

Striking the Right Note: Key Performance Indicators for Sovereign Sustainability— Linked Bonds



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Abbreviations

ABS	asset-backed security.
ARIES	Artificial Intelligence for Environment and Sustainability
BIOFIN	Biodiversity Finance Initiative
CAT	Climate Action Tracker
CBD	Convention on Biological Diversity
CCDR	Country Climate and Development Report
CCPI	Climate Change Performance Index
CNSI	Climate and Nature Sovereign Index
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalent
COP	Conference of the Parties
CPIA	Country Policy and Institutional Assessment
EPI	Environmental Performance Index
ESF	Environmental and Social Framework
ESG	environmental, social, and governance
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization of the United Nations data
GBP	Green Bond Principles
GDP	gross domestic product
GFW	Global Forest Watch
GHG	greenhouse gas
GNI	gross national income
ICMA	International Capital Markets Association
IDA	International Development Association
IEA	<i>International Energy Agency</i>
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KBA	key biodiversity area
KPI	key performance indicator
LTS	long-term strategies
LULUCF	land use, land-use change, and forestry
MRV	measuring, reporting, and verification
Mt CO ₂	million metric tonnes of carbon dioxide
NAP	National Adaptation Plan
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NGO	nongovernmental organization
PM 2.5	particulate matter 2.5 microns or smaller
PPP	purchasing power parity
PPS	Progression Performance Score
REDD+	reduce emissions from deforestation and forest degradation
RISE	Regulatory Indicators for Sustainable Energy
SBG	Sustainability Bond Guidelines
SBP	Social Bond Principles
SDG	Sustainability Development Goal
SEEA	System for Environmental Economic Accounting
SLBP	Sustainability-Linked Bond Principles

Striking the Right Note: Key Performance Indicators for Sovereign Sustainability-Linked Bonds

SLB	sustainability-linked bond
SPT	sustainable performance target
STAR	Species Threat Abatement and Recovery
TCFD	Task Force on Climate-Related Financial Disclosures
TES	total energy supply
TNC	The Nature Conservancy
TNFD	Task Force on Nature-Related Financial Disclosures
UN	United Nations
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
WDPA	World Database on Protected Areas
WHO	World Health Organization.
WWF	World Wildlife Fund

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Executive Summary

Governments globally are looking for innovative financial instruments to address the triple crisis of unprecedented debt levels, climate change, and nature loss. Many developing countries lack the fiscal space to mobilize the necessary financing to scale nature and climate investment to the level needed to avoid climate shocks and nature loss. The pandemic crisis further reduced resources for investment.

Sovereign sustainability-linked bonds (SLBs) could link sustainable sovereign financing with national climate and environmental commitments. Sovereign bonds—representing almost 40 percent of the \$100 trillion global bond market—are the largest asset class in many institutional investors’ portfolios. They are one of the key instruments for channeling capital to emerging markets and developing economies (EMDEs).

This report provides a framework for designing and assessing Sovereign SLBs with payments linked to the performance of key climate and nature indicators. SLBs are a particular type of financial instrument designed to incentivize the borrower’s achievement of ambitious, predetermined, sustainability performance objectives, measured using key performance indicators (KPIs). Unlike green and other sustainability-labeled bonds, these instruments are not ring-fenced for particular projects or spending; rather, the payout made to investors in the bond depends on whether the issuer of the debt meets agreed performance indicators. SLBs are growing fast in the corporate debt market and are now being considered for sovereign issuers.

The framework presented in the report is intended to bridge the gap between what sovereign investors would view as appropriately ambitious actions and what issuing countries see as achievable targets. The framework is intended to help investors with their decision-making and can inform Ministries of Finance and their debt management offices (DMOs) about what investors want to know regarding their country’s sustainability performance. The report findings may also inform creation of financial instruments and market analyses beyond sovereign SLBs and are relevant for a broad range of stakeholders. These include regulators, credit rating agencies, academics, as well as nongovernmental organizations (NGOs), and civil society groups which could be affected by the types of indicators selected and outcomes of government policies.

The report provides a framework for selecting KPIs and setting the associated sustainable performance targets (SPT) for sovereign SLBs. The framework builds on the International Capital Market Association (ICMA) ‘Sustainability-linked Bond Principles’. It is meant to provide initial guidance on what a framework for assessing the suitability of KPIs might look like, including whether a potential indicator is sufficiently robust, properly interpreted, aligned with the country context, and credibly ambitious. The report outlines a top-down approach, designed to make the KPI setting and monitoring process as simple as possible, while considering countries’ priorities and context.

The report screens existing datasets to identify potential KPIs that could be used by sovereign SLBs to determine sustainability performance objectives, with a specific focus on climate- and nature-related objectives. Leveraging existing datasets, established by respected third parties, could reduce the administrative burden for debt-management teams, encourage standardization, and increase confidence in these new instruments. Many of the indicators included in this report’s long list are common to multiple datasets and are now being used as KPIs in various contexts (see table ES.2). The prerequisites for selecting the datasets are that they should be *diverse* (include goals, outcomes, policies, and rankings/indexes); *relevant and material* (align with sustainability goals and have material development outcomes); *transparent* (provide information from credible and reliable sources); and *sovereign* (focus on the level of sovereign states). The identified KPI list should evolve over time to reflect the most important development, climate, and environmental priorities. For example, the list could be updated based on ongoing policy developments and international negotiations at the United Nations

Framework Convention on Climate Change [UNFCCC] and Convention on Biological Diversity [CBD] Conferences of the Parties meetings.

The report proposes a set of criteria for assessing data robustness (see table ES.1). Criteria are: (a) *available* (are the data available at a reasonable cost or publicly available for the foreseeable future?); (b) *attributable* (can the indicator be plausibly associated with sovereign interventions?); (c) *frequent* (are the data current and produced with enough frequency?); (d) *regular* (are the data provided regularly and over a considerably long period of time?); and (e) *comparable* (are the data within datasets consistent across countries?).

A fundamental challenge of using existing datasets as KPIs for sovereign SLBs is the lack of timely data. It will be important to establish methods to define acceptable reporting periods and to determine how and when to credit sustainable performance. Emerging technologies could potentially address this challenge by providing real-time data in the future, although further testing is needed to evaluate whether such solutions are appropriate in the EMDE context.

It is important to ensure alignment with the country context when selecting KPIs and setting targets for sovereign SLBs. For example, attribution of outcome-based indicators is a particular challenge for sovereign SLBs—as these outcomes may depend on factors outside the government’s control. Additional screening may be needed for certain KPIs to assess their true contribution to sustainability performance objectives. A combination of short-term policy indicators and associated long-term outcome indicators could be used to ensure that the outcomes are aligned with long-term development goals and reflect real sovereign interventions rather than factors outside the government’s control.

There are also various options for setting and assessing the ambition of KPI targets (see table ES.1). Potential options include (a) assessing *alignment with internationally agreed goals* (for example, 1.5–2°C temperature goals under the Paris Agreement); (b) developing *eligibility criteria* (for example, positive or negative lists); (c) *benchmarking with comparable countries*; (d) issuing *baseline targets* (for example, targets relative to a base year or a business-as-usual scenario); and (e) assessing *planetary boundaries* (for example, the level of resources that meets people’s needs without exceeding critical planetary thresholds). Each of these options have their own pros and cons that should be carefully considered. For example, some of these options may face uncertainties due to modeling assumptions. Some indicators may not truly reflect actual sovereign interventions if the outcome (for example, emission reduction) is achieved through nonpolicy factors (for example, economic downturn). Certain options may also be politically sensitive if they do not carefully consider the nuances of a country’s national circumstances and priorities.

Table ES.1. Criteria for Assessing the Robustness of Sovereign SLB Indicators and Targets

Indicator Assessment Criteria	Target Setting Assessment Criteria
Available	Alignment with internationally agreed goals
Attributable	Eligibility criteria
Frequent / Recent	Benchmarking with comparable countries
Regular	Baseline targets
Comparable across countries	Planetary boundaries

Source: World Bank staff.

Putting an economic value on many KPIs (such as biodiversity measures, water, or air quality) is still an emerging concept. Making the link between sustainable outcomes, economic impact—and ultimately market pricing—through KPIs will therefore have to be an art in the initial stages, as is the case with the start of most new financial instruments. Moving forward, further analysis will be needed to better understand how to price and trade sovereign SLBs efficiently, as this will be critical to

ensure the scalability of the market in the long run. EMDEs with high cost of capital (and large natural capital resources to protect) are likely to be the most interested in sovereign SLBs. The issuance of these instruments must contribute to an improvement in debt sustainability and not further destabilize these countries' debt burdens.

The report also notes persistent implementation challenges and recognizes that country pilots and consultations are needed to further understand how KPIs for sovereign SLBs could be developed in practice. Consideration of the need for safeguards as well as of the need to avoid the gaming of indicator selection, perverse incentives, and disadvantages to lower-income countries is discussed in the report. For next steps, a phased approach is proposed that starts with consultation, experimentation, and pilot studies; builds capacity over time; and facilitates learning-by-doing ahead of formalization and standardization. Such an approach aligns with the long-term vision of this work, which is to help financial markets tackle unprecedented debt levels while reaching climate- and nature-related goals.

Table ES.2. Long List of Potential Key Performance Indicators

Energy indicators	Biodiversity indicators
Proportion of population with access to electricity, by urban/rural (%)	Proportion of fish stocks within biologically sustainable levels (not overexploited) (%)
Proportion of population with primary reliance on clean fuels and technology (%)	Average proportion of Marine Key Biodiversity Areas (KBAs) covered by protected areas (%)
Renewable energy share in the total final energy consumption (%)	Forest area (thousands of hectares)
Energy intensity level of primary energy (megajoules per constant 2017 purchasing power parity GDP)	Forest area as a proportion of total land area (%)
Installed renewable electricity-generating capacity (watts per capita)	Land area (thousands of hectares)
PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	Arable land (% of land area)
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	Average proportion of Freshwater Key Biodiversity Areas (KBAs) covered by protected areas (%)
Adjusted net savings, including particulate emission damage (% of GNI)	Average proportion of Terrestrial Key Biodiversity Areas (KBAs) covered by protected areas (%)
Electricity production from coal sources (% of total)	Above-ground biomass stock in forest (tonnes per hectare)
Energy imports, net (% of energy use)	Forest area annual net change rate (%)
Energy use (kilogram of oil equivalent per capita)	Forest area under an independently verified forest management certification scheme (thousands of hectares)
Fossil fuel energy consumption (% of total)	Proportion of forest area under a long-term management plan (%)
Renewable electricity output (% of total electricity output)	Proportion of forest area within legally established protected areas (%)
Climate indicators	Average proportion of Mountain Key Biodiversity Areas (KBAs) covered by protected areas (%)
Country has Adaptation Communications (Yes/No)	Countries that established national targets in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020 in their National Biodiversity Strategy and Action Plans (1 = Yes; 0 = No)
Country has a National Adaptation Plan (Yes/No)	Countries with integrated biodiversity values into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting (1 = Yes; 0 = No)
Country has a Nationally Determined Contribution (Yes/No)	
Party has a net-zero emission target	
Party has an economy-wide target in a national law or policy	
Party intends to enhance ambition or action in their NDCs	
Party has submitted long-term strategies	
Total greenhouse gas emissions without LULUCF for Annex I Parties (Mt CO ₂ equivalent)	
Total greenhouse gas emissions without LULUCF for non-Annex I Parties (Mt CO ₂ equivalent)	
Total greenhouse gas emissions from LULUCF for Annex I Parties (Mt CO ₂ equivalent)	
Total greenhouse gas emissions from LULUCF for non-Annex I Parties (Mt CO ₂ equivalent)	
Total greenhouse gas emissions per capita (Mt CO ₂ equivalent per capita)	
Total greenhouse gas emissions per gross domestic product (Mt CO ₂ equivalent per GDP)	
Indexes	Natural capital indicators
IUCN Red List Index	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (%)
RISE Score (2019)	Adjusted savings: natural resources depletion (% of GNI)
CCPI Ranking (2021)	Adjusted savings: net forest depletion (% of GNI)
EPI Ranking (2020)	Total natural resources rents (% of GDP)

Source: World Bank staff.

Note: CCPI = Climate Change Performance Index; CO₂ = carbon dioxide; EPI = Environmental Performance Index; GDP = gross domestic product; GNI = gross national income; IUCN = International Union for Conservation of Nature; KBA = key biodiversity area; LULUCF = land use, land-use change and forestry; Mt CO₂ = million metric tonnes of carbon dioxide; PM 2.5 = particulate matter 2.5 microns or smaller in size; RISE = Regulatory Indicators for Sustainable Energy; WHO = World Health Organization.

Background

1. The World Bank and other stakeholders are seeking to help financial markets tackle unprecedented debt levels while reaching sustainable development goals. This report—and other complementary efforts—are intended to both inform and stimulate discussion on sovereign sustainability-linked bonds. The primary audience is potential investors in, and issuers of (that is, debt management offices and ministries of finance), these instruments. It is meant to serve as a guide to setting and assessing the robustness and ambition of the key-performance indicators related to these instruments. The report is also relevant for a broader range of stakeholders, including regulators, credit rating agencies, bilateral partners, intergovernmental organizations, international financial institutions, multilateral organizations, think tanks, nongovernmental organizations (NGOs), civil society groups, and indigenous organizations. The potential indicators identified, framework proposed, and issues raised are relevant for financial instruments and market analysis beyond sovereign sustainability-linked bonds and can inform the role and research of these different groups.

2. The latest Intergovernmental Panel on Climate Change (IPCC) report served to highlight further the urgency of the need to tackle climate change. The IPCC is unequivocal that human influence has warmed the atmosphere, ocean, and land and that the scale of recent changes across the climate system is unprecedented. The IPCC report states that the Paris Agreement aim of “holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C” will not be met and that levels will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO₂) and other greenhouse gas emissions occur in the coming decades.¹ It is also widely recognized that the costs of action on climate change mitigation are significantly lower than the costs of inaction and that the benefits generally outweigh the costs of climate change adaptation.²

3. At the same time, global initiatives are warning that biodiversity is declining at an unprecedented rate, and the pressures driving this decline are intensifying. None of the international biodiversity targets under the Convention on Biological Diversity (CBD)—that is, the Aichi Biodiversity Targets—were fully met, in turn threatening the achievement of the United Nations’ Sustainable Development Goals and undermining efforts to address climate change.³ The CBD’s post-2020 global biodiversity framework recognizes that biodiversity, and the benefits it provides, is fundamental to human well-being and a healthy planet; that urgent policy action globally, regionally, and nationally is required to transform economic, social, and financial models so that the trends that have exacerbated biodiversity loss will stabilize and allow for the recovery of natural ecosystems; and that governments and societies

¹ See Intergovernmental Panel on Climate Change (IPCC), “Climate Change 2021: The Physical Science Basis—Summary for Policymakers,” IPCC, Geneva, 2021, <https://www.ipcc.ch/report/ar6/wg1/#SPM>.

² See Intergovernmental Panel on Climate Change (IPCC), *AR5 Synthesis Report: Climate Change 2014* (Geneva: IPCC, 2015), <https://www.ipcc.ch/report/ar5/syr/>.

