of nature's contribution to people through sustainable management of wild terrestrial, freshwater and marine species

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

Wild fish and other natural aquatic biomass provisioning services are the ecosystem contributions to the growth of fish and other aquatic biomass that are captured in uncultivated production contexts by economic units for various uses, primarily food production. The unit of measurement is gross tonnes of aquatic products harvested,

Wild animals, plants and other biomass provisioning services are the ecosystem contributions to the growth of wild animals, plants and other biomass that are captured and harvested in uncultivated production contexts by economic units for various uses. The scope includes non-wood forest products and services related to hunting, trapping and bio-prospecting activities; but excludes wild fish and other natural aquatic biomass. The unit of measurement is tonnes of biomass harvested.

Pollination services are the ecosystem contributions by wild pollinators to the fertilization of crops that maintains or increases the abundance and/or diversity of other species that economic units use or enjoy. This may be recorded as a final or intermediate service.

Nursery population and habitat maintenance services are the ecosystem contributions necessary for sustaining populations of species that economic units ultimately use or enjoy either through the maintenance of habitats (e.g., for nurseries or migration) or the protection of natural gene pools. This service is an intermediate

service and may provide input to different final ecosystem services including biomass provision and recreation-related services. The potential metric is the size of biomass stocks dependent upon nursey and habitat services.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

The method of computation is under development.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable.

Data on the indicator will be collected by national authorities. Whenever national data is not available, data will be estimated through global data platforms and mechanisms endorsed by the UN Statistical Commission. Global estimated data will be sent to national authorities for validation.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The SEEA Ecosystem Accounting chapters on ecosystem services are adopted as part of an international statistical standard on ecosystem accounting by the United Nations Statistical Commission at its 52nd session in 2021.

ARIES for SEEA Explorer is an open access application.

5.e Data sources

Description of all actual and recommended sources of data

National data can be collected through existing sources (databases, maps, reports), including participatory inventories on land management systems as well as remote sensing data collected by national statistical offices and mapping agencies at the national level.

In the absence of national data sources, regional and global datasets will be collected to complement and support existing national indicators through global data platforms and mechanisms endorsed by the UN Statistical Commission. Global estimated data will be sent to national authorities for validation.

The ARIES for SEEA Explorer (https://seea.un.org/content/aries-for-seea) allows for compilation of ecosystem services account through an existing ecosystem services modelling platform. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for details, noting that global data sources of several ecosystem services are not yet available and under development

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Indicators are in development. The global monitoring process for this indicator, the update frequency and release calendar are currently under development. The year on when the first round of data will be ready is pending.

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

The relevant national authorities, in conjunction with National Statistical Offices and The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. In the absence of national reporting mechanism, national data can be estimated through ARIES or other biophysical modelling platforms. The functionality of existing modelling platforms will require further development and expansion in the coming years for the reporting of this indicator.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. Missing values for individual countries are imputed using ARIES modelling or another international data platform by custodian agency using existing global data sources.

5.j Gaps in data coverage

P*lease note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)*

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

Missing values for individual countries can be imputed using ARIES for SEEA or other international modelling platform using existing global data as the source. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for the methodology.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator data is applicable at the global, national and regional scale. National data can be collated to form global indicators provided that the underlying classifications are harmonized across countries.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Differences between country produced and internationally estimated data may arise due to differences in spatial resolution and projections of datasets, classification and modelling approaches, definition of ecosystem extent and/or contextualization with other indicators, data and information.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels

Regional and global estimates are produced by aggregating country-level data.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

The mechanism for collecting data from countries is currently under development.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

No

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

This indicator can be disaggregated by ecosystem type and geographical location.

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

- Goal B: National environmental economic accounts of ecosystem services
- Target 8: National greenhouse gas inventories from land use and land use change
- Indicators related to Target 10 focusing on measuring ecosystem services of the managed/anthropogenic ecosystems
- Target 11: National environmental-economic accounts of regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people, from ecosystem.

10 .Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

United Nations Statistics Division

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Julian Chow (chowj@un.org)

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

- UN System of Environmental-Economic Accounting: https://seea.un.org/ecosystemaccounting
- United Nations et al. (2021). System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA). White cover publication, pre-edited text subject to official editing. Available at: https://seea.un.org/ecosystem-accounting.
- United Nations (2021).Guidelines on Biophysical Modelling for Ecosystem Accounting – version 2.0
- ARIES for SEEA: https://seea.un.org/content/aries-for-seea

Indicator metadata sheet: 10.0.1 Proportion of agricultural area under productive and sustainable agriculture

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework].

10.0.1 Proportion of agricultural area under productive and sustainable agriculture

2. Date of metadata update

Insert date of metadata update

October 2018 (refinements in Agro-biodiversity supportive practices approved in November 2019)

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 10. Ensure all areas under agriculture, aquaculture and forestry are managed sustainably, in particular through the conservation and sustainable use of biodiversity, increasing the productivity and resilience of these production systems.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

The approaches to framing and defining sustainable agriculture vary in terms of their coverage of the three primary dimensions of sustainability, i.e. economic, environmental and social, and in terms of the scale that is used to assess sustainability, i.e. from field and farm scales, to national and global scales. Some approaches consider different features of sustainability, for example whether current practices are economically feasible, environmentally friendly and socially desirable. Other approaches focus on particular practices such as organic, regenerative or low-input agriculture and can equate these with sustainable agriculture. The conclusion from a literature review associated with the methodological development of this indicator is that the multi-dimensional approach developed by FAO in 1988 is a meaningful framing of the concept. Thus, sustainable agriculture can be considered as "the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generation. Such development (in agriculture, forestry and fishing etc.) conserves land, water, plant and animal genetic resources, environmentally non-degrading, technically appropriate, economically viable and socially acceptable." (FAO, 1988)

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The indicator is defined by the formula:

$$Area\ under\ productive\ and\ sustainable\ agriculture\ /Agricultural\ land\ area$$

This implies the need to measure both the extent of land under productive and sustainable agriculture (the numerator), as well as the extent of agriculture land area (the denominator).

• The numerator captures the three dimensions of sustainable production: environmental, economic and social. It corresponds to agricultural land area of the farms that satisfy the sustainability criteria of the 11 sub-indicators selected across all three dimensions.

• The denominator in turn the sum of agricultural land area (as defined by FAO) utilized by agricultural holdings that are owned (excluding rented-out), rented-in, leased, sharecropped or borrowed. State or communal land used by farm holdings is not included. Please see the methodological document prepared by FAO for a more detailed explanation.

The scope of the indicator is the agricultural farm holding, and more precisely the agricultural land area of the farm holdings, i.e. land used primarily to grow crops and raise livestock. This choice of scope is fully consistent with the intended use of a country's agricultural land area as the denominator of the aggregate indicator.

Specifically, the following are:
Included within scope:
• Intensive and extensive crops and livestock production systems.
• Subsistence agriculture.
• State and common land when used exclusively and managed by the farm holdings.
• Food and non-food crops and livestock products (e.g. tobacco, cotton, and sheep wool). • Crops grown for fodder or for energy purposes.
• Agro-forestry (trees on the agriculture land areas of the farm).
• Aquaculture, to the extent that it takes place within the agricultural land area. For example, rice fish farming and similar systems.

Excluded from scope:
• State and common land not used exclusively by the farm holding.
• Nomadic pastoralism.
• Production from gardens and backyards. Production from hobby farms
• Holdings focusing exclusively on aquaculture.
• Holdings focusing exclusively on forestry.
• Food harvested from the wild.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

Steps undertaken to develop the methodology of the indicator include:

1. Determining the scope of the indicator: The scope of Indicator is the agricultural farm holdings, and more precisely the agricultural land area of the farm holdings, i.e., land used primarily to grow crops and raise livestock. Forestry, fisheries and aquaculture activities may be included to the extent that they are secondary activities conducted on the agricultural area of the farm holdings, for example rice fish farming and similar systems

2. Determining the dimensions to be covered: Indicator includes environmental, economic and social dimensions in the sustainability assessment.

3. Choosing the scale for the sustainability assessment: Indicator is farm level with aggregation to higher levels.

4. Selecting the data collection instrument(s). It is recommended that indicator be collected through a farm survey.

5. Selecting the themes within each dimension, and choosing a sub-indicator for each theme. The sub-indicators should satisfy a number of sustainability criteria (described in annex 1 for each sub-indicator, respectively).

6. Assessing sustainability performance at farm level for each sub-indicator: Specific sustainability criteria are applied in order to assess the sustainability level of the farm for each theme according to the respective sub-indicators.

7. Deciding the periodicity of monitoring the indicator. It is recommended to be collected at least every three years.

8. Modality of reporting the indicator. The set of sub-indicators are presented in the form of a dashboard. The dashboard approach offers a response in terms of measuring sustainability at farm level and aggregating it at national level.

The methodology proposes reporting of indicator through a national-level dashboard, presenting the different sub-indicators together but independently. The dashboard approach offers several advantages, including the possibility of combining data from different sources and identification of critical sustainability issues, facilitating the search for a balance between the three sustainability dimensions. As a result, countries can easily visualize their performance in terms of the different sustainability dimensions and themes, and understand where policy efforts can be focused for future improvements.

Computation of results and construction of the dashboard are performed for each sub-indicator separately using the 'traffic light' approach already defined for each sub-indicator: aggregation at national level is performed for each sub-indicator independently, by summing the agricultural land area of each agricultural holdings by

sustainability category (red, yellow or green), and reporting the resulting national total as percentage of the total national agricultural land area of all agricultural farm holdings in the country. In practice, the reported value of Indicator is determined by the results of most limiting sub-indicator in terms of sustainability performance.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

A questionnaire is sent to all countries annually since 2020 (http://www.fao.org/sustainabledevelopment-goals/indicators/241/en/). Furthermore, in order to facilitate data collection by countries, a data collection module has been designed, which contains the core set of questions necessary to obtain the data for indicator. If farm surveys already exist within a country, these questions can be integrated into existing instruments in order to minimize the burden to national statistical offices in data collection.

All data collection activities will be done through the National Statistical Office or the offices designated (Ministry of Agriculture in some countries) to collect data for this indicator. FAO, together with the Global Strategy to improve Agriculture and Rural Statistics (GSARS), have developed the capacity development material necessary for this indicator, including a methodological guide, an enumerator manual, data entry guidelines, calculation procedure document, sampling guidance and an e-learning course to train country NSO and other relevant staff on the indicator.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The methodological, support documents, update on capacity development activities etc. can be found at this link: www.fao.org/sustainable-development-goals/indicators/241/en/

5.e Data sources

Description of all actual and recommended sources of data

In order to propose a manageable and cost-effective solution, a requirement stressed by several countries during the consultations, the methodology offers a single data collection instrument for all sub-indicators: the farm survey.

In the process of capacity development, several countries have suggested using existing data sources or alternative data sources on the grounds that these instruments can be more cost-effective and sometimes provide more reliable results than farm surveys. These instruments include remote sensing, GIS, models, agricultural surveys, household surveys, administrative data or environmental monitoring systems.

Often, environmental data are collected through environmental monitoring systems, including remote sensing. Yet many countries do not have the capacity or resources to do so, and therefore these data are sparse or non-existent. I

The methodology considers the possibility to use such instruments, subject to a series of criteria to ensure data quality and international comparability. Other data sources may also be used to complement and/or validate farm survey results. The methodology note also recommends that countries complement the farm survey with a monitoring system that can measure the impact of agriculture on the environment (soil, water, fertilizer and pesticide pollution, biodiversity, etc.) and on health (pesticides residues in food and human bodies). This will provide additional information and help crosscheck the robustness of indicator with regard to the environmental dimension of sustainability. In this respect, FAO has initiated work streams on alternative data sources to improve reporting of indicator. In addition, FAO has also commenced development of a proxy approach to report on the indicator as an interim solution to bridge the data gaps while countries get ready to adopt and implement the farm survey based methodology. The proxy approach is under development,

Once the proposal is finalized, tested and approved and endorsed by IAEG-SDG will be shared with member states.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Although new data may not be available annually for each country, all new information are expected to be released annually through FAO SDG portal and UNSD.

