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The Landscape of Sustainability Risk Integration

The current state of sustainability risk management practices in banks

June 2026

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About the Risk Centre

The UNEP FI Risk Centre is a UN centre-of-expertise that provides financial institutions with a coherent and practical approach to systematically integrate sustainability considerations into their existing risk management frameworks and practices.

Launched in 2024 at the World Economic Forum (WEF) meeting in Davos by Inger Andersen, Executive Director of UNEP, the Risk Centre undertakes research and develops knowledge resources to inform various aspects of sustainability risks. The Risk Centre works closely with financial institutions, academic institutions, data providers, modellers, tool developers, regulators and other stakeholders to create actionable insights and practical resources chiefly for risk professionals within banks and insurers.

The Risk Centre develops tools, methodologies and guidance to help financial institutions understand how sustainability factors affect prudential risk and provides practical support irrespective where they are on their sustainability risk integration journey.

More information about the Risk Centre can be found here: unepfi.org/risk-centre/.

About this report

Sustainability risks—spanning climate, nature, pollution, and social dimensions—are increasingly recognized as financially material drivers of prudential risk in the banking sector. This report presents a snapshot of the current state of sustainability risk integration in banks globally, drawing on a consultation with 28 UNEP FI member banks across five regions conducted in April and May 2026, supplemented by supervisory stocktakes, thematic reviews, and industry surveys published between December 2023 and May 2026. It begins by surveying the regulatory landscape. The evidence shows that climate risk remains the most advanced area of both regulation and bank practice. In comparison, nature risk is emerging, while pollution and social risks fall largely outside dedicated prudential frameworks. Within banks, structural foundations are now widely in place; governance is the most mature element of risk management, while risk monitoring and reporting are the least advanced. Credit risk is the primary entry point for integration across all sustainability risk types, whereas market and liquidity risk integration remains at an early stage. Data constraints are the dominant barrier, cited by 75 per cent of consulted banks as their primary implementation challenge. Over 90 per cent of consulted banks indicated that a structured reference framework would benefit their integration efforts. This report establishes the evidence base for the UNEP FI Risk Centre's *Approach to Sustainability Risk Integration*, which provides a coherent pathway for embedding sustainability risks into existing prudential risk management frameworks.

Acronyms and abbreviations

AME	Africa and Middle East
AMF	Autorité des Marchés Financiers (Québec, Canada)
APAC	Asia-Pacific
APRA	Australian Prudential Regulation Authority
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht (German Federal Financial Supervisory Authority)
BCBS	Basel Committee on Banking Supervision
BNM	Bank Negara Malaysia
BoE	Bank of England
CBUAE	Central Bank of the UAE
CCSBSO	Central American Council of Superintendents of Banks, Insurance and Other Financial Institutions
CFRC	Climate Financial Risk Center
CISL	Cambridge Institute for Sustainability Leadership
CMN	Conselho Monetário Nacional (Brazil's National Monetary Council)
CRD VI	Sixth Capital Requirements Directive (EU)
CRR	Capital Requirements Regulation (EU)
DNB	De Nederlandsche Bank (Dutch Central Bank)
EBA	European Banking Authority
ECB	European Central Bank
ECCB	Eastern Caribbean Central Bank
ECL	Expected Credit Loss
EMDEs	Emerging Markets and Developing Economies
EP / EP4	Equator Principles (Fourth Edition)
EPC	Energy Performance Certificate
ESG	Environmental, Social and Governance
ESMS	Environmental and Social Management System
ESRB	European Systemic Risk Board
ESRS	European Sustainability Reporting Standards
EU	European Union
FINMA	Swiss Financial Market Supervisory Authority
FSB	Financial Stability Board
GARP	Global Association of Risk Professionals
GDP	Gross Domestic Product
GHG	Greenhouse Gas
HKMA	Hong Kong Monetary Authority

IASB	International Accounting Standards Board
ICAAP	Internal Capital Adequacy Assessment Process
IFC	International Finance Corporation
IFRS	International Financial Reporting Standards
ILAAP	Internal Liquidity Adequacy Assessment Process
ILO	International Labour Organisation
IMF	International Monetary Fund
ISSB	International Sustainability Standards Board
KRIs	Key Risk Indicators
LCR	Liquidity Coverage Ratio
MAS	Monetary Authority of Singapore
MNB	Magyar Nemzeti Bank (Central Bank of Hungary)
NGFS	Network for Greening the Financial System
NSFR	Net Stable Funding Ratio
OECD	Organisation for Economic Co-operation and Development
OJK	Otoritas Jasa Keuangan (Indonesian Financial Services Authority)
OSFI	Office of the Superintendent of Financial Institutions (Canada)
PBOC	People's Bank of China
PCAF	Partnership for Carbon Accounting Financials
PRA	Prudential Regulation Authority (UK)
PRB	UN Principles for Responsible Banking
PSI	Principles for Sustainable Insurance
SARB	South African Reserve Bank (Prudential Authority)
SDGs	Sustainable Development Goals (UN)
TCFD	Task Force on Climate-related Financial Disclosures
TISFD	Taskforce on Inequality and Social-related Financial Disclosures
TNFD	Taskforce on Nature-related Financial Disclosures
TPT	Transition Plan Taskforce
UNEP FI	United Nations Environment Programme Finance Initiative
VaR	Value at Risk
WEF	World Economic Forum

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Executive summary

Sustainability risks have become a mainstream prudential concern. Climate shocks, nature loss, pollution, and social pressures are affecting markets, asset values, and financial stability, and regulators worldwide are tightening expectations for how banks identify, measure, and manage these risks. The UNEP FI Risk Centre defines sustainability risks as environmental and social conditions or events that, if they occur, can cause significant negative impacts on a financial institution and its counterparties. Sustainability risk is not a stand-alone risk category but rather a transversal driver and amplifier of established prudential risk types—credit, market, liquidity, operational, and reputational—across short-, medium-, and long-term horizons. This framing shapes where integration should occur (namely, within existing risk strategy, governance, materiality assessment, appetite, and reporting processes) and aligns with the prevailing direction of supervisory frameworks.

This report assesses the extent of that integration across the global banking sector. It draws on three evidence streams: a consultation with the UN Environment Programme Finance Initiative's (UNEP FI) 28 member banks across five regions conducted in April and May 2026; stocktakes and thematic reviews published by banking supervisors and international bodies; and industry surveys published between December 2023 and May 2026.

The regulatory landscape. Sustainability-related prudential regulation follows four broad approaches across jurisdictions: mandatory requirements embedded in hard law; supervisory guidance and expectations; preparatory and capacity-building work; and, in a limited set of countries, no explicit national requirements. Three characteristics define the current body of regulation: an initial emphasis on disclosure as a foundation for supervision and market discipline; a forward-looking orientation through scenario analysis and stress testing; and a growing emphasis on transition planning as a supervisory and corporate law requirement.

Regional maturity does vary. Europe appears to be the most advanced, with the EBA having embedded sustainability into prudential frameworks and the ECB enforcing expectations through binding supervisory decisions. Asia-Pacific supervisors—notably APRA, MAS, and the HKMA—have issued comprehensive guidance, with MAS publishing nature risk expectations in 2026. Regulatory frameworks in Africa and the Middle East, and Latin America and the Caribbean, range from nascent to active, with South Africa, Brazil, and the Eastern Caribbean among those with formal prudential standards. North America presents a mixed picture, with only Canada having established formal supervisory expectations.

Across all regions, climate risk is the primary regulatory priority. Nature risk is advancing in disclosure and scenario analysis while pollution and social risks remain largely subsumed within broader environmental or environmental, social, and governance (ESG) definitions. Voluntary frameworks continue to establish concepts later codified in supervisory expectations.

Current practices in banks. The consultation reveals a sector that has moved beyond whether to integrate sustainability risk and is instead grappling with how to deepen implementation. Nearly three-quarters (71 per cent) of consulted banks have adopted a sustainability risk integration framework and a further 25 per cent plan to introduce one. Yet banks with frameworks in place are more likely

to report integration difficulty than those still considering such a framework, suggesting that the challenge intensifies as implementation deepens.

Across six elements of risk management that were considered, governance is the most mature, with 61 per cent of respondents reporting largely or fully integrated arrangements; risk monitoring and reporting is the least advanced at 46 per cent. Across prudential risk types, credit risk is the clear frontrunner: 22 per cent of banks report full integration across all sustainability risk types, reflecting both supervisory pressure and the central role of credit portfolios as the main transmission channel. Market and liquidity risk lag substantially, with roughly half of responses indicating no integration; constraints include unspecified transmission channels and, for liquidity, a structural time-horizon mismatch between short-term metrics and long-term risk drivers.

Across sustainability risk types, the integration of climate risk is more advanced than that of other sustainability risks among consulted banks, with transition risk slightly ahead of physical risk: Nature risk is the least integrated, with 62–64 per cent of respondents not integrating it across prudential risk types or doing so only minimally. Pollution risk shows notable performance in credit risk, where 29 per cent of banks report large or full integration, reflecting the direct link between pollution-related liabilities and borrower creditworthiness. Social risk remains largely qualitative, mostly integrated in credit and non-financial risk frameworks through due diligence and conduct controls rather than embedded prudential processes.

Challenges and the case for a structured approach. Data constraints are the dominant barrier, cited by 75 per cent of consulted banks. Of banks using third-party data providers and tools, 57 per cent report challenges in translating outputs into measurable financial metrics and 50 per cent in integrating them with existing models. Banks' most sought-after resources are metrics and key risk indicators (KRIs) (75 per cent), toolkits and training materials (46 per cent each), and examples of risk appetite framework (39 per cent). There is a need for more practical guidance and tools for using extant sustainability risk data in risk management practices.

The trajectory of the past 25 years—from ad hoc environmental due diligence to structured prudential discipline—demonstrates why a systematic approach to integration is now needed. Sustainability risks are interconnected and system-wide. As such, a siloed, topic-by-topic approach cannot capture their shared transmission channels. Over 90 per cent of consulted banks believe current practices would benefit from a structured reference framework. The UNEP FI Risk Centre's forthcoming *Approach to Sustainability Risk Integration* is intended to meet that demand, providing a clearer and more structured path that runs from foundational commitment through to operational embedding.

1. Introduction

Sustainability risks are reshaping the conditions under which banks operate. Climate shocks, nature loss, pollution, and social tensions are already affecting markets, asset values, and the stability of financial systems. The World Economic Forum's Global Risks Report 2026 (WEF, 2026) confirms that decision makers now rank sustainability risks among the most significant threats of our time: i.e. not as distant or theoretical concerns, but as immediate, material, and financially transmissible risks. Bank regulators around the world have drawn the same conclusion and are tightening their expectations for how financial institutions identify, measure, and manage these risks accordingly.

For financial institutions, responding to sustainability risks is not just about meeting regulatory requirements; it is also about building resilience and protecting shareholder value. Banks that integrate sustainability risks into their core risk management frameworks will be better able to protect capital, navigate change, and remain competitive. However, the process of integration is not straightforward. Sustainability risks unfold over varied time-horizons, with potentially non-linear and indirect impacts, and with high levels of uncertainty in measurements and modelling. Moreover, climate, nature, pollution, and social issues intersect in ways that do not map neatly into existing risk categories. Resource scarcity, supply-chain vulnerabilities, waste externalities, and geopolitical pressures linked to resource dependency and linear production models[1] are also increasingly influencing the sustainability risk landscape currently faced by banks.

This report provides a snapshot of the extent to which the banking sector has integrated sustainability risk into day-to-day prudential risk management. It starts with a review of regulatory requirements and supervisory expectations, and then describes how banks around the world are meeting these. The report provides a distillation of regulatory and supervisory trends, stocktakes and thematic reviews of banking practices, and insights from UNEP FI member banks. It offers an evidence-based view of how sustainability risk is increasingly being integrated into day-to-day prudential risk management and outlines leading practices and current challenges.

1 UNEP FI defines linear business models as those that rely on the extraction of finite resources, the production of goods, and the disposal of materials as waste, rather than keeping products and materials in use through reuse, repair, remanufacturing, or recycling.

2. Definition of sustainability risk

The UNEP FI Risk Centre defines sustainability risks as environmental and social conditions or events that, if they occur, can cause significant negative impacts on a financial institution and its counterparties. This is not a stand-alone risk category, but a driver and amplifier of traditional financial risk types, including credit, market, liquidity, operational, and reputational risk—across short-, medium-, and long-term horizons.

Sustainability risks are deeply interconnected and mutually-reinforcing. For example, climate change accelerates nature loss through rising temperatures and via more frequent and extreme weather events, while nature loss undermines climate resilience by degrading the ecosystems that absorb carbon and buffer communities against physical impacts. Meanwhile, both climate change and nature loss can drive social disruption, by displacing people, causing food insecurity, and destroying livelihoods. This can increase liability exposure for banks, while governance failures can compound these dynamics by delaying necessary responses.