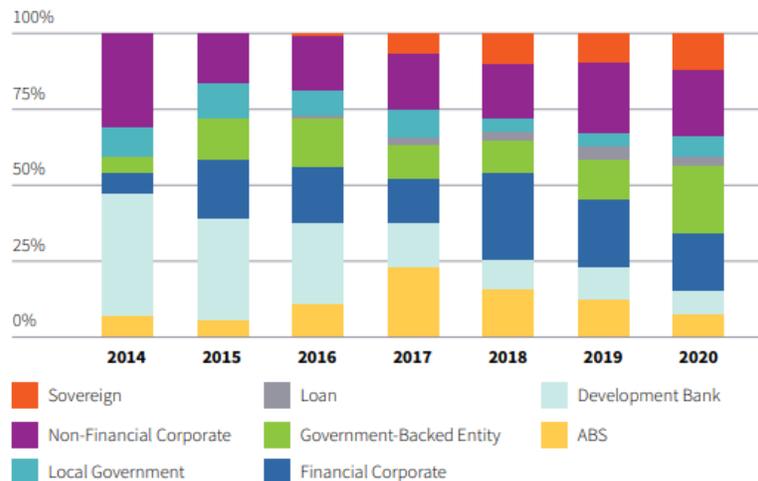
³ See Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 5* (Montreal, 2020), <https://www.cbd.int/gbo5>.

need to determine priorities and allocate financial and other resources, internalize the value of nature, and recognize the cost of inaction.⁴

4. Tackling these challenges is made only more difficult by already rising debt levels, notably in the countries that need to take the most action. Unprecedented levels of investment will be needed to fund COVID-19 stimulus and relief packages, as well as to address the challenges posed by climate change and the degradation of ecosystems that regulate the air, water, and soil on which everyone depends. Yet, in response to the pandemic, public debt already increased by US\$8.5 trillion in the nine months from January through September 2020, including by US\$1.4 trillion in emerging markets.⁵

5. Connections between these triple crises of unprecedent debt levels, climate change, and nature-related risks are, in fact, already being made in the financial markets. The market for sovereign bonds financing sustainable development is developing fast. Governments issued over US\$13 billion in sustainable-labeled bonds during the first half of 2020, according to the Climate Bonds Initiative,⁶ and figure 1 shows that governments and public sector entities led the growth of green bonds in 2020. Figure 2 shows the general increase in sustainable-labeled bonds from 2014 to 2020. Although most of this growth stemmed from green bonds, the first half of fiscal year (H1) 2020 shows the most even thematic split between “green,” “social,” “sustainability,” and “pandemic” bonds.

Figure 1. Sovereign and Public Sector Entities Led Growth in Green Bonds, 2020



Source: Climate Bonds Initiative, “Sustainable Debt: Global State of the Market 2020,” (London, Climate Bonds Initiative, 2021), 7.

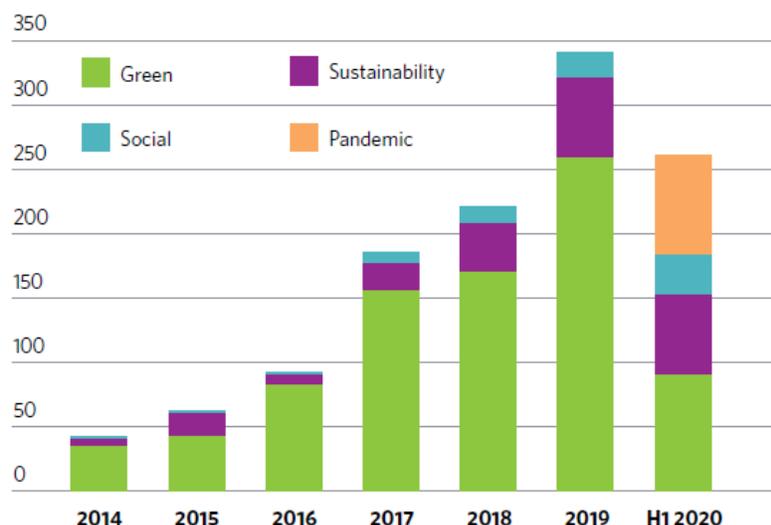
Note: ABS = asset-backed security.

⁴ See Convention on Biological Diversity, “Preparations for the Post-2020 Biodiversity Framework,” <https://www.cbd.int/conferences/post2020>.

⁵ See Silva and Steward, “My Word Is My Bond.”

⁶ See Climate Bonds Initiative, <https://www.climatebonds.net/>.

Figure 2. Growth in Sustainable-Labeled Bonds, 2014–H1(first half) 2020, US\$, Billions



Source: Climate Bonds Initiative, “Sustainable Debt: Global State of the Market H1 2020” (Climate Bonds Initiative, London, 2020), 3.

6. Sustainability-linked bonds (SLB) are a particular type of financial instrument intended to incentivize the borrower’s achievement of ambitious, predetermined sustainability performance objectives, measured using key performance indicators (KPIs).⁷ SLBs are different from green and other labeled bonds in that they are performance-linked instruments (rather than use-of-proceeds instruments) with interest rates or a refinancing mechanism tied to achieving sustainable goals.⁸ Unlike green bonds, proceeds of sustainability-linked bonds are not required to be ring-fenced.⁹ Given the greater flexibility in the use of proceeds, sustainability-linked instruments may be more attractive to countries with small debt management teams (potentially involving less reporting requirements for them, more fungible proceeds, and less market fragmentation). One of the potential advantages of a performance-linked instrument such as an SLB is that it could reduce the cost of capital by avoiding costly budget tagging and project identification costs because proceeds would be used for general purpose financing and could provide capital incentives for governments prepared to commit to ambitious targets.¹⁰

7. These instruments are growing fast in corporate debt markets. An SLB is a relatively new type of instrument but is increasing in popularity in the corporate world as a way to align borrowers’ sustainability profile with lending terms. For example, in 2019 sustainability-linked loans that tied the interest rate to a company’s performance reducing its impact on biodiversity increased by over 168

⁷ SLBs are any type of bond instrument for which the financial and structural characteristics can vary depending on whether the issuer achieves predefined sustainability or environmental, social, and governance objectives.

⁸ The cornerstone of a green bond is the use of the proceeds of the bond for eligible green projects, which should be appropriately described in the legal documentation of the security. All designated eligible green projects should provide clear environmental benefits, which are assessed and, where feasible, quantified by the issuer.

⁹ The proceeds of SLBs are intended to be used for general purposes, hence the use of proceeds is not a determinant in its categorization.

¹⁰ Silva and Steward, “Virtue and a Reward.”

percent from a year earlier, with major agricultural firms including Bunge, Louis Dreyfus, and Wilmer among the issuers. The growth in these loans is expected to continue.¹¹ While there has been no sovereign issuance of SLBs to date, the market is now considering whether sovereign entities are ready to move from use-of-proceeds instruments, such as green bonds, to performance-linked instruments such as SLBs.

8. Lessons from the corporate SLB market are limited so far—but the need for more robust KPI settings is a growing message (see box 1). Although the SLB market is growing quickly, relatively few examples exist, and those that do come from different sectors—for example, electricity utilities, forest and paper products manufacturing, pharmaceuticals, and apparel and textile products. The issue is that the KPIs and their related sustainability-based targets vary—for example, installed capacity in renewable energy sources, direct greenhouse gas (GHG) emissions, carbon intensity of products, patient reach, indirect GHG emissions, value chain GHG emissions, and percentage of renewable electricity in operations.¹² The bond characteristics also vary, with certain entities issuing more than one bond linked to a single KPI and other entities linking two KPIs to one tranche and one KPI to a second tranche. For comparison, examples of environmental impact bonds—where evaluation of project outcomes are used to establish the effectiveness of green infrastructure projects—also exist in local markets.¹³ Corporate SLBs to date have been around one to three years in tenor and have been structured with a step-up coupon (with the issuer paying a higher interest rate if KPI is not met) of around 25 basis points.

Box 1: Lessons from Corporate SLB Markets

Early experience suggests the following key challenges are facing corporate SLBs:

- *Proceed restrictions:* There could be a higher risk of green washing, because there are no restrictions on the use of proceeds and no consistent tracking of proceed use.
- *Metric comparability:* There is no standard set of KPIs or targets, which limits comparability.
- *Metric relevance:* In some cases, metrics set by the issuer may not be relevant to the entity’s profile (for example, in the context of the entity’s industry and business model).
- *Metric ambition:* Targets may not be ambitious enough.
- *Performance reliability:* Performance against set targets may not be reliably reported because they are usually self-reported and unaudited.
- *Financial penalty:* The financial penalty for failing to meet the predetermined targets may not be sufficient to incentivize the entity to deliver on its goals.

Sources: See S&P Global, “The ESG Pulse: Sustainability-Linked Bonds Are Taking Off” (June 8, 2021), <https://www.spglobal.com/ratings/en/research/pdf-articles/210608-the-esg-pulse-sustainability-linked-bonds-are-taking-off-100134555>. The following paper includes an analysis of the corporate SLB market, including detailed case studies: Abdeldjellil Bouzidi and Denis Papaioannou, “Sovereign Sustainability-Linked Bonds—Opportunities, Challenges and Pricing Considerations” (September 7, 2021), <http://dx.doi.org/10.2139/ssrn.3919159>.

Note: KPI = key performance indicator; SLB = sustainability-linked bond.

¹¹ Over US\$75 billion has been issued through the third quarter of 2021, with MSCI, Inc., estimating US\$100 billion by the end of the year, up from just US\$10 billion in 2020.

¹² See Nordea Open Insights, “Lessons from the Infant Sustainability-Linked Bond Market,” October 1, 2020, <https://insights.nordea.com/en/sustainability/sustainability-linked-bonds/>.

¹³ See Quantified Ventures, “What Is an Environmental Impact Bond?,” <https://www.quantifiedventures.com/what-is-an-environmental-impact-bond>.

9. Overall, there has been some pushback on these instruments as the quality of the KPIs (in terms of ambition and additionality) has been questioned. Though generally well supported—including by the European Central Bank which has announced that it will accept such instruments as collateral for credit operations—some investors have announced that they will not purchase these instruments because of a perceived lack of credibility for the indicators and targets.¹⁴ There have also been calls for targets to become more science-based and aspirational.¹⁵

10. This report provides research exploring the launch of a potential sovereign SLB market—acknowledging that selecting robust KPIs will be key for a new asset class to emerge.¹⁶ Given that sovereign SLBs are likely to be structured differently from their corporate counterparts, with a step-down rather than a step-up coupon (that is, incentivizing governments with a carrot of lower interest costs rather than a stick of higher payments), robust KPI settings will be even more important and will need to address the issues currently arising in the corporate market.

11. The purpose of this report is to screen existing datasets to identify potential KPIs that could be used by sovereign SLBs to determine sustainability performance objectives (with a specific focus on climate- and nature-related objectives).¹⁷ This report provides a framework for selecting KPIs for sovereign SLBs—that is, how to assess the suitability of KPIs, including whether a potential KPI is sufficiently robust, properly interpreted, appropriately aligned with the country context, and credibly ambitious. This framework is a guide that can help bridge the gap between what investors see as appropriately ambitious action and what countries will set themselves as achievable targets. The framework will help investors with their sustainable finance analysis and decision-making and will inform ministries of finance and their debt management offices about what investors want to know regarding their country’s sustainability performance. The use of existing datasets could reduce the administrative burden for small government debt management teams, encourage standardization, and introduce confidence about these new instruments (by using already established monitoring and reporting by respected third parties). A framework for selecting robust KPIs could also be used for broader purposes beyond a sovereign SLB market (for example, for structuring other financial instruments and for conducting sovereign environmental, social, and governance [ESG] market analysis, including credit ratings).

12. This report also describes key interpretation and selection considerations specifically related to the use of KPIs for sovereign SLBs. Sovereign bonds are the largest asset class in many

¹⁴ See Stephen M. Liberatore, “Sustainability-Linked Bonds Do Not Fit Our Impact Framework,” Nuveen, 2021, <https://www.nuveen.com/en-us/institutional/insights/income/sustainability-linked-bonds-do-not-fit-our-impact-framework>.

¹⁵ Sanne Wass, “Sustainability-linked Bonds in ‘Rapid Growth’ as More Firms Tap ESG Debt Market,” S&P Global Market Intelligence, June 23, 2021, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/sustainability-linked-bonds-in-rapid-growth-as-more-firms-tap-esg-debt-market-65049789>.

¹⁶ The World Bank jointly with the International Monetary Fund convened a series of meetings with a Consultative Group (CG) on the need for a collaborative platform to address the triple crisis (debt, climate, and nature), bringing coherence and consistency to targeted debt instruments and nondebt financing that support climate change and biodiversity outcomes. This report supports the knowledge pillar and technical working group of the initiative.

¹⁷ The International Capital Markets Association (ICMA) currently has a working group investigating KPIs and target setting deployed in the corporate market.

institutional investors' portfolios and are the key investment instrument for channeling capital to emerging markets. Selecting robust and credible KPIs is particularly important for the sovereign SLB market, since KPIs may involve both policy indicators that governments could potentially game and outcome indicators that may be beyond their control. A *top-down approach* where suitable KPIs are selected based on a thoughtful framework of considerations could potentially address these issues and seems well suited to public markets. A *bottom-up approach* where investors, local stakeholders, and others get involved with KPI selection and target setting with the issuer bilaterally and earlier also seems suitable for private placements and other instruments (such as debt for climate and nature swaps). In both cases, proper interpretation and selection of the KPIs is important. This report is not intended to specifically address instrument design or pricing structures for sovereign SLBs, though these issues will need to be tackled for an asset class to be established.

13. The remainder of this report is organized as followed: (a) Conceptual Framework; (b) Identifying the Potential Indicators from Existing Datasets; (c) Assessing Data Robustness; (d) Interpreting Indicators and Ensuring Alignment with Country Context; (e) Setting Targets; (f) Pricing SLBs based on KPI Performance; (g) Concluding Remarks and Recommendations; and (h) Moving toward Implementation.

Conceptual Framework

14. KPIs selected under this framework would be used to monitor and incentivize the SLB borrower's achievement of ambitious, predetermined sustainability performance objectives. Since selecting robust, relevant, and credible KPIs at the national level will be vital to establishing a market for sovereign SLBs, the purpose of this report is to assess whether existing datasets can provide suitable KPIs for national sustainability performance objectives. While this analysis focuses on climate- and nature-related KPIs, a similar exercise for social indicators could also be undertaken.¹⁸

15. This report is structured to consider the following research questions:

- *Data robustness:* Can these KPIs incentivize material and relevant sustainable development outcomes at the national level through financial instruments such as sovereign SLBs? Do existing datasets provide indicators that are robust enough to serve as KPIs? What are the key criteria to assess and select KPIs?
- *Alignment with country context:* How can we ensure that KPIs are internationally comparable while being closely aligned with a country's national priorities and circumstances? How can we ensure that these KPIs are attributable to actual sovereign interventions and address the most important development priorities for a particular country?

¹⁸ Additional KPIs might be included to address other development and sustainability concerns such as ESG ratings; human rights; and gender equality. Examples of these other indicators are included in the United Nations Sustainable Development Goals (<https://unstats.un.org/sdgs/indicators/database/>) and the World Bank Sovereign ESG Data Portal (<https://datatopics.worldbank.org/esg/framework.html>).

- *Target setting:* Assuming that data are robust and KPIs adequately reflect a country's context, how can we go about assessing the ambition of a target set for performance-linked financial instruments, such as sovereign SLBs?
- *Pricing:* Is it possible to link sustainable outcomes, economic impact, and ultimately market pricing through KPIs? How can we ensure that the issuance of sovereign SLBs contributes to emerging markets' and developing economies' productive growth?

