Reporting on the extent of natural ecosystems under the Kunming-Montreal Global Biodiversity Framework

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ABSTRACT

Unlike its predecessors, the Kunming-Montreal Global Biodiversity Framework emphasises ecosystems in its targets, goals, and monitoring framework. Parties to the Convention on Biological Diversity are now expected to report on ecosystem indicators for the first time. Here we surveyed how Parties reported on Headline Indicator A.2 (Extent of Natural Ecosystems) in their 7th National Reports to the Convention on Biological Diversity. Less than one-third of Parties reported on indicator A.2, so we explored the potential of existing global data as a temporary stopgap for global reporting. Although indicator values estimated from global data were statistically consistent with those reported by Parties, there was 21-26% error between the two sources, particularly in geographically small countries. While these results suggest that existing data can inform indicators at the global scale (suggesting that approximately 70% of global terrestrial ecosystems are still natural), Parties should strive to develop ecosystems maps for national-level applications

INTRODUCTION

The Kunming-Montreal Global Biodiversity Framework (GBF), adopted in December 2022, is unique because, unlike its predecessors, it includes targets, goals, and indicators for ecosystems (Watson et al. 2020; Nicholson et al. 2021, 2024; Convention on Biological Diversity 2022a). This was a significant development because it placed new onus on the 196 Parties to the Convention on Biological Diversity to consider the area, integrity and risk of collapse of ecosystems in their National Targets, National Biodiversity Strategies and Action Plans, and National Reports.

In addition to these national instruments, Parties were also requested to report on a suite of headline indicators as part of the GBF monitoring framework (Convention on Biological Diversity 2022b), which is grounded in science and developed in a deliberative and consultative way (Nicholson et al. 2021; Affinito et al. 2024). The rationale is for Parties to report on headline indicators in their National Reports, which then feed into the Global Review of Collective Progress (Convention on Biological Diversity 2022c). However, due to the newness of ecosystem indicators in the GBF, Parties' readiness to report on these headline indicators was only fully laid bare after they had submitted their 7th National Reports at the end of February 2026.

With this study, we examined how Parties reported on one of the headline indicators for ecosystems: Indicator A.2 on the Extent of Natural Ecosystems (the other ecosystem indicators being A.1 Red List of Ecosystems on the risk of ecosystem collapse; and B.1 Services provided by ecosystems). In its simplest form, Indicator A.2 is the geographical extent of natural ecosystems as a proportion of a country's total surface area (https://www.gbf-indicators.org/metadata/headline/A-2). 'Natural' in this context refers to the *type* of ecosystem (i.e., the structure, composition, and function of the ecosystem is predominantly the result of natural, rather than human, factors) and should not be conflated with the *condition* of the ecosystem (i.e., whether the ecosystem has high ecological integrity), which ought to be captured by other related indicators. By contrast, 'non-natural' (also referred to as 'anthropogenic') refers to ecosystems that are created and maintained through human interventions, replacing antecedent natural ecosystem types. Thus, natural and non-natural ecosystems refer to the binary typological identity (*sensu* Delettre 2021), rather than the relative exposure to human intervention as captured by concepts like human footprint (e.g., Venter et al. 2016) or human modification (e.g., Theobald et al. 2025), which represent a gradient of human pressure.

The distinction between natural and non-natural ecosystem types is perhaps more easily interpreted through the IUCN Global Ecosystem Typology (Keith et al. 2022), which classifies intensive use and anthropogenic biomes. On land, for example, these biomes are sub-classified into non-natural ecosystem functional groups, including croplands, sown pastures, plantations, urban areas, and derived semi-natural pastures (Keith et al. 2020; Driver & Botts 2025). Although Indicator A.2 is reported as proportion of natural ecosystem extent, the methodological metadata recommends disaggregating this single estimate according to ecosystem functional groups in the Global Ecosystem Typology. To report on this accurately, Parties presumably need geospatial data on the extent of different ecosystem functional groups (and the ecosystem types nested within these functional groups).

We surveyed how Parties reported on Indicator A.2 in their 7th National Reports submitted during February 2026. In addition to evaluating whether they were able to report on the indicator, we also explored the types of data used to quantify the indicator and whether they disaggregated natural and non-natural ecosystems. In addition to this survey, we also examined whether an existing global dataset designed to distinguish between natural and non-natural lands could be used to estimate the extent of natural ecosystems at the country level. Our motivation was twofold. First, to evaluate agreement between Indicator A.2 estimated from different sources. Second, if there was agreement between sources, to apply global sources nationally in countries where local information is still lacking (*sensu* Buschke et al. 2023). In the short-term, this approach of using existing global data could supplement the Global Review of Collective Progress (scheduled for October 2026).

METHODS

Review of 7th National Reports

We collected data from Parties' 7th National Reports submitted through the CBD's Online Reporting Tool (https://ort.cbd.int/national-reports/nr7). Although the initial deadline for these reports was 28 February 2026, we continued to screen reports submitted until 05 June 2026. For each report, we first recorded whether the Party had reported a value for Indicator A.2 and then collated the value of the indicator as a proportion between 0 and 1. For Parties that reported the indicator as a time-series covering more than one year, we recorded the most recent indicator value. We also limited indicator values to inland realms (i.e., terrestrial and inland freshwater realms, with their transitions), excluding any information for marine and subterranean ecosystems (where non-natural ecosystems classes are generally geographically small compared to the total extent of the marine realm, and where existing data is limited).

Several Parties only reported the geographical surface area of natural ecosystems, without including the area of non-natural ecosystems. In these instances, we used total surface areas of countries (km^2) as the denominator for the indicator, collected through annual questionnaires by the Food and Agriculture Organization (FAO) of the United Nations (accessed through the World Bank Open Data portal: https://data.worldbank.org/indicator/AG.SRF.TOTL.K2). When countries only reported surface areas for a subset of natural ecosystems, or if the total areas of natural ecosystems summed to ≥100% of the country area, we did not record the indicator value as it was inconsistent with the methodological metadata for the indicator overseen by the UN Statistical Division (https://gbf-indicators.org/metadata/headline/A-2).