Sustainability risk is treated as a transversal risk rather than a stand-alone risk. That is, environmental and social factors are considered drivers and amplifiers of established prudential risk types rather than as a new risk category that sits alongside them. From this vantage point, sustainability does not introduce a separate risk universe but changes the severity, timing, and distribution of familiar risks. For instance, climate transition could drive credit risk through the impairment of carbon-intensive assets or generate market risk through repricing, whereas nature degradation may affect collateral values and operational resilience.

This framing has two implications. First, it shapes where and how sustainability considerations are embedded across the framework—namely, into existing risk strategy, governance, materiality assessment, appetite, and reporting processes, rather than into parallel structures. Second, it aligns the upcoming *UNEP FI Risk Centre's Approach* to *Sustainability Risk Integration* with the prevailing direction of supervisory frameworks, which also treat sustainability as a driver of existing risk categories.

In addition, this framing motivates the UNEP FI Risk Centre's primary objective, which is to help financial institutions integrate sustainability considerations systematically into existing risk management frameworks and practices. It encourages a comprehensive approach to sustainability that recognizes the interconnections across sustainability themes, such as climate change, nature loss and degradation, pollution, and social issues. The insights from its work help deepen the understanding of how sustainability themes link to one another and how they transmit into traditional risk types. This includes capturing interactions across sustainability themes and understanding how they influence specific risk transmission channels.

3. Sustainability risk: regulatory requirements and supervisory expectations

This section provides an overview of prudential regulatory developments across regions, alongside a survey of guidance and analytical work published by international and multilateral bodies.

Sustainability-related implications on prudential risks, such as the environmental and social factors that can impair banks' capital adequacy, liquidity, or operational resilience, have become a mainstream regulatory priority across many parts of the world. Central banks and financial regulators increasingly recognize that climate change, environmental degradation, and social factors can give rise to material credit, market, operational, and systemic risks (NGFS, 2025). Alongside climate-related considerations, wider transition dynamics linked to critical materials dependencies, waste externalities, and resource efficiency are increasingly shaping discussions about longer-term economic resilience and sustainability-related financial risk transmission.

While approaches differ by jurisdiction and level of market development, a set of clear regulatory trends is emerging. Across countries, four broad approaches to sustainability-related prudential regulation can be seen: (1) mandatory requirements embedded in hard law and binding prudential rules; (2) supervisory guidance and explicit expectations; (3) preliminary and preparatory work, including capacity-building; and (4) no national regulation or explicit supervisory guidance. These are not discrete phases, as jurisdictions are evolving their approaches to include new elements of sustainability risks. For example, a country may have supervisory guidance for climate risks, while doing preliminary work on nature risks.

Table 1: Broad approaches to sustainability-related prudential regulation globally

1. Mandatory requirements (hard law & binding prudential rules)	2. Supervisory guidance & expectations	3. Preparatory & preliminary work	4. No national requirements or guidance
Binding prudential requirements embedded in primary legislation and hard-law prudential rules.	Issued by central banks and supervisors. While technically non-binding, these highly influential guidance, supervisory statements, and expectations are shaping most banks' sustainability risk management practices.	Capacity-building, research, pilot exercises, stakeholder engagement, and voluntary initiatives aimed at developing supervisory understanding and market readiness to integrate sustainability risk into prudential risk management, often focused on climate risk.	There is a limited set of countries where sustainability-related prudential risks are not explicitly included in regulatory and supervisory frameworks, beyond general risk management expectations.
Selected examples			
▪ Brazil[2] ▪ Canada[3] ▪ European Union[4] ▪ Indonesia[5] ▪ United Kingdom[6]	▪ Australia[7] ▪ China[8] ▪ Malaysia[9] ▪ Singapore[10] ▪ South Africa[11]	▪ India[12] ▪ Mexico[13] ▪ Thailand[14] ▪ Viet Nam[15]	▪ Argentina ▪ United States of America

2 Brazil's Central Bank Resolution CMN 4,943/2021. bcb.gov.br/content/estabilidadefinanceira/Res_151_EN.pdf

3 OSFI Guideline B-15: Climate Risk Management. OSFI—Guideline B-15 Page

4 The primary legislation is the Capital Requirements Directive, specifically Directive 2013/36/EU as amended by Directive (EU) 2024/1619, commonly referred to as CRD VI. The relevant legal basis is Article 87a(5) of the CRD, which mandates the European Banking Authority to issue the Guidelines on the management of ESG risks.

5 OJK Regulation No. 17 of 2023 on the Implementation of Governance for Commercial Banks. ojk.go.id/id/regulasi/Pages/Penerapan-Tata-Kelola-Bagi-Bank-Umum.aspx

6 PRA Supervisory Statement 5/25 is binding supervisory guidance for all PRA-regulated banks bankofengland.co.uk/prudential-regulation/enhancing-banks-and-insurers-approaches-to-managing-climate-related-risks

7 APRA Prudential Practice Guide CPG 229: Climate Change Financial Risks (2021). APRA—CPG 229 Page

8 China Banking and Insurance Regulatory Commission (2022, June 1). Notice on issuing the green finance guidelines for the banking and insurance industry. lawinfochina.com/display.aspx?id=38847&lib=law PBOC (2021, June 6). Green finance evaluation plan for banking financial institutions pbc.gov.cn/en/3688006/3995557/index.html

9 Bank Negara Malaysia (BNM)—Climate Risk Management and Scenario Analysis (CRMS) Policy Document (2022). Bank Negara Malaysia—Policy Document PDF

10 MAS Guidelines on Environmental Risk Management for Banks (2020, updated March 2026)

11 Prudential Authority / SARB: Draft Guidance Note on Climate-related Risks (2022) SARB Prudential Authority—G2/2024 Publication Page

12 Reserve Bank of India (2024). rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=1233

13 Global Green Growth Institute (2022). gggi.org/report/accelerating-green-financing-through-the-strengthening-of-mexicos-national-banking-and-securities-comission/

14 Bank of Thailand. (2023). bot.or.th/en/financial-innovation/sustainable-finance/green/FIPCS-internalizing_environmental_and_climate_change.html

15 European Investment Bank. eib.org/en/press/all/2025-136-viet-nam-eib-and-state-bank-of-vietnam-pave-the-way-for-green-finance-cooperation-to-support-just-energy-transition

The existing set of regulations, supervisory guidance, and expectations shares three defining characteristics:

- The first characteristic is an initial emphasis on disclosure requirements to improve transparency as a foundation for supervision and market discipline. However, this should not be read as evidence that disclosure is a completed or mature phase of sustainability risk integration. The UNEP FI Risk Centre's *Sustainability Disclosure Landscape Report for Risk Management: Insights from Climate-focused Case Studies* (2025) provides a more detailed outline of sustainability disclosure standards and frameworks, and their uptake into jurisdictional reporting requirements.

- The second characteristic is the introduction of a forward-looking perspective through an increasing use of scenario analysis, stress testing, and strategic assessments. Forward-looking climate transition and physical risk scenarios are now widely used to assess bank resilience, even before formal expectations are issued and often as a precursor to them. Furthermore, supervisors increasingly frame sustainability risks as a system-wide financial stability concern beyond on purely microprudential grounds (BCBS, 2024; ECB/ESRB, 2023; NGFS, 2022). The UNEP FI Risk Centre's *Climate Stress-Testing Methodologies for Banks* (2025) offers a more detailed picture of climate stress testing approaches.

- The third characteristic is a growing emphasis on transition planning as a forward-looking supervisory and corporate law requirement, embedding transition risk management into both prudential oversight and corporate governance frameworks. In the European Union (EU), the European Banking Authority (EBA) Guidelines on transition plan benchmarking and the Corporate Sustainability Due Diligence Directive (CSDDD) together create direct linkages between corporate law obligations and prudential risk management expectations.

Several additional trends emerge:

- All regions converge on the approach to climate risk governance, risk management, scenario analysis, and disclosure, despite variation in depth and enforcement. Nature risk is increasingly on supervisors' agendas: The Swiss Financial Market Supervisory Authority (FINMA) (2024), De Nederlandsche Bank (DNB) (2025), Monetary Authority of Singapore (MAS) (2026), and the European Central Bank (ECB) (2022/2026) require or expect materiality assessments, stress tests, and scenario analysis, though nature-specific stress testing remains at an early stage.

- Risks from pollution, linear production models, and resource dependency remain the least addressed in prudential regulation: most supervisors subsume pollution within broader environmental definitions. The Hong Kong Monetary Authority (HKMA) (2025) is a notable exception in explicitly naming air, water, and land pollution as constituent environmental risks. Additionally, the inclusion of pollution as a reporting standard within the European Union's European Sustainability Reporting Standards (ESRS) will increase counterparty-level data availability over time.

- Social risk is not yet treated as a distinct sub-type in most frameworks: the EBA suggests social risks should feed into prudential risk models rather than attract capital charges, with the forthcoming Taskforce on Inequality and Social-related Financial Disclosures (TISFD) framework potentially driving future regulatory developments.

- No sustainability-specific capital add-ons or risk weights have been implemented to date, though the European Union's sixth Capital Requirements Directive (CRD VI) clarifies that the Systemic Risk Buffer may be applied to climate exposures and the EBA is consulting on operationalizing this (EBA,

2026). The Bank of England (BoE) has separately flagged potential Pillar 2 adjustments for climate risk control gaps (BoE, 2025).

- In many markets, a capacity-building phase of diagnostics, pilot stress tests, and supervisory training comes before formal regulation (CISL, 2025; IMF, 2024; NGFS, 2025).
- There are indications of a gap between supervisory expectations and banks' implementation thereof: banks often report at a strategic and governance level without traceability into credit limits, provisioning, risk appetite, or the Internal Capital Adequacy Assessment Process (ICAAP) (ECB, 2024; EBA, 2025).

Together, these developments indicate a structural shift. Sustainability risks are no longer treated as reputational or ethical considerations but as financially material, forward-looking prudential risks. Approaches remain uneven, with progress on climate risk clearly ahead of nature, pollution, and social risks. Even so, the trajectory points toward deeper integration into core prudential regulations and supervision over time.

3.1 Multilateral regulatory guidance

Multilateral standard-setters and policy bodies provide a predominantly climate-focused and increasingly nature-aware, including on pollution and natural resources exploitation, as two drivers of nature loss. However, frameworks for holistic treatment of sustainability-related financial risks are still fragmented with limited direct treatment of social risks (BCBS, 2022; NGFS, 2024b; FSB, 2022).

The BCBS has established core prudential principles for the management and supervision of climate-related financial risks and developed disclosure frameworks that embed climate-related financial risk into banking supervision practices (BCBS, 2022). The NGFS complements this by providing non-binding supervisory guidance, conceptual frameworks for both climate and nature-related risks, including pollution and natural resources exploitation-related risks, and scenario-based tools that support central banks and supervisors in assessing environmental risk transmission to financial stability (NGFS, 2024b). The FSB plays a coordinating role at the macroprudential level, focusing on system-wide financial stability implications through climate-related financial risk roadmaps, supervisory stocktakes, and a stocktake on nature-related regulations and practices (FSB, 2022; FSB, 2024). The OECD contributes to broader policy analysis on climate resilience, biodiversity, pollution and natural resources exploitation-related financial risks, but social risk considerations remain largely indirect, being addressed through related themes such as resilience, and inequality (OECD, 2022; OECD, 2023). **Table 2** summarizes the influential work of these multilateral bodies.