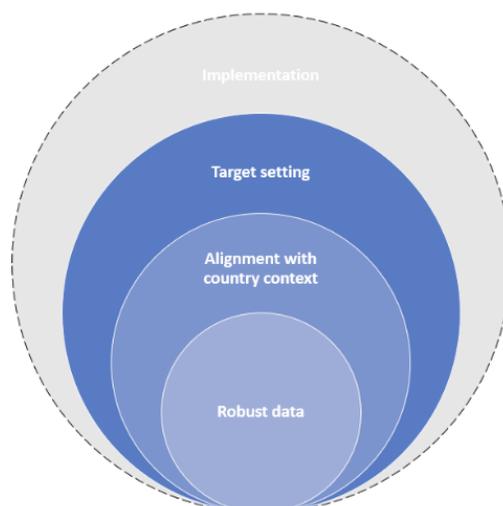
16. In answering these questions, the framework for selecting KPIs for SLBs and other information set out in this report will allow an interested party (for example, issuer or investor) to do the following:

- Check if the KPIs under consideration are on the long list of potential KPIs identified in this report (and if not, to leverage the identification and data robustness criteria identified in this report to screen the KPIs). The list of KPIs is expected to be dynamic and could be updated over time to reflect emerging priorities (for example, in relation to future outcomes of the Paris Agreement or CBD negotiations).
- Interpret the information expressed by the KPIs and determine whether the KPIs are appropriate for the country context (with the report outlining several considerations against which to check).
- Set appropriately ambitious sustainable performance targets for the KPIs (using one or more of the potential options for assessing the ambition of targets suggested in this report).
- Understand the wider implementation considerations for sovereign SLBs (with the report discussing various considerations).

17. In the context of implementing a market for sovereign SLBs and designing performance-linked financial instruments, additional considerations beyond robust KPIs are necessary. These include monitoring, reporting, and verifying the KPIs; including and monitoring safeguards (for example, assessments of social and governance indicators); planning for national investments in climate and biodiversity; assessing climate and biodiversity investment risk; and rating sovereign credit worthiness. There are several complementary, investment-focused plans considering these issues (see appendix A).

18. Figure 3 illustrates the different layers of this report's considerations. Robust data is at the core of establishing a market for sovereign SLBs, followed by alignment with country context, target setting, and implementation.

Figure 3. Conceptual Framework of This Report



Source: World Bank staff.

Identifying Potential Indicators from Existing Datasets

19. This report identifies and analyzes a set of indicators from existing datasets. While the datasets included for the analysis are by no means complete, for this report a comprehensive mapping of existing datasets was conducted and identified indicators that may be most relevant for the purpose of this study. The specific focus was on climate and biodiversity-related (that is, environmental) objectives to help financial markets respond to the triple crises from unprecedented debt levels, climate change, and nature-related risks. A combination of desk research and consultations with specialists was used to identify those data sources that might contain suitable indicators. The following criteria were used as a basis for identifying the potential indicators:

- **Diversity.** This report assesses and compares diverse indicators. The datasets in which the indicators were identified largely map into four categories: (a) goals, (b) outcomes, (c) policies, and (d) rankings and indexes, or a combination of these categories.
- **Relevance and materiality.** A critical first step is to ensure that the data source contains information that is relevant (for example, aligned with climate goals, sustainability goals, and biodiversity targets). It is also important to ensure the materiality of the outcome that is being measured. This is particularly important in the case of nature- and biodiversity-related activities, where transmission channels are not well understood and the economic (financial) impacts of the activity depend on the country's reliance on ecosystem services. For example, the recent World Bank report *The Economic Case for Nature* found that similar trends of environmental decline (which will result in similar KPIs)

can have very different impacts on macro, fiscal, and financial stability in different countries.¹⁹ The report suggests that the same scenario of collapse of selected ecosystem services (timber provision, carbon storage, pollination, and fisheries) has a much more dramatic impact on the economic performance of lower-income countries, whose economies depend relatively more on ecosystem services.

- **Transparency.** Transparency is critical when selecting KPIs and establishing market trust. For an investor to trust the information included in the KPIs, it is important that the information comes from a credible and reliable source. The datasets screened for the KPIs concentrate on information reported to (or by) an internationally recognized and reputable organization (for example, United Nations Framework Convention on Climate Change [UNFCCC]; Convention on Biological Diversity [CBD]; Food and Agriculture Organization of the United Nations [FAO]) and based on a commonly adopted methodology. Many of these organizations undertake their own additional arrangements to significantly enhance transparency and some include more comprehensive measurement, reporting, and verification (MRV) frameworks—including for data that are produced by governments themselves. For example, the UNFCCC formalizes transparency in the reporting of a country’s greenhouse gas emissions data using a combination of measures that include reporting requirements; submission processes; national communication and biennial reports; international assessment and review processes; GHG inventory review processes; report reviews; and multilateral assessments.²⁰
- **Sovereign.** The long list of potential indicators is focused at the level of sovereign states. Given the focus of this report on sovereign SLBs, the list of indicators identified in this report is more suited for monitoring overall performance at the national level.

¹⁹ See Justin Andrew Johnson et al., *The Economic Case for Nature: A Global Earth-Economy Model to Assess Development Policy Pathways* (Washington, DC: World Bank, 2021), <https://www.worldbank.org/en/topic/environment/publication/the-economic-case-for-nature>.

²⁰ See UNFCCC, “What Is Transparency and Reporting?,” <https://unfccc.int/process-and-meetings/transparency-and-reporting/the-big-picture/what-is-transparency-and-reporting>.

20. An initial list of 96 indicators was identified, with 50 chosen for analysis based on the abovementioned criteria. Of the 96 indicators, 21 were related to policy (or process) themes. For example, some of the policy indicators reflect the existence of national climate and environmental policies (such as countries with Nationally Determined Contributions, countries with National Biodiversity Strategy and Action Plans). Of the 96 indicators, 75 were related to outcome (or impact) themes. These include metrics associated with water, natural resources, renewable energy, energy efficiency, pollution, energy use, greenhouse gas emissions,²¹ marine area, forest area, mountain area, species, and finance. Figure 4 shows the types of screened datasets and the coverage of the key performance indicators. Appendix C shows the short list of data sources screened for indicators, a brief description of the data source, and the data source categories. Table 1 shows the long list of potential indicators.

21. The long list of potential indicators is dynamic and will need to be regularly updated. The list of indicators identified in this report is intended to be useful for a variety of international climate and biodiversity objectives and to inform dialogue on the broader development agenda, beyond sovereign SLBs. In this context, the long list provides a sample of diverse indicators suitable for consideration for sovereign SLBs linked to climate- and nature-related outcomes. However, the long list is neither definitive nor static. Modifications should be made to reflect the outcomes of ongoing climate change and biodiversity agreements (that is, upcoming UNFCCC and CBD Conferences of the Parties), and to reflect anticipated updates to the World Bank Sovereign Environmental, Social, and Governance Data Framework and the anticipated World Bank Country Climate and Development Report (CCDR).²² Biodiversity research work anticipated or concluded by organizations such as the International Union for Conservation of Nature (IUCN) (for example, the Species Threat Abatement and Recovery [STAR] Metric), The Nature Conservancy (TNC), UN Environment Programme World Conservation Monitoring Centre, and the Natural Capital Project (for example, InVEST software platform) should be consulted for emergent, nature-related KPIs. It would be beneficial if these organization could ensure that the metrics from these emerging datasets are transparent and robust enough to make them suitable for wider uses such as KPIs.

²¹ Note that greenhouse gas emissions cover various (IPCC classification) sectors: energy, industrial processes, solvent and other product use, agriculture, land use change and forestry, waste, other, CO₂ emissions from biomass, international bunkers, and multilateral operations.

²² The World Bank Group will develop a new Country Climate and Development Report (CCDR) to enhance climate analysis and policy in its programs, to identify and prioritize opportunities for climate action—including biodiversity and natural capital considerations—and to capture synergies between a country's national climate commitments and development objectives. This new diagnostic will be introduced in fiscal year 2022.

Table 1. Long List of Potential Indicators for Assessment

	Indicator	Sustainability theme	Indicator theme	Indicator metric	Data source	Data coverage	Data availability
1	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (%)	Natural capital	Natural resources	Percentage	FAO	Most countries	2000–2018
2	Adjusted savings: natural resources depletion (% of GNI)	Natural capital	Natural resources	Percentage	World Bank DataBank	Most countries	1990–2019
3	Adjusted savings: net forest depletion (% of GNI)	Natural capital	Natural resources	Percentage	World Bank DataBank	Most countries	1990–2020
4	Total natural resources rents (% of GDP)	Natural capital	Natural resources	Percentage	World Bank DataBank	Most countries	1970–2018
5	Proportion of population with access to electricity, by urban/rural (%)	Energy	Energy access	Percentage	UN statistics	Most countries	2000–2019
6	Proportion of population with primary reliance on clean fuels and technology (%)	Energy	Energy access	Percentage	UN statistics	Most countries	2000–2019
7	Renewable energy share in the total final energy consumption (%) ^a	Energy	Renewable energy	Percentage	UN statistics	Most countries	2000–2018
8	Energy intensity level of primary energy (megajoules per constant 2017 purchasing power parity GDP)	Energy	Energy intensity	Intensity	UN statistics	Most countries	2000–2018
9	Installed renewable electricity-generating capacity (watts per capita)	Energy	Renewable energy	Intensity	UN statistics	Most countries	2000–2019
10	PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	Energy	Pollution	Value	World Bank DataBank	Most countries	1990–2017
11	PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	Energy	Pollution	Percentage	World Bank DataBank	Most countries	1990–2017
12	Adjusted net savings, including particulate emission damage (% of GNI)	Energy	Pollution	Percentage	World Bank DataBank	Most countries	1990–2019
13	Electricity production from coal sources (% of total)	Energy	Fossil energy	Percentage	IEA statistics	Most countries	1990–2018
14	Energy imports, net (% of energy use)	Energy	Energy use	Percentage	IEA statistics	Most countries	1990–2018
15	Energy use (kilograms of oil equivalent per capita)	Energy	Energy use	Intensity	IEA statistics	Most countries	1990–2018
16	Fossil fuel energy consumption (% of total)	Energy	Energy use	Percentage	IEA statistics	Most	1990–2018

Striking the Right Note: Key Performance Indicators for Sovereign Sustainability-Linked Bonds

Indicator	Sustainability theme	Indicator theme	Indicator metric	Data source	Data coverage	Data availability	
					countries		
17	Renewable electricity output (% of total electricity output)	Energy	Renewable energy	Percentage	IEA statistics	Most countries	1990–2018
18	Country has Adaptation Communications (Yes/No)	Climate	Policy	Binary	UNFCCC	Select countries	2021
19	Country has a National Adaptation Plan (Yes/No)	Climate	Policy	Binary	UNFCCC	Select countries	2021
20	Country has a Nationally Determined Contribution (Yes/No)	Climate	Policy	Binary	UNFCCC	Select countries	2021
21	Party has a net-zero emission target	Climate	Policy	Binary	Climate Watch	Select countries	2020
22	Party has an economy-wide target in a national law or policy	Climate	Policy	Binary	Climate Watch	Select countries	2020
23	Party intends to enhance ambition or action in their NDCs	Climate	Policy	Binary	Climate Watch	Select countries	2020
24	Party has submitted long-term strategies	Climate	Policy	Binary	UNFCCC	Select countries	2020
25	Total greenhouse gas emissions without LULUCF for Annex I Parties (Mt CO ₂ equivalent)	Climate	Emissions	Value	UNFCCC	Most countries	1990–2019
26	Total greenhouse gas emissions without LULUCF for non-Annex I Parties (Mt CO ₂ equivalent)	Climate	Emissions	Value	UNFCCC	Most countries	2000–2018
27	Total greenhouse gas emissions from LULUCF for Annex I Parties (Mt CO ₂ equivalent)	Climate	Emissions	Value	UNFCCC	Most countries	1990–2019
28	Total greenhouse gas emissions from LULUCF for non-Annex I Parties (Mt CO ₂ equivalent)	Climate	Emissions	Value	UNFCCC	Most countries	2000–2018
29	Total greenhouse gas emissions per capita (Mt CO ₂ equivalent per capita)	Climate	Emissions	Intensity	UNFCCC	Most countries	1990–2019
30	Total greenhouse gas emissions per GDP (Mt CO ₂ equivalent per GDP)	Climate	Emissions	Intensity	UNFCCC	Most countries	1990–2019
31	Proportion of fish stocks within biologically sustainable levels (not overexploited) (%)	Biodiversity	Marine area	Percentage	UN statistics	Select countries	1974–2018
32	Average proportion of Marine Key Biodiversity Areas (KBAs) covered by protected areas (%)	Biodiversity	Marine area	Percentage	UN statistics	Most countries	2000–2019
33	Forest area (thousands of hectares)	Biodiversity	Forest area	Value	UN statistics	Most	2000–2020

Striking the Right Note: Key Performance Indicators for Sovereign Sustainability-Linked Bonds

	Indicator	Sustainability theme	Indicator theme	Indicator metric	Data source	Data coverage	Data availability
						countries	
34	Forest area as a proportion of total land area (%)	Biodiversity	Forest area	Percentage	UN statistics	Most countries	2000–2020
35	Land area (thousands of hectares)	Biodiversity	Land Area	Value	UN statistics	Most countries	2000–2020
36	Arable land (% of land area)	Biodiversity	Agriculture area	Percentage	World Bank DataBank	Most countries	1961–2018
37	Average proportion of Freshwater Key Biodiversity Areas (KBAs) covered by protected areas (%)	Biodiversity	Freshwater area	Percentage	UN statistics	Most countries	2000–2019
38	Average proportion of Terrestrial Key Biodiversity Areas (KBAs) covered by protected areas (%)	Biodiversity	Land area	Percentage	UN statistics	Most countries	2000–2019
39	Above-ground biomass stock in forest (tonnes per hectare)	Biodiversity	Forest carbon	Intensity	UN statistics	Most countries	2000–2020
40	Forest area annual net change rate (%)	Biodiversity	Forest area	Percentage	UN statistics	Most countries	2000–2020
41	Forest area under an independently verified forest management certification scheme (thousands of hectares)	Biodiversity	Forest area	Value	UN statistics	Most countries	2000–2020
42	Proportion of forest area under a long-term management plan (%)	Biodiversity	Forest area	Percentage	UN statistics	Most countries	2000–2020
43	Proportion of forest area within legally established protected areas (%)	Biodiversity	Forest area	Percentage	UN statistics	Most countries	2000–2020
44	Average proportion of Mountain Key Biodiversity Areas (KBAs) covered by protected areas (%)	Biodiversity	Mountain area	Percentage	UN statistics	Most countries	2000–2019
45	Countries that established national targets in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020 in their National Biodiversity Strategy and Action Plans (1 = Yes; 0 = No)	Biodiversity	Policy	Number	UN statistics	Most countries	2020
46	Countries with biodiversity values integrated into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting (1 = Yes; 0 = no)	Biodiversity	Policy	Number	UN statistics	Most countries	2006, 2014, 2017
47	IUCN Red List Index	Biodiversity	Species	Index	IUCN	Most	1993–2021