From each report, we classified the type of source data used to report on Indicator A.2. Through our screening, we identified seven broad classes of data: 1. *Ecosystem accounts* (i.e., tabular data consistent with the System of Environmental Economic Accounts, SEEA); 2. *Ecosystem maps* (i.e., geographical maps of ecosystem classes); 3. *Forest cover* (i.e., geographical distribution of forest or tree-covered ecosystems); 4. *Inventory data* (i.e., survey data of landscape features, like forest, wetlands, or croplands); 5. *Land cover* (i.e., earth observation products of land cover classes); 6. *Mixed sources* (i.e., a combination of multiple data sources); 7. *Unclear* (i.e., insufficient information to identify data type).

To examine alignment to GBF indicator metadata, we also recorded whether parties disaggregated extent data by sub-groups of natural or non-natural ecosystems. This allowed us to identify nine types of disaggregation used by Parties: 1. *Biome*; 2. *Ecological province*; 3. *Ecosystem type* (i.e., national classifications); 4. *Forest types*; 5. *Global Ecosystem Typology* (level 3: ecosystem functional group); 6. *Land cover classes*; 7. *Natural and semi-natural* *ecosystems* (i.e., natural ecosystem with widespread human interventions); 8. *Protection status*; and 9. *Red List of Ecosystems status*.

Global data on natural lands

A single global reference dataset for ecosystems mapped according to the IUCN Global Ecosystem Typology has yet to be developed. Therefore, we used the Science Based Targets Network (SBTN) Natural Lands Map version 1.1. developed by the Land & Carbon Lab (Mazur et al. 2025) as a proxy for natural ecosystems. Although named the SBTN Natural *Lands* Map, this dataset also includes freshwater bodies and wetlands, so is more accurately described as a map of *inland* ecosystems (for consistency, we continue using the term 'land' throughout this manuscript). This binary dataset maps natural and non-natural terrestrial land globally for 2020 and, where national ecosystem data are not available, is worth considering as an input into GBF indicator A.2 for several reasons. First, different landcover products are known to vary substantially even when they are meant to represent the same natural features (e.g., concordance between 11 cropland products varies by 16 – 70% across different African countries: Kerner et al. 2024). By integrating two global landcover products, 15 supplementary global datasets, and 18 regional datasets, the SBTN Natural Lands Maps is an ensemble output that is reported to be less sensitive to specific characteristics of individual datasets. Second, unlike many of its constituent land cover products, the SBTN Natural Lands Map distinguishes between natural and non-natural tree-covered landscapes (e.g., forest ecosystems vs. plantations), short vegetation (e.g., natural grasslands vs. pastures), wetlands (e.g., marshes vs. peat mines), and water bodies (e.g., lakes vs. dams). Third, the SBTN Natural Lands Map is standardised to the year 2020, which corresponds with the end of the previous Global Biodiversity Strategy 2010-2020. Finally, the SBTN Natural Lands Map is documented (Mazur et al. 2025), and is available through an open licence (CC-BY-SA-4.0) on Google Earth Engine (Google Earth Engine Team 2015), which facilitates its application by a wide set of stakeholders. Despite these positive features, technical guidance of the SBTN Natural Lands Map acknowledges limitations linked to definitional, temporal, and spatial inconsistencies across input datasets, urging users to first validate the dataset, especially for local applications (Mazur et al. 2025). Validation may include comparisons with high resolution aerial imagery, ground-truthing, supplementation by local datasets (Mazur et al. 2025), or – as is the case for this study – comparison with independently reported national area statistics.

Within Google Earth Engine, we quantified the total geographical extent of natural and non-natural land from the SBTN Map in each country, represented by country boundaries according to the FAO Global Administrative Unit Layer (GAUL) 2015 (FAO 2015). Our analysis included the United States of America and its unincorporated territories, despite not being Party to the CBD, because its inclusion informed the aggregated estimate of global extent of natural ecosystems. Indicator A.2 (the proportion of natural ecosystems per country) was calculated for each Party by dividing the extent of natural land by the country's total land area. At the global scale, we calculated Indicator A.2 as both the value averaged for each country (i.e., unweighted by surface area) and as total proportion of natural land globally.

Comparing Indicator A.2 reported by Parties and from global data

We compared values for Indicator A.2 reported by Parties to those estimated from the SBTN Natural Lands Map using three methods in R version 4.5.1 (R Core Team 2025): (1) the root mean squared error (RMSE), which is lower when there is concordance between the two sources; (2) the R^2 from a 1:1 unity line (i.e., a regression that assumes a slope of 1 and an intercept of 0); and (3) the R^2 from an ordinary least squares (OLS) regression (`lm` function in `stats` package), with Party-reported values as the independent variable and the SBTN value as the dependent variable. Since each method has its own strengths and weaknesses, considering all three simultaneously served as a statistical robustness check of the relationship between the data sources. Specifically, RMSE is indifferent to the choice of dependent and independent variables but can suggest concordance even in cases where values from one dataset is consistently higher (or lower) than the other. By contrast, unity line regression assumes a 1:1 relationship, but does not test this assumption explicitly. While OLS regression tests the slope of the relationship between two data sources, it is sensitive to the choice dependent and independent variables.