Table 2: Multilateral Regulatory Guidance

Institution	Role	Key Publications	Coverage			
			Climate	Nature	Pollution	Social
Basel Committee for Banking Supervision **BCBS**	The lead global prudential standard-setter for banking supervisors—including standards for the supervision of climate-related financial risk.	▪ Principles for Effective Management and Supervision of Climate-related Financial Risk ▪ A framework for the voluntary disclosure of climate-related financial risks	**High**	**Low—Medium** (emerging references via broader environmental risk framing)	**Low** (only indirect via environ-mental risk)	**Medium** (governance, conduct, operational risk linkages)
International Association of Insurance Supervisors **IAIS**	IAIS is the lead global standard-setter for insurance supervision. For banking groups with insurance subsidiaries or insurance partnerships, IAIS standards effectively shape group-level expectations on climate-related underwriting and investment risk. (In practice, this can flow into consolidated risk frameworks and ICAAP-style assessments.)	▪ Application Paper on the Supervision of Climate-related Risks in the Insurance Sector (2025) ▪ IAIS Climate Risk Supervisory Guidance Consultations (ICP updates & supporting material, 2023–2024) ▪ IAIS Climate Change Strategic Theme Overview & Resource Hub	**High**	**Medium** (increasing focus via nature-related risk workstreams)	**Low** (not a distinct category)	**Medium** (through underwriting, conduct, protection gaps)
Network for Greening the Financial System **NGFS**	A voluntary network of 152 central banks and supervisors from 95 countries, NGFS shares best practices, strengthens the management of climate- and environment-related financial risks, and supports the transition to a sustainable economy. It shares good practices rather than sets binding rules.	▪ Guide for Supervisors: Integrating Climate-Related and Environmental Risks into Prudential Supervision (updated 2025) ▪ Nature-related Financial Risks: A Conceptual Framework to Guide Action by Central Banks and Supervisors (2024) ▪ NGFS Transition Plan Package (2024) ▪ Tailoring Transition Plans: Considerations for EMDEs (2024) ▪ Credible Transition Plans: The MicroPrudential Perspective (2024)	**High**	**Medium—High**	**Medium** (transition and physical risk often include pollution pathways)	**Low—Medium** (mostly just transition framing)

Institution	Role	Key Publications	Coverage			
			Climate	Nature	Pollution	Social
Financial Stability Board **FSB**	The FSB plays a leading role in coordinating sustainability-related financial risk work at the global level, with a particular macroprudential focus on financial stability. Its publications assess global exposure to sustainability risks, especially climate risk.	▪ Supervisory and Regulatory Approaches to Climate-related Risks*: Final Report* (2022) ▪ FSB Roadmap for Addressing Financial Risks from Climate Change ▪ Stock take on Nature-related Risks (2024)	**High**	**Low—Medium** (still emerging via nature-related disclosure links)	**Low**	**Medium** (transition planning, disclosure, just transition harmoni-zation)
Organisation for Economic Cooperation and Development **OECD**	The OECD is an intergovernmental policy forum where 38 developed and emerging markets collaborate to stimulate economic progress, promote market systems, and establish international standards. It helps governments and financial systems identify, measure, and manage climate and nature risks to build resilient economies.	▪ A supervisory framework for assessing nature-related financial risks*: Identifying and navigating biodiversity risks* (2023) ▪ Assessing biodiversity-related financial risks: Navigating the landscape of existing approaches (2023) ▪ Building Financial Resilience to Climate Impacts*: A Framework for Governments to Manage the Risks of Losses and Damages* (2022).	**High**	**Medium**	**Medium** (explicit in environ-mental policy and circular economy work)	**High** (strong coverage: just transition, inequality, social policy integration)

3.2 Voluntary frameworks and standards

Before turning to the regional breakdown of sustainability risk regulation, it is useful to consider the role of voluntary standards and frameworks. These frameworks are now widely embedded across banking, though they vary in their direct relevance to prudential risk management. Many have also established concepts and practices that have then been codified in supervisory expectations, guidance, and regulation.

The UN Principles for Responsible Banking (PRB), adopted by more than 360 banks, are the leading benchmark for responsible banking. They require signatories to align strategy, portfolios, and client engagement with the Paris Agreement and the UN Sustainable Development Goals, with particular attention to climate, nature, human rights, and healthy and inclusive economies. Table 3 below highlights the PRB elements most relevant to risk practice, while noting that the PRB is primarily designed as a strategic alignment and impact-management framework.

Although this report focuses on banks, the Principles for Sustainable Insurance (PSI) are included because they are relevant for bancassurance, diversified financial groups, and potential UNEP FI Risk Centre work on insurance-related risks in the future.

The Equator Principles (EP) are a well-established benchmark for defining sustainability risk at the transaction level, and many banks use their methodology to manage sustainability risk within credit processes (EP, 2025). The International Finance Corporation (IFC) Performance Standards play a similar role, especially for transactions in emerging markets and developing economies (IFC, 2025).

The Task Force on Climate-related Financial Disclosures (TCFD), the Taskforce on Nature-related Financial Disclosures (TNFD) and the Transition Plan Taskforce (TPT) illustrate how voluntary frameworks can shape prudential practice, even though they are primarily disclosure frameworks with implications for risk management. The TCFD recommendations established a widely used structure for climate-related financial disclosures and were progressively referenced in supervisory guidance before being incorporated into binding regulation in certain jurisdictions (FSB, 2023). TCFD is not listed separately in Table 3 because its core architecture is now reflected in International Sustainability Standards Board (ISSB) standards, which are the emerging global baseline for sustainability-related financial disclosures. In 2023, the ISSB published two disclosure standards that build on and supersede TCFD. The TNFD, finalized in 2023, is following a similar path and is already referenced in the EBA's 2025 ESG Risk Guidelines and FINMA's Circular 2026/1 on nature-related financial risks. Furthermore, ISSB plans to specify aspects about material information on nature-related risks and opportunities for companies to disclose based on the TNFD framework (IFRS, 2026). For social risk, the emerging Taskforce on Inequality and Social-related Financial Disclosures (TISFD) framework is expected to play a similar agenda-setting role by providing a disclosure architecture for inequality- and people-related risks, although it remains at an earlier stage of development. The TPT has likewise informed the EBA's approach to prudential transition planning (ITPN, 2026), and the ISSB has adopted the TPT's disclosure-specific resources and incorporated them into its official guidance for compliance (IFRS, 2026). The Partnership for Carbon Accounting Financials (PCAF) is increasingly referenced in ISSB and in Pillar 3 disclosure requirements (BCBS, 2025).

Table 3 below summarizes voluntary frameworks and standards with operational relevance to prudential risk management, including strategic alignment frameworks, transaction-level environmental and social (E&S) risk standards, disclosure frameworks and measurement methodologies. For a fuller mapping of disclosure frameworks and their uptake into jurisdictional reporting requirements, see the UNEP FI Risk Centre's *Sustainability Disclosure Landscape Report for Risk Management* (2025).

Table 3: Voluntary frameworks and standards relevant to sustainability risk management

	Purpose	Adoption and Use	Risk Management Elements
UN Principles for Responsible Banking (PRB)	▪ Framework for aligning banking strategy with the Paris Agreement and the Sustainable Development Goals (SDGs) across four priority areas: climate, nature, human rights, and healthy and inclusive economies. ▪ Operates at strategy, portfolio, and transaction levels.	Over 360 banks in 85+ countries, representing around 50% of global banking assets. Signatories are 2.6x more likely to be ESG leaders than non-signatories (UNEP FI, 2025).	▪ PRB banks are required to identify and assess their material positive and negative sustainability impacts. ▪ This impact analysis provides a foundation for sustainability risk identification, assessment, and management. ▪ PRB signatories are expected to set sustainability objectives that function as forward-looking risk controls and tools for the management of portfolio transition risk. ▪ Sustainability risks are expected to be treated as core risk drivers, not separate overlays.
UN Principles for Sustainable Insurance (PSI)	▪ Framework for embedding sustainability in insurance underwriting, risk management, investment, and operations. ▪ Encourages insurers to support resilience, risk prevention, climate adaptation, and long-term societal well-being.	Voluntary framework adopted by 170 insurers, reinsurers, and insurance associations across multiple markets.	▪ Insurers are encouraged to identify and evaluate sustainability risks that may affect insured assets, operations, or clients. ▪ The PSI promotes embedding sustainability risks within enterprise risk management, board oversight, internal controls, performance monitoring, and public reporting processes. ▪ Particularly relevant for bancassurance and diversified financial groups.
Equator Principles (EP)	▪ Principles for assessing and managing E&S risk in project finance and related transactions through categorization, due diligence, contractual covenants, and ongoing monitoring embedded in credit and transaction workflows.	▪ Adopted by 138 banks across 38 countries. ▪ Covers project finance, project-related corporate loans, bridge loans, project-related refinancing, and acquisition finance.	▪ Transaction categorization by E&S risk level. ▪ Requirements for E&S due diligence. ▪ Contractual covenants ensuring client compliance. ▪ Environmental and Social Management System requirements for clients. ▪ Direct integration into credit approval and transaction workflows.
IFC Performance Standards (IFC)	▪ Eight standards for assessing E&S risk in lending to higher-risk counterparties. ▪ Designed to help avoid, mitigate, and manage E&S risks as a condition of financing.	Required by IFC for all direct investments in emerging markets.	▪ Environmental and Social Management System requirements. ▪ Eight standards covering E&S risks, including pollution and contamination, cultural heritage, community impacts, labour, and human rights. ▪ Risk identification, mitigation hierarchy, and ongoing monitoring requirements.

	Purpose	Adoption and Use	Risk Management Elements
Taskforce on Nature-related Financial Disclosures (TNFD)	▪ Framework for identifying, assessing, managing, and disclosing nature-related dependencies, impacts, risks, and opportunities across sectors and geographies. ▪ Improves information for financial markets to support better capital allocation and investment decisions. ▪ Integrates nature into strategy, risk management, and governance to help reduce nature loss.	▪ Designed for both financial firms and corporates. ▪ Increasingly incorporated into market practice with many institutions aligning TNFD disclosures with their existing sustainability reporting and risk management processes.	▪ Covers risks from nature loss, ecosystem degradation, policy and market shifts, and wider system disruption. ▪ Requires firms to identify nature-related dependencies and impacts. ▪ Embeds nature-related issues into enterprise risk management rather than treating them as stand-alone sustainability matters. ▪ Pollution is one of TNFD's recognized direct drivers of nature change, alongside resource exploitation.
Transition Plan Taskforce Disclosure Framework (TPT)	▪ Disclosure framework and sector-specific guidance for credible climate transition plans. ▪ Sets good-practice expectations for governance accountability, strategic ambition, financing actions, client engagement, and metrics and targets. ▪ Bank-specific guidance was published in April 2024.	The EBA's approach to prudential transition planning draws on the structural framework developed by the TPT (ITPN, 2026).	▪ Bank guidance covers transition risk identification, business model alignment and client transition assessment. ▪ Escalation and engagement protocols for high-risk counterparties. ▪ Metrics and targets linked to financed emissions and sector decarbonization pathways.
International Sustainability Standards Board Standards S1 and S2 (IFRS S1 and S2)	▪ IFRS S1: general requirements for disclosure of sustainability-related financial information. ▪ IFRS S2: climate-related disclosures, built on and superseding TCFD recommendations. ▪ Establishes a global baseline for sustainability-related corporate disclosure for capital markets.	Nearly 40 jurisdictions, representing around 60% of global GDP, are adopting or using ISSB Standards (IFRS, 2025).	▪ Four-pillar disclosure architecture: governance, strategy, risk management, metrics and targets. ▪ Climate risk categorization: physical and transition risk. ▪ Financed emissions disclosure requirements (aligned with PCAF methodology). ▪ Supports Pillar 3 regulatory disclosure requirements. ▪ Provides input to internal risk management and scenario analysis frameworks.

	Purpose	Adoption and Use	Risk Management Elements
Taskforce on Inequality and Social-related Financial Disclosures TISFD	▪ Emerging framework for identifying, assessing, and reporting social-related risks and impacts related to people and inequality. ▪ Structured around four pillars: governance, strategy, risk management, metrics and targets.	▪ Launched in 2024 by a coalition of 20+ organizations. ▪ Beta disclosure framework published in Q2 2026.	▪ Emerging framework for social risk identification, assessment, and reporting. ▪ Scope covers inequality, labour rights, community impacts, and broader social risks. ▪ Expected to shape supervisory expectations for social risk management in the same way that TCFD and TNFD have influenced prudential practice for climate and nature risk.
Partnership for Carbon Accounting Financials (PCAF)	▪ Establishes a common methodology for quantifying financed emissions at portfolio level, making climate-related financial exposure more measurable and comparable across counterparties and sectors. ▪ Directly supports portfolio alignment analysis, climate scenario analysis, transition planning, and climate-related risk appetite metrics.	▪ Over 550 financial institutions subscribe globally. ▪ Increasingly referenced in IFRS S2 and Pillar 3 disclosure requirements (PCAF, 2025).	▪ Scope 3 Category 15 financed emissions methodology. ▪ Supports transition risk assessment and portfolio decarbonization pathways. ▪ Often provides a basis for climate risk appetite metrics and financed-emissions targets.
Sector Principles and Frameworks	Sector-specific frameworks translate broad sustainability objectives into portfolio-level metrics, transition pathways, and escalation protocols that increasingly inform underwriting, client engagement, and risk appetite calibration.	Some examples: ▪ Poseidon Principles for shipping finance[16] ▪ Sustainable Steel Principles[17] ▪ Sustainable Aluminium Finance Framework[18] ▪ Aviation Pegasus Guidelines[19]	▪ Measurement of portfolio carbon intensity against decarbonization trajectories. ▪ Covenant clauses in loan agreements ensuring client data access and compliance. ▪ Asset-level climate alignment scoring and portfolio temperature assessment. ▪ Transition risk assessment and escalation processes for non-aligned clients. ▪ Integration into underwriting decisions, client engagement, and risk appetite calibration.

16 poseidonprinciples.org/finance/principles/
17 rmi.org/sustainable-steel-principles-forging-new-paradigm/
18 icmm.com/en-gb/guidance/environmental-stewardship/climate-change/aluminium-finance
19 climatealignment.org/wp-content/uploads/dlm_uploads/2024/04/pegasus_guidelines.pdf

3.3 Sustainability risk regulations by region

Sustainability-related financial regulation is evolving at different stages across regions, with climate-related financial risk as the most developed component of prudential frameworks (FSB, 2022; NGFS, 2024b).