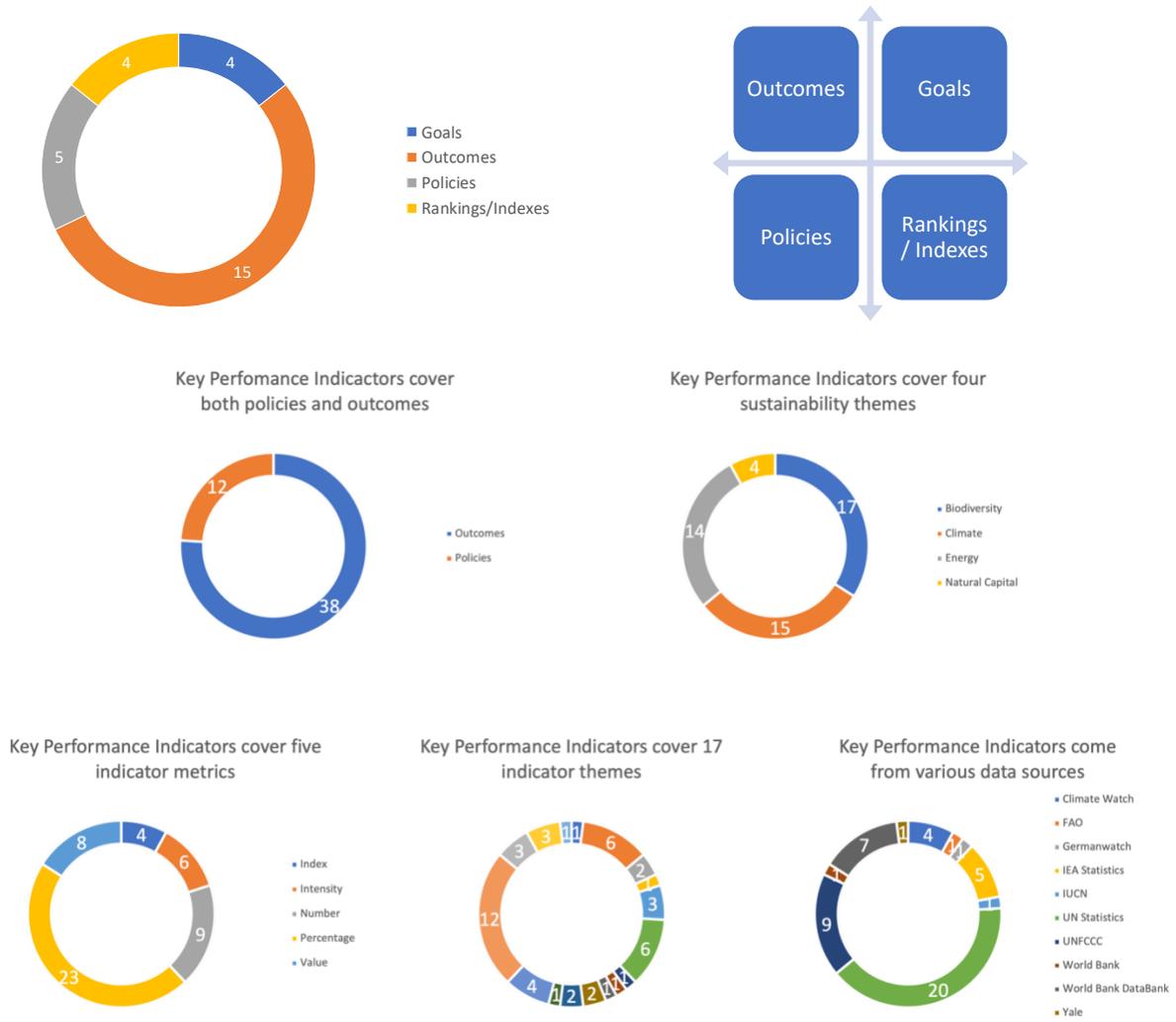
Striking the Right Note: Key Performance Indicators for Sovereign Sustainability-Linked Bonds

Indicator	Sustainability theme	Indicator theme	Indicator metric	Data source	Data coverage	Data availability	
48	RISE Score (2019)	Energy	Policy	Index	World Bank	Most countries	2010–2019
49	CCPI Ranking (2021)	Climate	Policy	Index	Germanwatch	Select countries	2021
50	EPI Ranking (2020)	Climate, biodiversity	Policy	Index	Yale	Most countries	2020

Note: Light green = indicator has the natural capital sustainability theme; yellow = indicator has the energy sustainability theme; orange = indicator has the climate sustainability theme; green = indicator has the biodiversity sustainability theme; blue = indicator has the index indicator metric. CCPI = Climate Change Performance Index; CO₂ = carbon dioxide; EPI = Environmental Performance Index; FAO = Food and Agriculture Organization of the United Nations; GDP = gross domestic product; GNI = gross national income; IEA = International Energy Agency; IUCN = International Union for Conservation of Nature; KBA = key biodiversity areas; LULUCF = land use, land-use change and forestry; Mt CO₂ = million metric tonnes of carbon dioxide; NDCs = nationally determined contributions; PM 2.5 = particulate matter 2.5 microns or smaller in size; RISE = Regulatory Indicators for Sustainable Energy; UN = United Nations; UNFCCC = United Nations Framework Convention on Climate Change; WHO = World Health Organization.

a. The IEA definition of *renewable energy* includes electricity and heat derived from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources.

Figure 4. Overview of the of Datasets: Four Categories and Characteristics of the 50 Key Performance Indicators Selected from the Datasets



Source: World Bank staff.

Note: The 17 indicator themes are agriculture area, emissions, energy access, energy intensity, energy use, forest area, forest carbon, fossil energy, freshwater area, land area, marine area, mountain area, natural resources, policy, pollution, renewable area, and species. FAO = Food and Agriculture Organization of the United Nations; IEA = International Energy Agency; IUCN = International Union for Conservation of Nature; UN = United Nations; UNFCCC = United Nations Framework Convention on Climate Change.

Box 2. NDC Partnership Mapping Standardized KPIs from Country Partnership Plans

The NDC Partnership recently undertook a similar indicator mapping exercise. The group reviewed the KPIs contained in 21 government-approved Partnership Plans to identify possible “standardized KPIs” that could streamline future development of Partnership Plans and signal potential areas for investment planning. The data were drawn from 21 government-approved Partnership Plans, featuring over 2,000 KPIs that had previously been tagged according to a number of criteria. The data were sorted by activity type (for example, “enacting and revising national strategies and plans,” “developing studies and analysis”) and key topic area (for example, “carbon markets and taxes,” “circular economies”). Potential standardized KPIs were identified where combinations of a particular activity type and topic area occurred more than 50 times.

The exercise identified 19 possible standardized KPIs; select combinations include:

- Enacting and revising policies and laws regarding energy efficiency.
- Developing studies/analyses to support (a) disaster risk reduction and (b) finance and investment.
- Preparing bankable projects and pipelines for (a) renewable energy, (b) energy efficiency, (c) disaster risk reduction, and (d) cities.

These initial results may serve as a basis for the development of standardized KPIs across broader development cooperation efforts.

Table B2.1. Activity Types and Key Topic Areas

Activity Type	Key Topic Area
Supporting gender balance	Carbon markets and taxes
Enacting and revising national strategies and plans	Circular economies
Enacting and revising policies and laws	Cities
Raising awareness and public education	Civil society
Developing capacity	Climate mainstreaming
Increasing intergovernmental coordination	Disaster risk reduction
Engaging stakeholders	E-mobility
Developing studies and analysis	Economic recovery
Developing or updating MRV/M&E systems and collecting data	Energy access and affordability
Sharing lessons and best practices	Energy efficiency
Participating in international exchanges and convenings	Equality and human rights
Financing projects and programs and mobilizing resources	Extractive industries
Integrating NDCs into national planning and budget and revenue streams	Finance and investment
Financing bankable projects and pipelines	Gender equality
	Health and wellbeing
	Jobs
	LTS
	NAPs
	NBS and ecosystem services
	NDC revision and enhancement
	Oceans and coasts

	Private sector REDD+ Renewable energy Rural development Subnational government SDGs
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Source: Personal communication from the NDC Partnership.

Note: LTS = long-term strategies; M&E = monitoring and evaluation; MRV = measuring, reporting, and verification; NAP = National Adaptation Plan; NBS = national biodiversity strategies; NDC = nationally determined contributions; REDD+ = reduce emissions from deforestation and forest degradation; SDG = Sustainability Development Goals.

Assessing Data Robustness

22. Several criteria were used to assess the wanted characteristics (or *robustness*) of the potential indicators. The assessment criteria are described in table 2.

Table 2. Criteria Used to Assess Data Robustness in the Context of KPIs for Sovereign SLBs

Assessment criteria	Description
Available	Data are available at a reasonable cost or publicly available for the foreseeable future.
Attributable	Data are plausibly associated with sovereign interventions (for example, national-level investment, national laws, and national regulations).
Frequent/recent	Data are current and produced with enough frequency (that is, at least once a year) so they can be adequately linked with financial incentives to promote sustainable performance.
Regular	Data are provided in sequence with equal intervals between them over a long period of time.
Comparable across countries	Data are available across most countries. Data within datasets are consistent and comparable (for example, reported using the same methods) across countries.

Note: KPI = key performance indicator; SLB = sustainability-linked bond.

23. Appendix D provides a preliminary assessment of the potential indicators' data quality based on the assessment criteria defined in table 2. The purpose of conducting this assessment is to better understand whether existing datasets can provide indicators that are robust enough to serve as KPIs for sovereign SLBs. The matrix in appendix 4 assesses whether indicators meet the data robustness

assessment criteria in table 2 using a traffic light system (that is, green means achieved, yellow means partially achieved, and red means not achieved). Note that the assessment is intended to be preliminary and high-level to serve as a basis for discussion.

24. Many of the indicators in the reviewed datasets are common to one or more of those datasets, which is an indication that the indicator is highly relevant. For example, datasets such as the Global Sustainability Development Goals (SDG) Indicator Database, Sovereign ESG Data Framework, World Bank World Development Indicators, and Climate Change Performance Index, and others include the indicator *Total greenhouse gas emissions per year*. This indicator and its associated subindicator sets (by sector, per capita, per gross domestic product) are clearly highly relevant—and in this case fundamental—for monitoring climate-related performance. Datasets including the Global SDG Indicator Database, Sovereign ESG Data Framework, World Bank World Development Indicators, and Aichi Biodiversity Targets include the indicator *Coverage of protected areas in relation to marine areas*. This indicator and its associated metric—*Average proportion of Marine Key Biodiversity Areas (KBAs) covered by protected areas (%)*—is clearly highly relevant for monitoring biodiversity-related performance. Care was taken to include these and other commonly used indicators in the potential long list of KPIs.

25. Timeliness is a key challenge for almost all datasets. For many of the time series indicators (for example, energy statistics from the International Energy Agency [IEA], GHG emissions from the UNFCCC), the latest year of reported data lags the present year—that is, 2018 data were reported in 2020, and 2019 data are reported in 2021. This convention allows countries time to verify national-level source data and time to prepare and submit reports to the relevant international climate and biodiversity bodies. However, in the context of designing financial instruments, these time lags might present a challenge for financial institutions that need more up-to-date and more frequent (that is, quarterly) information. In certain cases (for example, sectoral greenhouse gas emissions data), this challenge might be alleviated using proxy data (for example, recent effective emission factors—carbon dioxide equivalent [CO₂e] emissions per unit of production—for countries unlikely to experience significant changes in the sector and the sector’s unit process emissions) in combination with source data (for example, production data) that are reported more frequently. The borrower and investor might be able to use the approximate information in the interim and revise the information as the official information is reported. As shown in box 3, emerging technologies such as satellite data could be used to address the challenges of timely data in the future.

26. Many indicators cover a broad range of time horizons (for example, 20 to 30 years or more). Long time horizons could ensure that there is no misalignment between these KPIs and long-term policy goals and overall sustainability outcomes. Other indicators that cover shorter time horizons or provide point-in-time information (for example, policy indicators) are also available. A hybrid approach, including both longer-term outcome indicators aligned to shorter-term policy indicators at the implementation stage for sovereign SLBs, might broaden their appeal to capital markets, as this could potentially help ensure that long-term goals are achieved through real sovereign interventions rather than factors outside the government’s control.

27. Certain indicators for certain countries might not show significant change. Some of the indicators might change slowly over time and not demonstrate performance in the short term. For example, renewable electricity infrastructure (such as *Installed renewable electricity-generating capacity [watts per capita]*) requires substantial investment and can take a long time to set up, leading to slow progress in renewable electricity share (for example, *Renewable electricity output [% of total electricity output]*) and access to electricity (for example, *Proportion of population with access to electricity, by urban/rural [%]*). The same indicators (for example, *Proportion of population with access to electricity, by urban/rural [%]*) might be close to their maximum (or minimum) value for certain countries and not be able to show a noticeable improvement over time (that is, upper middle-income countries are near the maximum value). In these cases, country context is important when selecting appropriate indicators. That said, investments that demonstrate performance only after a significant period might still align well with long-term bond maturities. Pairing slow-to-change long-term outcome indicators with shorter-term policy indicators earlier in the life of an instrument might be appropriate in certain cases.

28. Another potential challenge is the lack of comparability across countries or time periods. For example, certain outcome-based indicators (for example, *Proportion of fish stocks within biologically sustainable levels*—SDG indicator 14.4.1)²³ use different methodologies for different countries, making the indicator suitable for checking countries' own progress over time but reducing the comparability of sustainability levels between countries.²⁴ Therefore, despite the importance of the related sustainable development goal (that is, *Conserve and sustainably use the oceans, seas, and marine resources for sustainable development*), including this indicator is likely inappropriate for monitoring performance in the context of sovereign SLBs. Furthermore, certain indicators (for example, ranking indexes) may not be comparable across time periods if the methodology is updated over time.

29. Equity and fairness issues are inherent for certain indicators. For example, for certain parties to the UNFCCC, the submission of certain climate-related information is optional. Least-developed countries and small island developing states are not required to provide long-term low emissions development strategies and Biennial Update Reports, which provide information on their GHG emissions.²⁵

30. A key prerequisite is to ensure that the indicators are available for the foreseeable future. Most of the indicators assessed in appendix D are from international development organizations such as the World Bank and United Nations, which are likely to continue to produce the data for the foreseeable future. However, in some cases (for example, in relation to ranking indexes produced by NGOs or

²³ See Sustainable Development Goals, Indicator 14.4.1—Proportion of fish stocks within biologically sustainable levels, <https://www.fao.org/sustainable-development-goals/indicators/1441/en/>.

²⁴ United Nations, SDG Indicator Metadata, last updated February 2021.

²⁵ GHG profiles—although not as detailed as National Communications, National Inventory Reports, or Biennial Update Reports—are available for nearly all Non-Annex I countries (except Andorra, Equatorial Guinea, Libya, Sierra Leone, and Somalia). Technical and financial support is available under the climate change convention for developing countries Parties for preparation of their National Communications and Biennial Update Reports. Such technical and financial support from the Convention or other actors might enable countries looking to monitor and benefit from their GHG emission performance to participate.

academic institutions), there may be less certainty as to whether indicators will continue to be produced in the medium or long run, if the production of the indicator is reliant on funding availability.

31. It is also challenging to ensure attribution for certain outcome-based indicators. Certain outcome-based indicators depend on factors beyond the government's control. For example, while government intervention could have a direct and significant impact on *PM2.5 air pollution* and *Total greenhouse gas emissions*, these outcomes will also largely depend on other factors such as economic activity (and transboundary air pollution). On the other hand, other outcome-based indicators such as *IUCN Red List indicators* may be affected by factors outside the government's control, such as climate change. Careful consideration is needed to use these indicators as KPIs for sovereign SLBs. Additional safeguard mechanisms may be required to ensure that these outcomes are truly a reflection of actual government intervention.