Next, we calculated the model residuals from a 1:1 relationship and compared these to the total surface

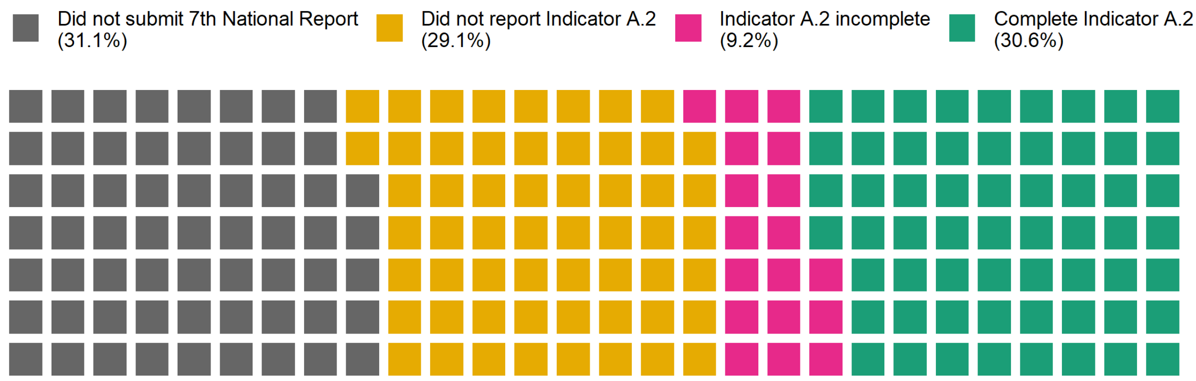

Figure 1. Reporting status for Headline Indicator A.2 (*Extent of Natural Ecosystems*) in 7th National Reports to the Convention on Biological Diversity (CBD). Each square represents one of the 196 Parties to the CBD.

area (km^2) of each country (estimated from FAO GAUL 2015) and the type of data used in the 7th National Reports. We combined log-transformed and scaled surface area as a continuous variable and type of data as a categorical variable (with '*Ecosystem map*' as the baseline category) as interacting terms in a two-way Analysis of Covariance (ANCOVA) (`lm` function in `stats` package). This allowed us to identify any systematic differences between the sources of the indicators. We also used quantile regression to depict the outer limits of the relationship between the residuals and the country surface area (0.01, 0.05, 0.95, 0.99 quantiles using the `rq` command in `quantreg` package: Koenker 2025).

RESULTS

Indicator A.2 from 7th National Reports

As of 05 June 2026, 135 of the 196 Parties to the CBD submitted 7th National Reports (**Figure 1**). However, only 78 reported on Headline Indicator A.2 on the Extent of Natural Ecosystems, and 18 of these had to be excluded because they were inconsistent with the methodological metadata developed by the UN Statistical Division. This meant that there were estimates for Indicator A.2 from 60 Parties (including the European Union) (**Figure 1; Supplementary Table S1**).

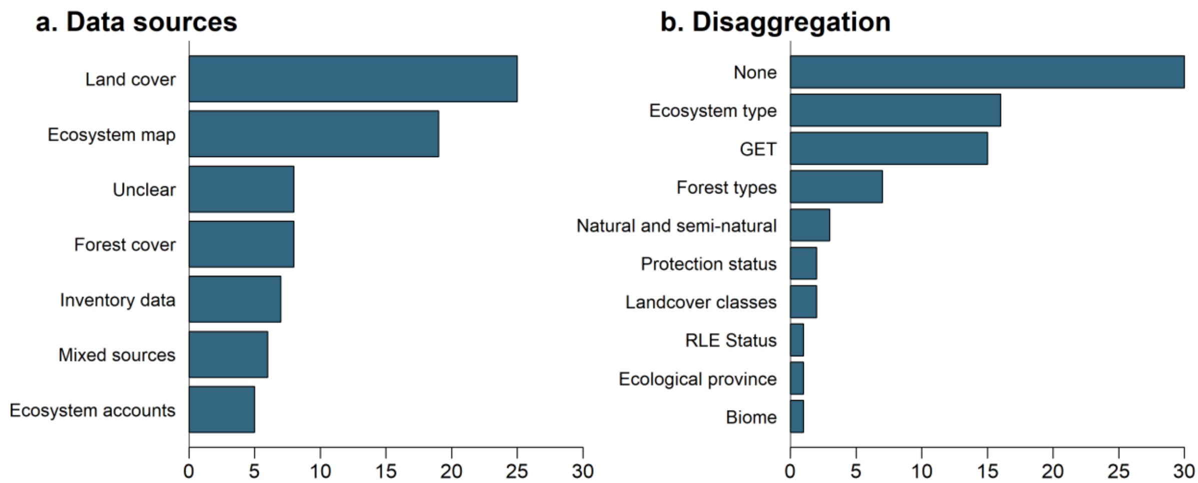

Figure 2. (**a**) The sources of information and (**b**) the type of disaggregation used by the 78 Parties that reported on Headline Indicator A.2 (*Extent of Natural Ecosystems*) in 7th National Reports to the Convention on Biological Diversity. (GET = level 3 of the Global Ecosystem Typology; RLE = Red List of Ecosystems).