In Europe, sustainability risk is largely integrated into prudential supervision through EU regulatory requirements and supervisory expectations, supported by national authorities. These give increasing attention to nature-related risks, including pollution- and natural resources exploitation-related risks, and more limited consideration to social risks (EBA, 2025; ECB, 2025; NGFS, 2024b).

In Africa and the Middle East, Asia-Pacific, and parts of Latin America and the Caribbean, regulatory approaches are generally at an earlier stage. In these regions, supervisors focus on three areas: climate risk governance; disclosure alignment with international standards, such as ISSB; and the gradual development of tools, including stress testing and scenario analysis, often supported by capacity-building initiatives (NGFS, 2023; FSB, 2022; OECD, 2023). Within Latin America and the Caribbean, a subset of jurisdictions (including Brazil and Colombia) has implemented formal prudential requirements related to climate risk, while others rely primarily on supervisory guidance and regional cooperation frameworks (Banco Central do Brasil, 2021; NGFS, 2024b). In North America, approaches are mixed, with Canada having established formal supervisory expectations for climate risk integration, Mexico developing supervisory frameworks, and the United States remaining in the report's category 4 at the federal level, notwithstanding state-level initiatives and other subnational or sector-specific activity (OSFI, 2023; NGFS, 2024b).

Across all regions, climate risk appears to be the primary focus of prudential regulation. Meantime, financial risks linked to nature, pollution and the exploitation of natural resources are emerging in early-stage policy development. As for social risks, these are generally addressed indirectly through broader ESG-related governance, disclosure, or financial stability considerations rather than as stand-alone prudential risk categories (FSB, 2022; NGFS, 2024b; OECD, 2023).

Table 4 below outlines the status of sustainability risk regulation and supervisory guidance across each region with selected examples from numerous jurisdictions.

Table 4: Regulatory developments related to sustainability risk, by region

Regulatory developments	Selected examples
Africa and Middle East: Nascent to active—Climate risk focus—Disclosure focus—Investment in capabilities and capacity	
▪ Nascent to active with several central banks and regulators integrating climate and environmental risk into prudential frameworks. ▪ Primary regulatory focus is on climate risk and standards for board oversight and governance of climate risk, stress testing and scenario analysis, and climate risk disclosures. ▪ There is also a clear trend of aligning disclosure requirements to the ISSB Standards, while also specifying climate risk elements in Pillar 3 disclosures. ▪ Countries in the region that are actively developing prudential regulation on climate risk management include Botswana, Namibia, and Tunisia. ▪ Multilateral capacity-building efforts to bolster country-related capabilities for climate risk management as a precursor to the publication of guidance or regulations are common.	**Ghana** Climate-Related Financial Risk Directive bog.gov.gh/news/climate-related-financial-risk-directive/ **Mauritius** Guideline on Climate-related and Environmental Financial Risk Management (Bank of Mauritius, April 2022) Bank of Mauritius—Guideline PDF **United Arab Emirates** Climate-related Financial Risk Management Regulation (Circular No. 8/2025) CBUAE Rulebook—Climate Risk Management Regulation

Regulatory developments	Selected examples
Asia Pacific: Nascent to active—Climate risk focus—Disclosures and scenario analysis—Investment in capabilities and capacity	
▪ Bank supervisors have issued guidance or expectations on governance, risk management, and scenario analysis for climate-related prudential risks. Australia (APRA), Singapore (MAS), and Hong Kong (HKMA) represent the most active tier, each having issued comprehensive supervisory guidance, required climate scenario analysis, and—in the case of MAS (2026)—published nature risk expectations. ▪ China has an established green finance supervisory framework led by the People's Bank of China (PBOC) that includes mandatory climate stress testing for the top 21 banks, plus a green lending reporting framework. ▪ Multilateral capacity-building efforts to bolster country-related capabilities for climate risk management as a precursor to the publication of guidance or regulations are common. ▪ Use of NGFS scenarios is common. ▪ India, Indonesia, and Thailand have ongoing initiatives but formal published directives or regulations specific to climate risk for banking institutions are less clearly codified or remain in development.	**Australia** APRA Climate Risk Prudential Practice Guide (CPG 229) 2021 APRA—CPG 229 **China** **China Banking and Insurance Regulatory Commission** (2022, June 1). *Notice on issuing the green finance guidelines for the banking and insurance industry* lawinfochina.com/display.aspx?id=38847&lib=law **PBOC** (2021, June 6). *Green finance evaluation plan for banking financial institutions* pbc.gov.cn/en/3688006/3995557/index.html **Singapore** MAS Guidelines on Environmental Risk Management for Banks (2020, updated March 2026) MAS Guidelines on Environmental Risk Management—Transition Planning (Banks) (March 2026) **Hong Kong** HKMA Supervisory Policy Manual—Climate Risk Management (GS-1) 2021 HKMA—Supervisory Policies & Guidelines **Republic of Korea** Climate Risk Stress Testing and Supervisory Expectations fsc.go.kr/eng/pr010101/77019

Regulatory developments	Selected examples
Europe: Advanced and integrated for climate risk—Nature risk a growing focus (including pollution as a driver of nature loss)	
▪ In the European Union, the EBA has fully embedded sustainability into prudential risk management frameworks and supervisory practice. It also requires integration of sustainability risk into core prudential risk categories, capital management, and risk management frameworks.[20] ▪ National regulators within the European Union (e.g., Germany, France, The Netherlands) reinforce the EBA expectations with tailored supervisory guidance and stress tests in line with local dynamics. ▪ As a non-Eurozone EU member, Hungary has a Green Bond Programme that includes green preferential capital requirements and climate risk stress testing. ▪ Norway and Iceland, as member of the European Economic Area, will transpose the EBA Guidelines into national regulation. ▪ Non-EU European countries are also starting to align with international standards on climate-related financial risk, but the level of formal, binding prudential regulation varies widely. ▪ In the United Kingdom, the PRA was the first regulator to introduce prudential requirements for climate risk management by banks in 2019, updated in 2025. It is now bringing nature risk into consideration. ▪ Türkiye has introduced mandatory green asset ratio reporting in addition to expanded supervisory expectations. ▪ Albania, Georgia, and Serbia currently rely on guidance, roadmaps, and supervisory expectations to build capacity and prepare for future binding regulation.	**European Union** EBA Guidelines on the Management of ESG Risks (Jan 2025) eba.europa.eu/sites/default/documents/files/document_library/Publications/Guidelines/2025/Guidelines%20on%20the%20management%20of%20ESG%20risks.pdf **Hungary** Magyar Nemzeti Bank (MNB) Green Programme greenfinanceplatform.org/policies-and-regulations/central-bank-hungary%E2%80%99s-green-program **Türkiye** Guideline on Environmental and Social Risk Management for Banks bddk.gov.tr/Mevzuat/DokumanGetir/1026 **United Kingdom of Great Britain & Northern Ireland** PRA Policy Statement PS25/25 and Supervisory Statement SS5/25—Enhancing Banks' and Insurers' Approaches to Managing Climate-related Risks (Dec 2025) bankofengland.co.uk/prudential-regulation/publication/2025/ss5-25-enhancing-banks-and-insurers-approaches-to-managing-climate-related-risks

20 Notably, the ECB has issued fines to two banks for not meeting supervisory expectations on sustainability risk management; namely, ABANCA Corporación Bancaria and Crédit Agricole (ECB, 2025, November 10; and ECB 2026, February 13).

Regulatory developments	Selected examples
Latin America and Caribbean: Nascent and active—both climate and nature risk are a focus—Investment in capabilities and capacity	
▪ The Eastern Caribbean, Brazil and Colombia have formal prudential standards on climate and environmental risks. ▪ Regional bodies such as the Central American Council of Superintendents of Banks, Insurance and Other Financial Institutions (CCSBSO) and the Climate Financial Risk Center (CFRCenter) are supporting harmonization and capacity-building, including in Panama and Costa Rica. ▪ Elsewhere, sustainability risk integration remains voluntary or guidance-based, although countries are aligning disclosure and risk-management practices with international guidance at different speeds.	**Brazil** Resolution BCB No. 151 of 6 October 2021—Remittance of Social, Environmental and Climate Risk Information bcb.gov.br/content/estabilidadefinanceira/Documents/Res_151_EN.pdf **Eastern Caribbean** Prudential Standard on Climate-related and Environmental Risks for Institutions Licensed Under the Banking Act, 2015 eccb-centralbank.org/content-manager/documents/download/1234
North America: Mixed picture from nascent to advanced—Climate risk focus	
▪ Canada has formal prudential guidance for banks on climate risk governance, risk management, and disclosure. ▪ Mexico is building capacity for climate risk managements, undertaking climate risk assessment before formal prudential regulation and supervisory expectations are published. ▪ In the United States, federal supervisors have not issued binding prudential requirements or explicit supervisory guidance, notwithstanding state-level initiatives and other subnational or sector-specific activity.	**Canada** Guideline B-15: Climate Risk Management (OSFI) 2022 OSFI—Guideline B-15 Page

Box 1: Beyond climate risk

The regulatory and supervisory landscape surveyed in this report remains predominantly climate focused. This reflects current practice and not the full scope of sustainability risks banks face. Prudential requirements, supervisory expectations and banks' risk management capabilities are most developed for climate risk; nature risk is advancing but remains at an earlier stage. Pollution and social risks remain largely absent from several dedicated prudential frameworks and are usually addressed within broader environmental or E&S definitions. However, uneven regulatory coverage does not mean non-climate risks are less financially material. Climate change, nature loss, pollution and social pressures transmit into financial risk not only through overlapping channels, but also individually as discrete risks depending on the sector or counterparty exposure (ECB, 2020; NGFS, 2023; UNEP FI, 2024a, 2024b, 2025; OECD, 2023). The discussion of climate, nature, pollution and resource efficiency, and social risks that follows should be read in this context. The upcoming UNEP FI Risk Centre's Approach to Sustainability Risk Integration treats these risks as interconnected dimensions of a single integration challenge.

4. Current practices in sustainability risk management in banks

This section of the report looks at the extent to which sustainability risks are being integrated into prudential risk management in the banking sector and points to the common challenges.

A review of the current landscape suggests that the banking sector's management of sustainability risk is maturing and integration is deepening, especially in respect of climate risk. However, there are still considerable gaps to be addressed before fuller integration can be achieved. A growing appreciation also exists of the complexity and scale of sustainability risk integration.

This review is based on the following evidence published between December 2023 and May 2026:

- Consultation with UNEP FI Member Banks conducted in April and May 2026
  Stocktakes and thematic reviews published by banking supervisors and related international bodies like the FSB and NGFS
- Industry reports published by professional bodies and consulting firms

Note that this is not a complete review of all extant policies, frameworks, practices, and reports on sustainability risk management in the banking sector. Rather, it comprises a sample thereof, drawn from publicly available documents that are available in English at the time of writing this report. It is supplemented by primary data collected from UNEP FI member banks during April and May 2026, the details of which can be found in Box 2.

The findings of this review are presented as follows:

- Key findings and trends in sustainability risk integration
- Progress in integrating sustainability risk into elements of risk management
- Progress in integrating sustainability risk into prudential risk types
- Progress in integration of sustainability themes (climate, nature, pollution, and social) within risk management practices
- Common challenges to sustainability risk integration

4.1 Key findings and trends in sustainability risk integration

Climate risk integration is the most advanced but remains incomplete. The surveyed UNEP FI banks are 40 to 60 per cent more advanced in integrating climate risk compared to other sustainability risks, with progress on transition climate risk slightly more advanced than physical climate risk.

Climate risk is now widely treated as financially material across major jurisdictions, and supervisory exercises show growing use of climate scenarios by banks to identify portfolio vulnerabilities (ECB, 2026; FSB, 2025; KPMG, 2025). Coverage across other prudential risk types remains partial, and integration into capital adequacy frameworks and routine credit decision-making is not yet standard practice at most institutions (APRA, 2024; KPMG, 2025). In fact, a recent study finds that full quantification of climate risk drivers has been achieved by no more than 10 per cent of banks globally (KPMG, 2025).

Nature risk integration is emerging but has progressed less than climate risk. Nature risk integration is the least advanced of the sustainability risks for the surveyed UNEP FI banks. For credit risk, 17.9 per cent of respondents reported that physical nature risk is not even minimally integrated; and the figure is 28.6 per cent for transition nature risk. Even though GARP and KPMG surveys indicate growing recognition among banks that nature loss and ecosystem degradation can generate material financial exposures, most banks remain in exploratory or pilot stages (GARP, 2025; KPMG, 2025). Coverage of nature risk metrics, thresholds, and scenario analysis remains limited at most institutions (FSB, 2024; GARP, 2025).

Box 2: UNEP FI Risk Centre consultation with PRB member banks

The UNEP FI Risk Centre conducted a consultation with member banks during April and May 2026 on the topic of sustainability risk integration.

28 banks participated in the consultation.

