

Beyond 2030 Agendas: Toward Conditional Convergence in Global Sustainability Governance

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Abstract

As major sustainable-development frameworks approach 2030, “Beyond 2030” conversations are emerging across the UN system. This review synthesizes seven tracks: the 2030 Sustainable Development Goals (SDGs), Sendai Framework for Disaster Risk Reduction, Kunming-Montreal Global Biodiversity Framework, United Nations Convention to Combat Desertification (UNCCD), Global Goal on Adaptation (GGA) under the Paris Agreement, “Beyond GDP,” and Financing for Development. It combines official sources with peer-reviewed literature. The current SDG target horizon and the Sendai Framework term culminate in 2030, while the KMGBF already contains 2050 goals and the Paris Agreement operates through recurring cycles without a fixed expiry. A cross-framework indicator review supports the convergence pattern empirically: it identifies at least six concrete indicator overlaps or shared-data relationships across the CBD/GBF, SDG and UNCCD systems, alongside additional opportunities for interoperability with the GGA. Eighteen indicators are ranked by relevance, gap severity, connectivity, and tractability for the natural capital and biodiversity research community. The likely trajectory is convergence rather than merger: a shared vision and interoperable indicators, with treaty bodies retaining their mandates. The review also situates the IPCC and IPBES assessment cycles, which formally feed several tracks and converge on the same 2027–2028 window as the political reviews.

¹ What Version 3 covers: updates Version 2 (2 September 2026) with the just concluded UNCCD COP17 outcomes, integrates the IPCC and IPBES assessment cycles as scientific inputs to the post-2030 review timeline (new §4.2 themes, revised Figures 4–5 and Table 2).

29 **Keywords:** post-2030 agenda; Sustainable Development Goals; Sendai Framework; biodiversity
30 governance; climate adaptation; development finance

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32 **Highlights**

- 33 • No successor to the 2030 Agenda is agreed; convergence is conditional, not
34 automatic.
- 35 • Six indicator overlaps link CBD, SDG and UNCCD, with further GGA opportunities.
- 36 • A seven-layer coherence stack specifies what convergence actually requires.
- 37 • Eighteen priority indicators are ranked for natural capital and biodiversity work.
- 38 • Finance quality, not just volume, is a recurring constraint across all tracks.

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41 **1. Introduction**

42 The international community is approaching 2030 with several global frameworks that share a
 43 target year but have markedly different legal and institutional structures. The 2030 Agenda and
 44 the Sendai Framework are explicitly organized around 2030. By contrast, the Paris Agreement
 45 is an enduring treaty architecture; the Kunming-Montreal Global Biodiversity Framework
 46 combines 2030 targets with a 2050 vision; and the UNCCD is already formally designing a
 47 post-2030 strategic framework.

48 The result is not one single “Beyond 2030” negotiation. Instead, a set of parallel processes is
 49 beginning to converge around a broader question: how should sustainable development,
 50 climate resilience, biodiversity, land, disaster risk, wellbeing, and finance be organized after
 51 2030 without creating another fragmented global reporting system?

52 This review addresses a question broader than “what replaces the SDGs?” The more precise
 53 question is what replaces the 2030 Agenda as a whole, including its disaster-risk, biodiversity,
 54 climate-adaptation, and financing counterparts. I ask whether the multilateral system can build
 55 a common long-term development vision while allowing specialized treaties and institutions to
 56 retain their mandates and adopt interoperable targets, indicators, stocktakes, and financing
 57 arrangements. Section 2 describes my evidence base and screening method. Section 3 reviews
 58 each of the seven tracks in turn, closing with a cross-framework indicator analysis and a
 59 comparative synthesis of findings. Section 4 discusses cross-cutting institutional themes and
 60 their implications. Section 5 concludes.

61 **2. Evidence Base and Methods**

62 **2.1 Primary official sources**

63 This review draws on two complementary evidence streams. The primary stream is official
 64 documentation from the United Nations Secretariat, the Convention on Biological Diversity
 65 Secretariat, the UN Framework Convention on Climate Change Secretariat, the UN Convention
 66 to Combat Desertification Secretariat, and the UN Office for Disaster Risk Reduction,
 67 including summit outcome documents, Conference of the Parties decisions, progress reports,
 68 and press releases. The primary stream also includes the official products of the two
 69 intergovernmental scientific assessment bodies whose outputs formally feed several of these
 70 tracks: the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental
 71 Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). These products

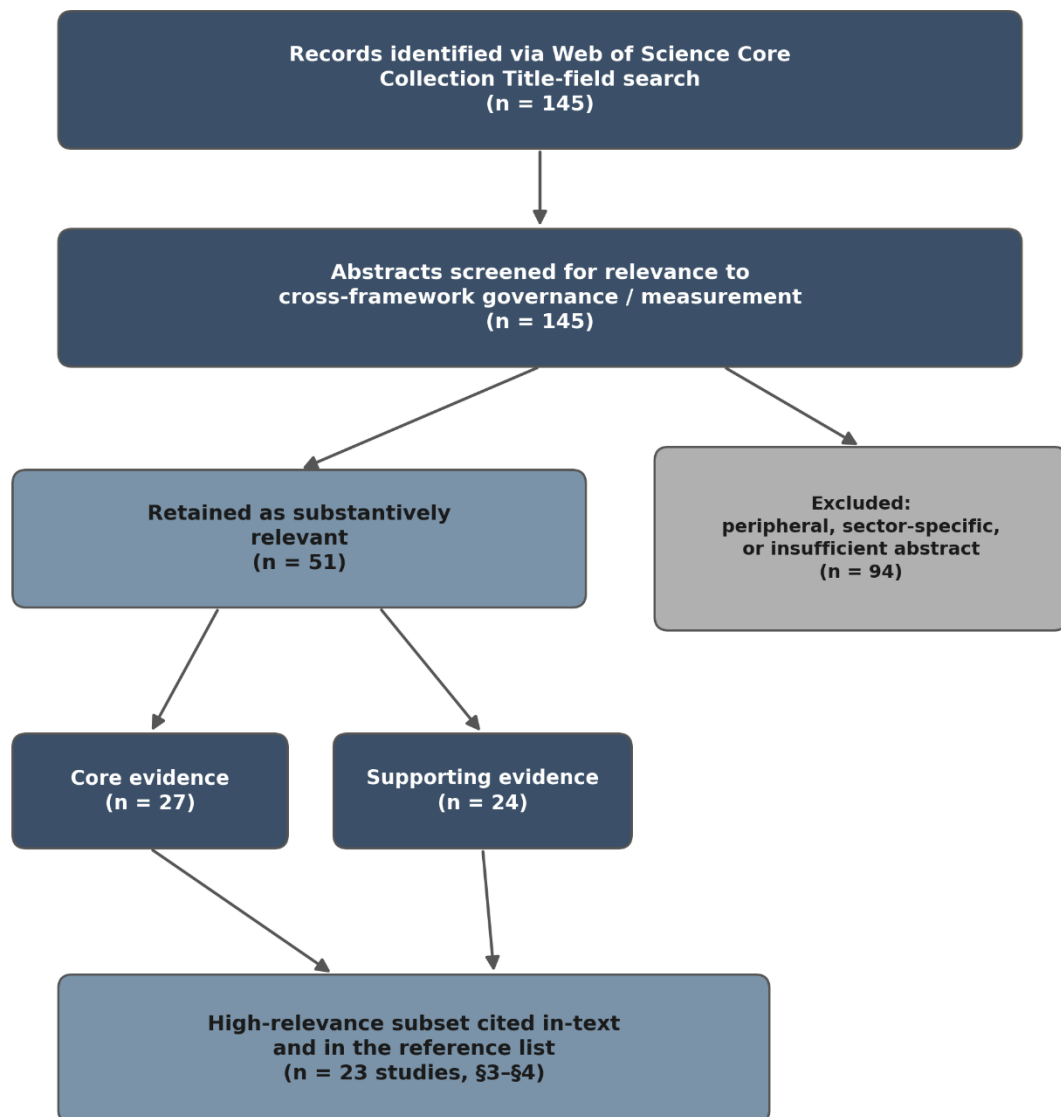
include approved summaries for policymakers, plenary decisions, and scoping documents, supplemented by Earth Negotiations Bulletin and specialist-press coverage of their plenaries.

2.2 Peer-reviewed literature: search strategy

The secondary stream is a structured Web of Science Core Collection search (Title field, all years through August 2026), conducted to test the review's policy mapping against the peer-reviewed literature. The query combined four Title-field term clusters with Boolean AND across clusters and OR within each cluster: (1) post-2030/SDG governance terms (e.g., “post-2030,” “beyond 2030,” “SDG successor,” “2030 Agenda,” *governance*, *framework*, *indicator*); (2) *sectoral framework terms* (*Sendai*, *disaster risk reduction*, *Global/Kunming-Montreal Biodiversity Framework*, *desertification*, *Paris Agreement*, *Global Goal on Adaptation*, *Belém Adaptation Indicator*, *global stocktake*, *resilience*); (3) measurement and finance terms (*Beyond GDP*, *wellbeing economy*, *inclusive wealth*, *natural/environmental-economic accounting*, *financing for development*, *international financial architecture*); and (4) integration vocabulary (*interoperability*, *indicator alignment*, *integration*, *convergence*, *coherence*, *harmonization*, *equity*). The full verbatim query is reproduced in the Supplementary Materials for reproducibility. The search returned a 145-record export including bibliographic metadata, abstracts, and cited-reference counts.

2.3 Screening and evidence synthesis

Every abstract in the 145-record export was read in full (Figure 1). Because the query combined broad governance vocabulary across four clusters, it also captured sector-specific studies unrelated to cross-framework governance (e.g., grid-resilience engineering or clinical ethics) despite matching the search terms. Screening against a single inclusion criterion (substantive relevance to cross-framework governance, coherence, or measurement of the seven tracks, §3) retained 51 records (35%) and excluded 94 (65%) as peripheral. Of the 51, 27 were classified as core evidence and 24 as supporting. All 27 core records underwent full-text review. Notably, zero records in the full 145-record set used the phrases “post-2030,” “beyond 2030,” “Belém Adaptation Indicators,” “Beyond GDP,” “Sevilla,” or “financing for development” in title or abstract, indicating this specific policy discourse is too recent to have an established indexed footprint at the phrase level; the retained literature instead addresses coherence, implementation, measurement, and governance of the underlying frameworks.



102
103 *Figure 1. Evidence screening flow for the Web of Science literature review*

3. Review by Institutional Track

3.1 The 2030 Agenda and the Sustainable Development Goals

Of the 139 SDG targets with sufficient trend data, 15% are on track and 21% show moderate progress (36% combined); nearly half are advancing only marginally or not at all; and 15% have slipped below their 2015 baselines (United Nations, 2026a) (Figure 2).

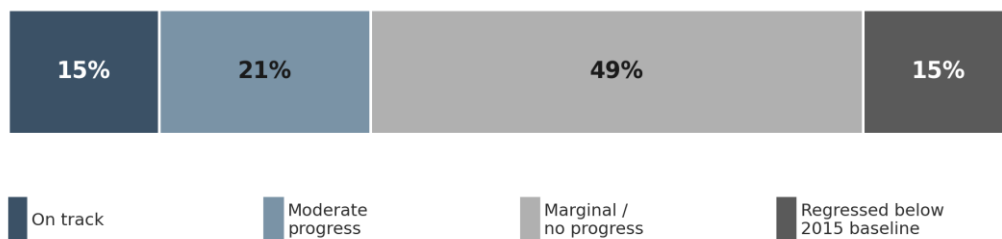


Figure 2. Progress on the 139 assessable SDG targets with sufficient trend data, as of the 2026 reporting cycle. Source: compiled from *The Sustainable Development Goals Report 2026* (United Nations, 2026a).

A genuine institutional asset has been built alongside this shortfall: the international SDG indicator database expanded from roughly 115 indicators and 330,000 records in 2016 to 233 indicators and 3.2 million records in 2026, which favors reform-and-reuse over wholesale replacement (United Nations, 2026a). Official development assistance fell by a record 23.1% in 2025, the largest annual decline on record, a headwind cited across nearly every 2026 progress report (United Nations, 2026a).

The formal process is anchored in the Pact for the Future, which invites the SDG Summit in September 2027 to consider “how we will advance sustainable development by 2030 and beyond,” informed by the final quadrennial Global Sustainable Development Report (SDG Knowledge Hub, 2025a). This mandate does not prejudge the outcome: it neither mandates new goals nor decides whether the framework will be extended, revised, or replaced. Various stakeholders have floated an extension model (retain the 17 SDGs, revise deadlines), a renewal model (retain structure, replace targets), a core-plus-flexibility model (small global core plus national add-ons), and a long-term-vision model (organize around 2050, borrowing from climate and biodiversity governance) (UN Sustainable Development Knowledge Platform, 2024), though none of these constitutes an agreed position.