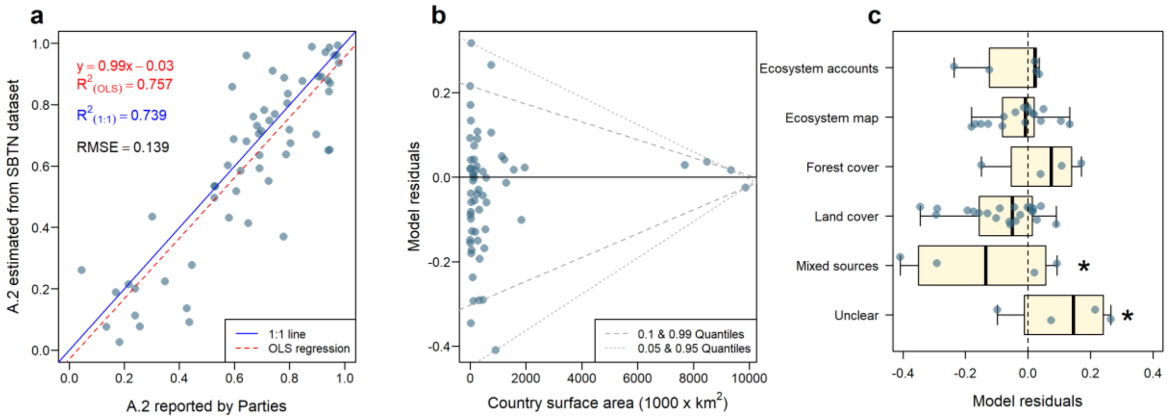

Figure 3. (**a**) A comparison between Headline Indicator A.2 (*Extent of Natural Ecosystems*) as reported by Parties to the Convention on Biological Diversity in their 7th National Reports and estimated from SBTN Natural Lands Map. R^2 values were from ordinary least squares (OLS: red) and 1:1 unity line (blue) regressions, complementing the root mean square error (RMSE). (**b**) The relationship between residuals from the comparison and the total surface area of each country. Grey dashed lines depict the outer limits of the data as estimated from a quantile regression (0.1, 0.05, 0.95, 0.99 quantiles). (**c**) The distribution of residuals for different type of data used in 7th National Reports. Boxplots show the minimum, median, maximum and interquartile range; and statistically significant difference are denoted by the asterisks (*), against a baseline set by *Ecosystem maps.*

The 78 Parties that reported on Indicator A.2 (both complete and incomplete values) most frequently used landcover data (25 Parties, 32.1%) and national ecosystem maps (19 Parties, 24.4%) to calculate the indicator (**Figure 2a**). Forest cover, inventories, and ecosystem accounts were collectively used by 20 Parties (25.6%), while 6 parties used a mixed combination of data sources. Eight Parties did not provide sufficient explanation to identify which data they used in calculating the indicator (**Figure 2a**). Forty-eight Parties (61.5%) made some attempt to disaggregate Indicator A.2 (**Figure 2b**). The most frequent type of disaggregation used national classifications of ecosystem types (16 Parties, 20.5%), while level 3 of the Global Ecosystem Typology was used by 15 Parties (19.2%).

Indicator A.2 from global data

There was a positive relationship between Indicator A.2 for the 60 Parties that reported the indicator in their 7th National Reports and estimates from the SBTN Natural Lands Map (**Figure 3a**). The ordinary least squares linear regression was statistically indistinguishable from the unity line, implying a 1:1 relationship (Intercept = -0.029 ± 0.05; t = -0.556; p = 0.581; Slope = 0.985 ± 0.07; t = -0.202; p = 0.841). RMSE = 0.139, which corresponds to an average error of 21.22% when divided by the mean indicator value. Similarly, 24.3% and 26.1% of variation between the two sources of information remained unaccounted for according to the OLS (R^2 = 0.757) and unity line (R^2 = 0.739) regressions, respectively. Combined, these patterns demonstrated broad concordance between the sources of the indicator, but urge caution when drawing conclusions for individual countries. Residuals were not systematically biased by the surface area of the countries (**Supplementary Tables S2 and S3**), though quantile regression showed that variation between the two sources was highest in smaller countries (**Figure 3b**). When parties used mixed data sources, their estimates were significantly lower than those estimated from the SBTN Natural Lands Map (**Figure 3c, Supplementary Table S3**). Underestimates were more pronounced in smaller countries (statistically significant interaction terms: **Supplementary Table S3**). By contrast, when it was unclear how Parties quantified the indicator, their estimates were consistently higher than those from the SBTN Natural Lands Map (**Figure 3c, Supplementary Table S3**).

The subset of Parties that reported on Indicator A.2 was a non-random sample of the countries covered by the SBTN Natural Lands Map (**Figure 4**), which meant that the country-averaged values for Indicator