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

Indicator measures progress towards more sustainable and productive agriculture over a three year periodicity because for many sub-indicators, it is likely that changes will be relatively limited from a year to another. Furthermore, the 3-year periodicity will enable countries to have three data points on the indicator before 2030.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

National Statistical Offices, Ministries of Agriculture or national offices designated by countries will be responsible for collecting and reporting data for this indicator,

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

National Statistical Offices or designated offices within countries will be responsible for collecting and compiling data for this indicator. They will in turn report to FAO that provides capacity development, conduct quality control and disseminate the information through FAO SDG portal. FAO will in turn report the regional and global estimates to the international statistical community and UNSD.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)

The indicator is new and complex and thus current data coverage of the indicator is low. Few countries have reported the entire dashboard, several reported a sub-set of the sub-indicators and majority are yet to provide data. The data coverage will improve over time (in the short to medium term), thanks to the capacity development efforts that include both regional and national trainings and bilateral technical assistance to member states.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

Partial non-response at individual level (farm holding) will be imputed using appropriate statistical techniques, such as nearest-neighbour algorithms. The decision on whether to impute or not and the choice of the method is a function of the nature of the variable to impute and the amount and type of data available for the imputation, such as the availability of auxiliary data coming from different sources (e.g. surveys, administrative information). It is important to clearly distinguish missing data from non-applicable events. As specified above and in the sub-indicator methodology sheets, some sub-indicators can be recorded as ‘not applicable’ for a given farm. In this case, the farm will be considered sustainable from the perspective of the given sub indicators.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

Indicator is available at global, regional and national scale.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

https://www.fao.org/3/ca7154en/ca7154en.pdf

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

An interim approach to report the indicator using proxies based on national FAOSTAT data is currently under deliberations. This short-term approach once discussed, tested, finalized will be submitted for IAEG-SDG approval and endorsement (in 2022) will be used to report on the indicator. Nevertheless, the capacity

development on farm survey-based methodology will continue to bridge the capacity and data gaps to enable countries adopt and implement the indicator.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*
Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

The indicator methodology proposes reporting of indicator through a national-level dashboard, presenting the different sub-indicators together but independently.

Computation of results and construction of the dashboard are performed for each sub-indicator separately using the 'traffic light' approach already defined for each sub-indicator. In practice, the reported value of Indicator is determined by the results of most limiting sub-indicator in terms of sustainability performance.

6.d.2 Additional methodological details
Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

Several levels of analysis will be undertaken with the data got from member countries. Time series of unsustainability for the entire world (both % and area) will allow to see the progress toward a sustainable agriculture worldwide. Charts by regions will show the % of unsustainability comparing the results of the same triennium, comparison will be done also analysing the results of three groups: developed countries, least developed countries, and developing countries. A map will be used to display the % of unsustainability, considering a given year or triennium, to have an immediate visualization of the most critical countries. Similar map will show the distance to the target of sustainability.

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

National Statistical Offices, Ministries of Agriculture or designated offices within countries will be responsible for collecting and compiling data for this indicator. They will in turn report to FAO who will conduct quality control and disseminate the information through FAO SDG portal. FAO will in turn report to the international statistical community and UNSD.

A questionnaire is sent by email to all countries annually since 2020 (http://www.fao.org/sustainabledevelopment-goals/indicators/241/en/).

The email is sent to the National focal point relevant to the indicator, National focal point for generic SDG and Heads of NSO. With copy to FAO Representative, Country, Regional and Sub-regional offices, FAO Regional Statisticians in the Region and in the Sub-regional offices, staff officially nominated to be in "CC" of all indicator communications and ESS-Registry, with a deadline for returning the filled in questionnaire within 4 weeks. Special cases for Bahrain, Cuba, Iran (Islamic Republic of), Nicaragua, Oman, Saudi Arabia, Venezuela, (Bolivarian Republic of), for which the dispatch will be addressed according to the "Data Collection Phase" guidelines (Statistical Standard Series, endorsed by the IDWG-TTF on Statistics, 15 November 2019).

Once the questionnaires are received a validation process is done through the check of the person who replied with the questionnaire returned: indicator focal point / FAO local office / Regional Statistician might be contacted to clarify if the questionnaire returned is considered valid or not.

The received questionnaires are analysed in all their parts. Namely, checking individually, both manually and automatically through an R script, standard rules (unit, text out of the spaces, time series, outliers, inconsistencies, anomalies, missing data).

7. Other MEAs, processes and organisations

7.a Other MEA and processes
Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

Linked with SDG 2.3.1, 2.4.1, 2.3.2 and 5.a.1_
Linked with SDG 2.4.1, 2.3.1, 2.3.2 and 5.a.1_

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

Proposed disaggregation

- Household and non-household sector farms
- Crops, livestock and mixed
- Irrigated and non-irrigated

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

FAO Statistics Division (Agri-environment team)

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Francesco Nicola Tubiello : Francesco.Tubiello@fao.org
Arbab Asfandiyar Khan: Arbab.Khan@fao.org

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

www.fao.org/sustainable-development-goals/indicators/241/en/

Indicator metadata sheet: 11.0.1 National environmental-economic accounts of regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people, from ecosystems

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

National environmental-economic accounts of regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people, from ecosystems

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b Target

Provide *the corresponding draft target name, draft target number, or N/A*

Target 11. Maintain and enhance nature's contributions to regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Target 11 can be informed by the following sub-indicators from physical ecosystem services flow accounts of the SEEA EA, namely1) Air filtration services; 2) Water regulation services; 3) Landslide mitigation services; 4) Flood control services, and 5) Storm mitigation services. Together they measure the regulation of air and water flows and the mitigation of extreme events by ecosystems that support the monitoring of nature's contribution to regulation of air quality, quality and quantity of water, and protection from hazards and extreme events for all people.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

Air filtration services are the ecosystem's contributions to the filtering of air-borne pollutants through the deposition, uptake, fixing and storage of pollutants by ecosystem components, particularly plants, that mitigates the harmful effects of the pollutants. The potential metric is tonnes of pollutant absorbed by type of pollutant (e.g. PM10, PM2.5).

Water flow regulation services consist of baseline flow maintenance services and Peak flow mitigation services. Water regulation services are the ecosystem contributions to the regulation of river flows and groundwater and lake water tables. They are derived from the ability of ecosystems to absorb and store water, and gradually release water during dry seasons or periods through evapotranspiration and hence secure a regular flow of water. Likewise, this ability mitigates the effects of flood and other extreme water-related events. The potential metric is the baseflow or local recharge measured in cubic metres.

Landslide mitigation services are the ecosystem contributions, particularly the land stabilising effects of vegetation, that mitigates or prevents potential damage to human health and safety and damaging effects to buildings and infrastructure that arise from the mass movement (wasting) of soil, rock and snow.

Flood control services consist of coastal protection services and river flood mitigation services. Coastal protection services are the ecosystem contributions of linear elements in the seascape, for instance coral reefs, sand banks, dunes or mangrove ecosystems along the shore, in protecting the shore and thus mitigating the impacts of tidal surges or storms on local communities. River flood mitigation services are the ecosystem contributions of riparian vegetation which provides structure and a physical barrier to high water levels and thus mitigates the impacts of floods on local communities. River flood mitigation services are synchronous with peak flow mitigation services in providing the benefit of flood protection.

Storm mitigation services are the ecosystem contributions of vegetation including linear elements, in mitigating the impacts of wind, sand and other storms (other than water related events) on local communities. The potential metric is the number of properties, people of the coast/shoreline/riparian zone protected.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

Air filtration services

The most common approach is to model air filtration estimates (ABSORPTION) as the following function of tree canopies and vegetation structure, period of analysis and deposition velocity, as follows
ABSORPTION = SURFACE*PERIOD*FLUX
Typically, Lead Area Index (LAI) is used as a proxy for SURFACE. LAI is a dimensionless index characterizing tree canopies and vegetation structure. LAI is defined as the one-sided leaf area per ground area for deciduous trees and half the total needle surface area per ground area for coniferous forests. PERIOD is defined as the period of analysis, multiplied by the proportion of dry days a year,

multiplied by the proportion of in-leaf days per year (or tree phenology). FLUX is defined as the deposition velocity multiplied by the ambient concentration of the pollutant that is being assessed.

Water flow regulation services

Water flow regulation can be modelled via a monthly time scale or a daily time scale analytical model such as InVEST Seasonal Water Yield model or Soil & Water Assessment Tool (SWAT). The water flow regulation service can be estimated by comparing the current water yield patterns with existing land cover with the water yield that would arise in a counterfactual situation of bare soil i.e. the absence of vegetation. The difference between the two situation allows to quantify the service. There are different metrics that can be used to quantify the service. A good option is to use baseflow or local recharge. An alternative is to use a metric that captures the change in volatility of stream flows.

Landslide mitigation services, Flood control services, Storm mitigation services

Mitigation services can be proxied by a number of metrices such as the number of properties and people with reduced risk of landslide/flood/storm, or the number of properties or the area of coast/shoreline/riparian zone protected.

Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for details on the modelling approach on the air filtration and water flow regulations services, noting the approach for landside mitigation services, flood control services and storm mitigation services are currently under development.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

Data on the indicator will be collected by national authorities. Whenever national data is not available, data will be estimated through global data platforms and mechanisms endorsed by the UN Statistical Commission. Global estimated data will be sent to national authorities for validation.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The SEEA Ecosystem Accounting chapters on ecosystem services are adopted as part of an international statistical standard on ecosystem accounting by the United Nations Statistical Commission at its 52nd session in 2021.

ARIES for SEEA Explorer is an open access application.

5.e Data sources

Description of all actual and recommended sources of data

National data can be collected through existing sources (databases, maps, reports), including participatory inventories on land management systems as well as remote sensing data collected by national statistical offices and mapping agencies at the national level.
In the absence of national data sources, regional and global datasets will be collected to complement and support existing national indicators through global data platforms and mechanisms endorsed by the UN Statistical Commission. Global estimated data will be sent to national authorities for validation.

The ARIES for SEEA Explorer (https://seea.un.org/content/aries-for-seea) allows for ecosystem services account to be estimated using existing ecosystem services models. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for details, noting that global data sources of several ecosystem services are not yet available and under development.

Air filtration services
If local data is not available, air pollutant removal from vegetation is estimated based on mid-resolution estimates of LAI and land cover extent, such as Landsat or Copernicus Global Land Service, and national-scale weather and air quality stations. If local data is available, the approach would rely on high-resolution and pollution concentration estimates, especially within urban areas and locations with high pollutant exposure such as industrial sites. It would track chemical-specific removal, covering multiple pollutants. Customized models and land use regression models are based on high resolution land cover mapping.

Water flow regulation services
If local data is not available, one of the most used models is to apply a model with monthly time step, such as the InVEST seasonal water yield model that adds a temporal aspect to the InVEST annual water yield model to estimate the relative contributions of different parts of the landscape to water yield and to distinguishing between quickflow (run-off occurring during or shortly after rain events) and baseflow (occurring during dry weather). If local data is available, a model with a daily time step such as the soil and water assessment tool (SWAT) can be applied.

Landside mitigation services, Flood control services, Storm mitigation services
To be developed

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Indicators are in development. The global monitoring process of indicators, the update frequency and release calendar are currently under development. The year when the first round of data will be ready is pending.

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

5.h Data providers

I*dentification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data*.

The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. In the absence of national reporting mechanism, national data can be estimated through ARIES or other biophysical modelling platforms. The functionality of existing modelling platforms will require further development and expansion in the coming years for the reporting of this indicator.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

The relevant national authorities, in conjunction with National Statistical Offices and specialized agencies, will prepare national reports for this indicator. Missing values for individual countries are imputed using ARIES modelling or another international data platform by custodian agency using existing global data sources.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

Missing values for individual countries can be imputed using ARIES for SEEA or other international modelling platform using existing global data as the source. Please refer to the Guidelines on Biophysical Modelling for Ecosystem Accounting (United Nations 2021) for the methodology.

6. Scale

6.a Scale of use

I*ndicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.*

The indicator data is applicable at the global, national and regional scale. National data can be collated to form global indicators provided that the underlying classifications are harmonized across countries.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Differences between country produced and internationally estimated data may arise due to differences in spatial resolution and projections of datasets, classification and modelling approaches, definition of ecosystem extent and/or contextualization with other indicators, data and information.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

Regional and global estimates are produced by aggregating country-level data.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

The mechanism for collecting data from countries is currently under development.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

No

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

This indicator can be disaggregated by ecosystem type and geographical location.

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

Goal B: National environmental economic accounts of ecosystem services
Target 8: National greenhouse gas inventories from land use and land use change
Target 9: National environmental-economic account of benefits from the use of wild species

Indicators related to Target 10 focusing on measuring ecosystem services of the managed/anthropogenic ecosystems

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

United Nations Statistics Division

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Julian Chow (chowj@un.org)

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

- UN System of Environmental-Economic Accounting: https://seea.un.org/ecosystemaccounting
- United Nations et al. (2021). System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA). White cover publication, pre-edited text subject to official editing. Available at: https://seea.un.org/ecosystem-accounting.
- United Nations (2021).Guidelines on Biophysical Modelling for Ecosystem Accounting – version 2.0
- ARIES for SEEA: https://seea.un.org/content/aries-for-seea

Indicator metadata sheet: 12.0.1 Average share of the built-up area of cities that is green/blue space for public use for all.

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

12.0.1 Average share of the built-up area of cities that is green/blue space for public use for all.

2. Date of metadata update

Insert date of metadata update

March 2021 (SDG 11.7.1)

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 12. Increase the area of, access to, and benefits from green and blue spaces, for human health and well-being in urban areas and other densely populated areas.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

The value of public spaces is often overlooked or underestimated by policy makers, leaders, citizens and urban developers. There are several reasons for this, such as lack of appreciation of the value of these spaces to the functioning of urban systems and quality of life, prevailing urban planning processes, the lack of resources, or understanding or capacity to use public space as a complete, multi-functional urban system. Often the lack of appropriate enabling frameworks, weak political will and the absence of the means of public engagement compound the situation.