Peer-reviewed evidence does not yet favor one successor model; instead, it emphasizes mechanisms for coordinating existing regimes rather than architecture per se. Analyzing nationally determined contributions (NDCs), Janetschek et al. (2020) show that national policy cycles can be used to identify overlaps, gaps, co-benefits, and trade-offs between Paris Agreement commitments and SDG strategies. Hermwille et al. (2023) similarly identify synchronized global review moments (the Global Stocktake and the SDG midterm review) as practical, underused opportunities for integration. This literature shifts attention from goal architecture alone toward recurring alignment and review mechanisms as the primary lever for coherence.

3.2 Sendai Framework for Disaster Risk Reduction (2015–2030)

Sendai's term runs concurrently with the SDGs (2015–2030) and was the first major agreement of the post-2015 development agenda, designed to operate alongside the SDGs, the Paris Agreement, and the Addis Ababa Action Agenda (UNDRR, 2026b). Its 2023 midterm review, prepared for UNDRR by the International Science Council, explicitly aimed to support “a post-2030 governance framework” integrating risk reduction as a determinant of sustainable development (International Science Council, 2023).

A concrete post-2030 vehicle now exists: UNDRR announced that Qatar will host the Ninth Global Platform for Disaster Risk Reduction (GP2028) in Doha. Convening two years before Sendai's 2030 end date, GP2028 is explicitly billed to “begin shaping the next phase of international cooperation on disaster risk reduction beyond 2030” (UNDRR, 2025a), a materially more concrete post-2030 signal than currently exists for the SDGs. UNDRR's Strategic Framework 2026–2030 sets four catalytic areas (risk knowledge, locally-led DRR, financing, and recovery readiness) to accelerate implementation in Sendai's closing years (UNDRR, 2025b).

Peer-reviewed literature makes the post-Sendai implementation challenge considerably more concrete. Studies spanning global monitoring, Sri Lanka, South Africa, Kenya, and Eswatini/SADC identify a consistent pattern: fragmented plans, weak institutional coordination, uneven subnational implementation, and insufficient monitoring. Alignment between DRR, climate adaptation, and SDG strategies has improved but remains partial, with national plans still needing better sub-national implementation (Yamazaki-Honda, 2022; Yamazaki-Honda, 2024). In Sri Lanka, coherence is limited by fragmented governance, weak coordination, inadequate M&E, resource constraints and limited local implementation (Swaris

et al., 2024); in South Africa, the three policy domains evolved in institutional isolation with misaligned objectives (Zembe et al., 2023); in Kenya, sub-national multi-level collaboration, not top-down goal alignment, is what actually produces convergence (Smucker et al., 2020). A 2026 theoretical review of Eswatini/SADC argues Policy Coherence for Development can enhance resilience through joint accountability and more efficient resource allocation (Myeni et al., 2026), while South Asian evidence finds ecosystem-based DRR requires science-policy integration mechanisms most national frameworks currently lack (Meraj et al., 2026). Separately, a lack of interoperability between data, models, communication, and governance, not a shortage of individual tools, is identified as the central barrier to integrated disaster risk management (Schröter et al., 2025). Common threads across this literature (shared metrics, joint M&E, multilevel institutions, aligned budgets, and place-based implementation) suggest a post-Sendai framework should invest as much in implementation architecture as in new targets.

3.3 Convention on Biological Diversity / Kunming-Montreal Global Biodiversity Framework

Adopted at COP15 (December, 2022), the GBF sets four long-term goals for 2050 and 23 action-oriented targets for 2030, meaning biodiversity governance already has an agreed beyond-2030 destination (UN Biodiversity Lab, 2026). COP16 (Cali, October–November 2024) adopted the Cali Fund for digital sequence information benefit-sharing but was suspended for loss of quorum before resolving resource-mobilization decisions (Earth Negotiations Bulletin, IISD, 2025); the Rome resumed session (February, 2025) adopted the first-ever text on Planning, Monitoring, Reporting and Review mechanisms, including a schedule for a global review at COP17 (Carbon Brief, 2025).

By 9 March 2026, 125 countries (nearly two-thirds of the 196 CBD Parties) had submitted their 7th National Reports, the primary data source for COP17's first global review (Convention on Biological Diversity, 2026). An independent count found only 98 submissions by the 28 February deadline itself, with Brazil, China, Ecuador, Papua New Guinea and the Philippines among the megadiverse countries yet to report (Carbon Brief, 2026c). COP17 (Yerevan, Armenia, 19–30 October 2026) conducts the first global review of collective GBF progress (UNDP, 2026). Scientific assessment is built into this review cycle. Decision 16/32 bases the global review primarily on national reports and a global report on collective progress, with scientific and technical inputs prepared through the Subsidiary Body on Scientific, Technical and Technological Advice (Convention on Biological Diversity, 2025). IPBES deliverables are

193 timed to inform the same cycle: a monitoring assessment reporting on progress toward GBF
 194 goals and targets is due at IPBES-13 in 2027, and the second global assessment of biodiversity
 195 and ecosystem services, which explicitly aims to support assessment of progress toward the
 196 GBF's 2030 targets, its 2050 goals, and relevant SDGs, is due at IPBES-14 in 2028, ahead of
 197 the second global review at COP19 in 2030 (IPBES, 2023, 2025; JNCC, 2026).

198 Biodiversity literature adds an important caution: ambitious global targets do not automatically
 199 translate into mainstreamed sectoral policy. The 2010 Biodiversity Target strengthened
 200 international cooperation but did not create policy alignment or coherent national
 201 implementation across Latin America and the Caribbean (Velázquez Gomar, 2014), and a
 202 systematic review of Biodiversity Policy Integration across 43 empirical studies similarly finds
 203 overall integration levels remain low: targets are overly abstract, biodiversity policies are often
 204 uncoded add-ons, and resources are insufficient (Runhaar et al., 2024). Comparing the United
 205 States and European Union, national mainstreaming of GBF targets is hampered by weak
 206 linkages to binding policy mechanisms, a pattern that predates the GBF and afflicted its Aichi
 207 Target predecessor (Carroll et al., 2022). Joint planning, coherent incentives, adaptive learning,
 208 stronger accountability, and institutional change emerge across this literature as central
 209 conditions for closing the target-to-implementation gap. Equity matters as much as
 210 mainstreaming: a “Rights for Life” scenario shows centering Indigenous Peoples' and local
 211 communities' rights can outperform area-based approaches like Half-Earth on social-equity
 212 grounds (Sarkki et al., 2023), while an earlier analysis of the post-2015 development agenda
 213 shows biodiversity and ecosystem services can be structurally integrated into a broader goal
 214 set when target areas and means of implementation are explicit from the outset, a design lesson
 215 directly relevant to any post-2030 architecture (Lucas et al., 2014). On the inter-treaty side, a
 216 2025 analysis proposes concrete mechanisms for the Ramsar Convention and CBD to build
 217 cooperation and indicator interoperability around GBF implementation (Ramsar–CBD, 2025).

218 **3.4 UNFCCC Global Goal on Adaptation and the Belém Adaptation Indicators**

219 The Paris Agreement itself does not expire in 2030; Article 7 establishes the Global Goal on
 220 Adaptation (GGA) as a continuing objective. The UAE Framework for Global Climate
 221 Resilience (COP28) set 11 targets (four on the iterative adaptation cycle, seven thematic),
 222 several with 2030 milestones (IISD, 2024). At CMA7/COP30 (Belém 2025), Parties adopted
 223 59 Belém Adaptation Indicators feeding into the Global Stocktake, and launched the two-year
 224 Belém–Addis Vision on Adaptation (UNFCCC, 2026). Indicator development explicitly

225 borrowed design from other frameworks: among proposed indicators compiled from party
 226 submissions, those drawn from the SDGs, Sendai, and the GBF were the most commonly cited
 227 (UNFCCC, 2024). A technical paper on indicator use and aggregation is due by 30 September
 228 2026; a formal review of the indicators, as part of the review of the UAE Framework, is
 229 scheduled for 2029, after the second Global Stocktake concludes at CMA10 in November 2028
 230 (UNFCCC, 2025). On the scientific side, the IPCC is revising its 1994 Technical Guidelines
 231 on impacts and adaptation, including adaptation indicators, metrics and guidelines, as a
 232 separate product developed alongside the AR7 Working Group II report (IPCC, 2026). This
 233 revision is a scientifically relevant parallel process to the Belém indicator review. IPCC authors
 234 have noted that AR6 did not assess the GGA in detail, leaving little assessed evidence when
 235 UNFCCC negotiators later requested it, and have suggested that AR7 examine GGA-relevant
 236 indicators explicitly (Nalau et al., 2024).

237 Peer-reviewed adaptation literature adds two design requirements the official-source evidence
 238 does not surface on its own: equity and scale. Barkai and Winkler (2025) address a gap in the
 239 GGA architecture directly: while fair-share frameworks exist for mitigation-responsibility
 240 equity, no equivalent previously existed for the GGA, so they propose a rubric-based
 241 Adaptation Equity Framework spanning distributive, procedural, recognitional, and
 242 intergenerational justice. Scale matters as much as framing: aggregate, city-level adaptation
 243 indicators can conceal severe neighborhood-level inequities (Kim et al., 2026), and practice-
 244 based monitoring and evaluation work shows that who defines indicators and controls resulting
 245 data can either reproduce or reduce inequity (Kotschy et al., 2025). This literature implies the
 246 GGA's national-flexibility principle should be paired with, not substituted for, explicit
 247 disaggregation, participation, and equity criteria. Separately, Hermwille et al. (2023) argue the
 248 global stocktake and SDG midterm review are complementary moments governments should
 249 deliberately link, offering an academic case for the stocktake-convergence pattern identified in
 250 Section 4.

251 **3.5 UNCCD: The Most Advanced Formal Post-2030 Design Process**

252 The UNCCD is structurally distinct: it is the only track among the “2030-bound” frameworks
 253 with an already-launched, time-bound intergovernmental process explicitly mandated to design
 254 a post-2030 successor. Following COP16, Parties established an Intergovernmental Working
 255 Group on the Future Strategic Framework (including 20 members: 15 regional representatives,
 256 three from each of five regional groups, plus five technical experts) tasked with identifying key

elements of a post-2030 strategic framework and re-analyzing existing indicators for post-2030 relevance (CARI Association, 2025). COP17 (Ulaanbaatar, Mongolia, 17–28 August 2026), the first of three major environmental COPs in 2026, concluded with the Working Group's mandate extended through the 2026–2028 biennium rather than a final post-2030 framework: an interim report is now due for consideration at CRIC 25, with a final proposal deferred to COP18. The conference launched a US\$1.2 billion Rangelands Flagship Initiative spanning 45 projects and produced the Ulaanbaatar Declaration, but on drought Parties agreed only to continue negotiations at COP18, the gender agenda item was blocked and placed on the COP18 agenda, and the Convention's longer-term post-2030 institutional design was left unresolved (UNCCD, 2026a; UNCCD, 2026b; Earth Negotiations Bulletin, IISD, 2026).

The chronic implementation challenge this process seeks to resolve is well documented: a 2011 study in Land Degradation & Development found the Convention's implementation record “remains poor worldwide,” attributing this to weak environmental policy integration across multi-level governance contexts, a diagnosis frequently still cited as relevant (Briassoulis, 2011). On measurement, a 2022 paper proposes integrated environmental-economic accounting for land degradation as a more complete alternative to the sparse indicators currently used for UNCCD monitoring, directly relevant to both the Working Group's mandate and the wider Beyond GDP/natural-capital agenda (§3.6) (Carlucci et al., 2022). UNCCD Parties now debate the design of their own Science-Policy Interface with explicit reference to the IPCC and IPBES: at COP17, delegates weighed whether negotiated summaries for policymakers of UNCCD flagship reports would require resources on the scale of those two bodies, and the EU encouraged synergies with other intergovernmental scientific bodies that could lead to joint assessments (Earth Negotiations Bulletin, IISD, 2026).

3.6 Beyond GDP: A New Intergovernmental Measurement Agenda

The Beyond GDP agenda moved from academic debate into a formal UN process in 2026. The Secretary-General's independent High-Level Expert Group (HLEG) on Beyond GDP, comprising 14 experts appointed in May 2025 and co-chaired by Kaushik Basu and Nora Lustig, released Counting What Counts: A Compass of Progress for People and Planet on 7 May 2026 (United Nations, 2026b). The report proposes a dashboard of 31 indicators organized around equitable, inclusive, and sustainable wellbeing; approximately half are drawn directly from existing SDG indicators, allowing immediate reporting from data countries already collect (UNCTAD, 2026). The HLEG was created in direct response to a Member State request

289 in the Pact for the Future; Spain and Guyana co-facilitate the follow-on intergovernmental
290 process launched with the report.