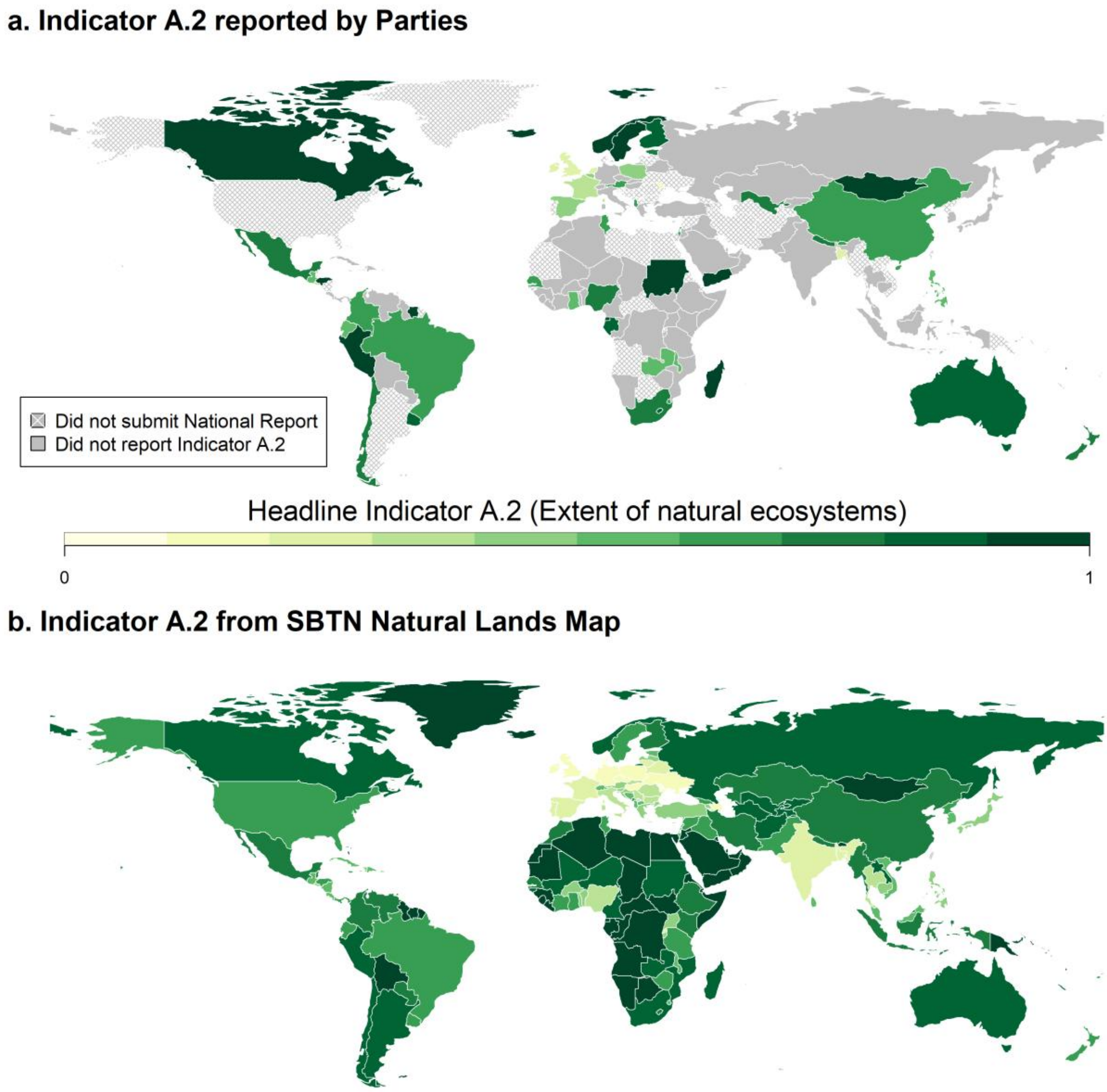

Figure 4. Headline Indicator A.2 (*Extent of Natural Ecosystems*) as (**a**) reported by Parties to the Convention on Biological Diversity in the 7th National Reports and (**b**) estimated from SBTN Natural Lands Map. Both maps use a common colour palette.

A.2 reported by Parties (n = 60; Mean = 0.654; Median = 0.691; Interquartile range = 0.52 – 0.86) differed from those estimated from the global dataset (n = 196; Mean = 0.597; Median = 0.643; Interquartile range = 0.39 – 0.86). These differences implied that the total extent of natural ecosystems globally could not simply be extrapolated from the subset of Parties that reported on Indicator A.2. Rather, the total extent of natural ecosystems globally had to be estimated using a dataset with global coverage; in the case of the SBTN Natural Lands Map, natural lands covered 70.54% of the total global area.

DISCUSSION

Roughly one in three Parties to the CBD included complete estimates of Headline Indicator A.2 in their 7th National Reports. An optimist might see this as an improvement on earlier reporting cycles, where only one-fifth of indicators were consistent with CBD recommendations (Bhatt et al. 2020). However, the 60 Parties that successfully reported on Indicator A.2 were outnumbered by the 75 Parties that submitted reports but either did not report on the indicator at all or only provided incomplete information. This points towards the lack of readiness to report on the extent of natural ecosystems.

An earlier evaluation ahead of reporting deadlines suggested that while methods had been established for Headline Indicator A.2, and data compiled in some countries, further data collection would be needed before the indicator was fully operational (Affinito et al. 2025). This evaluation has proven to be prescient. The method for calculating the indicator – under the custodianship of the UN Statistical Division and based on SEEA Ecosystem Accounting – is indeed well developed. Yet 18 Parties still provided information that was insufficient to calculate the indicator. While this could be attributed to incomplete data in these countries, it might justify creating additional national capacities by, for example, translating metadata into more languages, producing additional guidelines, or hosting training workshops. In this regard, the CBD Secretariat's efforts to host regional dialogues ahead of the 7th National Report deadlines was a step in the right direction (Convention on Biological Diversity 2026a), as is the EU-funded project led by the UN Statistical Division on *SEEA-related Indicators for the Global Biodiversity Framework* (https://seea.un.org/content/seea-related-indicators-global-biodiversity-framework).

Parties should aspire to develop their own national ecosystem maps, not only for reporting on Headline Indicator A.2, but because such maps are the foundation for spatial biodiversity planning, ecosystem accounting, and Red List of Ecosystems Assessments (Botts et al. 2020; Nicholson et al. 2024; SANBI & UNEP-WCMC 2024; Xiao et al. 2024). However, only 19 Parties used national ecosystem maps for their reporting, signalling the absence or underuse of these types of data products. Developing national ecosystem maps from scratch can take several years, followed by periodic updates and improvements that may last decades (Dayaram et al. 2019; Sink et al. 2023; Global Ecosystems Atlas 2026). So, although Parties may have time to develop national maps ahead of the 8th National reports due by mid-2029, the need for alternative global datasets remains in the short term.

The metadata for Headline Indicator A.2 describes two potential global data sources that could serve as a temporary stopgap. The first is ARIES for SEEA (https://seea.un.org/content/aries-for-seea), which combines global land cover data with a rules-based look-up table to identify broad ecosystem types (similar to the approach described by Sayre et al. 2020). This approach is relatively fast and accessible, but could be sensitive to known variations in global land cover products (Venter et al. 2022; Kerner et al. 2024), which would introduce errors unless validated locally (Meyer & Pebesma 2022; Buschke et al. 2023). The second listed data source is the Global Ecosystems Atlas (https://globalecosystemsatlas.org/), which is in the process of synthesising existing ecosystem maps (including from national sources) standardised using the IUCN Global Ecosystem Typology and filling data gaps using the newly developed ecosystem classification models (e.g., Brown et al. 2025; Herzog et al. 2025). While the Global Ecosystem Atlas has the advantage of including locally-validated datasets – including for the marine realm – it had not yet reached a level of completeness needed to inform the 2026 Global Review of Collective Progress.

The Draft Global Review of Collective Progress (https://www.cbd.int/gbf/implementation/globalreview) limited its analysis to data from the subset of Parties that successfully reported on Headline Indicator A.2. Our results show that there is merit in using a global analysis like ours based on the SBTN Natural Lands Map as a temporary stopgap for complete global coverage. Article 18 of Decision 16/32 of the CBD is unambiguous that national reports should be the primary source of information in the review (Convention on Biological Diversity 2026b), but it also makes provisions for content from "other relevant scientific and technical peer-reviewed literature" (Article 18h).