The regional distribution of participants is as follows:

- Africa Middle East—18%
- Asia Pacific—32%
- Europe—32%
- Latin America and Caribbean—7%
- North America—11%

A complete analysis of the findings from the consultation will be published in a forthcoming supplemental resource.

Pollution risk integration is more advanced than nature risk but remains incomplete. Consulted UNEP FI banks are at a more advanced stage of integrating pollution risk than nature risk across prudential risk types: over 10 per cent of member banks have largely or fully integrated pollution risk. Credit risk is again the most developed entry point, reflecting the more direct link between pollution-related exposures—e.g. environmental fines, asset devaluation, and stranded asset risk—and borrower creditworthiness. Pollution risk also shows stronger integration into market risk than nature risk, suggesting that the transmission channels to asset pricing and valuation are more legible to banks.

Market and liquidity risk nonetheless remain underdeveloped, with 64 per cent and 68 per cent of respondents respectively reporting no integration. Dedicated supervisory guidance on pollution risk remains limited; most regulatory frameworks subsume pollution within broader environmental risk definitions, leaving banks without clear methodological guidance on identification and quantification (EBA, 2025; HKMA, 2025). An exception is the HKMA (2025), which names air pollution, water pollution, and land contamination explicitly as constituent environmental risks alongside climate and nature. GARP (2025) found that while approximately half of responding banks examine or intend to examine air and water pollution as drivers of nature-related risk, only around 20 per cent currently use metrics, targets, or limits to measure pollution as a risk driver.

Social risk is the least operationalized within prudential risk frameworks. Although 57.1 per cent of UNEP FI banks report that social risk is at least partially integrated into credit risk, in practice this reflects due diligence in transaction screening, exclusions policies, and reputational controls, rather than through embedded prudential risk management processes (EBA, 2023; KPMG, 2025). Over half (53 per cent) of surveyed UNEP FI banks reported that social risk is partially to largely integrated into non-financial risk, and the figure increases to 46.4 per cent for strategic risk.

Supervisory assessments of sustainability risk materiality differ from banks' own conclusions. Banks in multiple jurisdictions have arrived at low-materiality conclusions for physical and transition risks. Bundesanstalt für Finanzdienstleistungsaufsicht (German Federal Financial Supervisory Authority (BaFin) (2024) found that only 10 per cent of German credit institutions consider physical climate risks to be substantially influencing their material risk types, and the PRA (2025) found that no bank from the United Kingdom of Great Britain & Northern Ireland had raised a material post-model adjustment for climate in Expected Credit Losses (ECLs). Both supervisors noted a divergence between banks' materiality conclusions and the observable upward trend in climate-related physical events. The ECB similarly found that banks' materiality assessments for nature risk lag those for climate (ECB, 2026).

Credit risk is the most operationally advanced integration point. Across all sustainability risk types, surveyed UNEP FI banks report that integration is most progressed for credit risk. Over one fifth (22 per cent) of banks report full integration into credit risk across all sustainability risk types, and only 19 per cent report no integration. Climate risk integration is most developed within credit risk assessment processes, and supervisory thematic reviews have focused predominantly on credit transmission channels (ECB, 2026; KPMG, 2025).

Data constraints limit progress on risk integration across all sustainability risk types. Of all the surveyed UNEP FI banks, 39 per cent cite data as the leading constraint to sustainability risk integration. They also report challenges related to data availability for counterparties and asset types (43 per cent), geographies (29 per cent), and sectors (14 per cent). Fewer than one in five (18 per cent) respondents note the cost of third-party data as a concern, while 29 per cent report experiencing nature risk-related data gaps. The OSFI (2025) found that most Canadian banks rely heavily on proxy data. Granular counterparty-level climate data, and reliance on sector-level proxies for nature risk, constrain materiality assessment and limits quantification (KPMG, 2025; OSFI, 2025).

Banks rely on NGFS scenarios, with limited development of bank-specific analysis. Most banks use NGFS scenarios as the primary basis for climate stress testing, with limited development of scenarios that reflect their own portfolio concentrations and business-model exposures (BCBS, 2024; KPMG, 2025). A pilot exercise by the Federal Reserve (2024) found that participants faced fundamental modelling challenges, including non-linearity, the inability to back test against historical outcomes,

and reliance on judgement in the absence of validated outputs. Some leading banks are integrating these scenarios with idiosyncratic shocks and extending time-horizons to 2050, with dedicated scenarios for the impacts of climate physical and climate transition risk on the trading book also emerging (ECB, 2026).

Integrating sustainability drivers into existing risk models remains a major technical challenge. Half of surveyed UNEP FI banks struggle to integrate third-party data and tools with existing models, while 57 per cent find it difficult to link outputs to financial metrics. Twenty-nine per cent cite the lack of common methodologies, and 21 per cent face both integration and translation barriers. This limits banks' ability to embed sustainability drivers into IFRS 9, Pillar 1, and Pillar 2 credit risk models, which require data and methodologies that many banks have not yet developed. KPMG identifies risk model integration as a leading challenge, while the ECB has fined institutions for not quantifying environmental risk drivers more systematically. Mapping sustainability transmission channels to conventional risk parameters remains incomplete across the sector (KPMG, 2025; ECB, 2026).

Structural foundations are in place, but deeper operational integration lags. Nearly three-quarters (71 per cent) of surveyed UNEP FI banks have adopted a framework for sustainability risk integration (SRI), and a further 25 per cent plan to introduce one. However, those banks that already have an SRI framework in place are more likely to cite integration difficulty (62 per cent) than those still under consideration (57 per cent). This suggests that the challenge intensifies as implementation deepens. Board oversight, sustainability governance structures, and high-level risk policies are now established at most large banks across reviewed jurisdictions (APRA, 2024; ECB, 2026; KPMG, 2025). The main challenge has shifted from establishing the relevance of sustainability risk to embedding it operationally—in credit limits, provisioning, risk appetite, ICAAP, and internal models. Even at more advanced institutions, this transition to operational depth is incomplete (APRA, 2024; ECB, 2026).

Progress is concentrated among large and systemically important institutions. Supervisory assessments by the PRA (2025), APRA (2024), BaFin (2025), OSFI (2025), and the Federal Reserve (2024), alongside surveys by GARP (2025) and KPMG (2025), consistently find that integration is most advanced at larger institutions, while smaller firms and emerging market banks remain at a foundational stage. The ECB's (2026) *Good Practices Compendium* documents that leading European institutions have developed quantitative KRIs for prudential risks, beyond only credit risk.

Supervisory expectation is the primary driver of integration, with capability-building following a phased approach. KPMG (2025) survey findings indicate that regulatory expectations, rather than institutions' own risk assessments, are the principal catalyst for sustainability risk integration. The ECB (2026) argues that supervisory pressure, including formal findings and enforcement actions, has driven the most substantive advances in banks' sustainability risk practices.

Supervisory assessments of sustainability risk materiality differ from banks' own conclusions. Banks in multiple jurisdictions have arrived at low-materiality conclusions for physical and transition risks. BaFin (2024) found that only 10 per cent of German credit institutions consider physical climate risks to be substantially influencing their material risk types, and the PRA (2025) found that no UK bank had raised a material post-model adjustment for climate in ECLs. Both supervisors noted a divergence between banks' materiality conclusions and the observable upward trend in climate-related physical events. The ECB similarly found that banks' materiality assessments for nature risk lag those for climate (ECB, 2026).

Disclosure and operational integration remain uneven, with disclosure-quality gaps obscuring the depth of embedding. Banks increasingly disclose governance arrangements, financed emissions metrics, scenario outputs, and sustainability targets, but these disclosures do not consistently evidence end-to-end integration into day-to-day prudential processes (ECB, 2026; KPMG, 2025). Surveyed banks rated risk monitoring and reporting as one of the least mature of the six risk management elements, with 46 per cent reporting it as largely or fully integrated. This points to material disclosure gaps in the current and anticipated financial effects of sustainability risks (FSB, 2025), the methodologies and analytics used to quantify transmission channels (ECB, 2026), and the operational and quantitative detail increasingly required by regulators. Reporting often lacks traceability to credit limits, provisioning, risk appetite, ICAAP and internal models, and the ECB's finding that Pillar 3 disclosures provide limited transparency on quantification methodologies and transmission analytics is evidence of the same underlying integration gap (ECB, 2026; EBA, 2025).

4.2 Integrating sustainability risks into elements of risk management

Findings from the UNEP FI Risk Centre's 2026 Member Bank Consultation, spanning 28 financial institutions across five regions, reveal that sustainability risk integration is progressing but remains uneven across both risk management elements and risk types. Governance appears to be the most mature element, with 61 per cent of respondents reporting largely or fully integrated arrangements, while Risk Monitoring and Reporting is the least advanced, with only 46 per cent reaching that threshold. The consultation data therefore do not support treating disclosure as a completed or more advanced phase than operational embedding. Across all six risk management elements, climate risk is consistently more integrated than nature risk, pollution risk, or social risk. Taken alongside evidence from supervisory reviews and industry surveys, the results point to a sector that has moved beyond whether to integrate sustainability risk and is now grappling with how to move beyond the foundational phase. Figure 1 shows how surveyed UNEP FI banks have progressed in embedding sustainability into various elements of risk management. Table 5 below provides further information on these results together with insights drawn from supervisory reviews and third-party surveys.

Box 3. Core risk elements of sustainability risk integration

The consultation asked member banks to assess their progress against six core elements of risk management. These elements reflect the established architecture through which banks identify, assess, and manage material risks. Brief descriptions are set out below for reference.

Risk Strategy—the articulation of which sustainability-related risks the bank is prepared to accept in pursuit of its business objectives, including how sustainability risk drivers may alter the long-term risk profile and business model viability across planning horizons.

Governance—the policies, processes, structures, and controls through which the board and senior management oversee sustainability risks, including board-level accountability, three-lines-of-defence application, and integration into risk culture.

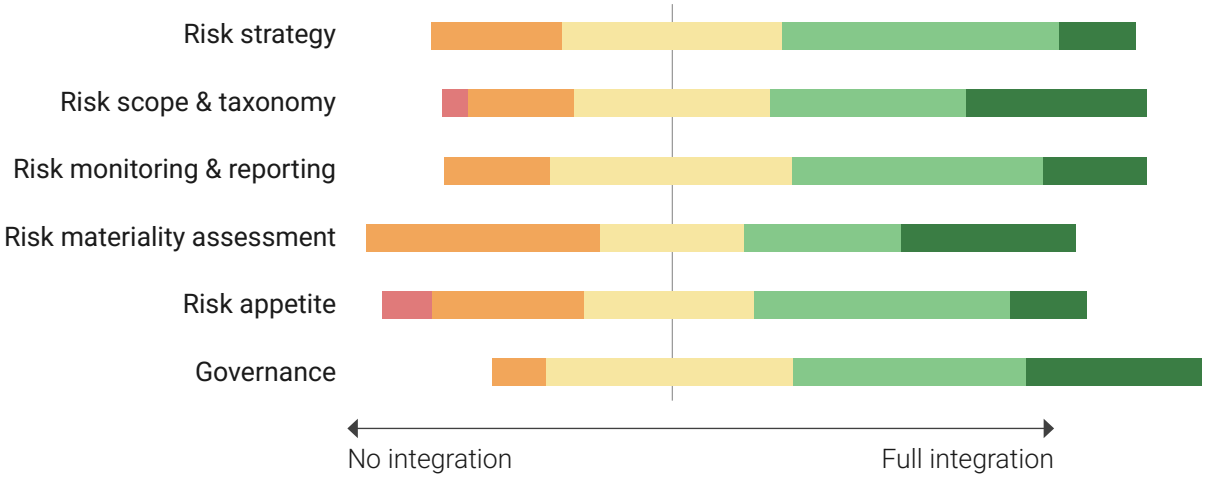
Risk Scope and Taxonomy—the classification of sustainability risks as drivers and amplifiers of established prudential risk types (credit, market, liquidity, operational, reputational), defining the scope of risks subject to management and setting a common language across the bank.

Risk Materiality Assessment—the structured process for identifying which sustainability risks are financially material to the institution, across relevant time-horizons, geographies, sectors, and counterparty types, using both quantitative and qualitative methods.

Risk Appetite—the aggregate level and types of sustainability risk the bank is willing to accept, expressed through quantitative limits and qualitative statements embedded in the existing Risk Appetite Framework and linked to strategy and materiality findings.

Risk Monitoring and Reporting—the continuous tracking, assessment, and communication of sustainability risk exposures against established thresholds, providing decision makers with timely, forward-looking information and supporting internal management and external disclosure obligations.

For full definitions and guidance on each element, see the forthcoming UNEP FI Risk Centre *Approach to Sustainability Risk Integration* and *Conceptual Framework for Sustainability Risk Integration* publications.



Legend: Stacked bars show the distribution of respondents across five levels of sustainability risk integration—not integrated, minimally integrated, partially integrated, largely integrated, fully integrated—across key risk management areas. Each bar represents 100 percent of respondents.