291 The academic evidence supports plural measurement rather than a single GDP substitute. One
292 prominent Beyond-GDP approach, inclusive wealth, has an extensive prior research base: a
293 bibliometric analysis of 1,444 Web of Science papers by Kousar et al. (2025) traces sustained
294 growth in inclusive-wealth and natural-capital/biodiversity-accounting research well before the
295 HLEG's 2026 proposal. This indicates that the HLEG report consolidates an already-maturing
296 research agenda rather than originating one. Land-accounting approaches show a practical
297 route for connecting environmental condition to income and wealth effects rather than
298 reporting them separately (Carlucci et al., 2022). The reviewed literature does not reveal a
299 settled scholarly consensus on any single headline post-GDP metric; Beyond GDP is therefore
300 better treated as a complementary measurement layer than as a GDP replacement (§4.3). IPBES
301 provides authoritative assessed evidence for this plural-measurement position: its Values
302 Assessment found that economic and political decisions have predominantly prioritized
303 market-based instrumental values of nature while overlooking non-market values, even though
304 more than 50 valuation methods are available (IPBES, 2022). This finding bears directly on
305 which values a Beyond GDP dashboard makes visible.

306 **3.7 Financing for Development**

307 The Fourth International Conference on Financing for Development (FfD4, Sevilla, 30 June–
308 3 July 2025) adopted the Compromiso de Sevilla, recognizing an estimated US\$4 trillion
309 annual financing-for-development gap and launching a package of reforms (SDG Knowledge
310 Hub, 2025b). It is the first intergovernmentally agreed financing-for-development framework
311 since the 2015 Addis Ababa Action Agenda (United Nations, 2025a), and covers domestic
312 public resources, private finance mobilization, debt sustainability, international financial
313 architecture reform, and trade, with a companion “Sevilla Platform for Action” comprising
314 over 130 implementation initiatives (United Nations, 2025b) (Figure 3). The United States
315 withdrew from the negotiations and did not attend the Sevilla conference, underscoring a
316 broader fault line in global consensus around sustainable-development financing (UN News,
317 2025). This track is not a separate silo: virtually every “what is constraining progress”
318 discussion in the SDG, Sendai, and GBF literature reviewed above points to the same shortfall:
319 the 2025 ODA collapse landing squarely inside the gap Sevilla was designed to address.

(a) Official development assistance



(b) Financing-for-development gap

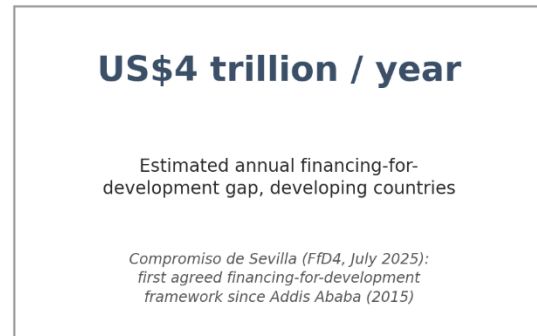


Figure 3. (a) The 2025 decline in Official Development Assistance and (b) the estimated annual financing-for-development gap recognized at FfD4.

Peer-reviewed adaptation-finance evidence adds a distributional caution the official-source record does not surface: green finance is not automatically equitable. Examining debt-financed urban sanitation adaptation, Hyde-Smith et al. (2025) find that green-labeled financing can shift costs onto users and future generations, and that a “green halo” label does not inherently make financing cheaper or distribute risk more fairly. A future means-of-implementation architecture should therefore track not only aggregate finance volumes, but also concessionality, affordability, lifecycle liabilities, the incidence of costs and benefits, and intergenerational equity.

3.8 Comparative Synthesis

Table 1 summarizes the beyond-2030 status of each track as of August 2026; Figures 4 and 5 present complementary visual syntheses of institutional time horizons and milestone sequencing, respectively.

Table 1. Comparative state of play across the seven tracks (August, 2026).

Framework	What “2030” means	Beyond-2030 status (Aug., 2026)	Status
2030 Agenda / SDGs	Current global target year	Pact mandates consideration in Sept. 2027; no successor agreed	Formal gateway
Sendai Framework	Framework formally ends 2030	GP2028 (Doha) explicitly billed to begin shaping post-2030 DRR cooperation	Active
CBD / KMGBF	23 targets reach 2030; 4 goals reach 2050	Long-term direction already agreed; first global review at COP17 (Oct., 2026)	Active
Paris Agreement / GGA	Treaty continues; several adaptation targets use 2030 milestones	59 Belém Adaptation Indicators adopted 2025; methodological work underway	Active

Framework	What “2030” means	Beyond-2030 status (Aug., 2026)	Status
UNCCD	Current Strategic Framework ends 2030	COP17 (Aug. 2026) extended the Working Group's mandate; final post-2030 proposal due at COP18	Formal process
Beyond GDP	No 2030 expiry	31-indicator dashboard proposal now in UN-led intergovernmental process	Active
Financing for Development	Supports implementation before/after 2030	Sevilla Commitment (2025) provides renewed financing framework and reform agenda	Formal

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337 *Table 2. Key dates to track 2026–2030.*

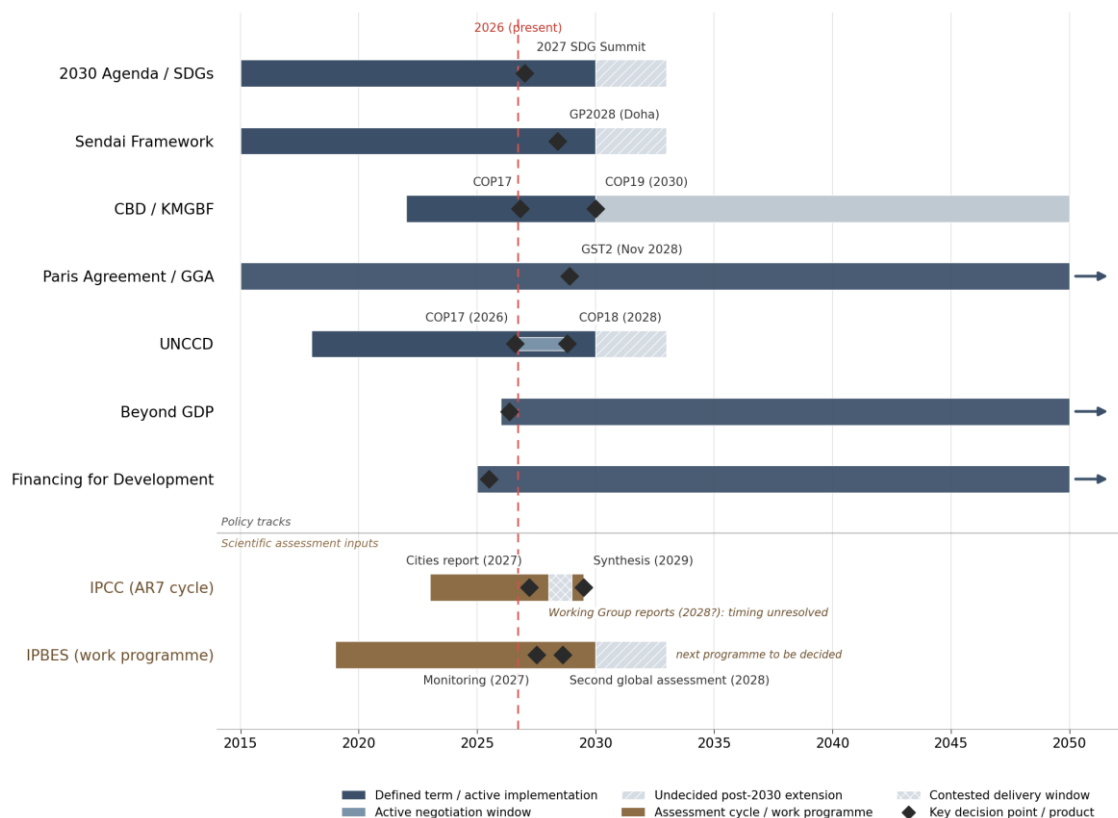
Date	Event	Track
17–28 Aug 2026	UNCCD COP17, Ulaanbaatar: Working Group mandate extended; final post-2030 proposal deferred to COP18	UNCCD
30 Sep 2026	UNFCCC technical paper on Belém Adaptation Indicators use/aggregation due	GGA
12–16 Oct 2026	IPCC-65, Addis Ababa: decision on the AR7 Working Group report timeline	IPCC
19–30 Oct 2026	CBD COP17, Yerevan, Armenia: first global review of GBF	CBD/GBF
9–20 Nov 2026	CMA8/COP31, Antalya: considers the technical paper on the Belém Adaptation Indicators; second global stocktake begins	GGA/UNFCCC
Mar 2027	IPCC Special Report on Climate Change and Cities	IPCC
2027	Final quadrennial GSDR published	SDGs
2027	IPBES-13: monitoring assessment of progress toward GBF goals and targets	IPBES/CBD
2027	UNCCD CRIC 25, Belgrade: interim report of the Working Group on the post-2030 Strategic Framework	UNCCD
Sep 2027	HLPF under the General Assembly considers how to advance sustainable development by 2030 and beyond	SDGs
Nov 2027	CMA9/COP32, Addis Ababa: considers technical work on Belém Adaptation Indicator metadata and methodologies, including through a technical taskforce	GGA/UNFCCC
2028	Ninth Global Platform for Disaster Risk Reduction, Doha, Qatar	Sendai/DRR
2028	UNCCD COP18, Egypt: Working Group's final post-2030 proposal considered	UNCCD
2028	IPBES-14: second global assessment of biodiversity and ecosystem services	IPBES/CBD/SDGs
Nov 2028	Second global stocktake concludes (CMA10); Belém Adaptation Indicator review follows in 2029	GGA/UNFCCC
2028–2029	IPCC AR7 Working Group reports (timing relative to the second stocktake unresolved); AR7 Synthesis Report agreed for 2029	IPCC/GGA

Date	Event	Track
2030	SDG, Sendai, and UNCCD (2018–2030) terms end; CBD COP19: second GBF review	All tracks
2030	IPBES rolling work programme ends; next programme to be decided	IPBES

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339 Figure 4 visualizes the same seven tracks along a continuous timeline, making explicit which
 340 frameworks face a hard 2030 boundary versus which already extend to 2050 or remain open-
 341 ended. Figure 5 sequences these same milestones chronologically to highlight the density of
 342 decision points concentrated in the 2026–2027 window.

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345 **Figure 4. Institutional time horizons across the seven Beyond-2030 tracks 2015–2050.** Diamonds mark key
 346 decision points; hatched segments indicate an undecided post-2030 extension. The lower band shows the
 347 scientific assessment inputs, the IPCC AR7 cycle and the IPBES rolling work programme, that feed the Global
 348 Stocktake and the CBD global reviews; cross-hatching marks the contested delivery window for the AR7
 349 Working Group reports.

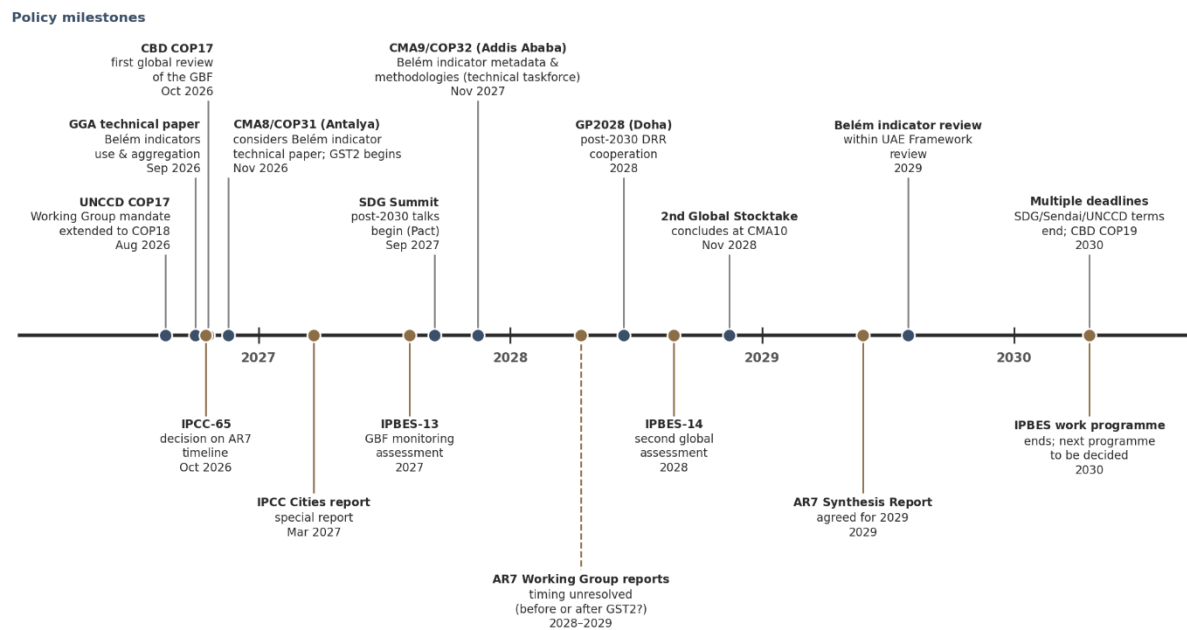


Figure 5. Sequence of critical Beyond-2030 milestones, August 2026 to 2030. Policy milestones appear above the axis and scientific assessment milestones (IPCC, IPBES) below it; the dashed line marks the AR7 Working Group reports, whose timing relative to the second Global Stocktake remains unresolved.