32. While policy-based indicators may be useful in addressing the abovementioned challenges with attribution, these indicators come with their own set of challenges. For instance, most policy-based indicators (for example, submitting a net-zero target or submitting a long-term strategy) entail a one-off binary assessment. This may be less suitable for instruments such as sovereign SLBs, where financial incentives are linked with sustainability performance over time. This report analyzed the potential relevance of climate prior actions that are used for the World Bank's Development Policy Financing projects. It was concluded that most of these indicators provide limited insights into what robust KPIs could look like for sovereign SLBs. This is because (a) prior actions are closely tailored to each country's background; (b) prior actions are mostly qualitative and are therefore hard to measure; and (c) prior actions are not globally benchmarkable and are therefore difficult to use for comparison between countries. Having said that, Development Policy Financing prior actions cover general themes that could inform the design of policy-based KPIs. These are further described in appendix 2.

33. Policy-based indicators should be further examined to ensure that the intent of the policies is to actively lead to climate and biodiversity performance benefits and that the policy documents outline how the countries intend to meet these policy commitments. It is important to avoid a situation where a country could propose a national policy to attract investors with no real intention of following through with concrete actions (or inaction resulting from changes in leadership). Examples of policy-based indicators include *Country has a nationally determined contribution; Party has a net-zero emission target; Party has an economywide target in a national law or policy; Party intends to enhance ambition or action in its Nationally Determined Contributions (NDCs); Party has submitted long-term strategies.* Complementary outcome-based indicators (for example, GHG emission intensities and totals) can be used to determine if the existence of a policy is achieving real and verifiable outcomes. Complementary indicators can also be used to avoid establishing perverse incentives. For example, complementary indicators might be used to assess whether a country is intentionally focused on nonrobust indicators to meet arbitrary targets while neglecting more robust (and likely harder to achieve) indicators that meet science-based targets. The existence of an enabling policy environment in the short term and the ability to monitor resultant outcomes over the mid to long term might align well with anticipated SLB maturity periods.

Box 3. Emerging Technologies

Satellite data and other emerging technologies could provide useful monitoring, reporting, and verification systems for important KPIs. There are several existing datasets that leverage the use of new technologies. However, much of this work is still emerging and may require further testing and analysis before considering its use as KPIs. Further analysis is also needed to ensure the applicability of new technologies in emerging markets and developing economies, which may lack the capacity or resources to implement these new frameworks. The following list provides key examples of datasets that rely on emerging technologies.

- Global Forest Watch (GFW) is an online platform that provides data and tools for monitoring forests. By harnessing cutting-edge technology, GFW allows anyone to access near real-time information about where and how forests are changing around the world. The platform includes over 100 global and local datasets covering forest change, land cover, land use, climate (that is, forest carbon), and biodiversity.
- The World Wildlife Fund (WWF) has a global intelligence platform—WWF-SIGHT—that aims to provide an up-to-date, high-level understanding of what is happening on the ground. This technology allows users to bring together diverse spatial datasets and combine them with satellite imagery to provide a near real-time, high-level understanding of the status of conservation assets around the globe.
- The System for Environmental Economic Accounting (SEEA) from the United Nations is a framework that integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment and the stocks and changes in stocks of environmental assets, as they bring benefits to humanity. It contains the internationally agreed-upon standard concepts, definitions, classifications, accounting rules, and tables for producing internationally comparable statistics, accounts, and indicators with many different potential analytical applications. The Artificial Intelligence for Environment and Sustainability (ARIES) for SEEA Explorer application enables users anywhere in the world to produce rapid, standardized, scalable, and customizable ecosystem accounts for their area of interest that are consistent with the SEEA Ecosystem Accounting framework. For example, ARIES can be used for spatial mapping and quantification of ecosystem services, spatial economic valuation of ecosystem services, and natural capital accounting at the local and national scale.

Source: Global Forest Watch, <https://www.globalforestwatch.org/>; WWF-SIGHT, <https://wwf-sight.org/>; System of Environmental-Economic Accounting (SEEA), <https://seea.un.org/>; Artificial Intelligence for Environment and Sustainability (ARIES), <https://aries.integratedmodelling.org/aries-for-seea-explorer/>.

Note: ARIES = Artificial Intelligence for Environment and Sustainability; GFW = Global Forest Watch; KPIs = key performance indicators; SEEA = System for Environmental Economic Accounting; WWF = World Wildlife Fund.

Interpreting Indicators and Ensuring Alignment with Country Context

34. Care should be taken when interpreting the information contained within the potential indicators as a measure of country-level performance. The type of country-level information contained in the indicators varies, but many indicators include annual time series (at various levels of disaggregation), proportional, or intensity information.

35. For time series data, the values for a particular year and the longitudinal trends should be assessed against the appropriate metric to determine performance. For example, the most recently available (for example, 2019) annual value (or the average of recent values) might be compared to a base year value (for example, 1990, 2000), or the trend in values might be compared to an appropriate baseline projection (for example, business as usual or a with policy or without policy scenario). In certain cases, the annual value or trend might be compared to a current or projected (for example, 2030, 2050) target. In

other cases, it might be sufficient for the annual value or trend (for example, *Forest area annual net change rate [%]*) to remain above (or below) a certain threshold (for example, remain above zero or positive) over a long period of time (for example, representing a reversal in deforestation). For specific time series indicators (for example, greenhouse gas emissions data), it might also be appropriate to compare the information against both nationally articulated targets (for example, in a country's NDC) as well as against targets and pathways consistent with international agreements (for example, the Paris Agreement commitment of limiting global warming to well below 2, preferably to 1.5 degrees centigrade, compared to preindustrial levels) or specific targets agreed between the investor and the borrower.

36. For proportional data (that is, percentage of a total), understanding that the proportional value as well as the absolute value is important. For example, a small (or large) percent change in area (for example, *Forest area as a proportion of total land area [%]*) might represent a large (or small) absolute change in area (for example, *Forest area (thousands of hectares)*) depending on the size (and characteristics) of the denominator (for example, total land area) for the country of interest.

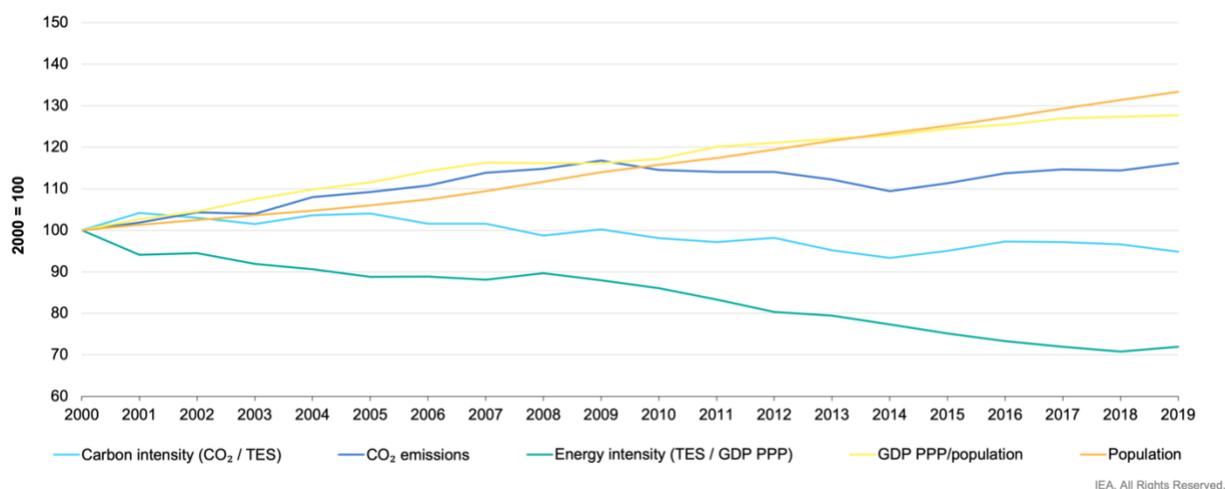
37. For proportional data (that is, percentage of a total), understanding the counterfactual indicator as well as the original indicator is important. For example, table 1 includes the indicators *Renewable electricity output (% of total electricity output)*, as well as *Electricity production from coal sources (% of total)*, and understanding the interplay between the two is important. A country might add both coal and renewable electricity capacity, but the rate of renewable expansion might be greater, resulting in a favorable increase in the renewable electricity output value, when a decline (to zero) in the coal value better aligns with science-based climate change goals.

38. For proportion data, contextualizing the indicator with other relevant data points might be important. For example, the *Renewable electricity output (% of total electricity output)* may need to be mapped against the total renewable resource availability in the country or resource availability in areas with grid connectivity depending on the specific country context.

39. For intensity data (for example, per capita, per GDP), understanding the trends in the underlying denominator (for example, population, GDP) and the sector is important to understanding what is driving the trend in the overall indicator. For example, figure 5 shows the total carbon dioxide emissions and drivers indexes for Australia as reported by the IEA. For 2000–2019, Australia shows a general decline in both carbon intensity (CO₂ emissions/total energy supply) and energy intensity (total energy supply/gross domestic product based on purchasing power parity), while absolute CO₂ emissions increased, driven by an increase in Australia's population and high level of emissions per person. The high level of emissions per person reflects the nation's heavy reliance on fossil fuels as a primary energy source and the dominant role of coal (an emissions-intensive fuel) in the production of electricity.²⁶ Note that some NDCs state targets in terms of emission intensity reductions. These emission intensity reductions may or may not equate to a declining trend in actual emission reductions depending on the underlying drivers for the country of interest.

²⁶ See Australia State of the Environment 2016, "Emission sources, Climate (2011)," <https://soe.environment.gov.au/theme/climate/topic/emission-sources>.

Figure 5 Total Carbon Dioxide Emissions and Drivers Indexes for Australia



Source: IEA, Energy and carbon tracker (2020 Edition), <https://www.iea.org/data-and-statistics/data-product/iea-energy-and-carbon-tracker-2020>.

Note: CO₂ = carbon dioxide; GDP = gross domestic product; PPP = purchasing power parity; TES = total energy supply.

40. Careful consideration of the baseline is needed when interpreting KPIs. For example, the baseline for the KPI may be incomplete or present a starting condition from which further change is difficult to measure. For example, some countries (for example, Bhutan) are carbon-negative countries. In this scenario, the measure of GHG emission may suggest limited movement because the baseline already represents a high level of climate achievement, even though these countries still require significant financing to maintain their carbon negative status.

41. Given these interpretation challenges, further verification will be needed. For example, it will be important to (a) consult with practitioners familiar with the country context and the information contained within indicators and (b) develop specific guidance so that the indicators are assessed correctly when determining a country’s sustainability-linked performance. There are several questions that one could ask to ensure alignment with country context:²⁷

- Is the intervention aligned with national sustainable development objectives? For example, in the case of climate interventions, is the intervention consistent with and supportive of existing long-term decarbonization targets and strategies? Does the intervention contribute to the government’s NDCs?
- Are KPIs already identified in national plans and documents? Do national documents—for example, original and updated NDC submissions—state increased goals and targets for which KPIs can be selected?
- What are the potential impacts of the intervention on broader development outcomes, beyond the sustainability-linked performance measured by the KPI (for example, employment, economic activity, technologies)?

²⁷ The World Bank Group’s “Proposed Sustainability Checklist for Assessing Economic Recovery Interventions” (April 2020) provides further examples of what questions could be asked when assessing alignment with country context.

- Could the intervention result in unintended negative consequences (for example, job losses, threats to indigenous communities or cultural heritages)? Are supplementary policies needed to safeguard against these concerns?
- Does the KPI reflect real efforts by the government? Does the government have a complementary, coordinated policy package to ensure that the predetermined sustainability outcome can be achieved?
- Were there unforeseen events (for example, extreme climate events) that may have led to underachievement of targets?
- Is the KPI applicable (that is, material) for a given country as well as in as many countries as possible to encourage widespread adoption? Does the sector or intervention outcome feature as a key component in macro or environmental diagnostics conducted by respected third parties (for example, World Bank Country Partnership Framework assessments, International Monetary Fund Article IV consultations, United Nations [UN] Environmental Programme environmental assessments)?
- Are nationally determined indicators more appropriate and acceptable to investors in certain circumstances?²⁸

Setting Targets

42. Once robust, context-based indicators are identified, it is important to ensure that the target is sufficiently ambitious to be taken seriously by the market, while at the same time is a reachable stretch for the country. Criticism has entered the corporate market that the targets are not sufficiently ambitious—and indeed some investors have stopped purchasing as a result.²⁹ Ambitious target setting will be even more important for the sovereign market for this asset class to develop at scale. There is an inevitable trade-off in target setting—with investors wanting to show the impact of their investments pushing for ambitious targets and governments wanting to set low, more achievable levels, to avoid the risk of nondelivery. At least initially, the market may find an equilibrium around modest but achievable targets, which will likely change and improve over time. It is also important to ensure that the target measures progress to staying within the planetary boundaries while meeting people’s basic needs.

43. A critical step is to identify ambitious targets and objectives for the individual indicators. Per the International Capital Markets Association (ICMA) Sustainability-Linked Bond Principles, SLBs incentivize the issuer’s achievement of material, quantitative, predetermined, ambitious, regularly monitored, and externally verified sustainability objectives through KPIs—and their related sustainability performance targets (SPTs). SPTs are measurable improvements in the key performance indicators to which issuers commit on a predefined timeline. SPTs should be ambitious, material, and where possible benchmarked and consistent with an issuer’s overall sustainability/ESG strategy.³⁰ Similar to the KPIs, the calculation methodologies for SPTs should be clear and transparent—that is, understandable to issuers, investors, and other stakeholders. The level of complexity should be minimized to the extent

²⁸ Internationally comparable indicators are anticipated to be preferred by investors to facilitate comparing and benchmarking. However, it is important to ensure that the KPIs selected are also aligned with and applicable to the national context.

²⁹ See Liberatore, “Sustainability-Linked Bonds.”

³⁰ See ICMA, “Sustainability-Linked Bond Principles Voluntary Process Guidelines,” June 2020, <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/>.

practicable and draw on external recognized reporting standards (for example, Global Reporting Initiative, GHG Protocol) when a clear calculation methodology is associated with such standards.

44. Table 3 shows potential options and examples for assessing the ambition of targets. Each approach has different pros and cons that the user should carefully consider. For example, emission reduction targets (such as those stated in a country’s NDC) based on a certain base year may not necessarily reflect actual government interventions if emission reduction was caused by nonpolicy factors (for example, COVID-19 pandemic, economic downturn). On the other hand, assessing alignment with the long-term Paris temperature goals may entail political sensitivities, given issues related to assessing a country’s “fair share” of emission reduction. Benchmarking with comparable countries may also face issues, given the difficulties in finding “comparable” countries, since each country’s national circumstances and priorities require nuanced considerations.

45. Interim targets might be appropriate for certain indicators. Given some long-term bond maturities (for example, 10 years), interim targets might be appropriate for selected indicators. For example, a 10-year bond including a KPI measuring the issuer’s share of renewable electricity generation could include several progressively more-challenging SPTs over the life (and/or tranches) of the bond.

46. Certain indicators will require additional screening to assess how well they contribute to sustainability performance objectives. For certain outcome-based indicators (for example, those indicators measuring the increase in the extent or proportion of protected areas), it is important to assess whether and how well these protected areas are actively managed. For example, the Global Environment Facility uses a variety of core and subordinate indicators when assessing projects, including measures of protected areas under improved management effectiveness and under improved management for the benefit of biodiversity. For policy-based indicators (for example, whether the country has submitted long-term strategies), it may be important to go beyond a yes or no binary assessment by considering how the countries state their increased ambition and actions, and what is included in the country’s long-term strategies.