Figure 1: Findings on integration of sustainability into core risk management elements

Table 5: Overview of sustainability risk integration into core risk management elements

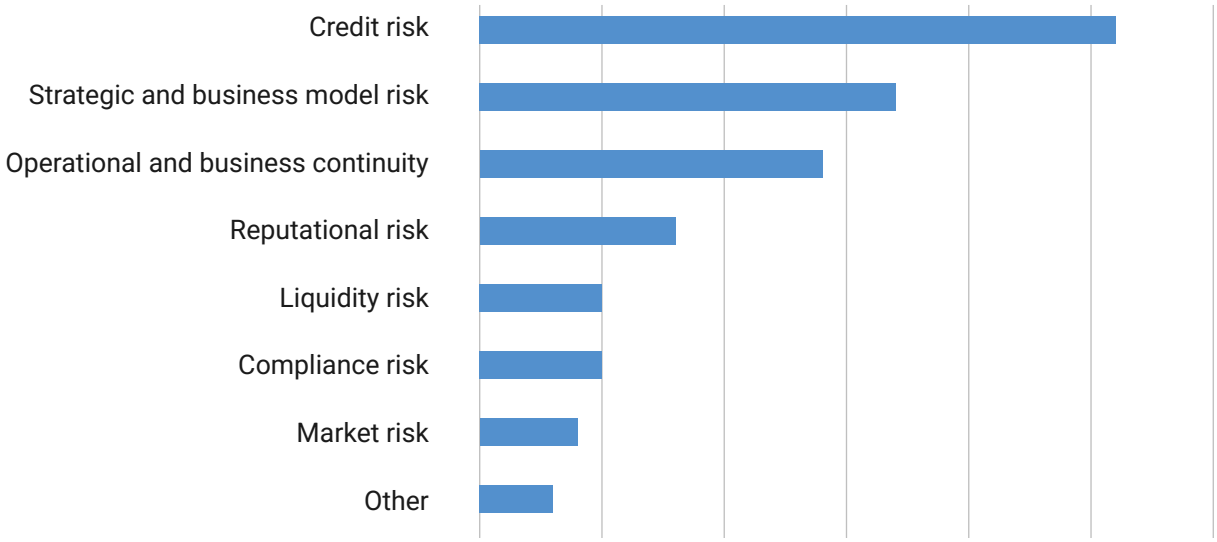
	UNEP FI Member Banks Consultation 2026	Thematic reviews, research, & third-party surveys
Risk strategy	54% of respondents report that sustainability risks are largely or fully integrated into Risk Strategy ▪ 0%—Not integrated ▪ 14%—Minimally integrated ▪ 32%—Partially integrated ▪ 43%—Largely integrated ▪ 11%—Fully integrated Notably, no respondent selected "*Not integrated*".	▪ Most banks are at a foundational stage of integrating sustainability risk into Risk Strategy, with practice most advanced in climate and limited to selected portfolios or geographies at more advanced institutions (APRA, 2024; ECB, 2025). ▪ Integration of sustainability considerations into strategic planning and business model assessment is emerging but uneven. Nature and social risk strategies are substantially less developed than climate (GARP, 2025; UNEP FI, 2025a). ▪ Advanced practice—including explicit sustainability risk appetite, scenario-informed strategy reviews, and net-zero pathway integration—remains concentrated at large, systemically important institutions (FSB, 2024; ECB, 2025). ▪ Supervisory assessments consistently find that sustainability Risk Strategy is more advanced as a governance commitment than as an operational framework embedded in resource allocation and capital planning (ECB, 2025; BaFin, 2024).
Risk appetite	47% of respondents report that sustainability risks are largely or fully integrated into Risk Appetite ▪ 7%—Not integrated ▪ 18%—Minimally integrated ▪ 29%—Partially integrated ▪ 36%—Largely integrated ▪ 11%—Fully integrated	▪ Climate Risk is increasingly reflected in Risk Appetite Statements through a combination of qualitative boundaries and quantitative limits, though practice is uneven (ECB, 2026; HKMA, 2025; KPMG, 2025; APRA, 2024; OSFI, 2025). Leading institutions are beginning to use climate stress test outputs to assess potential climate-related capital impacts, though this work is rarely embedded within capital models (OSFI, 2025; APRA, 2024). ▪ Integration of Nature Risk into Risk Appetite is less advanced (ECB, 2026; FSB, 2024; GARP, 2025; KPMG, 2025) ▪ Advanced banks differentiate Risk Appetite exposures by sector and technology type, monitor transition and physical risk KRIs, and use counterparty-level assessments to determine whether client exposures fall within appetite (Federal Reserve, 2024; HKMA, 2025).
Governance	61% of respondents report that sustainability risks are largely or fully integrated into Governance ▪ 0%—Not integrated ▪ 7%—Minimally integrated ▪ 32%—Partially integrated ▪ 36%—Largely integrated ▪ 25%—Fully integrated	▪ Board and senior management oversight of sustainability risk is now common at most large banks, with the most established governance structures centred on climate risk (APRA, 2024; KPMG, 2025). ▪ Only 50% of firms have board oversight of nature-related risks, compared with more than 80% for climate risk, and 40% of firms delegate nature risk responsibility below C-level (GARP, 2025). ▪ Pollution risk? ▪ Most banks have introduced or updated sustainability risk policies, though policies for nature and social risks are typically less developed and may remain high-level statements rather than actionable risk policies (APRA, 2024; ECB, 2026; FSB, 2024; GARP, 2025; HKMA, 2025; KPMG, 2025)

Risk materiality Assessment	46% of respondents report that sustainability risks are largely or fully integrated in Risk Materiality Assessments ▪ 0%—Not integrated ▪ 36%—Minimally integrated ▪ 18%—Partially integrated ▪ 21%—Largely integrated ▪ 25%—Fully integrated	▪ Climate Risk Materiality Assessments have become common (APRA, 2024; BaFin, 2025; ECB, 2026; KPMG, 2025) ▪ Nature Risk Materiality Assessments are becoming more evident, with 44% of banks conducting them (GARP, 2025).
Risk scope and taxonomy	54% of respondents report that sustainability risks are largely or fully integrated into Risk Taxonomy ▪ 4%—Not integrated ▪ 14%—Minimally integrated ▪ 29%—Partially integrated ▪ 29%—Largely integrated ▪ 25%—Fully integrated	▪ Sustainability risks are treated primarily as drivers of conventional prudential risk categories rather than as stand-alone risk types (APRA, 2024; BCBS, 2022; EBA, 2025; ECB, 2026; KPMG, 2025; PRA, 2025) ▪ Climate Physical and Transition Risks are routinely included in risk taxonomies. Some banks additionally include litigation and liability risk as a sub-type of climate risk (APRA, 2024; OSFI, 2024; PRA, 2024). ▪ More banks are naming specific nature-related risk drivers in their taxonomies (GARP, 2025). ▪ Greenwashing is increasingly identified as a driver of strategic and conduct risk (ECB, 2026; KPMG, 2025).
Risk monitoring and reporting	46% of respondents report sustainability risks are largely or fully integrated into Risk Monitoring and Reporting ▪ 0%—Not integrated ▪ 18%—Minimally integrated ▪ 36%—Partially integrated ▪ 32%—Largely integrated ▪ 14%—Fully integrated	▪ Climate risk metrics are increasingly disclosed and, in some institutions, included in internal risk reports (KPMG, 2025). ▪ Supervisors also note material weaknesses in the underlying data, methodologies, and analytics that limit the usefulness of these disclosures for decision-making (KPMG, 2025; OSFI, 2025; ECB, 2026). ▪ Coverage of non-climate sustainability risks remains far more limited (FSB, 2024; GARP, 2025; MAS, 2024), though nature-risk metrics are beginning to develop among leading European banks (ECB, 2026).

4.3 Progress in integrating sustainability risk into prudential risk types

The UNEP FI Risk Centre consultation reveals the extent to which the surveyed banks are integrating sustainability risk into different prudential risk types. Figure 2 depicts how these banks are prioritizing their integration efforts. Credit risk is the clear frontrunner, followed by strategic risk and operational risk. Liquidity and market risks are lagging. This finding is elaborated further below on the challenges to sustainability risk integration that consulted member banks have reported.

Figure 3 provides a more granular picture of progress across specific sustainability risks—climate, nature, pollution, and social—across each of the prudential risks.



Legend: This chart illustrates survey responses on which prudential risk types should be prioritised. Respondents were allowed to select up to 3 options. The results are displayed as a count for each of the risk categories.

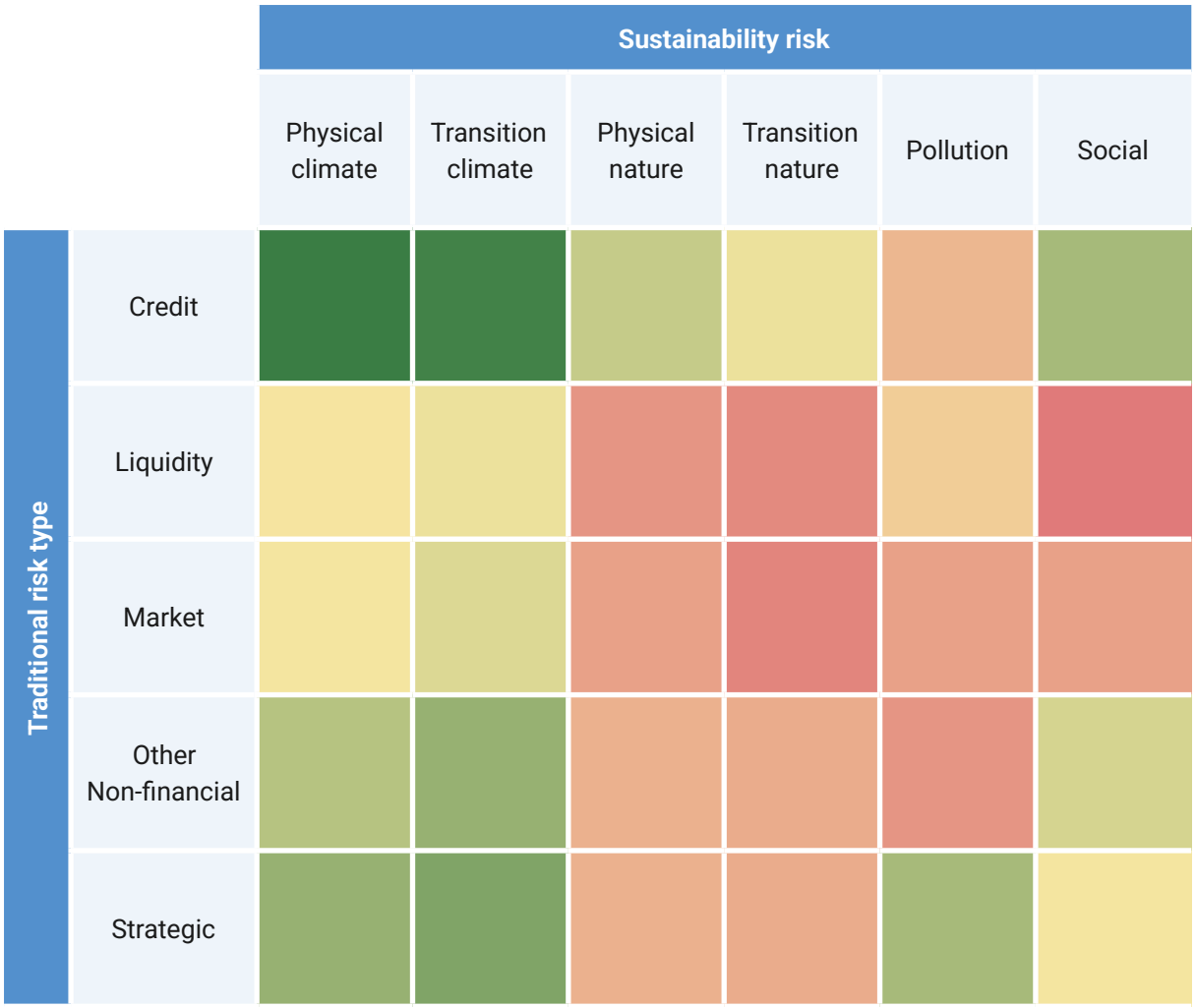
Figure 2: Findings on priority prudential risk types for sustainability risk integration

The table below summarizes the state of sustainability risk integration and the principal integration challenges across the six prudential risk types, based on the findings of the UNEP FI Member Bank Consultation and corroborating evidence from supervisory assessments and industry surveys.