3.9 Cross-Framework Indicator Analysis

The convergence patterns identified across Sections 3.1–3.7 can be tested directly at the indicator level. I reviewed the full indicator sets of the four measurement regimes most relevant to natural capital, ecosystem services, and biodiversity: the CBD/GBF monitoring framework (53 headline and binary indicators spanning Goals A–D and Targets 1–23 under Decision 16/31) (UNEP-WCMC, 2026); the 92 environment-related indicator entries identified by UNEP within the SDG global indicator framework, which comprises 234 unique indicators and 251 target-level assignments because some indicators repeat under more than one target; UNEP's list spans 15 of the 17 Goals and is concentrated in Goals 6, 11, 12, 13, 14 and 15 (United Nations Statistics Division, 2025; UNEP, 2025; Supplementary Table S2); the 59 Belém Adaptation Indicators adopted under the GGA, in particular the six sub-indicators under Target 9(d) on ecosystems and biodiversity (UNFCCC, 2025); and the 38 Sendai Framework indicators, concentrated in Global Targets A–G (UNDRR, 2026a). Section 4.3 discusses the implications of these findings for the natural capital, ecosystem services, and biodiversity research community.

3.9.1 Indicator-Level Evidence: Where the Frameworks Already Overlap

371 This side-by-side review finds that indicator interoperability across these regimes is already
 372 partially realized, often without formal cross-referencing between secretariats. At least six
 373 indicator pairs are identical, near-identical, or share an underlying data source, principally
 374 between the CBD/GBF and SDG frameworks, with land degradation also linking the SDGs
 375 and UNCCD: the Red List Index (CBD A.3 / SDG 15.5.1); land degradation (SDG 15.3.1,
 376 doubling as UNCCD's Land Degradation Neutrality metric and mapping to CBD Target 1);
 377 protected-area coverage (CBD 3.1 / SDG 14.5.1, 15.1.2, 15.4.1); fish-stock sustainability (CBD
 378 5.1 / SDG 14.4.1); coastal eutrophication (CBD 7.1 / SDG 14.1.1); and biodiversity finance
 379 (CBD D.1 / SDG 15.a.1, 15.b.1, sharing the same OECD DAC Rio-marker methodology)
 380 (CBD Secretariat & OECD DAC, 2026). This is a substantive finding, not a coincidence of
 381 drafting: a single, well-resourced data effort in any of these six areas could satisfy reporting
 382 obligations under two or three regimes at once, exactly the “operational interoperability” the
 383 literature in Section 4.2 argues is still missing in practice.

384 Against the adopted Belém Adaptation Indicators (decision 12/CMA.7), several of these
 385 indicators have conceptual counterparts rather than identical metrics: threat status of species
 386 (target 9(d)(e)) corresponds to the Red List Index; threat status of ecosystems (9(d)(d)) to the
 387 GBF Red List of Ecosystems (A.1); degraded areas under agricultural management (9(b)(c))
 388 to land degradation (SDG 15.3.1); water stress and water-use efficiency (9(a)(a)–(b)) to SDG
 389 6.4.2 and 6.4.1; and deaths and missing persons from climate-related hazards (10(c)(b)) to SDG
 390 1.5.1 and the Sendai mortality targets. Because the Belém indicators do not yet have agreed
 391 metadata, with technical work on metadata and methodologies due at CMA9 in November
 392 2027, these are interoperability opportunities rather than confirmed overlaps (UNFCCC, 2025).

393 The CBD D.1 indicator on international biodiversity finance illustrates both the opportunity
 394 and the difficulty precisely. Its own metadata documentation acknowledges that the underlying
 395 OECD DAC Rio-marker methodology has no agreed coefficient for converting “significant”
 396 (as opposed to “principal”) biodiversity objective scores into comparable finance figures (by
 397 convention many countries apply 40%, but this is described in the metadata itself as common
 398 practice rather than an agreed standard) and that multilateral institutions report inconsistently,
 399 creating double-counting risk between bilateral and multilateral channels (CBD Secretariat &
 400 OECD DAC, 2026). These are precisely the kinds of methodological standardization problems
 401 the natural capital and environmental-economic accounting research community is positioned
 402 to help resolve, given its existing engagement with the UN System of Environmental-Economic
 403 Accounting.

404 The newly adopted Belém Adaptation Indicators under GGA Target 9(d) are a second concrete
 405 entry point. Because they were only adopted in November 2025, all six sub-indicators
 406 (covering ecosystem service provision, ecosystem area under adaptation management,
 407 ecosystem resilience, threat status of ecosystems, threat status of species, and adaptive capacity
 408 from ecosystem-based adaptation and nature-based solutions) currently have no established
 409 baseline or reporting infrastructure, although several build on established biodiversity,
 410 ecosystem-condition and adaptation datasets and methodologies (UNFCCC, 2025). This is a
 411 rare instance of a live international indicator being built from a genuinely blank slate, and the
 412 ecosystem-based adaptation and nature-based solutions research community has an unusually
 413 open window to shape its operationalization before national reporting practices harden.

414 By contrast, the Sendai Framework's 38 indicators are structured almost entirely around
 415 disaster loss and international cooperation (Global Targets A–G) rather than ecosystem
 416 condition; ecosystem-based disaster risk reduction and green infrastructure are acknowledged
 417 only as optional disaggregation categories within the metadata for critical-infrastructure loss
 418 indicators (C.5, D.4, D.8), not as standalone metrics (UNDRR, 2026a). This is itself a finding
 419 relevant to Section 4.2's mainstreaming argument: even where ecosystem-based approaches
 420 are explicitly recognized as legitimate DRR tools, as in the midterm review evidence reviewed
 421 in Section 3.2, they remain absent from the framework's own headline measurement
 422 architecture, a gap the natural capital and ecosystem-services community could help close
 423 ahead of any post-2030 Sendai successor process.

424 **3.9.2 Priority Indicators for Natural Capital, Ecosystem Services, and Biodiversity** 425 **Community Engagement**

426 I ranked 18 indicators drawn from the CBD/GBF, SDG, GGA, and Sendai monitoring
 427 frameworks by their relevance and tractability for contribution from the natural capital,
 428 ecosystem services, and biodiversity research community. Each indicator was scored on four
 429 criteria, 0–3 each (maximum total 12): Relevance (R): how directly the indicator measures
 430 biodiversity, ecosystem condition, or natural capital stocks/flows; Gap severity (G): how
 431 significant the current data, methodological, or reporting gap is; Cross-framework connectivity
 432 (X): how many of the four frameworks reviewed share this indicator or a near-identical
 433 counterpart (0 = single framework; 3 = shared across three or more); and Tractability (T): how
 434 actionable near-term engagement is given existing research infrastructure and methods. The
 435 full 18-indicator table, including individual scores and recommended community roles, is
 436 provided as Supplementary Table S1; the analysis below synthesizes its main patterns.

Three findings stand out. First, the six top-ranked indicators (score = 10 of 12) share a common profile: the ecosystem services headline indicator (CBD B.1), ecosystem/forest extent (CBD A.2 / SDG 15.1.1), the Red List Index (CBD A.3 / SDG 15.5.1), the Red List of Ecosystems (CBD A.1, with a GGA 9(d)(d) counterpart), the newly adopted GGA ecosystem-based adaptation indicators (Target 9(d)), and land degradation (SDG 15.3.1 / UNCCD). None of these six is a niche or narrowly technical metric; each sits at the structural core of at least two international regimes simultaneously, which is precisely why a single, well-resourced measurement effort in any one of these six areas could satisfy reporting obligations under two or three regimes at once rather than only one.

Second, the recommended community roles are not evenly distributed across contribution types. Data gathering appears as a recommended role for roughly half of the 18 indicators, more than any other category, followed by modeling and reporting/synthesis; methods development appears only once (natural capital accounting, SDG 15.9.1(b)). This distribution suggests that for most of the highest-priority indicators, the binding constraint is not a lack of conceptual or methodological frameworks, which largely already exist, but a lack of sustained data infrastructure and field measurement capacity, particularly in the Global South, where much of the underlying ecological and socioeconomic data collection remains chronically underfunded relative to reporting obligations.

Third, cross-framework connectivity is not uniform across indicator types. State-of-nature indicators achieve the highest connectivity scores: land degradation links the SDG, UNCCD and CBD/GBF frameworks, and the Red List Index links the CBD/GBF and SDG frameworks with a GGA counterpart (target 9(d)(e)), while protected-area coverage links the CBD/GBF and SDG frameworks, consistent with the six confirmed cross-framework overlaps identified in Section 3.9.1. By contrast, finance- and disclosure-oriented indicators (CBD D.1 biodiversity finance, CBD 15.1 corporate disclosure) score highly on gap severity but lower on connectivity, indicating that financial-flow and corporate-reporting metrics remain comparatively siloed within their originating regime even where the underlying policy problem (inadequate and poorly tracked biodiversity finance) is shared across all four frameworks reviewed. The two lowest-ranked indicators in the table (CBD 21.1 on biodiversity monitoring information, and the Sendai Target F finance-cooperation indicators) are themselves meta-indicators about data and finance infrastructure; their comparatively low composite scores reflect lower direct biodiversity/ecosystem relevance and tractability under the scoring rubric,

even though they may function as prerequisites for progress on several of the higher-ranked indicators above them.

4. Discussion: Institutional Convergence and Cross-Cutting Themes

4.1 The Institutional Backdrop: Pact for the Future and UN80

The Pact for the Future (adopted 22 September 2024) is a 64-page outcome document with 56 actions spanning sustainable development and financing, peace and security, science and technology cooperation, and global governance reform, designed to “turbocharge” SDG implementation (SDG Knowledge Hub, 2025c; United Nations, 2026d). It is the legal and political trigger for the 2027 SDG Summit's consideration of the post-2030 agenda and also directly mandated the Beyond GDP HLEG process (§3.6), making it the connective document across nearly every track reviewed here. The parallel UN80 Initiative, an efficiency and reform effort now in a “decisive phase,” recorded a 21% reduction in Secretariat staff positions in 2026 and adoption of new mandate-discipline rules (United Nations, 2026c).

4.2 Cross-Cutting Themes

Synthesizing the evidence in Sections 3.1–3.9, I organize the cross-cutting findings into a seven-layer “coherence stack” that clarifies what convergence actually requires, moving beyond the observation that global goals overlap: (i) a shared long-term vision toward wellbeing, resilience, and ecological integrity, ideally extending beyond 2030; (ii) synchronized policy and review cycles, deliberately linking national planning, NDC/NAP updates, voluntary national reviews, and global stocktakes rather than scheduling them independently; (iii) institutional and legal coherence, with clear mandates and cross-ministerial, horizontal-vertical accountability; (iv) operational data interoperability, meaning shared concepts, metadata, provenance, and workflows, not merely identically named indicators; (v) financial coherence, with budgets and instruments aligned with stated objectives, with finance-quality metrics tracked alongside volumes; (vi) place-based implementation, meaning translation into subnational plans and land-use decisions; and (vii) equity, rights, and learning safeguards, with disaggregation, participation, and Indigenous/local rights built into monitoring design from the outset. The evidence below is strongest for layers (ii), (iv), and (vii), and thinnest for (iii).

– *Finance emerges as a recurring cross-cutting implementation constraint.* The 2025 ODA collapse, the US\$4 trillion Sevilla financing gap, and repeated references to unmet

financing commitments across SDG, Sendai, and GBF reporting make finance the dominant constraint identified across tracks (United Nations, 2026a; SDG Knowledge Hub, 2025b). The IPBES Nexus Assessment estimates “negative externalities (costs not considered as part of decision-making processes) across the fossil fuel, agriculture and fisheries sectors are currently estimated in the range of \$10 trillion to \$25 trillion per year, reflecting the negative impacts of production and consumption in these sectors on biodiversity, water, health and climate change” and “private sector financial flows that are directly damaging to biodiversity are estimated at \$5.3 trillion, and public subsidies incentivizing such activities, distorting trade and increasing pressure on natural resources are estimated at approximately \$1.7 trillion per year” (IPBES, 2024a, p. 16). These magnitudes are several times larger than the financing gaps in §3.7 and reinforce the case for tracking finance quality, not only volume.