47. Third-party advice may be needed to set SPTs. Overall, target setting can be a very subjective exercise, since there could be disagreements on how realistic the baseline is, and different ways of interpreting both ambition and adequacy of action based on the country’s development context and capability. There are also a variety of measures and metrics in which climate or environmental goals are expressed that could reduce the transparency and comparability across different actions. In these cases, an established third-party source of advice (for example, central facility, administrative unit, board, set of national experts) could help provide guidance.

Table 3. Potential Options and Examples for Assessing the Ambition of Target

Options	Examples	References
<i>Alignment with international agreed goals</i>	Intervention contributes to 1.5–2° C decarbonization pathways in all circumstances	<p><u>Climate Action Tracker</u> (CAT) compares emission pathways consistent with a long-term temperature goal with a country’s projected emissions. CAT relies on a “fair share” range to assess compatibility with the Paris goals.</p> <p>World Resources Institute published a paper <u>“Toward Paris Alignment,”</u> that highlighted the need to consider specific sector contexts. For example, all credible scenarios suggest that global emissions from electricity generation will have to go to zero by mid-century to meet the Paris 1.5° C goal.^a</p>
<i>Eligibility criteria</i>	Positive/negative list of sectors/technologies in alignment with climate mitigation and adaptation	<p><u>Inter-American Development Bank’s joint climate finance methodology</u> uses a positive list to define activities that can be counted toward each multilateral development bank’s respective climate finance targets.^b</p> <p>Alternatively, negative lists could also be used to exclude certain investments. For example, the World Bank Group stopped direct financing of new utility-scale coal-fired power projects in 2010.</p>
<i>Benchmarking with comparable countries</i>	Benchmark against the average of comparable countries (for example, G-20 average)	<p><u>Climate Transparency</u> produces annual country profiles to assess G-20 countries’ climate performance. These country profiles include more than 100 indicators that benchmark the country’s performance against the G-20 average on various fronts related to climate mitigation, adaptation, and finance.</p>

Striking the Right Note: Key Performance Indicators for Sovereign Sustainability-Linked Bonds

<i>Baseline targets</i>	Assess target compared to a predetermined baseline (for example, base year, business-as-usual scenario, with-/without-policy scenario)	Many countries' Nationally Determined Contributions use a baseline approach to assess ambition. Carbon crediting mechanisms also use baseline emissions to determine what the emission reduction would have been if the project was not implemented.
<i>Planetary boundaries</i>	Assess the level of biophysical resource use associated with meeting people's basic needs, and whether this level of resource use can be extended to all people without exceeding critical planetary boundaries ^c	<u>The website A Good Life For All Within Planetary Boundaries</u> compares the environmental and social performance of nations relative to a "safe and just" development space. The safe and just space framework argues that development should occur within a doughnut-shaped space where resource use is above the level required to meet people's basic needs, but below the level that carries a substantial risk of crossing the nine planetary boundaries. <u>MultiCapital Scorecard</u> includes a column for a Progression Performance Score (PPS). It indicates whether sustainability has been achieved for an individual Area of Impact; or if not, how it has progressed in its performance, either toward or away from it. PPS scoring utilizes a 7-point scale, ranging from a low score of -3 (3 or more years of regressive movement away from sustainability) to +3 (fully sustainable performance) in the year of interest.

Source: World Bank staff.

Note: C = centigrade; CAT = Climate Action Tracker; PPS = Progression Performance Score.

a. Gaia Larsen, Caitlin Smith, Nisha Krishnan, Lutz Weischer, Sophie Bartosch, and Hanna Fekete, *Toward Paris Alignment: How the Multilateral Development Banks Can Better Support the Paris Agreement* (Washington, DC: World Resources Institute, 2018).

b. African Development Bank; Asian Development Bank; Asian Infrastructure Investment Bank; European Bank for Reconstruction and Development; European Investment Bank; Inter American Development Bank; Islamic Development Bank; and World Bank; *2019 Joint Report on Multilateral Development Banks Climate Finance* (London: EBRD, August 2020). <http://dx.doi.org/10.18235/0002528>

c. Daniel W. O'Neill, Andrew L. Fanning, William F. Lamb, and Julia K. Steinberger, "A Good Life for All within Planetary Boundaries," *Nature Sustainability* 1 (2018): 88–95, <https://doi.org/10.1038/s41893-018-0021-4>.

Pricing of SLBs Based on KPI Performance

48. One question when considering KPIs is whether they are economically material—that is, whether it is possible to determine the economic or financial impact from meeting the goals set out in the SLB. This economic impact should in turn have a bearing on the pricing of the financial instrument—for example through transmission channels such as credit ratings, given sovereign bonds pricing can depend to a significant extent on a country’s credit rating.³¹

49. It may be possible to make the link between outcomes, economic impact—and ultimately market pricing—more directly with some KPIs than others. For example, this may be the case when GHG reductions can be measured, as carbon markets and pricing mechanisms (however imperfect) exist. However, putting an economic value on many of the other KPI outcomes (such biodiversity measures, water, or air quality) is still a developing science.³² Making a direct link between the economic impact of the KPI for a country and the pricing of the performance within an SLB will therefore need to be an art in the beginning—as is the case with the start of most new financial instruments. The payment discount that investors and third parties paying for performance will be prepared to offer will need to be negotiated and will develop over time. Initial attempts to determine a mathematical pricing framework for a sovereign SLBs have been made.³³ Further work is certainly warranted to explore how to price and trade bonds efficiently, as this will be key to ensuring the scalability of the market in the long run.

50. A country’s context in terms of debt sustainability will also need to be considered when issuing sovereign SLBs. Emerging market countries with a high cost of capital (and large natural capital resources to protect) are likely to be some of the most interested in these instruments. Ensuring that issuance does not further raise their debt burden will be important (for example, by linking to roll over of existing debt programs the instruments could be used to reduce the country’s overall cost of borrowing without increasing the debt stock, thereby contributing to an improvement in debt sustainability).

Box 4. Outstanding Research Questions Regarding Various Implementation and Pricing Issues

³¹ For further discussion of ESG impacts on sovereign credit ratings, see, for example, UN Principles for Responsible Investment, “A Practical Guide to ESG Integration in Sovereign Debt,” <https://www.unpri.org/fixed-income/a-practical-guide-to-esg-integration-in-sovereign-debt/4781.article>.

³² For developing methodologies on economic and financial impact of nature degradation, see, for example, World Bank, “Mythbusters: Uncovering Nature’s Economic Value” (World Bank, news article, June 30, 2021), <https://www.worldbank.org/en/news/feature/2021/06/30/mythbusters-uncovering-natures-economic-value>.

³³ Bouzidi and Papaioannou, in their recently published paper on sovereign sustainability-linked bonds, seek to provide a framework to bridge the gap between corporate and sovereign SLBs. They suggest “a framework to choose KPIs and Sustainability Performance Targets for a country . . . based on the ESG financial risk materiality and the macroeconomic impact of KPIs linked to Sustainability Development Goals (SDGs).” Abstract, p. 1. They also discuss other considerations relevant to sovereign SLBs, such as political cycles, maturity periods, incentives and penalties, moral issues, SPT ambition, data quality, responsibility for poor performance, contributions to global impact, and other targets not in SLBs. The paper includes a mathematical framework for SLB pricing, which creates an SPT default probability formula, assuming independence between SPT default and credit default, with approximation error quantified through Monte Carlo modeling. Abdeldjellil Bouzidi and Denis Papaioannou, “Sovereign Sustainability-Linked Bonds—Opportunities, Challenges and Pricing Considerations” (September 7, 2021), SSRN, <http://dx.doi.org/10.2139/ssrn.3919159>.

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As no pilot sovereign SLB issues have yet been issued, and extensive market sounding has not yet taken place, this report was not able to research and answer the following questions. These questions will, however, be interesting and important to consider if and when a market begins to develop.

- What are the relevant lessons from existing KPIs that are used by corporate sustainability-linked bonds? How will SLBs at the sovereign level compare to and differ from SLBs at the corporate level?
- What is the appropriate number of KPIs to link to a sovereign SLB? What type of issuer considerations and type of sovereign consideration influence the structure of a SLB? What tradeoffs are evident when balancing fewer indicators and related targets for simplicity against several indicators and targets to ensure environmental integrity?
- How might sovereign SLBs instruments be designed? How few or many KPIs and related targets need to be met to receive an incentive from an investor? Should an index be formed for the selected KPIs against which to track progress? How might an index address the issues of subjectivity and income bias?
- How has the corporate SLB market handled the challenge of data timeliness? What is the average time lag that payments are based on?
- Is there anything to learn from the sustainability loan market? Have any sovereign loans been priced here?
- Is the market sophisticated enough to push for indicators with ambitious targets? Are markets likely to significantly reward entities that are high achievers? Will a sovereign issuer ever be overly ambitious on the target given their circumstances (timeframes, political cycles, risk of noncompliance, and other complexities)?
- Do ambitious targets create a trade-off by attracting certain investors but presenting higher risk of noncompliance? Are more modest but achievable targets appropriate in the short term?
- Are interim targets useful from a pricing point of view?
- How will sovereign SLB prices offer enough incentive to overcome or offset the cost of compliance? How will smaller incentives make the asset class look to civil society groups and other onlookers and stakeholders?
- Would investors prefer standardized or bespoke indicators?
- Would investors accept normative assessments on country performance on climate- and biodiversity-related topics made by institutions such as the World Bank?
- Would issuers be willing to link their debt to the same normative assessments or would they prefer tailored KPIs?
- Which category of indicator will be easier to assess and incorporate into pricing?

- How efficient will the resultant sovereign SLB market be for each category of indicator?

Source: Authors

Note: KPI = key performance indicators; SLB = sustainability-linked bonds.

Concluding Remarks and Recommendations

51. Selecting the appropriate type and number of KPIs will be important for sovereign SLBs.

Adopting a (small) number of complementary indicators (for example, policy with outcome indicators, outcome indicators with indexes) could convey more complete performance-related information and might be suitable for sovereign SLBs. Even then, care should be taken to recognize and address persistent challenges (for example, the need for including safeguards and avoidance of gaming indicator selection, perverse incentives, and disadvantaging lower-income countries). For comparison, the appropriate number of KPIs linked to a corporate SLB is widely discussed in the market and depends on the type of issuer and the type of KPIs in mind. Fewer targets allow for a more focused sustainability story and transition, which can be easier to communicate to (and will encourage) investors, while several targets can combine different aspects of sustainability into one solution.³⁴

52. When designing performance-linked financial instruments, time lags in the indicator data might present the most significant challenge, because financial institutions are used to more up-to-date and more frequent information.

It will be important to establish methods to define acceptable reporting periods and to determine how and when to credit sustainable performance. Without good data, there cannot be effective target setting, appropriate indicator selection, or acceptable verification. This is a highly solvable problem. A huge amount of work has been done on developing timely data in recent years, and the methods exist to resolve most of the challenges around robustness and timeliness of data. Barriers that remain are largely a function of institutional inertia and lack of capacity and resources.³⁵

53. Risks and barriers should be assessed, and including and monitoring safeguards (for example, assessments of social and governance indicators) should be undertaken.

Supplementary assessments might be needed to ensure that the selected KPIs do not lead to unintended adverse impacts. For example, an increase in a country's *Proportion of population with access to electricity* indicator might have negative impacts if the electricity options require significant increases in the *Electricity production from coal sources* indicator rather than increases in the *Renewable electricity output* indicator. Further assessment might also be needed to understand how the country-level KPIs could adequately measure national sustainable performance and reflect any significant supranational or subnational circumstances or constraints.

54. Partnering and validating with key stakeholders at the national level will likely be a key step when selecting appropriate KPIs. These stakeholders will include key line ministries, civil society

³⁴ See Nordea Open Insights, "Lessons from the Infant Sustainability-Linked Bond Market."

³⁵ The Data for Now initiative, run jointly by the World Bank, UN Statistics Division, Global Partnership for Sustainable Development Data, and Sustainable Development Solutions Network, works with governments, academia, and private sector partners around the world to institutionalize robust and timely data solutions within national data systems, <https://www.data4sdgs.org/data4now>.

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groups, investors, credit reporting agencies, multilateral organizations, NGOs, and indigenous organizations. The stakeholders can identify the relevant KPIs from the potential long list, identify other country-specific performance indicators not on the potential long list, and collect and report relevant performance indicator data as appropriate.

55. Consulting with investor organizations and financial advisory firms will help inform options for implementation of and pricing for sovereign SLBs. Conducting further desk research and consulting with these stakeholders can provide insights and answer outstanding research questions regarding various implementation and pricing issues (see box 4).

56. Examining the emerging academic literature will be important when designing and implementing a framework for sovereign SLBs. Reviewing the available literature and engaging academics publishing on sovereign SLBs can provide information and guidance on how to design and implement a framework for sovereign SLBs.

57. Supporting efforts to develop suitable outcome metrics and the necessary underlying datasets for biodiversity will bridge the gap between measures to protect ecosystems (that is, establish protected areas) and the actual results and value of biodiversity protection. The integration of biodiversity valuation into national accounting and reporting systems would allow access to better indicators for nature-related objectives (see SEEA in box 3).

58. Third-party, independent advice for establishing KPIs and STPs for sovereign issues may help to launch the market for these instruments. Designing and implementing a universally accepted framework that uses KPIs to determine sustainability performance at the national level, as well as establishing a credible measuring, reporting, and verification (MRV) process for the selected KPIs will be necessary for investor confidence. Using existing indicators can help reduce the MRV burden for small debt offices. However, third-party assistance in selecting KPIs and setting targets, as well as monitoring that indicators are not being gamed will still be necessary. Existing MRV processes in operation at the World Bank and other multilateral development banks could also be leveraged. The cost of MRV might be funded through debt issuance, by performance payment source, or by technical assistance.

59. For private placements—and for other instruments (such as debt for climate and nature swaps)—a *bottom-up approach* where investors, local stakeholders, and others get involved with KPI selection and target setting with the issuer bilaterally and earlier also seems suitable (see box 5).³⁶

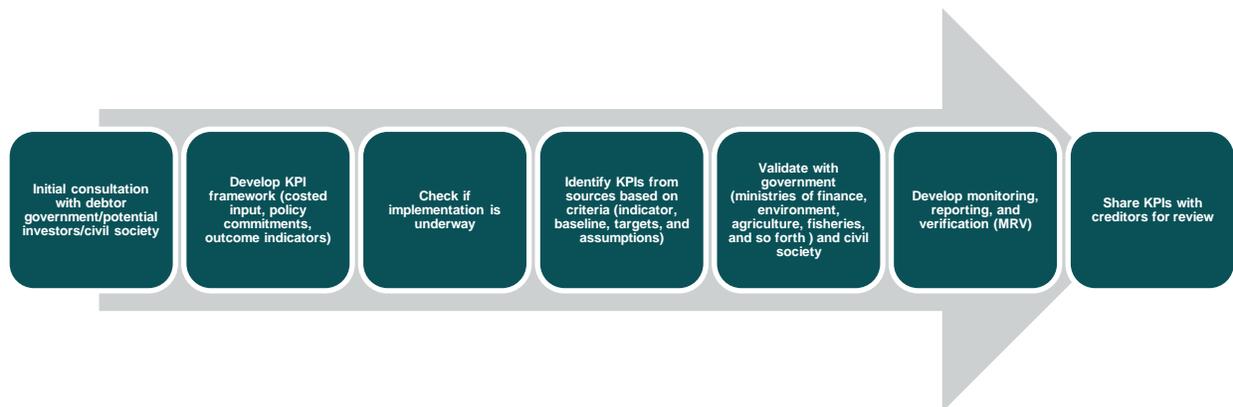
³⁶ See the work on climate and nature program swaps from the International Institute for Environment and Development (IIED) at “Tackling the Debt, Climate and Nature Crises Together,” <https://www.iied.org/tackling-debt-climate-nature-crises-together>.