The SDGs have for the first time provided a platform where public spaces can be globally monitored. Indicator 11.7.1 measures the share of land allocated to public spaces and the total population with access of these spaces by age, gender and disability. The share of land that a city allocates to streets and open public spaces is not only critical to its productivity, but also contributes significantly to the social dimensions and health of its population. The size, distribution and quality of a city's overall public space act as a good indicator of shared prosperity. A well developed and properly designed network of streets increases connectivity, promotes walking and social interactions but also income, gender, race or disability status and one that promotes multiple activities not only encourages their use, but also contributes to the urban character and quality of urban life.

Cities that improve and sustain the use of public space, including streets, enhance community cohesion, civic identity, and quality of life. A prosperous city develops policies and actions for sustainable use of, and equitable access to public space. In many cities however, there has been neglect of public space - both in quantity and quality, which has been further exacerbated by uncontrolled rapid urbanization which has created disorderly settlement patterns with alarmingly low shares of public space, as well as a dramatic reduction of public spaces. There is a need to expand the ratio of land allocated to public spaces and improve their qualities to make cities and urban areas more efficient, liveable, prosperous, and sustainable. Reclaiming urban spaces for people encourages development of other street activities that bring life to a city. Equally, a well distributed and hierarchical system of open public spaces that can be accessed by all regardless of is part of how we can humanize our cities and make our streets and public areas more communal.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The following is the definition of the SDG 11.7.1 indicator and consequently there could be small variations in the definition for the' Average share of the built-up area of cities that is green/blue space for public use for all'.

Indicator 11.7.1 has several interesting concepts that required global consultations and consensus. These include; built-up area, cities, open spaces for public use, etc. As a custodian agency, UN-Habitat has worked on these concepts along with several other partners.

a) **City**: A range of accepted definitions of the "city" exist, from those based on population data and extent of the built-up area to those that are based solely on administrative boundaries. These definitions vary within and between nations, complicating the task of international reporting for the SDGs. Definitions of cities, metropolitan areas and urban agglomerations also vary depending on legal, administrative, political, economic or cultural criteria in the respective countries and regions. Since 2016UN-Habitat and partners organized global consultations and discussions to narrow down the set of meaningful definitions that would be helpful for the global monitoring and reporting process. Following consultations with 86 member states, the United Nations Statistical Commission, in its 51st Session (March 2020) endorsed the Degree of Urbanisation (DEGURBA) as a workable method to delineate cities, urban and rural areas for international statistical comparisons. 1 This definition combines population size and population density thresholds to classify the entire territory of a country along the urban-rural continuum, and captures the full extent of a city, including the dense neighbourhoods beyond the boundary of the central municipality. DEGURBA is applied in a two-step process: First, 1 km2 grid cells are classified based on population density, contiguity and population size. Subsequently, local units are classified as urban or rural based on the type of grid cells in which majority of their population resides. For the computation of indicator 11.7.1, countries are encouraged to adopt the degree of urbanisation to define the analysis area (city or urban area).

b) **Built-up area of cities:** Conventionally, built up areas of cities are areas occupied by buildings and other artificial surfaces. For indicator 11.7.1, built up areas, as the indicator denominator has the same meaning as "city" (see definition of city above).

Public space: The Global Public Space toolkit defines Public Space as all places that are publicly owned or of public use, accessible and enjoyable by all, for free and without a profit motive, categorized into streets, open spaces and public facilities. Public space in general is defined as the meeting or gathering places that exist outside the home and workplace that are generally accessible by members of the public, and which foster resident interaction and opportunities for contact and proximity. This definition implies a higher level of community interaction and places a focus on public involvement rather than public ownership or stewardship. For the purpose of monitoring and reporting on indicator 11.7.1, public space is defined as all places of public use, accessible by all, and comprises open public space and streets.

c) **Open public space:** is any open piece of land that is undeveloped or land with no buildings (or other built structures) that is accessible to the public without charge, and provides recreational areas for residents and helps to enhance the beauty and environmental quality of neighbourhoods. UN-Habitat recognizes that different cities have different types of open public spaces, which vary in both size and typology. Based on the size of both soft and hard surfaces, open public spaces are broadly classified into six categories: national/metropolitan open spaces, regional/larger city open spaces, district/city open spaces, neighbourhood open spaces, local/pocket open spaces and linear open spaces. Classification of open public space by typology is described by the function of the space and can include: green public areas, riparian reserves, parks and urban forests, playground, square, plazas, waterfronts, sports field, community gardens, parklets and pocket parks.

d) **Potential open public space:** the identification of open public spaces across cities can be implemented through, among other sources, analysis of high to very high resolution satellite imagery, from base-maps provided by different organizations (e.g. OpenStreetMap, Esri, etc) or as crowd-sourced and volunteered data. While these sources provide important baseline data for indicator 11.7.1, some of the identifiable spaces may not meet the criteria of being "accessible to the public without charge". The term "potential open public space" is thus used to refer to open public spaces which are extracted from the above-mentioned sources (based on their spatial character), but which are not yet validated to confirm if they are accessible to the public without charge.

e) **Streets** are defined thoroughfares that are based inside urban areas, towns, cities and neighbourhoods most commonly lined with houses or buildings used by pedestrians or vehicles in order to go from one place to another in the city, interact and to earn a livelihood. The main purpose of a street is facilitating movement and enabling public interaction. The following elements are considered as streets space: Streets, avenues and boulevards, pavements, passages and galleries, Bicycle paths, sidewalks, traffic island, tramways and roundabouts. Elements excluded from street space include plots (either built-up), open space blocks, railways, paved space within parking lots and airports and individual industries.

f) **Land allocated to streets** refers to the total area of the city/urban area that is occupied by all forms of streets (as defined above). This indicator only includes streets available at the time of data collection and excludes proposed networks.

For more details and illustrations on the definition of the different types of open spaces considered for indicator 11.7.1 see SDG 11.7.1 step by step training module (https://unhabitat.org/sites/default/files/2020/07/indicator_11.7.1_training_module_public_space.pdf).

5.b. Method of Computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

The following is the definition of the SDG 11.7.1 indicator and consequently there could be small variations in the definition for the' Average share of the built-up area of cities that is green/blue space for public use for all'.
The method to estimate the area of public space has been globally piloted in over 600 cities and this follows a series of methodological developments that go back to the last 7 years. The finalized methodology is a three-step process:

a) Spatial analysis to delimit the city/urban area which will act as the geographical scope for the spatial analysis and indicator computation;
b) Spatial analysis to identify potential open public spaces, expert consultations and/or field work to validate data and assess the quality of spaces and calculation of the total area occupied by the verified open public spaces;
c) Estimation of the total area allocated to streets;
d) Estimation of share of population with access to open public spaces within 400 meters walking distance out of the total population in the city/ urban area and disaggregation of the population with access by sex, age and persons with disabilities

a. Spatial analysis to delimit the city/urban area

Following consultations with 86 member states, the United Nations Statistical Commission in its 51st Session (March 2020) endorsed the Degree of Urbanisation (DEGURBA) as a workable method to delineate cities, urban and rural areas for international statistical comparisons. Countries are thus encouraged to adopt this approach, which will help them produce data that is comparable across urban areas within their territories, as well as with urban areas and cities in other countries. More details on DEGURBA and its application are available here: https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Recommendation-E.pdf

b. Spatial analysis to identify potential open public spaces, ground verification and estimating their total area

This step involves mapping of potential open public spaces within the urban boundaries defined in step one above and estimation of their area. Identification of potential open public spaces is based on the spatial character of each space and is also informed by existing country/ city land use maps and open space inventories. To compute this component of the indicator, follow these steps:

1. An inventory of Open Public Spaces should be the initial source of information. Additional legal documents, land use plans and other official sources of information can be used to complement the data from the inventory. If the focus urban area or city has a detailed and up-to-date database of its open public spaces, use the information to plot such spaces in GIS software and compute their areas. Where necessary, clean data to remove components which are not applicable in the computation of this sub-indicator (e.g. recreation areas which attract a fee such as golf courses, etc).

2. Since many cities and countries do not have an open public spaces inventory, satellite imagery can be used to extract information on potential open public spaces. The identification of such spaces from imagery should be based on careful evaluation of the character of each space against the known forms of open public spaces within that city / country. High resolution satellite imagery or Google Earth imagery can be used in this analysis. Open data sources such as OpenStreetMap (OSM) have some polygon data on open spaces in many cities. While this data may not be comprehensive for all cities, it can contribute to the data collection efforts and can be explored.

3. Using the data extracted from step 2 above, undertake validation to remove spaces which are not open for public use (e.g. private non-built up land within the urban area), or to add new spaces that might have been omitted during the extraction stage. This can be achieved through analysing the character of spaces (e.g. size, shape, land cover, etc), comparison of identified spaces with known recreational areas within the city or with data from OpenStreetMap, or consultations with city leaders, local civil society groups, community representatives among others. UN-Habitat, in consultation with partners, experts and data producers have developed a detailed tool to facilitate the verification of each space and collection of additional data on the space quality and accessibility. This tool is freely available and allows for on-site definition/ editing of the space's boundaries. It also contains standard and extended questions which collect data relevant to the indicator, including location of the spaces, their ownership and management, safety, inclusivity and accessibility. This data provides basic information about each space, as well as information relevant for disaggregation - such as access issues linked to age, gender and disabilities, as requested for by the indicator. The tool is dynamic and allows cities to include extra

questions which generate information that is useful for their decision making (Tool is available at https://ee.kobotoolbox.org/x/#IGFf6ubq). It should however be noted that the validation approaches which require primary data collection are capital intensive and may not be feasible for most countries in the short term. Validation based on existing city-level data and continuous stakeholder engagement should thus be adopted since they have been shown to produce reliable results at lower costs.

4. Calculate the total area covered by the verified open public spaces. Once all open public spaces have been verified, calculate their area in GIS or other database management software. The share of land occupied by these spaces is then calculated using the formula

$$\textbf{Share of occupied land by OPS}\ (\%) = \left[\frac{\textbf{Total area covered by OPS}}{\textbf{Total area of the city}}\right]$$

c. Computation of land allocated to streets (LAS)

Where street data by width and length fields is available/specified, the following methodology could be used:

1. Select only the streets included in the city / urban area (or clip streets to the city/urban boundary)
2. From GIS (or alternative software), calculate the total area occupied by each street by multiplying its length with width. Add up all individual street areas to attain the total amount of land occupied all streets within the defined urban area.

Where detailed data on streets is not available, there is need to map out each street line (or the entire area covered by the streets), measure its length and width, which are required for the area computation. For small urban areas, it is possible to manually digitize all streets, but this is more complex for large urban areas and cities. For these large urban areas, an alternative technique for computing land allocated to the streets is one that adopts sampling principles. An approach that uses the Halton sampling sequence is recommended, specifically because the sequence generates equidistant points, increasing the degree of sample representativeness. To compute LAS using this method, follow the following steps:

1. Using the urban extent boundary identified earlier, generate a Halton sequence of sample points (Halton sequence refers to quasi-random sequence used to generate points in space that are ex-post evenly spread i.e. Equidistant). The number of points used for each city varies based on its area. In large study areas of more than 20 km^2, a density of one circle per hectare is used while in small study areas of less than 20 km^2 a density of 0.5 circle per hectare is used.
2. Buffer the points to get sample areas with an area of 10 hectares each.
3. Within each 10-hectare sample area, digitize all streets in GIS software and compute the total amount of land they occupy.
4. Calculate the average land allocated to streets for all sample areas using the following formula:

$$\text{The land allocated to streets} = \frac{\text{Sum of LAS from all sampling points}}{\text{Number of sampling points}}$$

Open source datasets such as OpenStreetMap (OSM) have a good amount of street data on many cities, which is increasingly being updated and extended to cover new areas. This data can also be used as a starting point to understand the pattern of streets in a city. Upon verification of the OSM street categorization for each city, sampling can be used to estimate the average width of each street category, which can in turn help compute the share of land allocated to streets.
The final computation of the indicator is done using the formula:

$$\textbf{Share of the built} - \textbf{up area of the city that is open space in public use}(\%)$$

$$= \frac{\textbf{Total surface of open public space} + \textbf{Total surface of land allocated to sreets}}{\textbf{Total area of the city}}$$

d) Estimation of share of population with access to open public spaces and disaggregation by population group

To help define an “acceptable walking distance” to open public spaces”, UN-Habitat organized a series of consultations with national statistical officers, civil society and community groups, experts in diverse fields, representatives from academia, think tanks, other UN-agencies, and regional commissions among other partners. These consultations, which were held between 2016 and 2018 concluded that a walking distance of 400 meters - equivalent to 5 minutes’ walk was a practical and realistic threshold. Based on this, a street network-based service area is drawn around each public open space, using the 400 meters access threshold. All populations living within the service areas are in turn identified as having access to the public open spaces, based on the following key assumptions:

- Equal access to each space by all groups of people – i.e. children, the disabled, women, elderly can walk a distance of 400 meters (for 5 minutes) to access the spaces (in actual sense, these will vary significantly by group).