– ***Long-term vision combined with recurring review cycles is an emerging design template.*** The GBF's 2030-targets-within-2050-goals structure, the Paris Agreement's recurring Global Stocktake, and UNCCD's proposed post-2030 process all point toward combining a longer horizon with periodic review rather than a single fixed end date (UN Sustainable Development Knowledge Platform, 2024). Peer-reviewed literature supports this pattern directly: Hermwille et al. (2023) make an explicit academic case for linking the stocktake and SDG midterm review, and periodic-review mechanisms recur as a proposed solution across the DRR coherence literature (§3.2).

– ***Scientific assessment cycles converge on the same window, but their alignment with policy review is contested.*** The IPCC and IPBES supply much of the scientific evidence base for several review points in Figure 5. The Global Stocktake must consider the best available science, and the first stocktake decision invited the IPCC to align its work with the second. Governments agreed in January 2024 to publish the AR7 Synthesis Report in 2029, but after five consecutive plenaries they had not agreed whether the three Working Group reports will be approved before or after the second stocktake concludes at COP33 in November 2028; the decision now rests with IPCC-65 in Addis Ababa in October 2026 (Carbon Brief, 2026a, 2026b). IPBES faces a parallel sequencing task that has so far been less contested, delivering a GBF monitoring assessment (2027) and its second global assessment (2028) ahead of the CBD's second global review at COP19 (IPBES, 2025; JNCC, 2026). The assessment bodies also face their own beyond-2030 question: IPBES's rolling work programme runs up to 2030, and IPBES-12 (Manchester, February

2026) requested a proposal on the nature, topics and timing of future deliverables for IPBES-13 (IPBES, 2026b). For layer (ii) of the coherence stack, synchronizing review cycles therefore has to include the assessment cycles that feed them, not only the political reviews.

- ***Indicator interoperability is deliberate and explicit, but the literature shows it must be operational, not rhetorical.*** GGA indicator submissions drew most heavily on SDG, Sendai, and GBF indicators (UNFCCC, 2024); Beyond GDP's dashboard draws roughly half its indicators directly from the SDGs (UNCTAD, 2026); UNCCD's Working Group is re-analyzing existing indicators for post-2030 relevance (CARI Association, 2025). Section 3.9 documents at least six indicators that are identical, near-identical, or share an underlying data source across two or more of these regimes. Schröter et al. (2025) identify the same structural barrier from the practitioner side, arguing interoperability requires common metadata, provenance, and workflows, not just shared labels; the Bari Manifesto's ten principles for essential biodiversity variables (Hardisty et al., 2019) offer one concrete template for what this looks like in practice. Harmonized core metrics improve comparability, but Conostas et al. (2022) and Balali et al. (2026) both show resilience indicators specifically must also become more dynamic, uncertainty-aware, and cross-scale to avoid missing interconnected shocks.
- ***Targets are not self-executing.*** Biodiversity and resilience studies consistently show that target-setting increases visibility and cooperation without automatically producing sectoral mainstreaming, implementation coherence, or adequate resourcing (Velázquez Gomar, 2014). Post-2030 design therefore needs explicit institutional, budgetary, and accountability mechanisms alongside any new targets (Runhaar et al., 2024).
- ***The assessment bodies' own evidence supports the convergence thesis.*** The first IPBES–IPCC co-sponsored workshop concluded that the functional separation of climate and biodiversity governance, in which each has its own convention and its own assessment body, risks incompletely identifying their interactions and even taking actions that undermine one or both (Pörtner et al., 2021, 2023). The IPBES Nexus Assessment extends this across biodiversity, water, food, health and climate change, finding that single-issue responses are ineffective and often counterproductive, and that its more than 70 assessed response options together support all 17 SDGs, all 23 GBF targets and the Paris Agreement's long-term goals, with 24 options each advancing more than five SDGs

and more than five GBF targets (IPBES, 2024a). The companion Transformative Change Assessment traces the limited success of past targets to underlying causes (disconnection from and domination over nature, inequitable concentration of power and wealth, and prioritization of short-term material gains) that target-setting alone does not address (IPBES, 2024b), independently corroborating the mainstreaming literature above. Both summaries were, however, approved at a plenary described as unprecedentedly challenging, with Member States citing a loss of trust in the process (Earth Negotiations Bulletin, IISD, 2024), a reminder that assessed evidence is not insulated from the political fault lines noted below.

- ***Equity is part of measurement architecture, not an afterthought.*** Adaptation, resilience, and biodiversity research converge on the same conclusion: distributional, procedural, recognition, and intergenerational justice, spatial disaggregation, participatory M&E, and Indigenous/local rights need to be built into monitoring and financing systems from the start rather than added after indicators are already selected (Barkai and Winkler, 2025; Kotschy et al., 2025; Sarkki et al., 2023).
- ***UNCCD functions as a pathfinder for negotiated transition.*** Its sequence (review, evaluate indicators, convene a time-bound working group, draft, and negotiate before expiry) is the most concrete transition template available as of August 2026.
- ***Reform of process is proceeding alongside reform of substance.*** UN80 and Pact for the Future governance reforms are intended to support, not precede, the various post-2030 goal-setting conversations.
- ***Political consensus is not universal.*** The United States' withdrawal from the FfD4/Sevilla negotiations (UN News, 2025), combined with broader reporting that a small number of countries have moved into active opposition to the sustainable-development paradigm, is a live fault line likely to shape the ambition of any post-2030 framework.

The peer-reviewed evidence strengthens this review's convergence thesis but adds an important qualification: convergence is not a self-executing consequence of overlapping goals. It has to be engineered through institutions, policy cycles, financing, data infrastructure, accountability, and equity safeguards, the same conditions the coherence, mainstreaming, and equity literature above identifies as necessary but frequently missing.

596 **4.3 Implications for Natural Capital, Ecosystem Services, and Biodiversity** 597 **Communities**

598 The convergence pattern documented above has specific, and largely favorable, implications
 599 for researchers and practitioners working on natural capital accounting, ecosystem services,
 600 and biodiversity science, but the same evidence base also contains explicit warnings against
 601 complacency.

602 *First, natural capital accounting is emerging as a plausible interoperability layer connecting*
 603 *several tracks that would otherwise report separately.* Beyond GDP's HLEG dashboard draws
 604 roughly half its indicators directly from existing SDG data (UNCTAD, 2026), and the
 605 underlying inclusive-wealth research programme, which treats natural, produced, and human
 606 capital as jointly measured stocks, substantially predates and now underpins that dashboard
 607 (Kousar et al., 2025). In parallel, UNCCD land-degradation monitoring is moving toward
 608 integrated environmental-economic accounting that expresses ecological change alongside
 609 income and wealth effects rather than in a separate reporting silo (Carlucci et al., 2022). Read
 610 together, these two developments suggest natural capital accounting could become the
 611 connective tissue linking Beyond GDP, UNCCD, and CBD/GBF monitoring, provided the
 612 three processes actively cross-reference rather than duplicate one another's indicator work, a
 613 coordination step that is not yet institutionally guaranteed.

614 *Second, the biodiversity-mainstreaming literature is a direct warning to this community*
 615 *against assuming ambitious targets are self-executing.* The GBF's four 2050 goals and 23
 616 2030 targets already give biodiversity governance an agreed beyond-2030 destination (§3.3),
 617 but Velázquez Gomar (2014) shows the 2010 Biodiversity Target strengthened cooperation
 618 without producing coherent national implementation, and a 43-study systematic review
 619 (Runhaar et al., 2024) finds the same pattern still holds for GBF-era mainstreaming: targets
 620 remain abstract, biodiversity policies are often uncoded add-ons, and resources are insufficient.
 621 For the natural capital and ecosystem-services community specifically, this implies that
 622 producing better accounts or better valuations is necessary but not sufficient; those accounts
 623 need an explicit institutional and budgetary pathway into sectoral decision-making (agriculture,
 624 energy, infrastructure, trade) to avoid becoming another abstract reporting exercise alongside
 625 the target itself.

626 *Third, equity is now treated in the literature as intrinsic to biodiversity and ecosystem-*
 627 *services measurement, not a separate social safeguard bolted on afterward.* The “Rights for

Life” scenario (Sarkki et al., 2023) shows that centering Indigenous Peoples' and local communities' rights can outperform conventional area-based conservation scenarios on social-equity grounds, and Kotschy et al. (2025) show that who defines an indicator and who controls the resulting data materially shapes whether monitoring reduces or reproduces inequity. For ecosystem-services valuation and natural capital accounting work feeding into GBF, UNCCD, or Beyond GDP reporting, this means participatory design and data governance are measurement-quality issues, not only ethical ones.

Fourth, the financing evidence has a direct consequence for biodiversity finance specifically.

The finding that green-labeled adaptation finance does not automatically distribute costs and benefits fairly (Hyde-Smith et al., 2025) applies with equal force to biodiversity and nature-based finance instruments (biodiversity credits, debt-for-nature swaps, GBF Fund disbursements): volume of finance mobilized is an incomplete success metric without also tracking concessionality, who bears lifecycle costs, and whether Indigenous and local communities share in benefits rather than only bearing implementation burdens.

Fifth, IPBES is a direct institutional channel through which this community's evidence enters the post-2030 process.

The Business and Biodiversity Assessment approved at IPBES-12 in February 2026, the Platform's first fast-track assessment, sets out methods and more than 100 actions for businesses and financial institutions to assess, disclose and manage nature-related dependencies and impacts, directly relevant to GBF Target 15 and the finance-quality concerns above (IPBES, 2026a). The scoping of the second global assessment directs authors to present trends using, preferably, indicators already adopted under multilateral environmental agreements, particularly the CBD (IPBES, 2023), so the shared indicators identified in §3.9 are likely to be both reinforced and assessed in the 2028 report. Contributing ecosystem-service models, natural capital accounts and scenario evidence to the 2027 monitoring and 2028 global assessments is therefore a concrete, near-term way to shape indicators before post-2030 frameworks fix them.

For the natural capital, ecosystem services, and biodiversity research communities, the practical implication is threefold: (i) invest in making natural capital accounts interoperable with SDG, UNCCD, and Beyond GDP indicator systems now, while those systems are still being designed, rather than after they are fixed; (ii) treat mainstreaming into sectoral budgets and decisions as part of the research and advocacy agenda, not a downstream implementation detail for governments alone; and (iii) build equity and participatory data governance into

ecosystem-service and natural-capital indicator design from the outset, following the same logic the adaptation-equity literature has already established for the GGA. Section 3.9 presents the indicator-level evidence and priority-ranking analysis underlying these implications.

664 5. Conclusion

665 As of August 2026, no negotiated “Beyond 2030 agenda” exists. What exists instead is a
 666 rapidly developing landscape of formal mandates, treaty-specific transition processes, indicator
 667 reforms, and stakeholder proposals across seven institutional tracks. Three conclusions follow.
 668 First, tracks differ structurally in their exposure to a 2030 cliff-edge: the SDGs and Sendai face
 669 a hard expiry with no agreed successor, while the GBF and Paris Agreement already have long-
 670 term horizons and are mid-cycle rather than at a term boundary; UNCCD occupies an
 671 intermediate position with an active transition process underway. Second, the full-text evidence
 672 refines rather than overturns the central claim: the likely trajectory is conditional convergence
 673 rather than merger. The major regimes share broad objectives and increasingly reuse indicators,
 674 but overlap does not reliably produce coherent implementation on its own (§4.2); convergence
 675 must be engineered through the seven-layer coherence stack (synchronized review cycles,
 676 institutional and legal mandates, operational data interoperability, financial coherence, place-
 677 based implementation, and equity and rights safeguards, oriented around a shared long-term
 678 vision). Third, financing, crystallized in the 2025 ODA collapse and the US\$4 trillion Sevilla
 679 gap, is the constraint most consistently limiting ambition across every track, and finance quality
 680 and distribution matter as much as volume (§3.7).

681 A plausible post-2030 architecture, consistent with the evidence reviewed, would combine a
 682 durable long-term vision with a compact common indicator core, treaty-specific modules,
 683 nationally and locally contextualized measures, periodic methodological review, and explicit
 684 equity and rights safeguards. This is a synthesis inference from the literature rather than a
 685 negotiated institutional blueprint; it preserves the autonomy of specialized agreements while
 686 identifying conditions under which national systems could reduce duplication and turn global
 687 commitments into more coordinated action.