Table 6: Progress and challenges in integrating sustainability risk, by prudential risk type

Prudential risk type	State of Integration	Key finding	Key challenges
Credit risk	**Most advanced—partial for most** 29–36% 'largely or fully integrated' across sustainability risk types	The primary entry point for sustainability risk. Climate risk is most advanced; nature risk is least developed. Pollution risk and social risk perform similarly in credit risk. Full integration into IFRS 9 and Pillar 1 and 2 capital models remains limited across the sector.	Data constraints are the dominant barrier, cited by 75% of UNEP FI banks as their primary challenge. Of those using third-party tools, 57% cannot translate outputs into measurable financial metrics and 50% cannot integrate them with existing risk models. Missing counterparty-level data (EPC ratings, emissions intensity, asset location) constrains full quantification. Embedding sustainability drivers into IFRS 9, Pillar 1, and Pillar 2 models remains limited; most banks rely on proxy data or partial quantification. Nature and social factors are typically treated as conduct checks rather than core credit-risk drivers (PRA, 2024; KPMG, 2025).
Market risk	**Early stage—significant gaps** 48% of responses at 'no integration'; climate performs best but 54% report 'not or minimally integrated'	Transmission channels recognized but rarely quantified. Integration into Value at Risk (VaR) or sensitivities uncommon. Nature risk embedded at only 19% of firms, up from 2% in 2024 (GARP, 2025).	Lack of common methodologies are cited by 29% of UNEP FI banks as a key barrier—a constraint that is particularly acute for market risk, where no standard approach exists for embedding sustainability drivers into VaR or sensitivity frameworks. Transmission channels from sustainability factors to market prices are indirect and poorly specified. Idiosyncratic scenario design is uncommon; most reliance is on broad NGFS shocks. Data gaps and modelling constraints remain the principal barriers (ECB, 2026; KPMG, 2025).
Liquidity risk	**Least advanced—structural barriers** 54% of responses at 'no integration'; only 18% 'largely or fully integrated'.	Fundamental time-horizon mismatch between short-term liquidity metrics (LCR, NSFR) and long-term sustainability risk drivers. Only a small leading group has begun incorporating climate-linked liquidity shocks into stress testing frameworks (ECB, 2026).	Short-term liquidity metrics (LCR, NSFR) are structurally misaligned with the long-term nature of sustainability risk drivers. Mapping sustainability factors onto survival horizons is technically difficult. The FSB (2024) notes that liquidity risk channels for nature risk have received insufficient analytical attention even at the supervisory level.

Prudential risk type	State of Integration	Key finding	Key challenges
Operational risk	**Progressing—physical climate leads** 32% 'largely or fully integrated' for physical climate risk (Note: consultation asked about physical climate risk only)	Physical climate risk as a driver of operational losses (business interruption, third-party failure) is increasingly recognized. Nature risk is embedded at only 10% of firms (GARP, 2025). Quantification and model integration remain immature.	Linking sustainability drivers to quantitative operational-risk methodologies is difficult because transmission channels are less direct than for credit risk. Nature risk is embedded at only 10% of firms (GARP, 2025). The FSB (2024) identifies operational risk as receiving far less analytical supervisory attention than credit and market risk (BaFin, 2025).
Strategy / business model risk	**Emerging—short horizons dominate** 19% 'largely or fully integrated'; 39% at 'no integration'	Climate scenario analysis is now used by most large institutions to test business model resilience, but integration is typically limited to one-to-five-year horizons. Nature and pollution risk are the least considered. Most banks have not yet embedded sustainability drivers into long-term strategic decision-making.	Most banks limit strategic integration to short time-horizons despite the long-term nature of the risks. Translating scenario analysis into routine business-model steering and capital allocation remains uneven. Nature and social drivers are rarely incorporated into formal strategic planning (ECB, 2026; KPMG, 2025).
Other non-financial risks (incl. Reputational)	**Widely cited—qualitative in practice** Reputational risk is the most cited transmission channel across surveyed banks.	APRA (2024) and HKMA (2025) identify reputational risk as a primary channel. GARP (2025) found 25% of firms embedding nature risk into reputational risk frameworks. Media-screening tools and internal awareness programmes are the most common management approach.	Reputational and other non-financial risks are assessed almost entirely qualitatively. Greenwashing and misconduct exposure are increasingly recognized but rarely formalized in risk frameworks. Standardized metrics for conduct-linked sustainability risks are largely absent across the sector (ECB, 2026; KPMG, 2025).



Legend: This heat map illustrates the degree to which sustainability-related risks are integrated into traditional risk types. Degree of integration is calculated using a weighted-average of categorical responses. Colour intensity reflects level of integration, ranging from low (red) to high (green). Specifically, red denotes average integration levels below 25%, yellow denotes levels between 25% and 35%, and green denotes levels over 35%.

Figure 3: Findings on integration of sustainability risks across prudential risk types

4.3.1 Credit risk

Credit risk is the primary entry point for climate risk (both physical and transition), which is the most advanced sustainability risk type across surveyed UNEP FI banks in terms of risk integration. Around one third (29–36 per cent) of surveyed banks report having largely or fully integrated climate risk, while only 7–11 per cent report having made minimal to no progress. Pollution risk and social risk perform similarly in credit risk. This reflects the more tractable links between pollution factors and social factors, on one side, and borrower creditworthiness, on the other side. Nature risk appears to be the least developed in credit. Overall, 19 per cent of credit risk responses across all sustainability risk types sit at minimal integration, while 22 per cent report it being largely or fully integrated. This shows that while integration within credit risk leads, it remains partial for most surveyed member banks.

This is repeated across the banking sector. Most banks already assess how sustainability drivers affect credit risk. This is far more than for any other risk type, possibly reflecting both supervisory pressure and the central role of credit portfolios as the main channel through which environmental

and social risks materialize. Banks have made progress in quantifying environmental risk drivers such as extreme weather events, resource scarcity, and nature dependencies. They are also increasingly linking these to creditworthiness, collateral values, and borrower resilience (ECB, 2026; KPMG, 2025). Credit-risk stress testing is now used not only to assess short-term impacts but also to evaluate long-term portfolio resilience under transition and physical climate risk pathways (ECB, 2026; HKMA, 2025).

Despite this progress, full integration of sustainability drivers into credit-risk models remains limited. Only a minority of banks have embedded sustainability factors into IFRS 9, Pillar 1, or Pillar 2 credit-risk models (KPMG, 2025; PRA, 2024). Banks are working to map sustainability drivers onto traditional modelling approaches with improved understanding of transmission mechanisms despite significant data gaps (ECB, 2026; KPMG, 2025). As a result, many rely on partial quantification or proxy data, and supervisors continue to press for faster methodological development (ECB, 2026; KPMG, 2025; PRA, 2024).

Numerous leading practices exist, including: the use of client transition-plan assessments to inform credit decisions; the application of sector- and technology-specific analysis to evaluate borrower risk profiles; and the embedding of physical-risk data such as asset location and value-chain exposure into credit assessments (ECB, 2026; HKMA, 2025). Banks are starting to map climate exposures across portfolios and increasingly using stress tests to identify concentrations and inform management action (ECB, 2026; HKMA, 2025). Climate considerations are also being reflected more directly in credit assessment through enhanced due diligence on transition plans, physical climate risk exposure, and climate-related drivers of ECLs (ECB, 2026; PRA, 2024). Common approaches include setting sector limits and concentration controls for climate-sensitive or high-emitting industries, as well as incorporating climate considerations into country and obligor ratings (ECB, 2026; HKMA, 2025). Climate risk is also being integrated into credit risk appetite, reinforcing expectations for underwriting, monitoring, and portfolio steering in line with defined tolerances (ECB, 2026; HKMA, 2025).

In more advanced institutions, portfolio management is increasingly treated as a forward-looking, scenario-driven discipline that is closely linked to transition planning, target setting, and risk appetite (ECB, 2026). These banks use portfolio-alignment metrics, client-level production-plan data, and scenario-based projections to steer portfolios toward strategic targets (ECB, 2026; PRA, 2025). Leading practices include setting short-, medium-, and long-term portfolio targets aligned with chosen decarbonization pathways, translating these into key risk indicators, and cascading them to business lines (ECB, 2026).

Supervisory exercises show that scenario analysis for credit risk is now widespread, but translation into routine portfolio steering remains uneven across institutions (HKMA, 2025; PRA, 2025). Evidence also points to fragmentation in modelling approaches, with more progress on integrating climate into probability of default than into other credit-risk parameters (ECB, 2026; PRA, 2025). The HKMA (2025) found that authorized institutions in its jurisdiction had incorporated climate-related considerations into risk management frameworks and policies, using climate and ESG risk questionnaires, internal scoring frameworks, enhanced due diligence, and client engagement. The PRA (2025) similarly describes banks as being at different stages when it comes to developing more granular approaches to quantifying the effect of climate risk drivers on ECL. In the case of more advanced firms, they are developing counterparty-level scorecards and expanding portfolio coverage for formal bottom-up analysis. Across UK banks, however, the dominant approach remains qualitative. As such, the PRA identifies the further embedding of climate risk into business-as-usual credit assessments for corporate exposures as a near-term priority (PRA, 2025).

By contrast, nature and social factors are more often treated as reputational or conduct checks than as core credit-risk drivers (KPMG, 2025; PRA, 2024).

4.3.2 Market risk

Among surveyed UNEP FI banks, market risk is one of the least developed areas of integration, with 48 per cent of responses at 'no integration'. Climate risk performs best, although 54 per cent of respondents at 'not or minimally integrated'. Nature and pollution risk are significantly less embedded: 54–64 per cent report no integration of physical nature, transition nature, or pollution risk into market risk frameworks, and only 7–14 per cent reach largely or fully integrated status. Social risk is similarly lagging in integration into market risk. The data confirm that for most surveyed member banks, market risk remains a gap across all sustainability risk types.

This trend is echoed across the sector. Most banks are at very early stages of assessing sustainability impacts on market risk (ECB, 2026; KPMG, 2025). Although banks recognize channels such as sentiment shifts, valuation changes, and transition-driven volatility, they rarely quantify these effects. Even fewer have begun integrating sustainability drivers into traditional market-risk models such as Value at Risk (VaR) or sensitivities (ECB, 2026; KPMG, 2025). Across the sector, the impact of sustainability risks on market risk is assessed by fewer than half of all institutions, making it one of the least developed areas of sustainability risk integration (KPMG, 2025).

Where sustainability risk does appear within market-risk frameworks, it is usually through stress testing, particularly via NGFS climate scenarios that capture broad market-wide shocks (ECB, 2026; KPMG, 2025). However, banks seem to seldom design idiosyncratic market-risk scenarios or embed sustainability factors systematically into their market-risk methodologies (ECB, 2026).

Emerging good practices involve explicitly linking transition and physical climate risk drivers to market-risk factors; for example, recognizing how carbon-intensive sectors may experience higher spread volatility, how disorderly transition scenarios can trigger abrupt repricing of equities or bonds, and how physical climate risks can affect commodity markets and sovereign spreads (ECB, 2026). More advanced banks embed these drivers into their market-risk taxonomies and assess trading-book exposures for sensitivity to climate- and nature-related shocks (ECB, 2026). Leading practices include developing internal scenario extensions from NGFS inputs to derive more granular institution-specific shocks, applying sector-specific spread shocks for carbon-intensive industries, using sensitivity-based profit-and-loss simulations to model the impact of climate-related variables such as carbon prices and credit spreads, and incorporating climate physical-risk-driven price shocks for commodities or geographies exposed to acute climate events (ECB, 2026). However, even in more advanced jurisdictions, market-risk integration remains at an early stage (ECB, 2026; KPMG, 2025).

For nature risk specifically, GARP (2025) found that 19 per cent of firms were embedding nature risk into market and traded-risk frameworks in 2025, up from 2 per cent in 2024. Data gaps, unclear transmission pathways, and modelling constraints remain the main barriers to further progress (ECB, 2026; KPMG, 2025).

Emerging methodological approaches to quantifying nature-related financial risks include impact valuation and natural capital accounting. These seek to assign economic values to banks' portfolio dependencies on natural systems as well as their impacts on such systems. While application in banking remains limited and methodologies are still developing, the Capitals Coalition's *Natural Capital Protocol* and associated *Biodiversity Guidance* provide a standardized framework for biodiversity-inclusive assessments (Capitals Coalition, 2023). Some financial institutions have begun to pilot these at the portfolio level.

4.3.3 Liquidity Risk

Integration into liquidity risk is the least advanced among member banks, with 54 per cent of responses at 'no integration' and only 18 per cent at 'largely or fully integrated'. Climate risk shows the most progress, but 36 per cent of respondents report 'no integration' of climate risk into liquidity frameworks.