- All streets are walkable – where existing barriers are known (e.g. un-walkable streets, lack of pedestrian crossings, etc), these can be defined in the delimitation of the space service area.
- All public open spaces have equal area of influence – which is measured as 400 meters along street networks. In real life situations, bigger spaces have a much larger area of influence.
- All buildings within the service area are habitable, and that the population is equally distributed in all buildings/built up areas

The estimation of total population with access to open public spaces is achieved using the two broad steps described below:

1. Create 400 meters walking distance service area from each open public along the street network. This requires use of the network analyst tool in GIS software and street data (such as that from City Authorities or from Open Sources such as OpenStreetMap). A network service area is a region that encompasses all accessible areas via the streets network within a specified impedance/distance. The distance in each direction (and in turn the shape of the surface area) varies depending on, among other things, existence of streets, presence of barriers along each route (e.g. lack of foot bridges and turns) and walkability or availability of pedestrian walkways along each street section. In the absence of detailed information on barriers and walkability along each street network, the major assumption in creating the service areas is that all streets are walkable. Since the analysis is done at the city level, local knowledge can be used to exclude streets which are not walkable. The recommendation is to run the service area analysis for each OPS separately then merge all individual service areas to create a continuous service area polygon. Step by step guidance on how to create the service area is provided in the detailed SDG 11.7.1 training module (https://unhabitat.org/sites/default/files/2020/07/indicator_11.7.1_training_module_public_space.pdf)

2. In GIS, overlay the created service area with high resolution demographic data, which should be disaggregated by age, gender, and disability. The best source of population data for the analysis is individual dwelling or block level total population which is collected by National Statistical Offices through censuses and other surveys. Where this level of population data is not available, or where data is released at large population units, countries are encouraged to create population grids, which can help disaggregate the data from large and different sized census/ population data release units to smaller uniform sized grids. For more details on the available methods for creation of population grids explore the links provided under the references section on “Some population gridding approaches”. A generic description of the different sources of population data for the indicator computation is also provided in the detailed Indicator 11.7.1 training module (https://unhabitat.org/sites/default/files/2020/07/indicator_11.7.1_training_module_public_space.pdf). Once the appropriate source of population data is acquired, the total population with access to open public spaces in the city/urban area will be equal to the population encompassed within the combined service area for all open public spaces, calculated using the formula below.

$$\textbf{Share of population with access to open space in public spaces } (\%) = \frac{\textbf{Total population within 400 m service areas}}{\textbf{Total population within the city/urban extent}}$$

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

The following is the definition of the SDG 11.7.1 indicator and consequently there could be small variations in the definition for the’ Average share of the built-up area of cities that is green/blue space for public use for all’.

The method to estimate the area of public space has been globally piloted in over 600 cities and this follows a series of methodological developments that go back to the last 7 years. The finalized methodology is a three-step process: a) Spatial analysis to delimit the city/urban area which will act as the geographical scope for the spatial analysis and indicator computation; b) Spatial analysis to identify potential open public spaces, expert consultations and/or field work to validate data and assess the quality of spaces, and calculation of the total area occupied by the verified open public spaces; c) Estimation of the total area allocated to streets; d) Estimation of share of population with access to open public spaces within 400 meters walking distance out of the total population in the city/ urban area and disaggregation of the population with access by sex, age and persons with disabilities.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For “global indicators” please note whether a methodology is available for use at national or regional scales

Methodology for SDG 11.7.1 is available and has been piloted in over 1000 cities globally. Data on the indicator is published by UN-Habitat (https://data.unhabitat.org)

5.e Data sources

Description of all actual and recommended sources of data

City land use plans, high to very high resolution satellite imagery (open sources), documentation outlining publicly owned land and community-based maps are the main sources of data.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

The monitoring of the indicator can be repeated at regular intervals of 3-5 years, allowing for three reporting points until the year 2030. However, annual updates to the existing database will be done and hence data releases based on annual updates will be available every year. Monitoring in 3-5-year intervals will allow cities to determine whether the shares of open public space in the built-up areas of cities are increasing significantly over time, as well as deriving the share of the global urban population living in cities where the open public space is below the acceptable minimum.

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

Baseline data on SDG 11.7.1 available for 2020

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

Ministries in charge of urban development, national mapping agencies, national statistical offices

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

UN-Habitat is the lead agency on the global reporting for this indicator and as such, has since 2016 coordinated the efforts of various partners, on methodological developments and piloting of data collection. Key among these partners have included National Statistical Offices, New York University, ESRI, FAO, UNGGIM, UCLG, Local government departments, the European Commission, UN regional commissions, KTH University-Sweden, Urban Observatories, etc. Working in partnership with these partners, UN-Habitat has undertaken trainings and capacity development activities in cities, countries and regions, which have contributed to enhanced data collection and setting up of systems to monitor and report on the indicator.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)
The currently available data covers cities and urban areas of different sizes but is not classified by typology of open public space i.e. green, blue and artificial surfaces.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

All qualifying cities/countries are expected to fully report on this indicator more consistently following implementation and full roll out of this methodology. In the early years of this indicator, we had data gaps due to no data being collected at the time, as opposed to missing data. In most of the cases, missing values to-date reflect a non-measurement of the indicator for the city. However, because national statistical agencies will report national figures from a complete coverage of all their cities, some cities may take longer to be measured or monitored. As a result, UN-habitat has worked with partners to develop a concept of applying a National Sample of Cities. With this approach, countries will be able to select a nationally representative sample of cities from their system of cities, and these will be used for global monitoring and reporting purposes for the period of the SDGs.

The fully developed methodology on this concept has been rolled out and countries that are unable to cover the full spectrum of their cities are already applying this approach. See:
https://unhabitat.org/sites/default/files/2020/06/national_sample_of_cities_english.pdf

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator is applicable from city to national and regional/global levels. Measurement is done at the city level (for all cities and/or using a sample of representative cities) from where data can be aggregated to national, regional and global levels.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

Global SDG 11.7.1 methodology is applicable to national and local city levels (see https://unstats.un.org/sdgs/metadata/files/Metadata-11-07-01.pdf).

Since countries have the responsibility to produce data on the indicator, the underlying data is available to them through existing national and local data sharing mechanisms. Data produced through the efforts of international organizations such as UN-Habitat is openly available to countries for use.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Minimal to no differences are likely to emerge for this indicator since measurement is done at the city level, with data aggregated to national, regional then global levels. Data produced by international organizations is to be shared with countries for validation, and nationally produced data will be treated as the most authoritative data.

The only likely source of variations may be on the application of the globally harmonized approach to defining cities and urban areas, where countries may choose to use their national definitions as opposed to the harmonized approach. Data for this indicator should thus be accompanied by an explanation on the definition of city/urban area used in the computations.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

Data produced at the city/urban level within each country is aggregated to produce a national value based on the national sample of cities approach developed by UN-Habitat, through which a weighting scheme is developed for each city as a factor of its national representativeness (See: https://unhabitat.org/sites/default/files/2020/06/national_sample_of_cities_english.pdf). The national aggregates from different countries are then used to produce regional and global estimates.

Anticipating the challenge of limited data availability from countries in the earlier years of the indicator, the global sample of cities developed jointly by UN-Habitat, New York University and the Lincoln Institute of Land Policy presents a consistent approach to producing regional and global aggregates.

The global sample of cities includes a list of cities which are representative of all regions and for which data can be produced and used to produce weighted regional and global values on the indicator performance (see https://www.lincolninst.edu/sites/default/files/pubfiles/atlas-of-urban-expansion-2016-volume-1-full.pdf).

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

N

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

Based on availability of high-resolution population data, population with access to open public spaces should be disaggregated by age, gender and disability.
Wherever possible, it would also be useful to have information disaggregated by:

- Location of public spaces (intra-urban)
- Quality of the open public space by safety, inclusivity, accessibility, greenness, and comfort
- Type of open space as a share of the city area
- The share of open spaces in public use which are universally accessible, particularly for persons with disabilities.
- Type of human settlements

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

UN-Habitat

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Robert Ndugwa: robert.ndugwa@un.org

11 References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

- Axon Johnson Foundation, Public Spaces and Place making, Future of Places, http://futureofplaces.com/
- UN-Habitat (2013) Streets as Public Spaces and Drivers of Urban Prosperity, Nairobi
- UN-Habitat (2014) Methodology for Measuring Street Connectivity Index
- UN-Habitat (2015) Spatial Capital of Saudi Arabian Cities, Street Connectivity as part of City Prosperity Initiative
- UN-Habitat (2015) Global Public Space Toolkit from Global Principles to Local Policies and Practice
- UN-Habitat (2018). SDG Indicator 11.7.1 Training Module: Public Space. United Nations Human Settlement Programme (UN-Habitat), Nairobi. Available at https://unhabitat.org/sites/default/files/2020/07/indicator_11.7.1_training_module_public_space.pdf
- Kaw, Jon Kher, Hyunji Lee, and Sameh Wahba, editors. 2020. The Hidden Wealth of Cities: Creating, Financing, and Managing Public Spaces. Washington, DC: World Bank. doi:10.1596/978-1-4648-1449-5. License: Creative Commons Attribution CC BY 3.0 IGO
- SDG 11.7.1 metadata, 2020. https://unstats.un.org/sdgs/metadata/files/Metadata-11-07-01.pdf

Shortened Format indicator metadata sheet: 13.0.1 Indicators of operational legislative, administrative or policy frameworks which ensure fair and equitable sharing of benefits, including those based on PIC and MAT

1. Proposed Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

13.0.1 Indicators of operational legislative, administrative or policy frameworks which ensure fair and equitable sharing of benefits, including those based on PIC and MAT

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3. a Draft goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b **Draft target**

Provide the corresponding draft target name, draft target number, or N/A

Target 13. Implement measures at global level and in all countries to facilitate access to genetic resources and to ensure the fair and equitable sharing of benefits arising from the use of genetic resources and, as relevant, of associated traditional knowledge, including through mutually agreed terms and prior and informed consent.

4. **Proposed rationale**

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Building upon Aichi Target 16 and SDG Target 15.6, this indicator would aim to measure national progress in implementing operational ABS legislative, administrative or policy frameworks. In line with the level of ambition of the post-2020 global biodiversity framework, this new indicator would allow countries to self-assess their access and benefit-sharing framework against a set of operational criteria, and monitor progress made over time. The objective of the indicator would not be to rank countries, but to help countries assess where they are and what they can do to enhance their implementation of access and benefit-sharing instruments. It is assumed that achieving Target 13 by 2030 would create the enabling environment needed to achieve Goal C by 2050. The indicator could be useful to guide capacity-building efforts and to support the mutually supportive implementation of access and benefit-sharing instruments at the national level. The indicator would attempt to capture various aspects of operational legislative, administrative or policy frameworks which ensure fair and equitable sharing of benefits. The criteria (sub-indicators) for the indicator would need to be defined.

5. **Current level of development (including methodology, data, spatial coverage)**

Not yet developed. The methodology for this indicator could be modelled on the methodology developed by UNEP for SDG indicator 17.14.1 (Mechanisms in place to enhance policy coherence for sustainable development) or similar composite indicators. This methodology would involve the development of a scoring mechanism to help countries self-assess their progress based on a set of criteria covering various aspects of operational legislative, administrative or policy frameworks which ensure fair and equitable sharing of benefits. Each criterion (sub-indicator) would be assigned a value by the reporting country. The aggregate value of these sub-indicators would provide a “score”, e.g. within a 0-10 range (where 0 means that no access and benefit-sharing framework is in place or operational, and 10 means that the national framework is fully operational).

6. Proposed timetable for development

To be determined.

7. Proposed scale of use
National data to be collated to form a global indicator, i.e. the average and/or median of self-assessed scores for all countries

8. Proposed data source
Completed survey/self-assessments by Governments (yet to be developed) submitted to the Secretariat of the Convention on a regular basis and leading up to 2030.

9. Proposed Indicator compiler

Secretariat to the CBD

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

10.b Contact person(s)
Jillian Campbell, SCBD, campbell7@un.org
Julie Roy, SCBD, julie.roy@un.org

11. References (if available)

Indicator metadata sheet: 14.0.1 Extent to which national targets for integrating biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies and accounts at all levels, ensuring that biodiversity values are mainstreamed across all sectors and integrated into assessments of environmental impacts

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

14.0.1 Extent to which national targets for integrating biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies and accounts at all levels, ensuring that biodiversity values are mainstreamed across all sectors and integrated into assessments of environmental impacts

2. Date of metadata update

Insert date of metadata update

28 January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Draft Target 14. Fully integrate biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies, accounts, and assessments of environmental impacts at all levels of government and across all sectors of the economy, ensuring that all activities and financial flows are aligned with biodiversity values.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Reaching the goals of the post-2020 global biodiversity framework and the 2050 Vision for Biodiversity will require that biodiversity moves from the periphery of decision making to become a core consideration in decision and planning processes across government and all sectors of the economy and of society, recognizing the multiple values of biodiversity. These issues are addressed under proposed target 14. This suggested indicator would directly inform the extent to which biodiversity is reflected in relevant decision making processes.
SDG indicator 15.9.1(a) examines at the extent to which countries have established targets related to Aichi Biodiversity Target 2 and the progress towards these. This indicator can be considered as broadly similar to proposed indicator 14.01 to the extent that draft target 14 address issues similar to Aichi Biodiversity Target 2.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

The final definition for the indicator will depend on the details of the post-2020 global biodiversity framework. Assuming that Parties are encouraged to establish national targets or commitments similar to draft target 14, the indicator would measure the progress towards these based on the information provided by Parties in their national reports.