688 This review has four principal limitations. First, it is a narrative synthesis of a fast-moving
 689 policy landscape rather than a comprehensive systematic review of a mature literature; the CBD
 690 COP17 outcome discussed was still pending at the time of writing and should be independently
 691 verified; UNCCD COP17 has since concluded and §3.5 has been updated accordingly. Second,
 692 the accompanying literature screening (§2) returned a 35% retention rate from a broad Boolean
 693 query, reflecting how new this policy discourse is in the indexed literature. Third, the literature
 694 is considerably stronger on coherence and implementation of existing frameworks than on
 695 explicit post-2030 design, and remains geographically uneven; the Belém Adaptation

Indicators were adopted too recently to evaluate, so the GGA conclusions (§3.4) should be read as design implications rather than empirical findings. Fourth, the review treats the IPCC and IPBES as scientific inputs to the seven tracks rather than as tracks in their own right, and the timing of the AR7 Working Group reports relative to the second Global Stocktake was unresolved at the time of writing and should be verified after IPCC-65 (October 2026). I recommend this review be revisited after the September 2027 SDG Summit, once the CBD COP17 outcome and the UNCCD Working Group's final post-2030 proposal, due at COP18, are finalized.

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6. References

- Balali, H., Allen, C.R., Ward, F.A., Eslamifar, G., Fernald, A.Y., 2026. Toward convergence in social-ecological systems resilience assessment: A systematic review and conceptual framework. *Ecol. Indic.* 185, 114792. <https://doi.org/10.1016/j.ecolind.2026.114792>
- Barkai, K.R., Winkler, H., 2025. Developing a framework for assessing equity in national contributions to the global goal on adaptation. *Int. Environ. Agreements.* 25, 79–106. <https://doi.org/10.1007/s10784-024-09660-y>
- Briassoulis, H., 2011. Governing desertification in Mediterranean Europe: The challenge of environmental policy integration in multi-level governance contexts. *Land Degrad. Dev.* 22(3), 313–325. <https://doi.org/10.1002/ldr.1018>

- Carbon Brief, 2025. COP16: Key outcomes agreed at the resumed UN biodiversity conference in Rome. <https://www.carbonbrief.org/cop16-key-outcomes-agreed-at-the-resumed-un-biodiversity-conference-in-rome> (accessed 27 August 2026).
- Carbon Brief, 2026a. Q&A: Why the standoff between nations over the next IPCC reports matters. <https://www.carbonbrief.org/qa-why-the-standoff-between-nations-over-the-next-ipcc-reports-matters> (accessed 23 September 2026).
- Carbon Brief, 2026b. IPCC: ‘Frustrating and disappointing’ meeting leaves AR7 timeline in deadlock. <https://www.carbonbrief.org/ipcc-frustrating-and-disappointing-meeting-leaves-ar7-timeline-in-deadlock> (accessed 23 September 2026).
- Carbon Brief, 2026c. Analysis: Half of nations meet UN deadline for nature-loss reporting. <https://www.carbonbrief.org/analysis-half-of-nations-meet-un-deadline-for-nature-loss-reporting> (accessed 23 September 2026).
- CARI Association, 2025. Intergovernmental Working Group on Future UNCCD Strategy. <https://www.cariassociation.org/en/intergovernmental-working-group-on-future-unccd-strategy/> (accessed 27 August 2026).
- Carlucci, M., Salvia, R., Quaranta, G., Salvati, L., Imbrenda, V., 2022. Official statistics, spatio-temporal dynamics and local-scale monitoring: toward integrated environmental-economic accounting for land degradation. *Lett. Spat. Resour. Sci.* 15(3), 469–491. <https://doi.org/10.1007/s12076-022-00305-9>
- Carroll, C., Rohlf, D.J., Epstein, Y., 2022. Mainstreaming the Ambition, Coherence, and Comprehensiveness of the Post-2020 Global Biodiversity Framework Into Conservation Policy. *Front. Conserv. Sci.* 3, 906699. <https://doi.org/10.3389/fcsc.2022.906699>
- CBD Secretariat & OECD DAC, 2026. Metadata for headline indicator D.1: International public funding, including official development assistance (ODA), for conservation and sustainable use of biodiversity and ecosystems. <https://www.gbf-indicators.org/> (accessed 27 August 2026).
- Constas, M.A., d'Errico, M., Pietrelli, R., 2022. Toward Core Indicators for Resilience Analysis: A framework to promote harmonized metrics and empirical coherence. *Glob. Food Secur.* 35, 100655. <https://doi.org/10.1016/j.gfs.2022.100655>
- Convention on Biological Diversity, 2025. Decision 16/32 adopted by the Conference of the Parties to the Convention on Biological Diversity (CBD/COP/DEC/16/32), 27 February 2025. <https://www.cbd.int/doc/decisions/cop-16/cop-16-dec-32-en.pdf> (accessed 23 September 2026).
- Convention on Biological Diversity, 2026. 125 Countries Submit 7th National Reports Ahead of COP17. <https://www.cbd.int/article/2026-NationalReports> (accessed 27 August 2026).

- 758 Earth Negotiations Bulletin, IISD, 2024. Summary report, 9–16 December 2024: Eleventh session of
 759 the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem
 760 Services (IPBES 11). [https://enb.iisd.org/intergovernmental-science-policy-platform-](https://enb.iisd.org/intergovernmental-science-policy-platform-biodiversity-ecosystem-services-ipbes11-summary)
 761 biodiversity-ecosystem-services-ipbes11-summary (accessed 23 September 2026).
- 762 Earth Negotiations Bulletin, IISD, 2025. Summary report, 25–27 February 2025 (CBD COP16
 763 resumed session). <https://enb.iisd.org/un-biodiversity-conference-cbd-cop16-resumed-summary>
 764 (accessed 27 August 2026).
- 765 Earth Negotiations Bulletin, IISD, 2026. Summary report, 17–28 August 2026: 17th Session of the
 766 Conference of the Parties to the UNCCD (COP 17). [https://enb.iisd.org/convention-combat-](https://enb.iisd.org/convention-combat-desertification-unccd-cop17-summary)
 767 [desertification-unccd-cop17-summary](https://enb.iisd.org/convention-combat-desertification-unccd-cop17-summary) (accessed 22 September 2026).
- 768 Hardisty, A.R., Michener, W.K., Agosti, D., et al., 2019. The Bari Manifesto: An interoperability
 769 framework for essential biodiversity variables. *Ecol. Inform.* 49, 22–31.
 770 <https://doi.org/10.1016/j.ecoinf.2018.11.003>
- 771 Hermwille, L., Dzebo, A., Iacobuța, G.I., Obergassel, W., 2023. Global stocktake and the SDG
 772 midterm review as opportunities for integration. *Nat. Clim. Chang.* 13, 1002-1004.
 773 <https://doi.org/10.1038/s41558-023-01813-2>
- 774 Hyde-Smith, L., Roelich, K., Mdee, A., Zhan, Z., Evans, B., 2025. Blinded by the “green-halo”?
 775 Equity in financing climate adaptation of urban sanitation. *Environ. Plan. E Nat. Space.* 8(1),
 776 278–305. <https://doi.org/10.1177/25148486241287446>
- 777 IISD, 2024. How to Track Adaptation Progress: Key questions for the UAE-Belém work programme
 778 at COP 29. <https://www.iisd.org/articles/explainer/cop-29-adaptation-progress-uae-belem>
 779 (accessed 27 August 2026).
- 780 International Science Council, 2023. Report for the Mid-Term Review of the Sendai Framework for
 781 Disaster Risk Reduction. [https://council.science/publications/mtr-sendai-framework-disaster-](https://council.science/publications/mtr-sendai-framework-disaster-risk-reduction/)
 782 [risk-reduction/](https://council.science/publications/mtr-sendai-framework-disaster-risk-reduction/) (accessed 27 August 2026).
- 783 IPBES, 2022. Methodological Assessment Report on the Diverse Values and Valuation of Nature of
 784 the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
 785 Balvanera, P., Pascual, U., Christie, M., Baptiste, B., González-Jiménez, D. (Eds.). IPBES
 786 Secretariat, Bonn. <https://doi.org/10.5281/zenodo.6522522>
- 787 IPBES, 2023. Scoping report for a second global assessment of biodiversity and ecosystem services.
 788 IPBES Secretariat, Bonn. <https://www.ipbes.net/second-global-assessment> (accessed 23
 789 September 2026).

- 790 IPBES, 2024a. Summary for Policymakers of the Thematic Assessment Report on the Interlinkages
 791 among Biodiversity, Water, Food and Health (Nexus Assessment). IPBES Secretariat, Bonn.
 792 <https://www.ipbes.net/nexus-assessment> (accessed 23 September 2026).
- 793 IPBES, 2024b. Thematic Assessment Report on the Underlying Causes of Biodiversity Loss and the
 794 Determinants of Transformative Change and Options for Achieving the 2050 Vision for
 795 Biodiversity. O'Brien, K., Garibaldi, L., Agrawal, A. (Eds.). IPBES Secretariat, Bonn.
 796 <https://doi.org/10.5281/zenodo.11382215>
- 797 IPBES, 2025. Report of the Executive Secretary on progress in the implementation of the rolling work
 798 programme up to 2030 (IPBES/12/4). <https://www.ipbes.net/resource-file/108939> (accessed 23
 799 September 2026).
- 800 IPBES, 2026a. Summary for Policymakers of the Methodological Assessment Report on the Impact
 801 and Dependence of Business on Biodiversity and Nature's Contributions to People. Jones, M.,
 802 Polasky, S., Rueda, X., et al. IPBES Secretariat, Bonn. <https://www.ipbes.net/business-impact>
 803 (accessed 23 September 2026).
- 804 IPBES, 2026b. Work programme: rolling work programme up to 2030 and decision IPBES-12/1.
 805 <https://www.ipbes.net/work-programme> (accessed 23 September 2026).
- 806 IPCC, 2026. Seventh Assessment Report (AR7): products and timeline.
 807 <https://www.ipcc.ch/assessment-report/ar7/> (accessed 23 September 2026).
- 808 Janetschek, H., Brandi, C., Dzebo, A., Hackmann, B., 2020. The 2030 Agenda and the Paris
 809 Agreement: voluntary contributions towards thematic policy coherence. *Clim. Policy* 20(4),
 810 430–442. <https://doi.org/10.1080/14693062.2019.1677549>
- 811 JNCC, 2026. IPBES-12 and the Business and Biodiversity Assessment. Joint Nature Conservation
 812 Committee. <https://jncc.gov.uk/news/ipbes-12-and-the-business-and-biodiversity-assessment/>
 813 (accessed 23 September 2026).
- 814 Kim, S., Park, C., Lee, D., 2026. Diagnosing local injustice in climate adaptation: spatial equity in the
 815 governance of cooling centers in Seoul. *Local Environ.*
 816 <https://doi.org/10.1080/13549839.2026.2631490>
- 817 Kotschy, K.A., de Villiers, A.C., Hiestermann, M., Mvulane, P., Raven, G., Soal, S., 2025. Using
 818 monitoring and evaluation to build equity and resilience: lessons from practice. *Ecol. Soc.* 30(2),
 819 8. <https://doi.org/10.5751/ES-15757-300208>
- 820 Kousar, S., Ahmed, F., Abid, A., Haluza, D., 2025. Inclusive wealth as a measurement of sustainable
 821 future: bibliometric analysis for past, present and future research agenda in biodiversity