Our comparison showed that overall patterns of Indicator A.2 are statistically comparable between the National Reports and the SBTN Natural Lands Map, with the error between the two sources greatest in geographically small countries, especially when Parties used multiple or ambiguous data types. Larger discrepancies in small countries point towards artefacts caused by geoprocessing choices rather than fundamental inconsistencies in underlying datasets. Small differences in geographical projection, country boundaries, data resolution, mapping processes, and analyst biases all affect estimates of surface area (Olofsson et al. 2014). One expects these discrepancies to disproportionately affect smaller areas where they make up a greater proportion of the total area, compared to large countries where different sources of uncertainty may even out themselves out. Therefore, indicators derived from the SBTN Natural Land Map appear more reliable at larger continental- or global-scales in a way that could supplement the Global Review of Collective Progress (data tables are included in **Supplementary Table S1**).

Headline Indicator A.2 estimated from the SBTN Natural Land Map has the shortcoming that it cannot be disaggregated according to the Global Ecosystem Typology as recommended in the indicator's methodological metadata. But seeing that only 15 Parties reported this disaggregation, this specific drawback of the SBTN remains relatively minor for now. An advantage of the SBTN Global Lands Map is that it can be used to estimate Indicator A.2 for the whole planet (excluding the marine realm), suggesting that 70.5% of terrestrial areas globally remain natural. This should not imply that these areas are necessarily in a state of high integrity. Independent analyses showed that roughly 70% of lands have very low (43%) and low (27%) human modification (Theobald et al. 2025), consistent with our estimate for Indicator A.2. But other estimates of the global ecological footprint show how 75% of the terrestrial surface area faces some form of human pressure (Venter et al. 2016), signalling that a significant part of the remaining natural ecosystem extent is likely exposed to negative human pressures. Given these facts, we encourage the continued development of national-level ecosystem data and their subsequent integration in ecosystem risk assessments (Bland et al. 2017; Nicholson et al. 2024). In the meantime, the Global Biodiversity Framework should continue promoting ecosystems as the focus of policy, planning, implementation, and monitoring. While Parties learn and develop their monitoring systems to incorporate ecosystem data, our study makes the case to apply and validate spatial information from global sources to meet global reporting needs.

DATA AVAILABILITY: The data and analysis scripts are available from https://github.com/falko-buschke/GBF_Indicator_A2

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Supplementary Information

Supplementary Table S1: Headline Indicator A.2 (Extent of Natural Ecosystems) for the 196 Parties to the Convention on Biological Diversity from 7th National Reports and the SBTN Natural Lands Map. (ISO3 = International Organization for Standardization 3-letter country code; † Estimates for the European Union are based on aggregations of data from Member States – excluding overseas territories – and not separate geoprocessing, which may compound errors.)

No.	Country Name	ISO3	7th National Report	SBTN	Total area (km^2)
1.	Afghanistan	AFG	-	0.855	642000
2.	Albania	ALB	0.691	0.592	28700
3.	Algeria	DZA	Submitted report, no indicator	0.952	2310000
4.	Andorra	AND	-	0.867	475
5.	Angola	AGO	Submitted report, no indicator	0.928	1250000
6.	Antigua and Barbuda	ATG	-	0.530	453
7.	Argentina	ARG	-	0.802	2780000
8.	Armenia	ARM	Submitted report, no indicator	0.439	29600
9.	Australia	AUS	0.848	0.876	7690000
10.	Austria	AUT	0.650	0.413	84000
11.	Azerbaijan	AZE	-	0.195	165000
12.	Bahamas (The)	BHS	Submitted report, no indicator	0.908	11900
13.	Bahrain	BHR	Submitted report, no indicator	0.532	673
14.	Bangladesh	BGD	0.216	0.214	140000
15.	Barbados	BRB	-	0.156	433
16.	Belarus	BLR	Submitted report, no indicator	0.287	208000
17.	Belgium	BEL	0.436	0.091	30700
18.	Belize	BLZ	0.727	0.748	21800
19.	Benin	BEN	Submitted report, no indicator	0.471	115000
20.	Bhutan	BTN	0.643	0.960	37700
21.	Bolivia (Plurinational State of)	BOL	Incomplete indicator	0.906	1080000
22.	Bosnia and Herzegovina	BIH	-	0.528	51100
23.	Botswana	BWA	0.962	0.960	578000
24.	Brazil	BRA	0.643	0.680	8490000
25.	Brunei Darussalam	BRN	Submitted report, no indicator	0.861	5900
26.	Bulgaria	BGR	Submitted report, no indicator	0.368	111000
27.	Burkina Faso	BFA	Submitted report, no indicator	0.495	273000
28.	Burundi	BDI	Incomplete indicator	0.424	26900

29.	Cabo Verde	CPV	-	0.882	4060
30.	Cambodia	KHM	Submitted report, no indicator	0.493	181000
31.	Cameroon	CMR	Incomplete indicator	0.845	465000
32.	Canada	CAN	0.916	0.891	9870000
33.	Central African Republic	CAF	-	0.979	620000
34.	Chad	TCD	Incomplete indicator	0.905	1260000
35.	Chile	CHL	0.782	0.887	753000
36.	China	CHN	0.688	0.705	9350000
37.	Colombia	COL	0.682	0.732	1140000
38.	Comoros	COM	-	0.861	1650
39.	Congo	COG	Submitted report, no indicator	0.977	341000
40.	Cook Islands	COK	Submitted report, no indicator	0.257	242
41.	Costa Rica	CRI	Submitted report, no indicator	0.545	51000
42.	Côte d'Ivoire	CIV	Submitted report, no indicator	0.612	322000
43.	Croatia	HRV	-	0.479	56600
44.	Cuba	CUB	Incomplete indicator	0.557	111000
45.	Cyprus	CYP	Submitted report, no indicator	0.317	9250
46.	Czechia	CZE	Submitted report, no indicator	0.155	78800
47.	Democratic People's Republic of Korea	PRK	-	0.640	122000
48.	Democratic Republic of the Congo	COD	Submitted report, no indicator	0.914	2330000
49.	Denmark	DNK	-	0.052	44500
50.	Djibouti	DJI	-	0.991	21700
51.	Dominica	DMA	-	0.830	751
52.	Dominican Republic	DOM	Submitted report, no indicator	0.520	48100
53.	Ecuador	ECU	0.597	0.688	256000
54.	Egypt	EGY	-	0.943	982000
55.	El Salvador	SLV	0.302	0.435	20700
56.	Equatorial Guinea	GNQ	0.930	0.970	27000
57.	Eritrea	ERI	-	0.917	121000
58.	Estonia	EST	0.724	0.551	45400
59.	Eswatini	SWZ	0.607	0.517	17300
60.	Ethiopia	ETH	Submitted report, no indicator	0.714	1130000
61.	European Union†	EUE	0.455	0.334	4131987
62.	Fiji	FJI	-	0.694	18300