In accordance with Article 26 of the Convention on Biological Diversity, Parties are obligated to provide information on measures taken towards the implementation of the Convention and its strategic plans, as reflected in the National Biodiversity Strategy and Action Plan (NBSAP), as well as on the effectiveness of these measures. The national reports are publicly available on the Convention's Clearing-House Mechanism. The format for the seventh national reports have not yet been agreed by Parties however assuming that a similar approach is used for the seventh national reports as was for the sixth national reports, Parties would be

requested to, among other things, provide an assessment of their progress towards proposed target 14 and/or any corresponding national targets or similar commitments.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

The format for the seventh national reports has not yet to be agreed by Parties to the Convention. However, the reports are likely to include a mixture of quantitative and qualitative information on the level of national progress made towards the goals, milestones and targets agreed in the post-2020 global biodiversity framework. Using a similar methodology to that used for SDG indicator 15.9.1(a), and as illustrated in the fifth edition of the Global Biodiversity Outlook, this information will be compiled to provide an assessment of progress towards proposed target 14. The details of the methodology will be further determined based on the final wording of proposed target 14 and the format of the seventh national reports.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

The methodology will be refined based on the final format of the seventh national reports. The information for the indicators will be collected through the seventh national reports

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The methodology for this indicator would be based on the SDG indicator 15.9.1(a). A detailed methodology, including definitions and data collection methods need to be developed. However the methodology would be similar to that used for SDG indicator 15.9.1(a). The metadata for that indicator is accessible from https://unstats.un.org/sdgs/metadata/files/Metadata-15-09-01.pdf

5.e Data sources

The data source will be the seventh and eight national reports. Details will be further determined on the basis of the final format of the seventh national reports.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

This will need to be determined as part of the methodological development of the indicator and the final format of the seventh national report. However, if the proposal that the seventh national reports should be submitted on 30 June 2025 is maintained, the first results from the indicator could be reported in the second half of 2025. An update of the indicator would then be prepared on the basis of the eight national reports which are currently proposed to be submitted on 30 June 2029. Interim updates could also be undertaken within this period depending on the level of submissions of the national reports and any updates provided by Parties.

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

Indicator not yet developed. This will need to be determined as part of the methodological development of the indicator. Assuming that the current proposal for the seventh and eight national reports is maintained, the indicator would cover a period from 2025 to 2029. If the indicator is comparable with the SDG indicator 15.9.1, the data range could be 2020 to 2029.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

The indicator would be prepared on the basis on the national reports submitted by Parties.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

The information for the indicator would be compiled by the Secretariat of the Convention on Biological Diversity, or an identified partner, on the basis of the information provided by Parties through their national reports.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)
Indicator not yet developed. Data gaps will be identified as the methodology is developed. The primary gaps would be the result of incomplete information from the national reports.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator
Indicator not yet developed. To be determined during method development.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator would be compiled on the basis of the national reports. The data could be reported, nationally, regionally and//or globally.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.
The indicator would follow a similar methodology to that used for SDG 15.9.1(a). As the indicator is an aggregation of national data there would be no national methodology.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Indicator not yet developed. Not yet available. However as the indicator would be compiled from official information provided by Parties no differences would be expected.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*
Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

Not applicable to this proposed indicator

6.d.2 Additional methodological details
Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

Not applicable to this proposed indicator.

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

The information would be complied through the national reports to the Convention on Biological Diversity. The national reports are generally submitted by the national focal point to the Convention.

7. Other MEAs, processes and organisations

7.a Other MEA and processes
Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).
This indicator is not yet in use. However the indicator is similar to SDG indicator 15.9.1(a).

7.b Biodiversity Indicator Partnership
Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

Indicator not yet developed. Not yet available

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)
The indicator would be available for use nationally, regionally and globally.

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

Indicator not yet developed. However the indicator would likely be relevant to all targets related to Goal B and D.

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata
Secretariat of the Convention on Biological Diversity

10.b Contact person(s)
Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

To be identified.

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

SDG indicator 15.9.1 (a) available here https://unstats.un.org/sdgs/metadata/files/Metadata-15-09-01.pdf.

Shortened Format indicator metadata sheet: 15.0.1 Dependencies and impacts of businesses on biodiversity

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

15.0.1 Dependencies and impacts of businesses on biodiversity

2. Date of metadata update

Insert date of metadata update

28 January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A
N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Draft Target 15. All businesses (public and private, large, medium and small) assess and report on their dependencies and impacts on biodiversity, from local to global, and progressively reduce negative impacts, by at least half and increase positive impacts, reducing biodiversity-related risks to businesses and moving towards the full sustainability of extraction and production practices, sourcing and supply chains, and use and disposal.

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

All business have impacts (positive, neutral and negative) on biodiversity. A better understanding and tracking of these impacts can help to inform to inform decision making and to better understand dependencies and interlinkages. While there are multiple private sector reporting initiatives, there is currently no globally comprehensive information on this issue. An indicator related to the dependencies and impacts of businesses on biodiversity would address an important information gap.

5. Current level of development

This proposed indicator is not yet developed. An organization(s) to develop it and to support its operationalisation needs to be identified.

6. Proposed timetable for development

This proposed indicator is not yet developed. On the basis of information provided in the national reports (depending on their agreed format) and/or additional surveys of Parties to the Convention on Biological Diversity, reporting on this indicator would be feasible for the sixteenth meeting of the Conference of the Parties.

7. Proposed scale of use

This proposed indicator is not yet developed. However it would most likely need to be developed on basis on national data which could then be aggregated to the global level.

8. Proposed data source

This proposed indicator is not yet developed. An indicator provided needs to be identified. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

9. Proposed indicator compiler

No methodology for this indicator is currently available. Data sources, including definitions and data collection methods, need to be identified. Information could be provided through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

10.b Contact person(s)

11. References (if available)

Indicator not yet developed. To be identified

Indicator metadata sheet: 16.0.1 Food waste index

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

16.0.1 Food waste index

2. Date of metadata update

Insert date of metadata update

5 February 2021

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 16. Ensure that people are encouraged and enabled to make responsible choices and have access to relevant information and alternatives, taking into account cultural preferences, to reduce by at least half the waste and, where relevant the overconsumption, of food and other materials.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

According to an FAO publication in 2011, approximately one-third of all food is lost or wasted. This results in economic loss and increased pressure on food systems. Reducing food waste is critical to maximizing the value of agricultural land and ensuring that natural resources are used in a sustainable way. This indicator will not only help countries identify where food is lost and wasted but also it can provide information which Governments, citizens and the private sector can take in order to reduce food waste.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

Food waste is food and associated inedible parts removed from the human food supply chain in the following sectors: retail and other distribution of food; out-of-home consumption (restaurants, schools, hospitals, other canteens, etc.); and households. “Removed from the human food supply chain” means one of the following end destinations: landfill, controlled combustion, sewer, litter/discards/ refuse, co/anaerobic digestion, compost/aerobic digestion or land application.

Food Waste = Edible Parts + Inedible Parts, and this definition is about whether the food was intended for human consumption, rather than if it is not edible or not at the point of disposal.

Food is any substance – whether processed, semi processed or raw – that is intended for human consumption. “Food” includes drink, and any substance that has been used in the manufacture, preparation or treatment of food. “Food” also includes material that has spoiled and is therefore no longer fit for human consumption. It does not include cosmetics, tobacco or substances used only as drugs. It does not include processing agents used along the food supply chain, for example water to clean or cook raw materials in factories or at home.

The indicator aims to measure the total amount of food that is wasted in tonnes.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight

cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

For this indicator two levels are used:
Level I: Globally available data;
Level II: National data which will be collected from countries.

Level I indicator: *Food waste in the waste stream*	Estimated from a global model, based on regional coefficients for food waste in the total waste stream.
Level II indicator: *Food waste generation by supply chain stage*	Collect data on food waste generation from supply chain stages based on national priorities

For level I, the global modelling approach will estimate a proportion of food in the total waste stream data (e.g. municipal solid waste (MSW)) and apply the proportion to the total. Note that when a country reports data then no global estimation will be done, the country data will be used directly.
For level II, countries should identify the scope of which stages of the supply chain can be covered and estimate the total amount of food wasted for each supply chain stream. The amount of food waste within a stage of the food supply chain shall be established by measuring food waste generated by a sample of food business operators or households in accordance with any of the following methods or a combination of those methods or any other method equivalent in terms of relevance, representativeness and reliability.
The food waste index is calculated according to the following approach:

$$Food\ waste\ per\ capita_t = \frac{Total\ foodwaste_t}{Population_t}$$

where: t = year total food waste is the sum of waste in three sectors in a given year as per the formula below:

$$Total\ food\ waste_t = FW_{in\ households_t} + FW_{Restaurants\ and\ food\ services\ _t} + FW_{Retail_t}$$

The Food Waste Index for the year in question is then calculated as food waste per capita in that year divided by food waste per capita in a baseline year (t_0) multiplied by 100 to express the result as a percentage:

$$Food\ Waste\ Index_t = \frac{Food\ waste\ per\ capita_t}{Food\ waste\ per\ capita_{t_0}} \times 100$$

In countries where it is not possible to obtain the detailed data necessary to estimate total food waste using the formula above, a simplified approach to calculating food waste per capita may be taken:

$$Food\ waste\ per\ capita_{t_{simp}} = \frac{MSW\ generated_t \times Share\ of\ food\ waste_t}{Population_t}$$

where: t = year $MSW\ generated$; t is total municipal solid waste generated in a given year; $Share\ of\ food\ wastet$ is the proportion of total MSW made up of food waste in the year, which can be estimated from waste composition studies.

The food waste index for the year is then calculated using the simplified estimate of food waste per capita in the same formula as above:

$$Food\ Waste\ Index_{t_{simp}} = \frac{Food\ waste\ per\ capita_{t_{simp}}}{Food\ waste\ per\ capita_{t_{0_{simp}}}} \times 100$$

5.c Data collection method
Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

UNEP is exploring the use of the UNSD/UNEP Questionnaire on Environment Statistics for data collection. Additional data will be collected through directly by UNEP.

5.d Accessibility of methodology
Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

A full methodology for this indicator is available in the document entitled "Global Chemicals and Waste Indicator Review Document (UNEP, 2021)"

5.e Data sources
Description of all actual and recommended sources of data

Level I data is produced on the bases of data available from different national or international datasets. Level II data is provided by national governments, including NSOs and Ministries of Environment.

5.f Availability and release calendar
Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Level I Indicators: were reported in 2021 for the year 2019.
Level II Indicators: will be available in 2023 for the years up to 2021.

5.g Time series
Date range for which indicator is available, e.g. 1993 – 2021

Level I data was reported in 2021 for the year 2019.

5.h Data providers
Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

Data is provided by national governments, including NSOs and Ministries of Environment

5.i Data compilers
Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

UNSD and UNEP

5.j Gaps in data coverage
Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)

There are no gaps in data coverage for Level I indicators. Gaps in data coverage for Level II indicators will depend on national capacity.

5.k Treatment of missing values
Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator
Missing values are not imputed for national figures. However, UNEP is using a global modelling approach for level I (this is due to the lack of data on this topic and the interest in having data that can be used for high-level tracking).

6. Scale

6.a Scale of use
Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

The indicator is applicable at the global, regional and national scale.

6.b National/regional indicator production
For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

A full methodology for this indicator is available in the document entitled, "Global Chemicals and Waste Indicator Review Document (UNEP, 2021)".

6.c Sources of differences between global and national figures
Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

Level I indicator: *Food waste in the waste stream*	Estimated from a global model, based on regional coefficients for food waste in the total waste stream.
Level II indicator: *Food waste generation by supply chain stage*	Collect data on food waste generation from supply chain stages based on national priorities

Please see more information in 5.b *Method of computation*.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*
Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

For level I, the global modelling approach will estimate a proportion of food in the total waste stream data (e.g. municipal solid waste, MSW) and apply the proportion to the total. Note that when a country reports data then no global estimation will be done, the country data will be used directly.
Please see more information in 5.b *Method of computation*.

6.d.2 Additional methodological details
Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

UNEP is exploring the use of the UNSD/UNEP Questionnaire on Environment Statistics for data collection from countries. Additional data will be collected directly by UNEP.

7. Other MEAs, processes and organisations

7.a Other MEA and processes
Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD) SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

SDGs: indicator 12.3.1 *(a) Food loss index and (b) food waste index*.