- 822 accounting and sustainable development. *Int. J. Clim. Chang. Strateg. Manag.* 17(3), 23–61.
 823 <https://doi.org/10.1108/IJCCSM-03-2025-0064>
- 824 Lucas, P.L., Kok, M.T.J., Nilsson, M., Alkemade, R., 2014. Integrating Biodiversity and Ecosystem
 825 Services in the Post-2015 Development Agenda: Goal Structure, Target Areas and Means of
 826 Implementation. *Sustainability*. 6(1), 193–216. <https://doi.org/10.3390/su6010193>
- 827 Meraj, G., Hashimoto, S., Kanga, S., Kumar, P., Singh, S.K., Mahmood, H., Avtar, R., 2026. Science-
 828 policy integration for ecosystem-based disaster risk reduction: comparative governance
 829 frameworks and a pathway for South Asia. *Sustain. Sci.* [https://doi.org/10.1007/s11625-026-](https://doi.org/10.1007/s11625-026-01806-y)
 830 [01806-y](https://doi.org/10.1007/s11625-026-01806-y)
- 831 Myeni, S.A., Coetzee, C., Kruger, L., 2026. Policy coherence for development as a potential
 832 framework for creating synergies between disaster risk reduction, climate change and food
 833 security: A theoretical review. *Jamba*. 18(1), 1837. <https://doi.org/10.4102/jamba.v18i1.1837>
- 834 Nalau, J., Gilmore, E., Howden, M., 2024. Improving adaptation assessment in the IPCC. *npj Clim.*
 835 *Action* 3, 76. <https://doi.org/10.1038/s44168-024-00155-9>
- 836 Pörtner, H.O., Scholes, R.J., Agard, J., et al., 2021. IPBES-IPCC co-sponsored workshop report on
 837 biodiversity and climate change. IPBES and IPCC. <https://doi.org/10.5281/zenodo.4782538>
- 838 Pörtner, H.-O., Scholes, R.J., Arneth, A., et al., 2023. Overcoming the coupled climate and
 839 biodiversity crises and their societal impacts. *Science* 380, eabl4881.
 840 <https://doi.org/10.1126/science.abl4881>
- 841 Ramsar–CBD, 2025. The Ramsar Convention and the Convention on Biological Diversity:
 842 Proposals for enhanced cooperation, synergies, and interoperability for the Kunming-Montreal
 843 Global Biodiversity Framework. In: Gardner, R.C., Caddell, R., Okuno, E. (Eds.), *Wetlands and*
 844 *International Environmental Law: The Evolution and Impact of the Ramsar Convention*, ch. 8.
 845 Edward Elgar Publishing, Cheltenham.
- 846 Runhaar, H., Pröbstl, F., Heim, F., Cardona Santos, E., Claudet, J., Dik, L., de Queiroz-Stein, G.,
 847 Zolyomi, A., Zinngrebe, Y., 2024. Mainstreaming biodiversity targets into sectoral policies and
 848 plans: A review from a Biodiversity Policy Integration perspective. *Earth Syst. Gov.* 20, 100209.
 849 <https://doi.org/10.1016/j.esg.2024.100209>
- 850 Sarkki, S., Pihlajamäki, M., Rasmus, S., Eronen, J.T., 2023. ‘Rights for Life’ scenario to reach
 851 biodiversity targets and social equity for indigenous peoples and local communities. *Biol.*
 852 *Conserv.* 280, 109958. <https://doi.org/10.1016/j.biocon.2023.109958>
- 853 Schröter, K., Schweizer, P.-J., Gräler, B., Cumiskey, L., Bharwani, S., Parviainen, J., Kropf, C.M.,
 854 Håkansson, V.W., Drews, M., Irvine, T., Dondi, C., Apel, H., Löhrlin, J., Hochrainer-Stigler,

- 855 S., Bagli, S., Huszti, L., Genillard, C., Unguendoli, S., Hattermann, F., Steinhausen, M., 2025.
 856 Invited perspectives: Fostering interoperability of data, models, communication, and governance
 857 for disaster resilience through transdisciplinary knowledge co-production. *Nat. Hazards Earth*
 858 *Syst. Sci.* 25, 3055-3073. <https://doi.org/10.5194/nhess-25-3055-2025>
- 859 SDG Knowledge Hub, 2025a. How We're Tracking Beyond 2030 Discussions. IISD.
 860 <https://sdg.iisd.org/commentary/policy-briefs/how-were-tracking-beyond-2030-discussions/>
 861 (accessed 27 August 2026).
- 862 SDG Knowledge Hub, 2025b. FfD4 Outcome Document Agreed Ahead of Conference. IISD.
 863 <https://sdg.iisd.org/news/ffd4-outcome-document-agreed-ahead-of-conference/> (accessed 27
 864 August 2026).
- 865 SDG Knowledge Hub, 2025c. Pact for the Future: From Adoption to Implementation. IISD.
 866 [https://sdg.iisd.org/commentary/policy-briefs/pact-for-the-future-from-adoption-to-
 867 implementation/](https://sdg.iisd.org/commentary/policy-briefs/pact-for-the-future-from-adoption-to-implementation/) (accessed 27 August 2026).
- 868 Smucker, T.A., Oulu, M., Nijbroek, R., 2020. Foundations for convergence: Sub-national
 869 collaboration at the nexus of climate change adaptation, disaster risk reduction, and land
 870 restoration under multi-level governance in Kenya. *Int. J. Disaster Risk Reduct.* 51, 101834.
 871 <https://doi.org/10.1016/j.ijdr.2020.101834>
- 872 Swaris, N., Halwatura, R.U., Amaratunga, D., 2024. Policy coherence for resilience in Sri Lanka:
 873 coherence of climate change adaptation, disaster risk reduction and the SDGs. *Int. J. Disaster*
 874 *Resil. Built Environ.* 15(3), 450–473. <https://doi.org/10.1108/IJDRBE-02-2023-0035>
- 875 UN Biodiversity Lab, 2026. Monitoring Framework of the Kunming-Montreal Global Biodiversity
 876 Framework. [https://unbiodiversitylab.org/en/monitoring-framework-of-the-kunming-montreal-
 877 global-biodiversity-framework-data-collection/](https://unbiodiversitylab.org/en/monitoring-framework-of-the-kunming-montreal-global-biodiversity-framework-data-collection/) (accessed 27 August 2026).
- 878 UN News, 2025. Ahead of UN summit, countries finalise landmark ‘Compromiso de Sevilla’.
 879 <https://news.un.org/en/story/2025/06/1164591> (accessed 27 August 2026).
- 880 UN Sustainable Development Knowledge Platform, 2024. Integrating SDGs and Delivering a
 881 Sustainable Future – 2030 and Beyond. [https://sdgs.un.org/sites/default/files/2024-
 882 10/V42%20Integrating%20SDGs%20and%20Delivering%20a%20Sustainable%20Future%20-
 883 %202030%20and%20Beyond.pdf](https://sdgs.un.org/sites/default/files/2024-10/V42%20Integrating%20SDGs%20and%20Delivering%20a%20Sustainable%20Future%20-%202030%20and%20Beyond.pdf) (accessed 27 August 2026).
- 884 UNCCD, 2026a. COP17, Ulaanbaatar, Mongolia, 2026: Official documents.
 885 <https://www.unccd.int/convention/official-documents/cop-17-ulaanbaatar-mongolia-2026>
 886 (accessed 27 August 2026).

- 887 UNCCD, 2026b. UNCCD 17th session of the Conference of the Parties. <https://www.unccd.int/cop17>
888 (accessed 27 August 2026).
- 889 UNCTAD, 2026. Counting What Counts: A compass of progress for people and planet.
890 <https://unctad.org/publication/counting-what-counts-compass-progress-people-and-planet>
891 (accessed 27 August 2026).
- 892 UNDP, 2026. CBD 'Biodiversity' COP17. <https://www.undp.org/nature/events/cbd-cop17> (accessed
893 27 August 2026).
- 894 UNDRR, 2025a. Qatar to host the Ninth Global Platform for Disaster Risk Reduction in 2028.
895 <https://www.undrr.org/news/qatar-host-ninth-global-platform-disaster-risk-reduction-2028>
896 (accessed 27 August 2026).
- 897 UNDRR, 2025b. UNDRR Strategic Framework 2026–2030. [https://www.undrr.org/strategic-](https://www.undrr.org/strategic-framework-2026-2030)
898 [framework-2026-2030](https://www.undrr.org/strategic-framework-2026-2030) (accessed 27 August 2026).
- 899 UNDRR, 2026a. Sendai Framework Indicators. PreventionWeb.
900 <https://www.preventionweb.net/sendai-framework/sendai-framework-indicators> (accessed 27
901 August 2026).
- 902 UNDRR, 2026b. What is the Sendai Framework for Disaster Risk Reduction?
903 <https://www.undrr.org/implementing-sendai-framework/what-sendai-framework> (accessed 27
904 August 2026).
- 905 UNEP, 2025. From Data to Impact: Measuring Progress through Disaggregated SDG Indicators,
906 Annex A: List of 92 environment-related SDG indicators. United Nations Environment
907 Programme. <https://sdgs.unep.org/article/annex> (accessed 24 September 2026).
- 908 UNEP-WCMC, 2026. Indicators for the Kunming-Montreal Global Biodiversity Framework.
909 Indicator Repository. <https://www.gbf-indicators.org/> (accessed 27 August 2026).
- 910 UNFCCC, 2024. Synthesis of submissions on the UAE–Belém work programme on indicators.
911 [https://unfccc.int/sites/default/files/resource/Synthesis%20of%20Submissions%20UAE-](https://unfccc.int/sites/default/files/resource/Synthesis%20of%20Submissions%20UAE-Belem%20Work%20programme%20Final.pdf)
912 [Belem%20Work%20programme%20Final.pdf](https://unfccc.int/sites/default/files/resource/Synthesis%20of%20Submissions%20UAE-Belem%20Work%20programme%20Final.pdf) (accessed 27 August 2026).
- 913 UNFCCC, 2025. Decision 12/CMA.7: Global goal on adaptation (Presidency proposal text, version of
914 21 November 2025). https://unfccc.int/sites/default/files/resource/gga_cop30_5.pdf (accessed 27
915 August 2026).
- 916 UNFCCC, 2026. Global goal on adaptation. [https://unfccc.int/topics/adaptation-and-](https://unfccc.int/topics/adaptation-and-resilience/workstreams/gga)
917 [resilience/workstreams/gga](https://unfccc.int/topics/adaptation-and-resilience/workstreams/gga) (accessed 27 August 2026).

- 918 United Nations, 2025a. FfD4 Closing Press Release.
 919 <https://www.un.org/sustainabledevelopment/blog/2025/07/ffd4-closing-press-release> (accessed
 920 27 August 2026).
- 921 United Nations, 2025b. Consensus declaration signals action on debt, investment, and financial
 922 system reform. [https://www.un.org/sustainabledevelopment/blog/2025/06/ffd4-opening-
 923 renewed-framework-2/](https://www.un.org/sustainabledevelopment/blog/2025/06/ffd4-opening-renewed-framework-2/) (accessed 27 August 2026).
- 924 United Nations, 2026a. The Sustainable Development Goals Report 2026. UN Department of
 925 Economic and Social Affairs. <https://unstats.un.org/sdgs/report/2026/> (accessed 27 August
 926 2026).
- 927 United Nations, 2026b. United Nations proposes new global dashboard to measure progress beyond
 928 GDP. [https://www.un.org/en/desa/united-nations-proposes-new-global-dashboard-to-measure-
 929 progress-beyond-gdp](https://www.un.org/en/desa/united-nations-proposes-new-global-dashboard-to-measure-progress-beyond-gdp) (accessed 27 August 2026).
- 930 United Nations, 2026c. UN80 Initiative: Progress Report. [https://www.un.org/un80-
 931 initiative/en/un80-initiative-progress-report](https://www.un.org/un80-initiative/en/un80-initiative-progress-report) (accessed 27 August 2026).
- 932 United Nations, 2026d. About the Pact. Pact for the Future. [https://www.un.org/pact-for-the-
 933 future/en/about-pact](https://www.un.org/pact-for-the-future/en/about-pact) (accessed 27 August 2026).
- 934 United Nations Statistics Division, 2025. Global indicator framework for the Sustainable
 935 Development Goals and targets of the 2030 Agenda for Sustainable Development, including
 936 changes from the 2025 Comprehensive Review (E/CN.3/2025/6).
 937 <https://unstats.un.org/sdgs/indicators/indicators-list/> (accessed 24 September 2026).
- 938 Velázquez Gomar, J.O., 2014. International targets and environmental policy integration: The 2010
 939 Biodiversity Target and its impact on international policy and national implementation in Latin
 940 America and the Caribbean. *Glob. Environ. Change*. 29, 202–212.
 941 <https://doi.org/10.1016/j.gloenvcha.2014.10.002>
- 942 Yamazaki-Honda, R., 2022. Promoting Coherence Among Disaster Risk Reduction, Climate Change
 943 Adaptation, and Sustainable Development for Disaster Resilience. *J. Disaster Res.* 17(6), 1015–
 944 1021. <https://doi.org/10.20965/jdr.2022.p1015>
- 945 Yamazaki-Honda, R., 2024. Progress and Challenges Toward Coherence Among Disaster Risk
 946 Reduction, Climate Change Adaptation, and Sustainable Development. *J. Disaster Res.* 19(5),
 947 750–759. <https://doi.org/10.20965/jdr.2024.p0750>
- 948 Zembe, A., Nemaikonde, L.D., Chipangura, P., 2023. A policy coherence framework for food security,
 949 climate change adaptation and disaster risk reduction in South Africa. *Int. J. Disaster Risk
 950 Reduct.* 95, 103877. <https://doi.org/10.1016/j.ijdr.2023.103877>

951 S. Supplementary Materials

952 S.1 Full Web of Science Search Query

953 Cluster 1 (post-2030/SDG governance): “post-2030” OR “post 2030” OR “beyond 2030” OR
 954 “2030 and beyond” OR post-SDG(wildcard) OR “future sustainable development agenda” OR
 955 “SDG successor(wildcard)” OR “future of the SDG(wildcard)” OR “sustainable development”
 956 OR SDG(wildcard) OR “2030 Agenda” OR governance OR framework(wildcard) OR
 957 target(wildcard) OR indicator(wildcard) OR monitoring OR implementation OR finance OR
 958 “global governance”. Cluster 2 (sectoral frameworks): “Sendai Framework” OR “disaster risk
 959 reduction” OR “post-Sendai” OR “Global Biodiversity Framework” OR “Kunming-Montreal
 960 Global Biodiversity Framework” OR biodiversity OR desertification OR “land degradation”
 961 OR “Paris Agreement” OR “Global Goal on Adaptation” OR GGA OR “Belém Adaptation
 962 Indicator(wildcard)” OR “climate adaptation” OR “global stocktake” OR resilience. Cluster 3
 963 (measurement and finance): “Beyond GDP” OR “wellbeing economy” OR “inclusive wealth”
 964 OR “natural capital accounting” OR “environmental economic accounting” OR “financing for
 965 development” OR “SDG financing” OR “international financial architecture” OR “means of
 966 implementation”. Cluster 4 (integration vocabulary): interoperability OR “indicator
 967 interoperability” OR “indicator alignment” OR integration OR convergence OR coherence OR
 968 harmonization OR harmonisation OR equity. Clusters were combined with Boolean AND;
 969 terms within each cluster were combined with OR. “(wildcard)” denotes the asterisk wildcard-
 970 truncation operator in the original query (e.g., framework(wildcard) matches framework,
 971 frameworks, and frameworked). Searched against the Web of Science Core Collection, Title
 972 field, all years through August 2026.