Box 5. Alternative Process for SLBs

While this report outlines a top-down approach to KPI setting, using existing indicators—an alternative, bottom-up approach—may be appropriate for some SLBs and other instruments (for example, private placement bonds, debt swaps).

Figure B5.1 gives an initial idea of a potential process for developing KPIs for sovereign SLBs as outlined by the International Institute for Environment and Development. This development process could be further assessed and tested in the next phase of work. Protocols will be needed to facilitate the measurement and reporting of sustainable performance at the national level. Verification should ideally leverage existing independent domestic and independent international verifiers to the extent possible. Domestic verifiers might include civil society groups or participatory citizens. International verifiers might include those used by established funds—for example, the Green Climate Fund for climate resilience and renewable energy and the Global Environmental Facility for biodiversity—and carbon markets and results-based climate finance programs (e.g., REDD+) for greenhouse gas emission mitigation.

Figure B5.1. Potential Process for Developing KPIs for Sovereign SLBs



Source: Authors based on personal communication from the International Institute for Environment and Development.

Note: KPI = key performance indicators; MRV = measuring, reporting, and verification; REDD+ = reduce emissions from deforestation and forest degradation; SLB = sustainability-linked bonds.

60. Establishing a global platform or administrative or research unit for sovereign SLBs might help with conducting research, consulting with stakeholders, improving data collection, maintaining and updating KPIs, coordinating pilot studies, overseeing implementation, and providing a third-party source of advice to investors. Currently, data to verify sustainability and social commitments by governments, such as the United Nations’ Sustainable Development Goals, are verified by governments themselves through their national statistics offices and reported to the United Nations or multilateral bodies such as the World Bank. To be acceptable to financial markets, those bodies may need to be complemented by a further verification process, either through a single expert body mandated to perform this

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role or an agreed upon process with input from academia and other expert bodies. Discussions to establish a global platform on scaling finance for climate and nature action are underway. Further consultations and analytical work could help explore how such an entity could take on this role of supporting the development of a sovereign SLB market, among other activities.

61. Having a neutral party support or endorse the selected KPI could add legitimacy and credibility. An independent body could also help periodically review the efficacy of KPIs and convene a wide set of stakeholders to provide inputs to the development and update of KPIs. However, moving forward, it will be important to further explore the nature of this platform or unit (the team composition, governance framework, and so forth) to ensure that it is truly independent and can meet the needs of sovereign SLBs. A central group of experts who could be drawn upon to provide such opinions could be established and housed in an existing organization or initiative or in a new one (such as the aforementioned global platform).³⁷

Moving toward Implementation

62. Several practical next steps could be taken to further explore the use of KPIs for sovereign SLBs. To develop a robust sovereign SLB market, work is needed on two levels: first, top down work is needed to improve metrics and data over time to solve some of the shortcomings in the global KPIs currently available (drawing on initiatives with broader data improvement goals); second, bottom up work will come from experimentation in pilot countries, addressing practical implementation challenges, which in turn can inform further development of the data work. A phased approach is proposed starting with consultation, experimentation, and pilot studies; building capacity over time; and facilitating learning-by-doing ahead of formalization and standardization. Such an approach aligns with the long-term vision of this work, which is to help financial markets tackle unprecedented debt levels, while reaching climate- and nature-related goals.

63. These next steps include the following. Through the proposed global platform, the World Bank could work with other partners (including academic and NGO research partners, financial institutions, and other multilateral development banks) to determine which partner is best placed to do the following:

- *Identify ambitious targets and objectives for the individual indicators.* Identify how acceptable levels of performance might be set for each of the indicators in the potential long list. Are there certain levels of improvement or thresholds that need to be met, or are there certain trends that need to be reversed? If a particular target datum (for example, by 2020) for a particular indicator target (by 2020, conserve at least 10 percent of coastal and marine areas) has been missed, what level of increased ambition is necessary, and what is an acceptable timeframe to achieve that ambition?

³⁷ As an example, the World Bank leverages independent assessments produced by Climate Transparency when conducting climate diagnostics. The key value-add of Climate Transparency is that the consortium is a global partnership, composed of 14 well-recognized research organizations from different G-20 countries and funded by different major organizations. This example suggests that the involvement and support of a wide range of stakeholders could be a potential way to reduce subjectivity and ensure independence, although further research is needed to assess the applicability of such approach in the context of SLBs.

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- *Identify the primary sources of the indicator data, and identify the individuals and organizations responsible for updating the data.* Identify and communicate with the individuals and organizations responsible for updating the indicator data to determine if and how timelier indicator (or proxy) data might be obtained and if and how the indicator data might be better processed or presented to measure sustainable performance. The responsible parties should be in a position to say whether or not the indicator's data sufficiently accounts for regional disparities in data collection and management (particularly for time series data) and whether there are significant omissions in the dataset (or methods to estimate values) for particular countries that might benefit the most from sovereign SLBs.
- *Conduct assessments of the materiality of the individual indicators.* Assess the economic materiality of each of the indicators in the potential long list, including discussion of how KPIs relate to higher order socioeconomic objectives (for example, economic prosperity, macrofinancial stability). Quantifying the relationships between KPIs and higher order economic outcomes is difficult. However, explaining why a particular indicator matters (that is, the pathways through which changes in the KPI affects economic variables) would be useful for investors.
- *Organize discussion sessions with internal and external experts responsible for developing KPIs.* Discuss the potential long list of KPIs and the findings from this report with relevant Global Practices and regional teams within the World Bank, as well as relevant external experts working on this topic (for example, Climate Policy Initiative, Climate Transparency, GermanWatch, IIED, IUCN). These discussions could provide an opportunity to request feedback from sector teams on how to update the potential long list of KPIs. Outreach should also be carried out with experts who are developing new indicators (particularly in relation to nature and biodiversity objectives, which often lack the needed outcome-based indicators).
- *Organize workshops with investor organizations and financial advisory firms.* Convene a workshop with relevant investor organizations and financial advisory firms (for example, Potomac Group) interested in this topic.
- *Consult with investors.* Partner with investors to discuss different options for linking KPIs to the payment clauses for sovereign sustainability-linked bonds to effectively incentivize sustainable performance.
- *Consult with regional working groups.* Conduct consultations with relevant regional working groups (for example, Association of Southeast Asian Nations, Asia-Pacific Economic Cooperation, Bureau of East Asian and Pacific Affairs) and national experts on sustainable finance focused on capital markets and metrics.
- *Conduct pilot studies.* Any resultant performance-based framework should be tested with investors and borrowers to assess robustness in selected countries. Select certain countries as pilot studies to illustrate how the potential list of KPIs could be applied in practice to measure national climate or environmental performance. Questions asked might include the following: Is the

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number of KPIs sufficient to cover national circumstances? Are supplemental indicators or assessments needed? Do complementary sets of KPIs show the expected trends? Are there significant data gaps for the selected country? Are significant activities implemented by the government reflected in the indicators? The selected countries for the pilot studies should be diverse in nature (for example, in terms of economic structure, climate, and environmental objectives) to demonstrate how the KPIs could be applicable across diverse policy environments and context. The pilot-study process should elaborate on which countries are more likely to benefit from SLBs not only for environmental reasons (that is, those countries with higher carbon intensity or larger biodiverse ecosystems) but also from a financial perspective.

- *Update the potential long list of KPIs.* Update the potential long list of KPIs to reflect the outcomes of ongoing climate change and biodiversity agreements (that is, upcoming UNFCCC and CBD Conferences of the Parties) to reflect anticipated updates to the World Bank Sovereign Environmental, Social, and Governance Data Framework and to reflect recommendations from data providers, internal and external stakeholders, and pilot studies.
- *Identify risks and barriers.* Assess potential risks and barriers inside and outside the financial sector that could inhibit the implementation of sovereign SLBs, particularly in emerging markets, developing economies, and small island developing states. The assessment might include market and political risks, poor legal and regulatory conditions, and insufficient institutional capacity.
- *Identify the cost of compliance associated with sovereign SLBs.* Partner with the investors and borrowers from the pilot studies to assess the cost (for example, identify the types and amounts involved) to comply with the requirements of a sovereign SLB. Like the cost of MRV, the cost of compliance might also be funded through debt issuance, by performance payment source, or by technical assistance.
- *Share knowledge with stakeholders.* The World Bank—for example through the proposed global platform—and other stakeholders working on these issues should facilitate and share knowledge from the various consultations and pilot studies, and share lessons learned as the market develops.

Appendix A. Complementary Environmental Assessments Supporting KPI Settings

- **World Bank Safeguard Policies and the Environmental and Social Framework (ESF)** enable the bank and borrowers to better manage environmental and social risks of projects and to improve development outcomes.
- **The World Bank Country Policy and Institutional Assessment (CPIA)** assess the conduciveness of a country's policy and institutional framework to poverty reduction, sustainable growth, and the effective use of development assistance. The CPIA enters the calculation of country performance ratings that, since 1980, have been used to allocate International Development Association (IDA) resources to eligible client countries.
- **The United Nations Development Program (UNDP) Nationally Determined Contribution (NDC) Support Program** is preparing risk-informed, sectoral investment plans and prospectuses and private sector engagement strategies to support NDC financial resource mobilization strategies.
- **The Paulson Institute**, the Nature Conservancy, and the Cornell Atkinson Center for Sustainability at Cornell University set out the economic case for financing biodiversity and looked at how much is currently spent and how much is needed annually in the next 10 years to protect the most important biodiversity and the ecosystem services it provides.
- **The United Nations Development Program (UNDP) Biodiversity Finance Initiative (BIOFIN)** develops evidence-based Biodiversity Finance Plans and supports countries in implementing finance solutions to reach their national biodiversity targets.
- **The Task Force on Climate-Related Financial Disclosures (TCFD) and the Task Force on Nature-Related Financial Disclosures (TNFD)** are both working to provide a framework for corporations and financial institutions to assess, manage, and report on their dependencies and impacts on climate and nature, respectively, aiding in the appraisal of climate- and nature-related risk and the redirection of global financial flows away from climate- and nature-negative outcomes and toward climate- and nature-positive outcomes.
- **The World Wildlife Fund (WWF) Climate and Nature Sovereign Index (CNSI)** is based on an innovative framework that uses real-time and forward-looking indicators to assess long-term risks relating to climate change and nature loss at a country level. Such a framework should not only help achieve a more robust integration of environmental risk in the sovereign debt asset class but also help countries in designing appropriate policy and institutional mechanisms that can make their borrowing more attractive and sustainable in the long term.
- **The International Capital Market Association (ICMA) publishes the Sustainability Bond Guidelines (SBG)**, updated as of June 2021. The guidelines cover the Green Bond Principles (GBP), together with the Social Bond Principles (SBP), the Sustainability Bond Guidelines (SBG), and the Sustainability-Linked Bond Principles (SLBP). The principles are a collection of voluntary frameworks with the stated mission and vision of promoting the role that global debt capital markets can play in financing progress toward environmental and social sustainability. The Climate Transition Finance Handbook acts as additional guidance for issuers seeking to utilize green bonds, sustainability bonds or sustainability-linked bonds for the achievement of their climate transition strategy.
- **S&P Global Ratings** and other credit rating agencies monitor comparative statistics (for example, sovereign risk indicators) for rated sovereigns. An interactive version of the S&P Global Sovereign Risk Indicators can be found at www.spratings.com/SRI.

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Source: World Bank staff.

Note: BIOFIN = Biodiversity Finance Initiative; CNSI = Climate and Nature Sovereign Index; CPIA = Country Policy and Institutional Assessment; ESF = Environmental and Social Framework; GBP = Green Bond Principles; ICMA = International Capital Market Association; IDA = International Development Association; KPI = key performance indicators; NDC = Nationally Determined Contribution; SBG = Sustainability Bond Guidelines; SBP = Social Bond Principles; SLBP = Sustainability-Linked Bond Principles; TCFD = Task Force on Climate-Related Financial Disclosures; TNFD = Task Force on Nature-Related Financial Disclosures; UNDP = United Nations Development Program; WWF = World Wildlife Fund.

Appendix B. Climate Policy Themes Based on World Bank Lending Climate Prior Actions

Agriculture, Fishing, and Forestry

- Establish appropriate criteria for the classification of protection areas.
- Adopt measures to prevent and control deforestation and other environmental issues across federal and state levels.
- Enact policies to protect territorial waters from illegal exploitation and degradation of marine ecosystems.
- Promote agricultural research.
- Set up an electronic distribution system for subsidized agricultural inputs to improve transparency, targeting, monitoring, and evaluation.

Education

- Establish a results-based budgeting program for education.
- Improve the selection and training process for teachers and school staff.
- Enhance physical, environmental, and social protection at education facilities.
- Revise criteria on where new teachers are assigned to improve education provided in underserved areas.
- Set up a periodic standardized national evaluation of learning outcomes.
- Improve quality and accessibility of textbooks.
- Expand early childhood care.

Energy and Extractives

- Support the scale-up of renewable energy generation.
- Facilitate an institutional reform of the sector focused on customer service, billing optimization, improved collection rates, and loss reduction.
- Set regulations for public-private partnerships in the sector.
- Revise the electricity tariff schedule.
- Update the regulatory framework for cross-border electricity trade.
- Transition to automated customer and bill management.
- Increase transparency in financial reporting.

Financial Sector

- Establish guidelines for banking regulators with regards to sustainable finance practices.
- Incentivize digital payment methods.
- Strengthen the legal framework of the sector to enhance data protection.
- Boost financial inclusion.
- Attract private investors by aligning the legal financial framework with international standards.
- Establish disaster-risk finance mechanisms.
- Strengthen insolvency and creditor rights.

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Health

- Enhance the assignment of health personnel across regions.
- Simplify customs procedures for the importation of materials and medicines.
- Increase access to family planning assistance for women.
- Incentivize vaccination by making it a condition for school enrollment.
- Increase import duties on tobacco, alcohol, sugary beverage products, and so forth.
- Adopt clinical protocols and pharmacotherapeutic guidelines to rationalize the use of expensive drugs to contain public spending.

Industry, Trade, and Services

- Update capital market regulations to provide a framework for a commodities exchange market.
- Modernize the customs code to increase transparency and accountability of customs decisions and procedures and to facilitate international trade.
- Adopt environmental and social sustainability requirements for construction and housing.
- Improve the business environment by reducing bureaucracy.
- Enact laws to support small family businesses by providing financial and technical assistance.
- Invest in information and communications technologies.
- Create an action plan focused on closing the gender gap in internet access.
- Promote open internet access to underserved urban and rural areas by attracting private investment.
- Incentivize telecom operators to expand mobile networks, strengthen regulations for them, and allow foreign firms to operate.
- Promote the use of electronic payment and digital platforms by reducing barriers.
- Enhance cyber security laws.