The indicator on food waste refers to SDG Indicators 12.3.1 (*a*) Food loss index and (*b*) food waste index, 11.6.1 Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities and 12.5.1 National recycling rate, tons of material recycled

7.b Biodiversity Indicator Partnership
Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

No

8. Disaggregation
Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

Ideally, food waste would be disaggregated by edible and inedible parts.
Disaggregation of food waste by destination is important for understanding the best way to optimize the use of food waste for fertilizer. This includes:

- Co-digestion/anaerobic digestion,
- Composting/aerobic process,
- Controlled combustion,
- Land application,
- Landfill,
- Refuse/discards/litter

9. Related goals, targets and indicators
Description of linkages to other indicators proposed in the first draft monitoring framework

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

United Nations Environment Programme (UNEP)

10.b Contact person(s)
Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Dany Ghafari, dany.ghafari@un.org

11. References
Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

UNEP Food Waste Index Report 2021

Indicator metadata sheet: 16.0.2 Material footprint per capita

1. Indicator name
Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

16.0.2 Material footprint per capita

2. Date of metadata update
Insert date of metadata update

20 December 2021

3. Goals and Targets addressed
Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal
Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target
Provide the corresponding draft target name, draft target number, or N/A

Target 16. Ensure that people are encouraged and enabled to make responsible choices and have access to relevant information and alternatives, taking into account cultural preferences, to reduce by at least half the waste and, where relevant the overconsumption, of food and other materials.

4. Rationale
Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Material footprint of consumption reports the amount of primary materials required to serve final demand of a country and can be interpreted as an indicator for the material standard of living/level of capitalization of an economy. Per-capita MF describes the average material use for final demand.

5. Definitions, concepts and classifications

5.a Definition:
Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

Material Footprint (MF) is the attribution of global material extraction to domestic final demand of a country. The total material footprint is the sum of the material footprint for biomass, fossil fuels, metal ores and non-metal ores. Per-capita MF describes the average material use for final demand.
Domestic Material Consumption (DMC) and Material Footprint (MF) need to be looked at in combination as they cover the two aspects of the economy, production and consumption. The DMC reports the actual amount of material in an economy, MF the virtual amount required across the whole supply chain to service final demand. A country can, for instance have a very high DMC because it has a large primary production sector for export or a very low DMC because it has outsourced most of the material intensive industrial process to other countries. The material footprint corrects for both phenomena.

5.b Method of computation
Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

It is calculated as raw material equivalent of imports (RMEIM) plus domestic extraction (DE) minus raw material equivalents of exports (RMEEX). For the attribution of the primary material needs of final demand a global, multi-regional input-output (MRIO) framework is employed. The attribution method based on I-O analytical tools is described in detail in Wiedmann et al. 2015. It is based on the EORA MRIO framework developed by the

University of Sydney, Australia (Lenzen et al. 2013) which is an internationally well-established and the most detailed and reliable MRIO framework available to date.

5.c Data collection method
Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

The IRP Global Material Flows and Resource Productivity working group compiles the data from countries using national and international (UNSD, FAOSTAT, IEA, etc.) data sources.

5.d Accessibility of methodology
Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The use of natural resources in the economy: A global manual on Economy-Wide Material Flow Accounting

5.e Data sources
Description of all actual and recommended sources of data

The global material flows database is based on country material flow accounts from the European Union and Japan and estimated data for the rest of the world. Estimated data is produced on the bases of data available from different national or international datasets in the domain of agriculture, forestry, fisheries, mining and energy statistics

International statistical sources include the IEA, USGS, FAO and COMTRADE databases.

5.f Availability and release calendar
Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc). If the indicator is not operational, please add a short description of how it is being made operational.

The indicator is available and will be updated every 2-3 years with annual volumes.

5.g Time series
Date range for which indicator is available, e.g. 1993 – 2021

The data set covers each nation individually, over a time period of 1970-2019.

5.h Data providers
Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

National Statistical Offices

5.i Data compilers
Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

UNEP, OECD and EUROSTAT

5.j Gaps in data coverage
Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)

No gaps in the data coverage.

5.k Treatment of missing values
Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

Please find a description of the methodology in 5.b Method of computation. For more information, see *The use of natural resources in the economy: A global manual on Economy-Wide Material Flow Accounting*

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

Global, regional and national scales.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

Eurostat, Economy-wide Material Flow Accounts Handbook:
https://ec.europa.eu/eurostat/documents/3859598/9117556/KS-GQ-18-006-EN-N.pdf/b621b8ce-2792-47ff-9d10-067d2b8aac4b

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

There are no significant differences between country produced and internationally estimated data, because Material flow accounts apply the accounting concepts, structures, rules and principles of the SEEA Central Framework (International Statistical Standard).

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*
Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

There are no significant differences between national and international methodology, because Material flow accounts apply the accounting concepts, structures, rules and principles of the SEEA Central Framework (International Statistical Standard).

6.d.2 Additional methodological details
Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

Estimated data is produced by IPR (UNEP) on the bases of data available from different national or international datasets in the domain of agriculture, forestry, fisheries, mining and energy statistics. International statistical sources include the IEA, USGS, FAO and COMTRADE databases. UNEP sends the estimated indicators to the counties for validation.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

SDGs: Indicators 8.4.1 / 12.2.*1 Material footprint, material footprint per capita, and material footprint per GDP*.

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.
No

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

The MF indicator can be disaggregated to four main material categories (biomass, fossil fuels, metal ores and non-metal ores)

9. Related goals, targets and indicators
Description of linkages to other indicators proposed in the first draft monitoring framework

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

United Nations Environment Programme (UNEP)

10.b Contact person(s)
Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Dany Ghafari, dany.ghafari@un.org

11. References
Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

EUROSTAT (2013). Economy-wide material flow accounts. Compilation guide 2013.

Wiedmann, T., H. Schandl, M. Lenzen, D. Moran, S. Suh, J. West, K. Kanemoto, (2013) The Material Footprint of Nations, Proc. Nat. Acad. Sci. Online before print.

Lenzen, M., Moran, D., Kanemoto, K., Geschke, A. (2013) Building Eora: A global Multi-regional Input-Output Database at High Country and Secotr Resolution, Economic Systems Research, 25:1, 20-49.

Indicator metadata sheet: 17.0.1 Indicator of measures in place to prevent, manage and control potential adverse impacts of biotechnology on biodiversity taking into account human health
tbc

No metadata available

Indicator metadata sheet: 18.0.1 Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated.

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

18.0.1 Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated.

OECD comments: It is not clear why the OECD data on government support to agriculture has been put forward as a headline indicator. OECD does collect data on government support to agriculture in 54 countries annually, and has been able to identify potentially most environmentally harmful support to agriculture. But this share of support has been reported at an aggregate level (i.e., at OECD or global level). At this stage, OECD is not in a position to offer a headline indicator tracking such support nationally every year for the country it has data on. Instead, we propose that data on potentially environmentally harmful support to agriculture serve as a complementary or composite indicator (as it could continue to be reported in an aggregated manner for OECD and emerging economies that provide data – further information is provided below).

In contrast, OECD collects national level data on positive incentives for the conservation and sustainable use of biodiversity. These incentives are also referred to as economic instruments or incentive-based instruments. OECD collects the data through the OECD database on Policy Instruments for the Environment (PINE). The data meets the headline indicator criteria (i.e. they can be aggregated up from national level data and can be disaggregated down from totals, as the data is reported in a consistent and comparable way across countries). More than 120 countries are currently contributing to the OECD Policy Instruments for the Environment (PINE) database. Data covered includes:
biodiversity-relevant taxes
biodiversity-relevant fees and charges
biodiversity-relevant tradable permits
biodiversity-relevant positive subsidies

We therefore propose this headline indicator name: Positive incentives (by type) in place to promote biodiversity conservation and sustainable use. The subsequent information provided in this factsheet relates to this proposed indicator, unless otherwise specified.

2. Date of metadata update

Insert date of metadata update

2021.

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 18. Redirect, repurpose, reform or eliminate incentives harmful for biodiversity, in a just and equitable way, reducing them by at least 500 billion per year, including all of the most harmful subsidies, and ensure that incentives, including public and private economic and regulatory incentives, are either positive or neutral for biodiversity.

4. Rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Positive incentives for biodiversity conservation and sustainable use (also referred to as incentive-based mechanisms or economic instruments) are key policy instruments that serve to help internalise the negative externalities associated with the use of biodiversity. Examples include taxes on pesticide pollution, fees for

hunting and fishing licenses, tradable permits for groundwater extraction, amongst many others. These positive incentives are key to mainstreaming biodiversity across sectors (e.g. agriculture, forestry, fisheries) and to reflect the true value of biodiversity into market (i.e. economic) decision-making. Many of these positive (or economic) incentives are also able to generate revenue (e.g. biodiversity-relevant taxes, fees and charges, and also tradable permits if they are auctioned). They raise the cost of using the natural resource, thereby providing continuous incentives to both consumers and producers to behave in a more environmentally sustainable way.

5. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

Definition of positive incentives for biodiversity conservation and sustainable use: Positive incentives, or incentive-based mechanisms or economic instruments are the set of policy instruments that are based on providing incentives for producers and consumers to behave in a more sustainable way. Economic instruments are fiscal and other economic incentives to incorporate environmental costs (and benefits) into production and consumption. The objective is to encourage environmentally sound and efficient production and consumption through full-cost pricing. In contrast to more traditional command-and-control approaches (e.g. restrictions on access or use, standards, etc), economic instruments can in theory meet a given environmental objective at a lower total economic cost.

Unit of measurement: Number of positive incentives (by type).

In case OECD agriculture support data is used as a complementary indicator:
Agricultural support considered to be potentially most environmentally harmful is defined as the sum of three categories of support: (positive) market price support, or price inflating measures, payments based on agricultural outputs, and variable input payments without constraints. Several OECD publications have confirmed the potential effect of these categories in support at farm level and country level.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

On the OECD PINE database on economic instruments (positive incentives): Countries are requested to report on when the policy instrument was introduced, what it applies to, the geographical coverage, the environmental domain, the industries concerned; the revenues, costs or rates; whether the revenue is earmarked; and any exemptions.

Information is available by country at the individual policy instrument level. Data can be aggregated up to the global level.

See OECD (2021), Tracking Economic Instruments and Finance for Biodiversity – 2021.

Information for the OECD PINE database is collected via a network of 200 country experts, including in government agencies (Ministries of Finance and Environment, statistical institutes) as well as research institutes and international organisations. Data is collected systematically for OECD members as well as the active accession countries. A growing number of non-member countries also provide information. Currently, more than 120 countries are contributing data. Registered experts are asked to update data at least once a year, typically in January or February, through a password-protected interface. The data collection method may result in some reporting bias, as OECD members and active accession countries are likely to report more data on a regular basis, and all figures should be interpreted in this context.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

Data on positive incentives for biodiversity is collected via the OECD database on Policy Instruments for the Environment (PINE). For the OECD PINE database, data is collected via a network of 200 country experts, including in government agencies (Ministries of Finance and Environment, statistical institutes) as well as research institutes and international organisations. Data is collected systematically for OECD members as well as the active accession countries. A growing number of non-member countries also provide information. Currently, more than 120 countries are contributing data. Registered experts are asked to update data at least once a year,

typically in January or February, through a password-protected interface. The data collection method may result in some reporting bias, as OECD members and active accession countries are likely to report more data on a regular basis, and all figures should be interpreted in this context.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The PINE data is publicly available on the OECD website. The methodology has been approved by OECD delegates.

5.e Data sources

Description of all actual and recommended sources of data

Countries are requested to report on when the policy instrument was introduced, what it applies to, the geographical coverage, the environmental domain, the industries concerned; the revenues, costs or rates; whether the revenue is earmarked; and exemptions.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Available now

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

Data on positive incentives for biodiversity is available from 1980-present. More than 120 countries are contributing to the OECD Policy Instruments for the Environment (PINE) database, from which the data on incentives for biodiversity derives. Latest update on biodiversity is available here: OECD (2021), Tracking Economic Instruments and Finance for Biodiversity – 2021.

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

Data on positive incentives for biodiversity is collected via the OECD database on Policy Instruments for the Environment (PINE). For the OECD PINE database, data is collected via a network of 200 country experts, including in government agencies (Ministries of Finance and Environment, statistical institutes) as well as research institutes and international organisations. Data is collected systematically for OECD members as well as the active accession countries. A growing number of non-member countries also provide information. Currently, more than 120 countries are contributing data. Registered experts are asked to update data at least once a year, typically in January or February, through a password-protected interface.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

The OECD is responsible for collecting and compiling the data on Policy Instruments for the Environment, which includes data on biodiversity-relevant economic instruments (i.e. positive incentives).

The OECD does not impute for missing data.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)

More than 120 countries worldwide are contributing data to the OECD PINE database. All countries are welcome and encouraged to contribute data

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator.

Any missing data/values are not imputed.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

Data on positive incentives is collected at national level. Countries can specify whether the policy instrument is applied nationally or sub-nationally. National data can therefore be collated to provide global indicators (e.g. total number of countries with biodiversity-relevant taxes [over time]; total number of biodiversity-relevant taxes [over time], etc).

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

All the PINE data is available online on the OECD website. The data covers different environmental domains (e.g. biodiversity, climate, air, etc). The OECD Secretariat regularly provides an overview of the biodiversity-relevant data, given its relevance to the CBD and so as to enhance user-friendliness.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

N/A

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

6.d.3 Description of the mechanism for collecting data from countries

Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

7. Other MEAs, processes and organisations

7.a Other MEA and processes

Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

The indicator is already in use for SDG 15.a.1 on biodiversity finance.
This is because the data collected also includes information on the revenue generated or finance mobilised by the economic instruments.