973 ***Table S1. Priority indicators for natural capital, ecosystem services, and biodiversity***
 974 ***community contribution, ranked by composite score (R+G+X+T, max 12). Full scoring***
 975 ***detail underlying the synthesis in Section 3.9.2.***

Indicator	Frameworks	R	G	X	T	Total	Role
CBD B.1 (Ecosystem services)	CBD-GBF Goal B; GGA 9(d)(a)	3	3	2	2	10	Modeling, synthesis
CBD A.2 / SDG 15.1.1 (Ecosystem/forest extent)	CBD-GBF A/T1; SDG 15.1.1	3	2	2	3	10	Data gathering, modeling
CBD A.3 / SDG 15.5.1 (Red List Index)	CBD-GBF A/T4; SDG 15.5.1 (identical); GGA 9(d)(e) counterpart	3	2	3	2	10	Data gathering
GGA Target 9(d)(a–f) (Ecosystem-based adaptation)	GGA/UNFCCC; CBD Goal A/B	3	3	2	2	10	Modeling, data gathering

Indicator	Frameworks	R	G	X	T	Total	Role
SDG 15.3.1 (Land degradation)	SDG; UNCCD (LDN); CBD T1	3	2	3	2	10	Data gathering, modeling
CBD A.1 (Red List of Ecosystems)	CBD-GBF A/T1; GGA 9(d)(d) counterpart	3	3	2	2	10	Data gathering, modeling
CBD D.1 / SDG 15.a.1, 15.b.1 (Biodiversity finance)	CBD-GBF D/T19; SDG 15.a.1, 15.b.1	2	3	2	2	9	Reporting, synthesis
SDG 15.9.1(b) (Natural capital accounting: SEEA implementation)	SDG; CBD Goal D; Beyond GDP	3	3	1	2	9	Methods development
CBD 3.1 / SDG 14.5.1, 15.1.2, 15.4.1 (Protected area coverage)	CBD-GBF T3; SDG 14.5.1, 15.1.2, 15.4.1	2	1	2	3	8	Data gathering
CBD 15.1 (Corporate biodiversity disclosure)	CBD-GBF T15; TNFD-adjacent	2	3	1	2	8	Reporting, synthesis
SDG 6.6.1 (Water-related ecosystem extent)	SDG; CBD T1	3	2	1	2	8	Data gathering
SDG 14.1.1 / CBD 7.1 (Coastal eutrophication)	SDG 14.1.1; CBD-GBF T7	2	2	2	2	8	Modeling, data gathering
SDG 14.4.1 / CBD 5.1 (Fish stocks)	SDG 14.4.1; CBD-GBF T5	2	2	2	2	8	Modeling
SDG 2.4.1 / CBD 10.1 (Sustainable agriculture area)	SDG 2.4.1; CBD-GBF T10	2	2	2	2	8	Data gathering, country support
SDG 11.7.1 / CBD 12.1 (Urban green/blue space)	SDG 11.7.1; CBD-GBF T12	2	1	2	2	7	Data gathering, country support
CBD 18.2 (Harmful subsidies value)	CBD-GBF T18	2	3	1	1	7	Modeling
Sendai Target F (F1–F8, DRR finance)	Sendai; parallels CBD D.1–D.3	1	2	2	1	6	Reporting, synthesis
CBD 21.1 (Biodiversity monitoring information)	CBD-GBF T21 (data infra.)	1	3	1	1	6	Reporting, synthesis

Note: Each indicator was scored on four criteria, 0–3 each (maximum total 12):

- **Relevance (R):** how directly the indicator measures biodiversity, ecosystem condition, or natural capital stocks/flows;
- **Gap severity (G):** how significant the current data, methodological, or reporting gap is;
- **Cross-framework connectivity (X):** how many of the four frameworks reviewed share this indicator or a near-identical counterpart
- **Tractability (T):** how actionable near-term engagement is given existing research infrastructure and methods.

Connectivity scores count a framework only where it has an identical or near-identical counterpart indicator; frameworks listed as thematic links (for example, CBD T1 for SDG 6.6.1) do not raise the score. GGA entries are counterparts among the Belém Adaptation Indicators adopted in decision 12/CMA.7, which do not yet have agreed metadata; they are treated as near-identical counterparts only where the indicator wording corresponds directly (threat status of species under target 9(d)(e) and the Red List Index; threat status of ecosystems under 9(d)(d) and the Red List of Ecosystems).

991 S.2 Environment-Related SDG Indicators (Classification Rule and Full List)

992 **Framework size.** The SDG global indicator framework comprises 234 unique indicators following the 2025
 993 Comprehensive Review (E/CN.3/2025/6). Because some indicators repeat under two or three targets, the
 994 framework contains 251 target-level indicator assignments (United Nations Statistics Division, 2025).

995 **Classification rule.** An SDG indicator is classified as environment-related in this review if, and only if, it appears
 996 in the list of environment-related SDG indicators published by the UN Environment Programme (UNEP) and used
 997 for its Global and National Scorecards (UNEP, 2025, Annex A). No indicators were added to or removed from
 998 UNEP's list. UNEP's list contains 92 target-level entries across 15 of the 17 Goals; indicators that repeat under
 999 more than one target (for example, 1.5.1, 11.5.1 and 13.1.1 on disaster deaths and affected persons) are counted
 1000 once per target, following UNEP. Table S2 reproduces the full list; long indicator titles are abridged, and the
 1001 official wording is available in the UNSD global indicator framework. UNEP's list predates some 2025
 1002 Comprehensive Review revisions, so a small number of titles may differ from the current official wording.

1003 **Table S2.** *Environment-related SDG indicators used in Section 3.9 (n = 92 target-level entries; UNEP, 2025,*
 1004 *Annex A).*

Indicator	Goal	Indicator title (UNEP, 2025, Annex A)
1.4.2	1	Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure
1.5.1	1	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
1.5.2	1	Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)
1.5.3	1	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
1.5.4	1	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
2.4.1	2	Proportion of agricultural area under productive and sustainable agriculture
2.5.1	2	Number of (a) plant and (b) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities
2.5.2	2	Proportion of local breeds classified as being at risk, not-at-risk or at unknown level of risk of extinction
3.9.1	3	Mortality rate attributed to household and ambient air pollution
3.9.2	3	Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
3.9.3	3	Mortality rate attributed to unintentional poisoning
4.7.1	4	Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment
5.a.1	5	(a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure
6.1.1	6	Proportion of population using safely managed drinking water services
6.2.1	6	Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water
6.3.1	6	Proportion of wastewater safely treated
6.3.2	6	Proportion of bodies of water with good ambient water quality
6.4.1	6	Change in water-use efficiency over time
6.4.2	6	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
6.5.1	6	Degree of integrated water resources management implementation (0–100)
6.5.2	6	Proportion of transboundary basin area with an operational arrangement for water cooperation
6.6.1	6	Change in the extent of water-related ecosystems over time
6.a.1	6	Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan

Indicator	Goal	Indicator title (UNEP, 2025, Annex A)
6.b.1	6	Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management
7.1.2	7	Proportion of population with primary reliance on clean fuels and technology
7.2.1	7	Renewable energy share in the total final energy consumption
7.3.1	7	Energy intensity measured in terms of primary energy and GDP
7.a.1	7	International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems
7.b.1	7	Installed renewable energy-generating capacity in developing and developed countries (in watts per capita)
8.4.1	8	Material footprint, material footprint per capita, and material footprint per GDP
8.4.2	8	Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
9.4.1	9	CO ₂ emission per unit of value added
11.2.1	11	Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
11.3.1	11	Ratio of land consumption rate to population growth rate
11.3.2	11	Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically
11.4.1	11	Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage, by source of funding, type of heritage and level of government
11.5.1	11	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
11.5.2	11	Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)
11.6.1	11	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities
11.6.2	11	Annual mean levels of fine particulate matter (e.g. PM _{2.5} and PM ₁₀) in cities (population weighted)
11.7.1	11	Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
11.b.1	11	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
11.b.2	11	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
12.1.1	12	Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies
12.2.1	12	Material footprint, material footprint per capita, and material footprint per GDP
12.2.2	12	Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
12.3.1	12	(a) Food loss index and (b) food waste index
12.4.1	12	Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement
12.4.2	12	(a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment
12.5.1	12	National recycling rate, tons of material recycled
12.6.1	12	Number of companies publishing sustainability reports
12.7.1	12	Degree of sustainable public procurement policies and action plan implementation
12.8.1	12	Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
12.a.1	12	Installed renewable energy-generating capacity in developing and developed countries (in watts per capita)
12.b.1	12	Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability
12.c.1	12	Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels
13.1.1	13	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
13.1.2	13	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
13.1.3	13	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies

Indicator	Goal	Indicator title (UNEP, 2025, Annex A)
13.2.1	13	Number of countries with nationally determined contributions, long-term strategies, national adaptation plans, strategies as reported in adaptation communications and national communications
13.2.2	13	Total greenhouse gas emissions per year
13.3.1	13	Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
13.a.1	13	Mobilized amount of United States dollars per year between 2020 and 2025 accountable towards the \$100 billion commitment
13.b.1	13	Number of least developed countries and small island developing States with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the UNFCCC secretariat
14.1.1	14	(a) Index of coastal eutrophication; and (b) plastic debris density
14.2.1	14	Number of countries using ecosystem-based approaches to managing marine areas
14.3.1	14	Average marine acidity (pH) measured at agreed suite of representative sampling stations
14.4.1	14	Proportion of fish stocks within biologically sustainable levels
14.5.1	14	Coverage of protected areas in relation to marine areas
14.6.1	14	Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing
14.7.1	14	Sustainable fisheries as a proportion of GDP in small island developing States, least developed countries and all countries
14.a.1	14	Proportion of total research budget allocated to research in the field of marine technology
14.c.1	14	Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in UNCLOS
15.1.1	15	Forest area as a proportion of total land area
15.1.2	15	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
15.2.1	15	Progress towards sustainable forest management
15.3.1	15	Proportion of land that is degraded over total land area
15.4.1	15	Coverage by protected areas of important sites for mountain biodiversity
15.4.2	15	(a) Mountain Green Cover Index and (b) proportion of degraded mountain land
15.5.1	15	Red List Index
15.6.1	15	Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits
15.7.1	15	Proportion of traded wildlife that was poached or illicitly trafficked
15.8.1	15	Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species
15.9.1	15	(a) National targets in accordance with or similar to Aichi Biodiversity Target 2 in national biodiversity strategy and action plans; and (b) integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting
15.a.1	15	Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
15.b.1	15	Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
15.c.1	15	Proportion of traded wildlife that was poached or illicitly trafficked
17.7.1	17	Total amount of approved funding for developing and developed countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies
17.9.1	17	Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries
17.14.1	17	Number of countries with mechanisms in place to enhance policy coherence of sustainable development
17.16.1	17	Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the Sustainable Development Goals
17.18.1	17	Statistical capacity indicator for Sustainable Development Goal monitoring

Note: Goal-level counts are Goal 1 (5), Goal 2 (3), Goal 3 (3), Goal 4 (1), Goal 5 (1), Goal 6 (11), Goal 7 (5), Goal 8 (2), Goal 9 (1), Goal 11 (11), Goal 12 (13), Goal 13 (8), Goal 14 (9), Goal 15 (14) and Goal 17 (5). Goals 10 and 16 have no entries. The natural capital accounting indicator ranked in Table S1 is SDG 15.9.1(b), integration of biodiversity into national accounting and reporting systems through the System of Environmental-Economic Accounting; SDG 12.b.1 concerns sustainable tourism accounting.