Public Administration

- Adopt more efficient and transparent budget laws.
- Increase government transparency and establish an internal audit unit focused on independence, audit planning, risk assessment, and periodic reporting.
- Establish clear prioritization criteria for public investment projects.
- Impose mandatory use of competitive bidding to avoid corruption.
- Implement tax reform.
- Establish investor facilitation services to attract private investment into the country.

Social Support

- Establish and enhance nationwide cash transfer in addition to or instead of a social housing program.
- Improve social and fiscal sustainability of the social benefit system by reviewing lifetime benefits awarded.
- Introduce laws and regulations to prevent violence against women.
- Establish and enhance a temporary unemployment scheme.
- Adopt measures to regularize the legal status of irregular migrants.
- Incentivize microfinance lending.

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Transportation

- Review national policies to do the following:
 - Reduce logistics costs and improve efficiency of foreign trade operations.
 - Improve regional and urban mobility to promote sustainable public transport and nonmotorized modes of transport, as well as increase road networks and improve maintenance.
 - Promote the use of electric vehicles through financial and nonfinancial incentives.
 - Allow private sector investment.

Water, Sanitation, and Waste Management

- Establish programs to increase access to basic water services.
- Strengthen the institutional sector framework.
- Launch support programs for water resources management, including disaster management and climate change adaptation.
- Establish waste management regulations.
- Adopt regulations on groundwater protection and improve sand-mining management and river-works planning to protect water sources.
- Increase the financial viability of the sector.

Appendix C. Datasets Screened

Dataset	Description	Category			
		Goals	Outcomes	Policies	Rankings/indexes
<u>Global SDG Indicators Database</u>	This is a database of available global, regional, and country data and metadata for the SDG indicators.	•	•		
<u>Sovereign ESG Data (Environmental Pillar)</u>	This platform can be used for discovering available data relevant to sovereign ESG analysis and decision making.		•		
<u>UNFCCC GHG Data</u>	This data interface provides access to the most recent GHG data reported by countries that are Parties to the Climate Change Convention.		•		
<u>NDC Registry Data</u>	NDCs communicated by Parties are recorded in a public registry maintained by the secretariat.	•	•	•	
<u>Climate Watch Platform</u>	This online platform enables users to compare the NDCs under the Paris Agreement, access historical emissions data, leverage climate goals to achieve sustainable development objectives, and use models to map new lower carbon pathways .	•	•	•	
<u>Aichi Biodiversity Targets</u>	This data is drawn from the online sixth national reports related to the status of implementation of each global target. Examples of measures and outcomes are drawn respectively from post-COP10 NBSAPs and sixth national reports from each UN region.	•	•	•	
<u>Climate Transparency</u>	The proposed KPIs are taken from Climate Transparency annual reports and country profiles.		•		•
<u>World Bank RISE Framework (Energy)</u>	RISE scores reflect a snapshot of a country’s policies and regulations in the energy sector, organized by the three pillars of sustainable energy: energy access, energy efficiency, and renewable energy.			•	•

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Dataset	Description	Category
<u>IIED KPI Framework</u>	This research paper and presentation suggest possible performance indicators for countries at the intersection of indebtedness, climate vulnerability, biodiversity loss, and limited access to credit that would benefit from debt for climate and nature program swaps.	•
<u>IUCN STAR Metric</u>	The STAR metric is calculated from data on the distribution, threats, and extinction risk of threatened species derived, for example, from the IUCN Red List of Threatened Species	•
<u>World Database on Protected Areas (WDPA)</u>	This is the most comprehensive global database on terrestrial and marine protected areas.	•
<u>Global Forest Watch (GFW)</u>	GFW is an online platform that provides data and tools for monitoring forest change, land cover, land use, climate, and biodiversity.	•
<u>FAOSTAT</u>	FAOSTAT provides free access to food and agriculture data for over 245 countries and territories and covers all FAO regional groupings.	•
<u>International Energy Agency (IEA)</u>	IEA collects, assesses, and disseminates energy statistics on supply and demand, compiled into energy balances in addition to several other key energy-related indicators, including energy prices; public research, development, and demonstration; and measures of energy efficiency, with other measures in development.	•

Source: World Bank staff.

Note: ESG = environmental, social, and governance; FAOSTAT = Food and Agriculture Organization of the United Nations data; GFW = Global Forest Watch; GHG = greenhouse gas; IEA = International Energy Agency; IIED = International Institute for Environment and Development; IUCN = International Union for Conservation of Nature; KPI = key performance indicator; NBSAPs = National Biodiversity Strategies and Action Plans; NDC = Nationally Determined Contribution; RISE = Regulatory Indicators for Sustainable Energy; SDG = Sustainability Development Goal; UN = United Nations; UNFCCC = United Nations Framework Convention on Climate Change; WDPA = World Database on Protected Areas.

Appendix D. Preliminary Assessment of the Robustness of Potential Indicators

Potential indicator	Available	Attributable	Frequent/recent	Regular	Comparable across countries
Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (%)	Data publicly available and produced by FAO.	Level of water stress depends on nonpolicy factors (for example, climate change/ natural disasters).	Most recent data point is from 2018.	Data were only produced from 2000 onward.	Most countries are covered.
Adjusted savings: natural resources depletion (% of GNI)	Data publicly available and produced by World Bank.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent data point is from 2019.	Data were produced from 1990 onward.	Most countries are covered.
Adjusted savings: net forest depletion (% of GNI)	Data publicly available and produced by World Bank.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent data point is from 2020.	Data are produced from 1990 onward.	Most countries are covered.
Total natural resources rents (% of GDP)	Data publicly available and produced by World Bank.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent data point is from 2019.	Data are produced 1970 onward.	Most countries are covered.
Proportion of population with access to electricity, by urban/rural (%)	Data publicly available and produced by the UN.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, population growth).	Most recent data point is from 2019.	Data are produced from 2000 onward.	Most countries are covered.
Proportion of population with primary reliance on clean fuels and technology (%)	Data publicly available and produced by the UN.	Regulation will have a direct and significant impact, but outcome may	Most recent data point is from 2019.	Data are produced from 2000 onward.	Most countries are covered.

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		also depend on other factors (for example, population growth).			
Renewable energy share in the total final energy consumption (%)	Data publicly available and produced by the UN.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent data point is from 2018.	Data are produced from 2000 onward.	Most countries are covered.
Energy intensity level of primary energy (megajoules per constant 2017 purchasing power parity GDP)	Data publicly available and produced by the UN.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent datapoint is from 2018.	Data are produced from 2000 onward.	Most countries are covered.
Installed renewable electricity-generating capacity (watts per capita)	Data publicly available and produced by the UN.	Regulation will have a direct and significant impact on the outcome.	Most recent datapoint is from 2019.	Data are produced from 2000 onward.	Most countries are covered.
PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	Data publicly available and produced by the World Bank.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent data point is from 2017.	Data are produced from 1990 onward.	Most countries are covered.
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	Data publicly available and produced by the World Bank.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent data point is from 2017.	Data are produced from 1990 onward.	Most countries are covered.
Adjusted net savings, including particulate emission damage (% of GNI)	Data publicly available and produced by the World Bank.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example, economic activity).	Most recent data point is from 2019.	Data are produced from 1990 onward.	Most countries are covered.

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Electricity production from coal sources (% of total)	Data publicly available and produced by the IEA.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2017.	Data are produced from 1990 onward.	Most countries are covered.
Energy imports, net (% of energy use)	Data publicly available and produced by the IEA.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity). Indicator may not reflect sustainability interventions.	Most recent data point is from 2018.	Data are produced from 1990 onward.	Most countries are covered.
Energy use (kilogram of oil equivalent per capita)	Data publicly available and produced by the IEA.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2018.	Data are produced from 1990 onward.	Most countries are covered.
Fossil fuel energy consumption (% of total)	Data publicly available and produced by the IEA.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2018.	Data are produced from 1990 onward.	Most countries are covered.
Renewable electricity output (% of total electricity output)	Data publicly available and produced by the IEA.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2018.	Data are produced from 1990 onward.	Most countries are covered.
Country has adaptation communications (Yes/No)	Data publicly available and produced by countries via UNFCCC.	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on when countries produce their adaptation communications.	This is a one-off binary assessment.	Coverage depends on whether the country has produced an Adaptation Communication.
Country has an adaptation plan (Yes/No)	Data publicly available and produced by countries via UNFCCC.	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on when countries produce their National Adaptation Plan.	This is a one-off binary assessment.	Coverage depends on whether the country has produced a National Adaptation Plan.
Country has a Nationally Determined Contribution (Yes/No)	Data publicly available and produced by countries via UNFCCC.	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on when countries produce their NDCs.	This is a one-off binary assessment.	Coverage depends on whether the country has produced a NDC.

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Party has a net-zero emission target	No official centralized system for documenting targets, but Climate Watch voluntary takes stock of this information.	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on when countries produce their net zero targets.	This is a one-off binary assessment.	Coverage depends on whether the country has produced a net zero target.
Party has an economy-wide target in a national law or policy	No official centralized system for documenting targets, but Climate Watch voluntary takes stock of this information.	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on when countries produce their national law/policy.	This is a one-off binary assessment.	Coverage depends on whether the country has produced a national law/policy.
Party intends to enhance ambition or action in their NDCs	No official centralized system for documenting targets, but Climate Watch voluntary takes stock of this information.	“Intention” to enhance ambition or action in NDC may be subject to change. Does not reflect actual intervention.	Recency depends on when countries announce their intention.	This is a one-off binary assessment.	Coverage depends on whether the country has announced its intention.
Party has submitted long-term strategies	Data publicly available and produced by countries via UNFCCC.	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on when countries submit LTS	This is a one-off binary assessment.	Coverage depends on when the country submits the LTS.
Total greenhouse gas emissions without LULUCF for Annex I Parties (Mt CO ₂ equivalent)	Data publicly available and produced by countries via the UNFCCC.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2019.	Data are produced from 1990 onward.	Most countries are covered.
Total greenhouse gas emissions without LULUCF for non-Annex I Parties (Mt CO ₂ equivalent)	Data publicly available and produced by countries via the UNFCCC.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2018.	Data are produced from 2000 onward.	Most countries are covered. MRV may vary across countries depending on capacity levels.
Total greenhouse gas emissions from LULUCF for Annex I Parties (Mt CO ₂ equivalent)	Data publicly available and produced by countries via the UNFCCC.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example	Most recent data point is from 2019.	Data are produced from 1990 onward.	Most countries are covered.

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		economic activity).			
Total greenhouse gas emissions from LULUCF for non-Annex I Parties (Mt CO ₂ equivalent)	Data publicly available and produced by countries via the UNFCCC.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2018.	Data are produced from 2000 onward.	Most countries are covered. MRV may vary across countries depending on capacity levels.
Total greenhouse gas emissions per capita (Mt CO ₂ equivalent per capita)	Data publicly available and produced by countries via the UNFCCC.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2019.	Data are produced from 1990 onward.	Most countries are covered. MRV may vary across countries depending on capacity levels.
Total greenhouse gas emissions per gross domestic product (Mt CO ₂ equivalent per GDP)	Data publicly available and produced by countries via the UNFCCC.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2019.	Data are produced from 1990 onward.	Most countries are covered. MRV may vary across countries depending on capacity levels.
Average proportion of Marine Key Biodiversity Areas (KBAs) covered by protected areas (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2019.	Data are produced from 2000 onward.	Most countries are covered.
Forest area (thousands of hectares)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.
Forest area as a proportion of total land area (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.

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Land area (thousands of hectares)	Publicly available and produced by UN	Indicator may not reflect government intervention for sustainability.	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.
Arable land (% of land area)	Data publicly available and produced by World Bank.	Indicator may not reflect government intervention for sustainability.	Most recent data point is from 2018.	Data are produced from 1961 onward.	Most countries are covered.
Average proportion of Freshwater Key Biodiversity Areas (KBAs) covered by protected areas (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2019.	Data are produced from 2000 onward.	Most countries are covered.
Average proportion of Terrestrial Key Biodiversity Areas (KBAs) covered by protected areas (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2019.	Data are produced from 2000 onward.	Most countries are covered.
Above-ground biomass stock in forest (tonnes per hectare)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example climate change).	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.
Forest area annual net change rate (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.
Forest area under an independently verified forest management certification scheme (thousands of hectares)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.
Proportion of forest area under a long-term management plan (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.
Proportion of forest area within legally established protected areas (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2020.	Data are produced from 2000 onward.	Most countries are covered.
Average proportion of Mountain Key Biodiversity Areas (KBAs) covered by protected areas (%)	Data publicly available and produced by UN.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2019.	Data are produced from 2000 onward.	Most countries are covered.

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Countries that established national targets in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020 in their National Biodiversity Strategy and Action Plans (1 = Yes; 0 = No)	Publicly available and produced by countries via UN	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on the country.	A one-off binary assessment	Coverage depends on the country.
Countries with integrated biodiversity values in national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting (1 = Yes; 0 = No)	Data publicly available and produced by countries via UN.	Sovereign governments will have a direct and significant impact on the outcome.	Recency depends on the country.	A one-off binary assessment	Coverage depends on the country.
Proportion of fish stocks within biologically sustainable levels (not overexploited) (%)	Data publicly available and produced by the FAO.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example economic activity).	Data is produced every 2 years. Most recent data point is from 2017.	Data are produced from 1974	Methodology varies across countries which reduces comparability.
IUCN Red List Index	Index publicly available and produced by NGO. Unclear whether it will be available permanently/for the foreseeable future.	Regulation will have a direct and significant impact, but outcome may also depend on other factors (for example climate change).	Most recent data point is from 2021.	Data are produced from 1993. Unclear whether data are comparable across different time periods as ranking methodology may change over time	Most countries are covered.
RISE Score (2019)	Score publicly available and will be available and continually updated by the World Bank.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2019. RISE data are available every 2 years. 2021 data will be available by July/September 2022.	Data are produced from 2010 onward. RISE scores are always recalculated according to the most recent methodology so they are comparable across years dating back to 2010.	Most countries are covered.
CCPI Ranking (2021)	Ranking publicly available and produced by NGO. Unclear whether it will be available permanently/for the	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2020.	Data are produced from X [[AQ: Add correct data.]] onward. Unclear whether data are comparable across	Most countries are covered.

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	foreseeable future.			different time periods as ranking methodology may change over time.	
EPI Ranking (2020)	Ranking publicly available and produced by academic institution. Unclear whether it will be available permanently/for the foreseeable future.	Regulation will have a direct and significant impact on the outcome.	Most recent data point is from 2020.	Data is produced from X [[AQ: Add correct data.]] onward. Unclear whether data are comparable across different time periods as ranking methodology may change over time.	Most countries are covered.

Source: Authors

Note: Green = achieved, orange = partially achieved, red = not achieved. CCPI = Climate Change Performance Index; CO₂ = carbon dioxide; EPI = Environmental Performance Index; FAO = Food and Agriculture Organization of the United Nations; GDP = gross domestic product; GNI = gross national income; IEA = International Energy Agency; IUCN = International Union for Conservation of Nature; KBA = key biodiversity areas; LTS = long-term strategies; LULUCF = land use, land-use change and forestry; Mt CO₂ = million metric tonnes of carbon dioxide; MRV = measuring, reporting, and verification; NDCs = nationally determined contributions; NGO = nongovernmental organization; PM 2.5 = particulate matter 2.5 microns or smaller in size; RISE = Regulatory Indicators for Sustainable Energy; UN = United Nations; UNFCCC = United Nations Framework Convention on Climate Change; WHO = World Health Organization.