63.	Finland	FIN	0.897	0.703	337000
64.	France	FRA	0.348	0.224	549000
65.	Gabon	GAB	0.881	0.989	264000
66.	Gambia	GMB	Submitted report, no indicator	0.494	11200
67.	Georgia	GEO	-	0.649	69800
68.	Germany	DEU	Submitted report, no indicator	0.119	357000
69.	Ghana	GHA	0.576	0.603	239000
70.	Greece	GRC	Submitted report, no indicator	0.451	133000
71.	Grenada	GRD	-	0.677	319
72.	Guatemala	GTM	0.528	0.535	109000
73.	Guinea	GIN	Submitted report, no indicator	0.909	243000
74.	Guinea-Bissau	GNB	-	0.879	30700
75.	Guyana	GUY	Submitted report, no indicator	0.976	212000
76.	Haiti	HTI	-	0.452	27000
77.	Honduras	HND	0.946	0.653	112000
78.	Hungary	HUN	Submitted report, no indicator	0.165	93100
79.	Iceland	ISL	0.971	0.962	103000
80.	India	IND	Submitted report, no indicator	0.282	2960000
81.	Indonesia	IDN	Submitted report, no indicator	0.725	1890000
82.	Iran (Islamic Republic of)	IRN	-	0.750	1680000
83.	Iraq	IRQ	Incomplete indicator	0.688	436000
84.	Ireland	IRL	0.240	0.112	69800
85.	Israel	ISR	0.623	0.585	20700
86.	Italy	ITA	Submitted report, no indicator	0.312	302000
87.	Jamaica	JAM	-	0.638	11000
88.	Japan	JPN	Submitted report, no indicator	0.439	374000
89.	Jordan	JOR	Incomplete indicator	0.910	89100
90.	Kazakhstan	KAZ	Submitted report, no indicator	0.729	2840000
91.	Kenya	KEN	Incomplete indicator	0.797	582000
92.	Kiribati	KIR	-	0.612	1020
93.	Kuwait	KWT	-	0.908	17400
94.	Kyrgyzstan	KGZ	Submitted report, no indicator	0.869	199000
95.	Lao People's Democratic Republic	LAO	-	0.848	230000
96.	Latvia	LVA	-	0.457	64600

97.	Lebanon	LBN	-	0.563	10100
98.	Lesotho	LSO	0.800	0.718	30500
99.	Liberia	LBR	Submitted report, no indicator	0.960	96100
100.	Libya	LBY	-	0.981	1620000
101.	Liechtenstein	LIE	-	0.474	151
102.	Lithuania	LTU	-	0.271	64900
103.	Luxembourg	LUX	0.169	0.188	2620
104.	Madagascar	MDG	0.939	0.879	589000
105.	Malawi	MWI	0.530	0.533	119000
106.	Malaysia	MYS	Incomplete indicator	0.567	330000
107.	Maldives	MDV	-	0.792	226
108.	Mali	MLI	Incomplete indicator	0.864	1250000
109.	Malta	MLT	0.182	0.026	317
110.	Marshall Islands	MHL	Submitted report, no indicator	0.457	269
111.	Mauritania	MRT	-	0.990	1040000
112.	Mauritius	MUS	-	0.871	2020
113.	Mexico	MEX	0.747	0.769	1950000
114.	Micronesia (Federated States of)	FSM	Submitted report, no indicator	0.152	742
115.	Monaco	MCO	-	0.052	8.348947
116.	Mongolia	MNG	0.976	0.994	1560000
117.	Montenegro	MNE	-	0.672	13800
118.	Morocco	MAR	Incomplete indicator	0.717	414000
119.	Mozambique	MOZ	Submitted report, no indicator	0.823	787000
120.	Myanmar	MMR	-	0.709	667000
121.	Namibia	NAM	Submitted report, no indicator	0.977	824000
122.	Nauru	NRU	-	0.583	21.6
123.	Nepal	NPL	0.708	0.782	147000
124.	Netherlands (Kingdom of the)	NLD	0.257	0.076	35200
125.	New Zealand	NZL	0.788	0.637	270000
126.	Nicaragua	NIC	-	0.577	128000
127.	Niger	NER	Incomplete indicator	0.873	1180000
128.	Nigeria	NGA	0.779	0.370	909000
129.	Niue	NIU	-	0.117	264
130.	North Macedonia	MKD	-	0.571	25400