7.b Biodiversity Indicator Partnership

Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

YES. See the link on the BIP website on Aichi Target 3.

8. Disaggregation

Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

9. Related goals, targets and indicators

Description of linkages to other indicators proposed in the first draft monitoring framework

Target 14: Fully integrate biodiversity values into policies, regulations…

Goal D: The gap between available financial and other means of implementation, and those necessary to achieve the 2050 Vision, is closed

10. Data reporter

10.a Organisation

Organisation of the contact person(s) for the data or metadata

Organisation for Economic Co-operation and Development

10.b Contact person(s)

Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Katia Karousakis katia.karousakis@oecd.org

11. References

Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

On positive incentives (economic instruments) for biodiversity conservation and sustainable use: OECD 2021, Tracking Economic Instruments and Finance for Biodiversity – 2021.

Indicator metadata sheet: Indicator 19.0.1: Official development assistance for biodiversity

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

Indicator 19.0.1: Official development assistance for biodiversity

2. Date of metadata update

Insert date of metadata update

January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 19. Increase financial resources from all sources to at least US$ 200 billion per year, including new, additional and effective financial resources, increasing by at least US$ 10 billion per year international financial flows to developing countries, leveraging private finance, and increasing domestic resource mobilization, taking into account national biodiversity finance planning, and strengthen capacity-building and technology transfer and scientific cooperation, to meet the needs for implementation, commensurate with the ambition of the goals and targets of the framework.

3. Rationale

Description of the purpose and rationale behind the indicator, noting its relevance to the corresponding draft goal or target

a) Total ODA flows to developing countries quantify the public effort that donors provide to developing countries for biodiversity, fostering transparency across the development co-operation landscape. In addition, ODA flows allow to hold donor efforts against their commitments on biodiversity, thus fostering accountability, as well as promoting co-ordination across donors and a more efficient development co-operation landscape.

b) Economic policy instruments can either generate revenue (e.g. biodiversity-relevant taxes) or mobilise finance directly for biodiversity conservation and sustainable use (e.g. biodiversity-relevant fees and charges; positive subsidies; PES and offsets) which is finance mobilised at domestic level.

The data are collected in a consistent and comparable way across countries.

4. Definitions, concepts and classifications

5.a Definition:

Precise definition of the indicator, including references to standards and classifications. The indicator definition should be unambiguous and in expressed in universally applicable terms. It must clearly express the unit of measurement (proportion, dollars, number of people, etc.).

a) Official development assistance on conservation and sustainable use of biodiversity, defined as gross disbursements of total Official Development Assistance (ODA) from all donors for biodiversity. Data is also available in net terms (constant prices) and for commitments undertaken by donors, which signal intention to fund a particular objective. Separate data is also available now on marine conservation ODA.

b) Revenue generated and finance mobilised from biodiversity-relevant economic instruments, defined as revenue generated and finance mobilised from biodiversity-relevant economic instruments, covering biodiversity-relevant taxes, fees and charges, and positive subsidies. Additional work was undertaken in 2020-21 to collect data on payments for ecosystem services and biodiversity offsets -- including the finance they mobilise for biodiversity.

5.b Method of computation

Explanation of how the indicator is calculated, including mathematical formulas and descriptive information of computations made on the source data to produce the indicator (including adjustments and weighting). This explanation should also highlight cases in which mixed sources are used or where the calculation has changed over the time (i.e., discontinuities in the series). If there is an existing standard or manual, please include a link here.

a) This indicator is calculated as the sum of all ODA flows from all donors to developing countries that have biodiversity as a principal or significant objective, thus marked with the Rio marker for biodiversity.

b) Countries are requested to report on when the policy instrument was introduced, what it applies to, the geographical coverage, the environmental domain, the industries concerned; the revenues, costs or rates; whether the revenue is earmarked; and any exemptions.

5.c Data collection method

Description of all methods used for data collection. This description should include, when applicable, the questions used to collect the data, the type of interview, the dates/duration of fieldwork, the sample size and the response rate. Hyperlinks to methodologies are acceptable

a) Via annual reporting tables that national statistical reporters in aid agencies, ministries of foreign affairs, etc. send to the OECD to be part of the DAC Creditor Reporting System database.

b) Via the network of contacts established for the OECD Policy Instruments for the Environment database, as well as questionnaires.

5.d Accessibility of methodology

Note whether the methodology for the indicator and the underlying data are published in a peer reviewed location that can be accessed, and the methodology can be repeated by other scientists or agencies with the same overall result obtained. For "global indicators" please note whether a methodology is available for use at national or regional scales

The Methodology on the Rio Marker for biodiversity is available here:
https://one.oecd.org/document/DCD/DAC/STAT(2020)44/ADD2/FINAL/en/pdf (Annex 20)

5.e Data sources

Description of all actual and recommended sources of data

a) The OECD/DAC has been collecting data on official and private resource flows from 1960 at an aggregate level and 1973 at an activity level through the CRS (CRS data are considered complete from 1995 for commitments at an activity level and 2002 for disbursements). The Rio marker for biodiversity was introduced in 2002. The data are provided by DAC donors, other bilateral providers of development cooperation and multilateral organizations. The CRS also includes information from private philanthropic institutions providing development finance for biodiversity and also tracks private finance flows mobilised through public interventions (e.g. through the use of guarantees or other forms of finance, including blended finance).

b) Information for the OECD Policy Instruments for the Environment (PINE) database is collected via a network of 200 country experts, including in government agencies (Ministries of Finance and Environment, statistical institutes) as well as research institutes and international organisations. Data is collected systematically for 37 OECD members as well as the active accession countries. A growing number of non-member countries also provide information. Currently, more than 120 countries are contributing data. Registered experts are asked to update data at least once a year, typically in January or February, through a password-protected interface. The data collection method may result in some reporting bias, as OECD members and active accession countries are likely to report more data on a regular basis, and all figures should be interpreted in this context.

5.f Availability and release calendar

Please note whether the indicator is available now or in development. If in development, please state the year it will be available. Additionally, state how often the indicator will be updated with additional data. (e.g. annually, every five years etc).

Data collection:
a) On an annual basis.
b) On an on-going basis.

Data release:

a) The data are published at the end of each year for year -1.

b) An updated and expanded brochure on “Tracking Economic Instruments and Finance for Biodiversity - 2021” was released in September 2021.

The 2021 version is available here: OECD (2021), Tracking Economic Instruments and Finance for Biodiversity - 2021 https://www.oecd.org/environment/resources/biodiversity/tracking-economic-instruments-and-finance-for-biodiversity-2021.pdf

a) The Rio biodiversity marker was introduced in 2002 and data are available since then for most DAC members, as well as selected non-DAC members, with improvements in reporting over time. Not all other providers report their data at an activity level though.

b) A biodiversity snapshot will be prepared in 2022, and regularly after that, with key data and trends on biodiversity-related flows.

Provisional data classification: Tier I

b) Currently more than 20 countries are contributing data to the PINE database. As of 2021, the database contained more than 4 100 policy instruments for the environment, of which 3 680 are in force. The environmental domains covered by the database include biodiversity, climate, air pollution, among others.

5.g Time series

Date range for which indicator is available, e.g. 1993 – 2021

a) The data are available since 1996 on an annual basis, with time series since 1950.

b) The data series is annual, and data is available from before 1980.
The PINE database exists since 1996, with the added feature of tagging biodiversity-relevant instruments introduced in 2017. The biodiversity-relevant information in the PINE database has been used to monitor progress towards Aichi Target 3 on positive incentives, under the Convention on Biological Diversity. For more information on this, see Aichi Target 3 under the website of the Biodiversity Indicators Partnership (BIP).

5.h Data providers

Identification of data provider(s), where relevant noting any national data providers. Specify the organisation(s) responsible for producing the data.

a) A statistical reporter is responsible for the collection of DAC statistics in each providing country/agency/institution. This reporter is usually located in the national aid agency, Ministry of Foreign Affairs or Finance etc.

b) Information for the PINE database is collected via a network of 200 country experts, including in government agencies (Ministries of Finance and Environment, statistical institutes) as well as research institutes and international organisations. Data is collected systematically for 37 OECD members as well as the active accession countries. A growing number of non-member countries also provide information. Registered experts are asked to update data at least once a year, typically in January or February, through a password-protected interface. The data collection method may result in some reporting bias, as OECD members and active accession countries are likely to report more data on a regular basis, and all figures should be interpreted in this context.

The OECD Secretariat, in consultation with countries, validates the CRS data before they are published online. The management of PINE is overseen by OECD Committees and Working Parties.

5.i Data compilers

Organisation(s) responsible for compilation of this indicator [if relevant, at the national level Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator].

a) OECD, Development Co-operation Directorate. The OECD is the only International Organisation collecting this data.

b) OECD, Environment Directorate. The OECD is the only International Organisation collecting this data.

5.j Gaps in data coverage

Please note any gaps in the data coverage for this indicator (e.g. taxonomic, thematic, or geographic data gaps)
Few multilateral organisations report to the OECD using the biodiversity marker. On-going work is taking place on increasing the coverage of the data beyond ODA from DAC members.

5.k Treatment of missing values

Description of the methodology employed for producing estimates for the indicator when country data are not available, including any mathematical formulas and description of additional variables used as input into the estimation process.

Global/International context only: Description of how missing values for individual countries or areas are imputed or otherwise estimated by international agencies to derive regional or global aggregates of the indicator

- At country level
  a) and b) No attempt is made to estimate missing values.
- At regional and global levels
  a) and b) No attempt is made to estimate missing values.

6. Scale

6.a Scale of use

Indicate if indicator data is applicable at the global, national, regional scale. Specify whether global or regional scale indicators can be disaggregated for national use, and/or whether national data can be collated to form global indicator. Additionally, please mention any plans to nationalise the indicator.

a) This indicator can be disaggregated by donor, by recipient country (or region), by income group, by type of finance, by type of aid, by sub-sector, by policy marker (e.g. gender), by channel of delivery, etc.

b) Information is available by country at the individual policy instrument level.

6.b National/regional indicator production

For global indicators, please note whether a national/regional methodology available for use and provide links to any online documentation. Please also specify if underlying data can be accessed and used by countries to produce national indicators.

a) The DAC statistical Reporting Directives govern the reporting of DAC statistics, and are reviewed and agreed by the DAC Working Party of Development Finance Statistics, see:
https://one.oecd.org/document/DCD/DAC/STAT(2020)44/ADD2/FINAL/en/pdf (Annex 20)

b) The OECD provides instructions and a formatted questionnaire for countries to provide data.

6.c Sources of differences between global and national figures

Explanation on the differences between country produced and internationally estimated data on the indicator, highlighting and summarising the main sources of differences.

a) DAC statistics are standardized on a calendar year basis for all donors and may differ from fiscal year data available in budget documents for some countries. Some countries provide more comprehensive information than others.

b) Some countries provide more comprehensive information than others.

6.d Regional and global estimates & data collection for global monitoring

6.d.1 *Description of the methodology.*

Include any mathematical formulas, used for the calculation of the regional/global aggregates from the country values. Description of the weighting structure used for aggregating country indicator values to regional and global levels.

a) Data are reported at a country level.

b) Data are reported at national and sub-national level, depending on the scope of the policy instrument.

6.d.2 Additional methodological details

Description of how the data from countries or areas is assembled by custodian international agencies to provide regional and global aggregates. This is distinct from the method of computation section), which looks at how the indicator is compiled at a national level.

Quality assurance

a) The data collected by the OECD/DAC Secretariat are official data provided by national statistical reporters in each providing country/agency. The OECD/DAC Secretariat is responsible for checking, validating and publishing these data.

b) Data are provided by competent national authorities. The OECD Secretariat conducts regular checks to identify errors or missing data.

6.d.3 Description of the mechanism for collecting data from countries
Include: (i) the official counterpart at the country level; (ii) description of any validation and consultation process; (iii) description of any adjustments with respect to use of standard classifications and harmonization of breakdowns for age group and other dimensions, or adjustments made for compliance with specific international or national definitions.

a) Via and annual questionnaire reported by national statistical reporters in aid agencies, ministries of foreign affairs, etc.

b) Via questionnaire and directly via the network of contacts.

7. Other MEAs, processes and organisations

7.a Other MEA and processes
Please note where the indicator is already in use (e.g. by the CBD, other MEAs (such as CITES, CMS, Ramsar, UNCCD),SDGs, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES).

Both sets of data are being used in SDG 15.

7.b Biodiversity Indicator Partnership
Is the indicator included in those approved and promoted by the Biodiversity Indicators Partnership (Y/N)? If Y, insert a link to BIP website.

Y - https://www.bipindicators.net/indicators/official-development-assistance-provided-in-support-of-the-convention

8. Disaggregation
Specification of the dimensions and levels used for disaggregation of the indicator (e.g., species, taxa, ecosystem, geographic location, income, sex, age group, disability status, etc.)

a) This indicator can be disaggregated by donor, by recipient country (or region), by income group, by type of finance, by type of aid, by sub-sector, by policy marker (e.g. gender), by channel of delivery, etc.

b) Information is available by country at the individual policy instrument level.