131.	Norway	NOR	0.948	0.870	324000
132.	Oman	OMN	Submitted report, no indicator	0.981	308000
133.	Pakistan	PAK	Incomplete indicator	0.659	788000
134.	Palau	PLW	Submitted report, no indicator	0.912	453
135.	Panama	PAN	Submitted report, no indicator	0.673	74900
136.	Papua New Guinea	PNG	-	0.957	462000
137.	Paraguay	PRY	Submitted report, no indicator	0.717	399000
138.	Peru	PER	0.905	0.891	1290000
139.	Philippines	PHL	0.527	0.497	296000
140.	Poland	POL	0.427	0.136	312000
141.	Portugal	PRT	-	0.248	88800
142.	Qatar	QAT	Submitted report, no indicator	0.870	11500
143.	Republic of Korea	KOR	Submitted report, no indicator	0.543	99100
144.	Republic of Moldova	MDA	0.135	0.076	33800
145.	Romania	ROU	-	0.321	238000
146.	Russian Federation	RUS	Submitted report, no indicator	0.859	17000000
147.	Rwanda	RWA	-	0.250	25400
148.	Saint Kitts and Nevis	KNA	-	0.550	262
149.	Saint Lucia	LCA	-	0.758	603
150.	Saint Vincent and the Grenadines	VCT	Submitted report, no indicator	0.733	427
151.	Samoa	WSM	Submitted report, no indicator	0.136	2840
152.	San Marino	SMR	-	0.054	60.3
153.	Sao Tome and Principe	STP	-	0.073	991
154.	Saudi Arabia	SAU	Submitted report, no indicator	0.969	1930000
155.	Senegal	SEN	0.698	0.714	196000
156.	Serbia	SRB	-	0.368	88500
157.	Seychelles	SYC	0.580	0.431	501
158.	Sierra Leone	SLE	Submitted report, no indicator	0.954	72300
159.	Singapore	SGP	0.045	0.261	595
160.	Slovakia	SVK	Submitted report, no indicator	0.387	49100
161.	Slovenia	SVN	-	0.489	20300
162.	Solomon Islands	SLB	-	0.866	28300
163.	Somalia	SOM	Submitted report, no indicator	0.951	633000
164.	South Africa	ZAF	0.794	0.836	1220000

165.	South Sudan	SSD	Submitted report, no indicator	0.971	630000
166.	Spain	ESP	0.445	0.277	506000
167.	Sri Lanka	LKA	Submitted report, no indicator	0.598	66200
168.	State of Palestine	PSE	-	0.071	441.7
169.	Sudan	SDN	0.943	0.842	1840000
170.	Suriname	SUR	0.945	0.986	145000
171.	Sweden	SWE	0.941	0.650	449000
172.	Switzerland	CHE	Submitted report, no indicator	0.528	41300
173.	Syrian Arab Republic	SYR	-	0.601	188000
174.	Tajikistan	TJK	-	0.873	142000
175.	Thailand	THA	Incomplete indicator	0.383	515000
176.	Timor-Leste	TLS	-	0.785	14900
177.	Togo	TGO	Submitted report, no indicator	0.496	56800
178.	Tonga	TON	-	0.165	699
179.	Trinidad and Tobago	TTO	0.668	0.761	5140
180.	Tunisia	TUN	0.692	0.635	155000
181.	Türkiye	TUR	Submitted report, no indicator	0.456	781000
182.	Turkmenistan	TKM	-	0.807	555000
183.	Tuvalu	TUV	-	0.325	46.7
184.	Uganda	UGA	Incomplete indicator	0.481	241000
185.	Ukraine	UKR	-	0.152	601000
186.	United Arab Emirates	ARE	Submitted report, no indicator	0.903	71200
187.	United Kingdom of Great Britain and Northern Ireland	GBR	0.240	0.200	244000
188.	United Republic of Tanzania	TZA	Incomplete indicator	0.676	940000
189.	Uruguay	URY	0.804	0.674	178000
190.	Uzbekistan	UZB	0.791	0.804	450000
191.	Vanuatu	VUT	0.740	0.910	12200
192.	Venezuela (Bolivarian Republic of)	VEN	Incomplete indicator	0.748	912000
193.	Viet Nam	VNM	-	0.515	328000
194.	Yemen	YEM	0.980	0.936	454000
195.	Zambia	ZMB	0.592	0.858	751000
196.	Zimbabwe	ZWE	Incomplete indicator	0.668	391000

Supplementary Table S2: Analysis of Variance for a linear model, where the responses are the residuals between Headline indicator A.2 reported in 7th National Reports and estimated from SBTN Natural Lands Map. The explanatory variables included the surface area (log km^2) of each country as a continuous variable, and the source type of data in 7th National Reports as a categorical variable with six levels. Statistically significant terms (α = 0.05) are denoted by the asterisk *.

Explanatory variable	Degrees of Freedom	Sum of Squares	Mean squares	F-value	P-value
Area	1	0.0002	0.0002	0.019	0.892
Data type	5	0.221	0.044	3.655	0.007*
Area × Data type	5	0.253	0.051	4.174	0.003*
Residuals	44	0.533	0.012		

Supplementary Table S3: Model coefficients from a two-way Analysis of Covariance, where the responses are the residuals between Headline indicator A.2 reported in 7th National Reports and estimated from SBTN Natural Lands Map. The explanatory variables included the surface area (log km^2) of each country as a continuous variable, and the source type of data in 7th National Reports as a categorical variable with six levels, as well as their interactions. Coefficients that are significantly different from 0 ($\alpha = 0.05$) are denoted by the asterisk *.

Explanatory variable	Coefficient (± s.e)	t-value	P-value
Intercept	-0.031 (0.027)	-1.121	0.268
Area	0.013 (0.032)	0.401	0.691
Additive terms (baseline = Ecosystem map)			
Unclear	0.146 (0.068)	2.158	0.036*
Mixed data	-0.185 (0.064)	-2.864	0.005*
Land cover	-0.055 (0.036)	-1.534	0.132
Forest cover	0.166 (0.084)	1.984	0.054
Ecosystem accounts	-0.009 (0.074)	-1.353	0.183
Interaction terms with Area (baseline = Ecosystem map)			
Area × Unclear	-0.009 (0.056)	-0.175	0.862
Area × Mixed data	-0.238 (0.068)	-3.521	0.001*
Area × Land cover	0.027 (0.040)	0.664	0.510
Area × Forest cover	0.077 (0.063)	1.219	0.229
Area × Ecosystem accounts	0.095 (0.075)	1.257	0.215