9. Related goals, targets and indicators
Description of linkages to other indicators proposed in the first draft monitoring framework

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

OECD DAC (Development Assistance Committee) and OECD EPOC (Environmental Policy Committee)

10.b Contact person(s)
Person(s) and email addresses to be contacted with any questions regarding the data or metadata.

Katia.KAROUSAKIS@oecd.org
Juan.CASADOASENSIO@oecd.org
Giorgio.GUALBERTI@oecd.org

11. References
Links to other literature helpful in understanding, interpreting and using the indicator. A maximum of ten references is preferred.

- OECD (2021), Tracking Economic Instruments and Finance for Biodiversity – 2021
- OECD (2018), Review of the definition and eligibility criteria for the Rio Marker for Biodiversity, https://one.oecd.org/document/DCD/DAC/STAT(2018)25/en/pdf
- OECD (2018), Biodiversity-related Official Development Assistance 2016, https://www.slideshare.net/OECDdev/biodiversityrelated-official-development-assistance-2016

Shortened format indicator metadata sheet: 19.0.2 Public expenditure and private expenditure on conservation and sustainable use of biodiversity and ecosystems

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

19.0.2 Public expenditure and private expenditure on conservation and sustainable use of biodiversity and ecosystems

2. Date of metadata update

Insert date of metadata update

28 January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A
N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Draft **Target 19**. Increase financial resources from all sources to at least US$ 200 billion per year, including new, additional and effective financial resources, increasing by at least US$ 10 billion per year international financial flows to developing countries, leveraging private finance, and increasing domestic resource mobilization, taking into account national biodiversity finance planning, and strengthen capacity-building and technology transfer and scientific cooperation, to meet the needs for implementation, commensurate with the ambition of the goals and targets of the framework.

4. Proposed rationale

Description of the purpose and rationale behind the indicator, noting its relevance to the corresponding draft goal or target

The lack of financial resources has frequently been noted as a limitation to the conservation and sustainable use of biodiversity. OECD data suggest that global biodiversity finance is of the order of $78-91 billion per year (2015-2017 average). Data reported to the Convention on Biological Diversity is consistent with these estimates. This funding comes from a variety of sources, including domestic sources (about $67.8 billion per year), OECD data suggest that global biodiversity finance is of the order of $78-91 billion per year (2015- 2017 average). Data reported to the Convention on Biological Diversity is consistent with these estimates. This funding comes from a variety of sources, including domestic sources (about $67.8 billion per year). However there is estimated biodiversity funding gap of the order of $700 billion per year. Given this, tracking expenditure on biodiversity, from both public and private sources, will be critically important in the post-2020 period.
The financial reporting framework, adopted through decision XII/3, already collects some of the information necessary to calculate this indicator. However this information is geared towards Aichi Biodiversity Target 20 and may require adjustment in the post-2020 period. Further There are various initiatives aimed at tracking public and private expenditure on biodiversity which could help to support the development and operationalization of this indicator.

5. Current level of development

This proposed indicator is not yet developed for the private sector. However, under the Aichi financial reporting framework, the UN System of Environmental Economic Accounting and the BioFin programme there are existing methodologies and experiences for assessing public expenditure.

6. Proposed timetable for development

This proposed indicator is not yet developed. On the basis of information provided in the national reports (depending on their agreed format) and/or additional surveys of Parties to the Convention on Biological Diversity, reporting on this indicator would be feasible for the sixteenth meeting of the Conference of the Parties.

7. Proposed scale of use

The indicator would need to be compiled at the national level and aggregated at the global level.

8. Proposed data source

For public expenditure the primary data source is government expenditure. For private expenditure, data sources will need to be identified.

9. Proposed Indicator provider

This proposed indicator is not yet developed. An indicator provided needs to be identified. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

10.b Contact person(s)

11. References (if available)

BioFin: https://www.biofin.org/sites/default/files/content/publications/undp-biofin-web_0.pdf

SEEA Expenditure accounts: https://seea.un.org/content/environmental-protection-expenditure-accounts-handbook-%E2%80%94-2017-edition

Shortened format indicator metadata sheet: 20.0.1 Indicator on biodiversity information and monitoring, including traditional knowledge, for management.

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

Indicator on biodiversity information and monitoring, including traditional knowledge, for management.

2. Date of metadata update

Insert date of metadata update

28 January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Draft **Target 20.** Ensure that relevant knowledge, including the traditional knowledge, innovations and practices of indigenous peoples and local communities with their free, prior, and informed consent, guides decision-making for the effective management of biodiversity, enabling monitoring, and by promoting awareness, education and research

4. Proposed rationale

Quality and timely biodiversity information is required to identify threats to biodiversity, to determine priority actions for conservation and sustainable use and to determine if such actions are effective. Biodiversity information, including traditional knowledge, will underpin progress towards all of the proposed goals and targets of the post-2020 global biodiversity framework. Despite the important of traditional knowledge to biodiversity, there is limited information on how such information is being taken into account in decision making.

A combined measure that integrates i) the coverage in space and time of accessible data addressing different biodiversity dimensions and ii) the quantity and scope of active biodiversity monitoring activities, and iii) the recognition and use of indigenous and local knowledge of biodiversity, all relative to the reference period, could be developed.

Initial considerations the following as potentially promising approaches for each of the three components of the indicator:

A) Coverage in space and time of accessible data addressing different biodiversity dimensions:
The methodology here could follow that formally developed for growth in spatiotemporal biodiversity coverage, extended to trait and phylogenetic dimensions. Specifically, Oliver et al (PLoS Biology 2021) formalized the Species Status Information Index (SSII, a draft component indicator) as the average per-species coverage of publicly accessible spatiotemporal occurrence data. It can be aggregated at national (and below national) scale and weighted by national stewardship for species (the proportion of the global distribution a country holds). The same calculation can be applied to species trait (e.g. Kattge et al. 2020) and phylogenetic attribute data, i.e. what proportion of species of a given taxon have data on select functional traits, population and threat metrics, and phylogenetic data. Progress would be measured as aggregate of the biodiversity dimensions with data, relative to the reference period (set to 100).

B) Quantity and scope of active biodiversity monitoring activities:
Here a standardized protocol could support the outside or self-assessment of national monitoring activities. One component of the measure would be the existence of National Biodiversity Observation Networks (National BONs), or similar structures, that link up and guide monitoring activities (Proenca et al 2017, Navarro et al. 2017).

Another component would be the coverage of long-term monitoring efforts for different environments, taxa, and biodiversity dimensions. Progress would be measured as aggregate of different monitoring types, compared to the reference period (set to 100).

C) Recognition and use of indigenous and local knowledge (ILK) of biodiversity
No quantitative metrics addressing the quantity and quality of production and use of biodiversity ILK currently exist.

The overall indicator score could be the average of A-C.

5. Current level of development

This proposed indicator is not yet developed.

6. Proposed timetable for development

This proposed indicator is not yet developed. On the basis of information provided in the national reports (depending on their agreed format) and/or additional surveys of Parties to the Convention on Biological Diversity, reporting on this indicator would be feasible for the sixteenth meeting of the Conference of the Parties.

7. Proposed scale of use

This proposed indicator is not yet developed. However it would most likely need to be developed on basis on national data which could then be aggregated to the global level.

8. Proposed data source

No methodology for this indicator is currently available. Data sources, including definitions and data collection methods, need to be identified. Information could be provided through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

9. Proposed Indicator provider

This proposed indicator is not yet developed. An indicator provided needs to be identified. GEOBON could be a partner for components of this indicator. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

10.b Contact person(s)

11. References (if available)

Indicator not yet developed. To be identified

Shortened format indicator metadata sheet: 21.0.1 Degree to which indigenous peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

21.0.1 Degree to which indigenous peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity

2. Date of metadata update

Insert date of metadata update

28 January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Target 21. Ensure equitable and effective participation in decision-making related to biodiversity by indigenous peoples and local communities, and respect their rights over lands, territories and resources, as well as by women and girls, and youth.

4. Proposed rationale

Description of the purpose and rationale behind the indicator, noting its relevance to the corresponding draft goal or target

Reaching the 2050 Vision for Biodiversity will require a whole of society approach. Given this, it is important that the views, perspectives and experiences of all groups are taken into account in decision making processes related to biodiversity. Draft target 21 addresses the degree to which indigenous peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity

Currently there is no globally comprehensive information or indicator on the extent to which indigenous peoples and local communities, women and girls and youth are effectively participating in decision making processes related to biodiversity. The collection of such comprehensive information is further complicated by the different rights regimes and frameworks that apply to these groups and need to be taken into account. However previous assessments of national biodiversity strategies and action plans as well as the national reports have generated useful information in this respect.

In decision XIII/28, the Conference of the Parties welcomed an updated list of indicators for the Strategic Plan for Biodiversity 2011-2020. For Aichi Biodiversity Target 18 four indicators were identified. These were “Trends in land-use change and land tenure in the traditional territories of indigenous and local communities”, “Trends in the practice of traditional occupations”, “Trends in which traditional knowledge and practices are respected through their full integration, safeguards and the full and effective participation of indigenous and local communities in the national implementation of the Strategic Plan” and “Trends of linguistic diversity and numbers of speakers of indigenous languages”. The first two of these indicators were adopted in decision X/34 while the last was identified in decisions VII/30 and VIII/15.

Specifically with regards to the participation of indigenous peoples and local communities, in decision XIII/28, the Conference of the Parties welcomed an updated list of indicators for the Strategic Plan for Biodiversity 2011-2020 which included the “Trends in which traditional knowledge and practices are respected through their full integration, safeguards and the full and effective participation of indigenous and local communities in the national implementation of the Strategic Plan”. However this indicator is not currently operational.

5. Current level of development

This proposed indicator is not yet developed. On the basis of information provided in the national reports (depending on their agreed format) and/or additional surveys of Parties to the Convention on Biological Diversity, reporting on this indicator would be feasible for the sixteenth meeting of the Conference of the Parties.

6. Proposed timetable for development

This proposed indicator is not yet developed. An organization(s) to develop it and to support its operationalisation needs to be identified.

7. Proposed scale of use

This proposed indicator is not yet developed. However it would most likely need to be developed on basis on national data which could then be aggregated to the global level.

8. Proposed data source

No methodology for this indicator is currently available. Data sources, including definitions and data collection methods, need to be identified. Information could be provided through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

9. Proposed Indicator provider

This proposed indicator is not yet developed. An indicator provided needs to be identified. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

10.b Contact person(s)

11. References (if available)

Indicator not yet developed. To be identified

Shortened format indicator metadata sheet: 21.0.2 Indicator metadata sheet

1. Indicator name

Insert full indicator name and number [number to be populated after the adoption of the post-2020 global biodiversity framework]

21.0.2 Land tenure in the traditional territories of indigenous peoples and local communities

2. Date of metadata update

Insert date of metadata update

28 January 2022

3. Goals and Targets addressed

Please provide details about the proposed goals and targets of the first draft post-2020 global biodiversity framework for which the indicator will measure progress in the first draft of the post-2020 global biodiversity framework

3.a Goal

Provide the corresponding draft goal name, draft goal number, or N/A

N/A

3.b Target

Provide the corresponding draft target name, draft target number, or N/A

Draft Target 21. Ensure equitable and effective participation in decision-making related to biodiversity by indigenous peoples and local communities, and respect their rights over lands, territories and resources, as well as by women and girls, and youth.

4. Proposed rationale

Description of the purpose and rational behind the indicator, noting its relevance to the corresponding draft goal or target

Draft target 21 addresses the degree to which indigenous peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity
Reaching this target will require a greater recognition of the rights and roles of indigenous peoples and local communities, including ensuring that their rights, particularly as they relate to owning, using, accessing, controlling, transferring, inheriting, , and otherwise taking decisions about land, water and related resources, are respected and that the principle of free, prior and informed consent is followed.

Currently there is no globally comprehensive information or indicator on the extent to which land tenure in the traditional territories of indigenous peoples and local communities is recognised and respected. Previously, through decision X/43, the Conference of the Parties welcomed an updated list of indicators for the Strategic Plan for Biodiversity 2011-2020 which included an indicator on trends in land-use change and land tenure in the traditional territories of indigenous and local communities. This indicator, which has yet to be fully operationalized, is related in part to proposed indicator 21.0.2.

5. Proposed timetable for development

An indicator on land tenure exists; however, not with the appropriate level of detail. A mechanism for disaggregating with IPLC status could be developed in consultation with FAO and other partners.

6. Proposed scale of use

This indicator would be compiled nationally and aligned with SDG 1.4.2.

7. Proposed data source

The collection of this data would need to align with the existing SDG indicator.

8. Proposed Indicator provider

FAO is the custodian of SDG 1.4.2. In the event that an appropriate indicator provider cannot be identified information could be collected by the Secretariat of the Convention on Biological Diversity through the national reports to the Convention on Biological Diversity and/or complimentary surveys of Parties.

10. Data reporter

10.a Organisation
Organisation of the contact person(s) for the data or metadata

10.b Contact person(s)

11. References (if available)

FAO 1.4.2: https://landportal.org/node/52264