Most banks have not yet translated sustainability risk drivers into liquidity-risk frameworks (ECB, 2026; KPMG, 2025). Banks recognize potential channels such as funding-cost volatility, investor sentiment shifts, and deposit instability linked to environmental or social controversies. However, these effects are rarely quantified (ECB, 2026). Integration into liquidity-risk models remains limited and difficult because banks are confronting technical challenges in mapping sustainability drivers onto traditional liquidity metrics such as the Liquidity Coverage Ratio (LCR), Net Stable Funding Ratio (NSFR), and survival horizons. In part, this is because liquidity risk operates over short-term horizons that create a fundamental time-horizon mismatch with the longer-term nature of climate and environmental risks. Another factor is that the transmission channels through which sustainability factors affect liquidity are more indirect and harder to specify than for credit risk (ECB, 2026; KPMG, 2025). The ECB observes that liquidity-risk integration remains at an early stage, with most banks based in the European Union still developing the capability to quantify climate- and nature-related liquidity impacts. This reflects the notable observation that the ECB's (2026) *Good Practices* document includes only a single liquidity-risk key risk indicator example, in constrast to an extensive treatment of credit-risk practices. A small leading group of banks is beginning to incorporate climate-linked liquidity shocks into stress testing frameworks, including scenario-based funding-cost increases, reduced market depth, and impaired collateral values, as well as metrics for deposits vulnerable to climate-related physical risk-induced bank runs (ECB, 2026).

For nature risk specifically, GARP (2025) found that only 13 per cent of firms were embedding nature risk into liquidity risk. The FSB *Nature Stocktake* explicitly acknowledged that liquidity and operational risk channels for nature risk have received insufficient analytical attention even at the supervisory level, limiting the regulatory impetus for banks to develop these capabilities (FSB, 2024).

4.3.4 Operational risk

UNEP FI banks are making progress in integrating physical climate risk into their operational risk frameworks, with 32 per cent at 'largely or fully integrated' and 11 per cent at 'no integration'. It should be noted that our consultation questions on operational risk focused specifically on physical climate risks; findings on other sustainability risk types within this category therefore draw on external sources.

KPMG's 2025 survey found that fewer than half of surveyed banks assess sustainability impacts on operational risk, and integration into existing operational-risk models remains rare (KPMG, 2025). Banks report challenges in linking sustainability drivers to quantitative operational-risk methodologies, partly because the transmission channels are less direct and harder to formalize than for credit risk (ECB, 2026). In practice, banks are working on capturing the direct impact of physical risks on banks' internal operations, infrastructure, and service delivery (ECB, 2026). The ECB (2026) has observed leading practices involving the identification of how extreme weather events, supply-chain disruption, environmental degradation, and regulatory change can trigger operational-risk losses. These losses relate to business interruption, loss of personnel and facilities, third-party provider failures, data-quality issues, and exposure to greenwashing, misconduct, and misrepresentation (ECB, 2026). Steps taken by more advanced banks include mapping these drivers to operational-

risk taxonomies, updating risk registers, and incorporating them into materiality assessments and internal control frameworks (ECB, 2026). Emerging practices include using physical-risk data such as asset location and supply-chain vulnerability to assess business-continuity exposures. For example, some banks map office buildings, recovery sites, and third-party data centres to wildfire, flood, and hurricane hazard maps. Another example is to link operational-risk assessments to governance, data-quality, and reporting enhancements (ECB, 2026). However, the ECB's overall assessment is that quantification and integration of sustainability drivers into operational risk remain immature across the sector (ECB, 2026).

BaFin's study of smaller German credit institutions with elevated physical risk exposure found that floods, storms, and droughts are increasingly expected to affect banks' own operations directly. This provides empirical evidence of physical climate risk as an operational risk source at the institution level, not only a financial risk to borrowers (BaFin, 2025). For nature risk, GARP (2025) found that only 10 per cent of firms were embedding nature risk into operational risk in 2025. The FSB (2024) similarly identified operational risk as receiving far less analytical attention from supervisors than credit and market risk, placing it in the same underdeveloped category as liquidity risk. In sum, it is acknowledged as a relevant transmission channel for sustainability risk drivers, but is not yet a focus of structured supervisory or institutional work.

4.3.5 Strategy risk

Nearly one fifth (19 per cent) of surveyed UNEP FI banks report that sustainability risk is 'largely or fully integrated' into strategy risk, while 39 per cent report 'no integration'. Climate risk performs best, reflecting the growing use of scenario analysis and business-model resilience assessments. Social risk shows moderate integration, suggesting that some member banks are beginning to reflect social considerations in longer-term strategic positioning. Nature risk appears least integrated within strategy risk. Pollution risk, by contrast, appears more advanced in the heatmap, which may reflect its clearer links to sector strategy, regulatory transition exposure, environmental liabilities, and borrower business-model viability.

Within the European Union, leading banks integrate the insights from sustainability risk materiality assessments, targets, and risk appetite into a coherent framework that guides business decisions and capital allocation. In this way, sustainability factors are treated as strategic risks capable of altering competitive positioning, profitability trajectories, and long-term resilience (ECB, 2026). The Federal Reserve's (2024) pilot Climate Scenario Analysis exercise found that all participating banks used climate scenario analysis to assess the resilience of their business models across a range of climate scenarios and to identify strategic vulnerabilities over both short- and longer-term horizons. In practice, however, sustainability risk is frequently embedded in strategic planning only over short-term horizons of one to five years (ECB, 2026). As a sector, progress remains uneven, with most banks yet having embedded sustainability drivers fully into strategic planning, business-model resilience assessments, or long-term decision-making. This is despite the potential impact of these drivers on sector profitability, client behaviour, regulatory expectations, and competitive positioning (ECB, 2026; KPMG, 2025). Emerging strategic considerations may increasingly include exposure to resource-intensive and linear business models that may become increasingly vulnerable to evolving regulation, technological disruption, changing consumer preferences, resource scarcity, and supply-chain volatility (Ellen MacArthur Foundation, 2025; OECD, 2024; UNEP FI, 2024).

4.3.6 Other non-financial risks (including reputational risk)

Reputational risk is a widely cited transmission channel for sustainability risk by banks (APRA, 2024; ECB, 2026; GARP, 2025). APRA (2024) found that Australian banks treating climate risk as a driver of other risks most commonly identify reputational risk as the primary channel, ranking it ahead of strategic risk and credit risk. HKMA (2025) observed that authorized institutions consider reputational impacts as part of their assessment of counterparties' nature-related conduct. It also noted that some firms are embedding climate and nature considerations into performance evaluation frameworks in part to manage conduct-linked reputational exposure. Meanwhile, GARP (2025) found that reputational risk is the second most common prudential risk type into which nature risk is being embedded at the firm level, with 25 per cent of surveyed firms doing so in 2025.

Banks face growing litigation and liability risks linked to climate, nature, pollution, and social harms. This is because legal theories, regulatory scrutiny, and civil-society action are increasingly targeting financial institutions for financed activities. Climate litigation has exceeded 3,000 cases globally, with a growing subset targeting financial institutions (UNEP, 2024; Setzer & Higham, 2024). Nature-, pollution- and social-related claims are also accelerating where banks finance activities that damage ecosystems, release toxic substances, contaminate land, or involve labour abuses, human rights violations, or community impacts (OECD, 2025; NGFS, 2026; UNEP, 2025; World Bank, 2025). Courts, regulators, and claimants are invoking precaution, polluter-pays, duties of care, due diligence obligations, and disclosure claims to argue that banks may share responsibility for harmful financing. This creates rising litigation, plus reputational and financial exposure, for banks that have material exposure to high-emitting, pollution-intensive or socially harmful sectors. Regulators and supervisors are increasingly warning that sustainabilityrelated harms can translate into material financial risks for banks. The PRA, for instance, emphasizes that these risks are already "*crystallising through litigation*" and must be treated as part of core risk management rather than future hypotheticals or purely reputational issues (EBA, 2026; PRA, 2025; UNEP, 2025)

4.4 Progress across sustainability risk types

The risk types examined in this report—i.e. climate, nature, pollution, and social risk—reflect current market and supervisory practice rather than a formal UNEP FI categorization. For an authoritative categorization of sustainability issues, readers are directed to the UNEP FI Impact Radar.

Climate risk

Substantial progress, uneven depth

Integration has advanced significantly over the past five years, driven by sustained supervisory pressure. Transition risk is more effectively integrated than physical risk, particularly in credit risk frameworks. Most banks have not yet assessed climate impacts on operational, market, liquidity, or concentration risk, and integration remains partial across institutions.

Data gaps are the primary constraint, with proxy reliance and model non-linearity further impeding progress (Federal Reserve, 2024; PRA, 2024).

Nature risk

Early stage across all prudential risk types

Awareness of financial materiality is growing. However, integration into core risk processes is very limited. Half of consulted banks report no integration of physical nature risk into liquidity, market, or strategic risks.

Data infrastructure remains a constraint; the multiplicity of indicators in use across companies makes portfolio-level aggregation highly problematic (FSB, 2024). Only 34% of surveyed firms have an internal definition of nature risk, and nearly half operate without formal regulatory guidance on the subject (GARP, 2025).

Pollution risk

Credit risk most integrated

Banks are more advanced on pollution than nature risk. Over 10% of member banks have largely or fully integrated pollution risk into their processes, with credit risk the most mature channel—reflecting the direct link between pollution exposure and borrower performance. The integration of pollution risk into market risk is stronger than for nature risk.

Most regulatory frameworks subsume pollution within broader environmental risk definitions, leaving banks without clear methodological guidance on identification and quantification (EBA, 2025; HKMA, 2025).

Social risk

Largely qualitative, credit risk most integrated

Social risk integration is more advanced than nature risk, primarily in credit risk where labour, human rights, and customer-related exposures link to borrower creditworthiness. Social factors are increasingly included in materiality assessments. Quantification remains elusive, and integration into models and stress testing is nascent.

Social risk is typically assessed qualitatively and lacks a quantitative data infrastructure to support model-based integration, with social metrics scarce and inconsistently defined across institutions (ECB, 2026; KPMG, 2025).

4.4.1 Climate risk

Surveyed UNEP FI banks have made progress in integrating climate risk into prudential risk types, in particular credit risk, although this integration remains largely partial. Taken across all prudential risk types, 57 per cent of responses for physical climate risk and 58 per cent for transition climate risk sit at 'partially, mostly or fully integrated'.

Over the past five years, climate risk integration into prudential risk management has progressed substantially, driven primarily by sustained and escalating supervisory pressure (ECB, 2026; & KPMG, 2025). Within the European Union, the ECB's five-year programme (2020–25) produced a measurable shift in practices among European significant institutions (ECB, 2026). KPMG's fourth iteration of its ESG Risk Survey for Banks (2025) confirms this directional progress across 153 institutions in 28 countries.

Transition climate risk appears to be integrated more effectively than physical climate risk (ECB, 2026; KPMG, 2025). Banks are most advanced in integrating transition climate risk within credit risk frameworks, reflecting both the relative maturity of credit risk methodologies and the influence of regulatory requirements (ECB, 2026). Moreover, the link between transition climate risk (including regulatory changes, technological shifts, and market changes) and borrower creditworthiness is more tractable than for physical climate risk. This makes it easier to embed the former in existing credit processes (ECB, 2026; PRA, 2024).

Despite this progress, supervisors note that significant gaps remain, and the depth of integration is uneven across institutions and across risk types (APRA, 2024; ECB, 2025; ECB, 2026; KPMG, 2025). The ECB's *Good Practices Compendium* (2026) acknowledges that advances remain concentrated in a subset of larger institutions and frequently cover only portions of the relevant portfolio rather than the whole (ECB, 2026). KPMG (2025) finds that while credit risk is the most advanced area of climate risk integration, most banks have not assessed climate risk impacts on operational, market, liquidity, or concentration risk, with business model and strategic risk lagging further still. Full quantification of climate risk drivers has been achieved by no more than 10 per cent of institutions globally, and the integration of climate factors into existing Pillar I and II models remains a major challenge (KPMG, 2025).

4.4.2 Nature risk

At surveyed UNEP FI banks, nature risk is substantially less advanced than climate risk across all prudential risk types. For physical nature risk, 62 per cent of responses are 'not integrated or minimally integrated', while for transition nature risk 64 per cent are 'not integrated or minimally integrated'. Credit risk is again the most developed entry point. Market, liquidity, and strategy risk are particularly underdeveloped, with 54–64 per cent of respondents reporting no integration of physical nature risk into these frameworks. Only nine to ten per cent of all responses across prudential risk types indicate 'largely or fully integrated' status for either nature risk subtype.

Fifty per cent of banks in the consultation report no form of integration of physical nature risk into liquidity, market, or strategic risks. Similarly, transition nature risk is at an early stage, with over half of consulted banks either not integrated or only minimally integrated. The integration of physical nature risk remains at an early stage across all risk types, with limited maturity even in credit risk and with significant gaps in market and liquidity risk.

Relatedly, KPMG (2025) found that 65 per cent of banks consider nature risks to be as relevant as, or more relevant than, climate risks in the long run. This reflects a growing awareness that ecosystem decline, resource scarcity, and physical environmental shocks can affect the real economy and, in turn, compromise financial stability. Despite this, most banks remain at an early stage of integration: only 34 per cent have an internal definition of nature, and fewer than half have conducted a nature-risk materiality assessment (KPMG, 2025). Integration into core risk processes is more limited still; just 6 per cent of surveyed banks have incorporated nature into credit scoring, 5 per cent into stress testing, and 4 per cent have developed nature transition plans (KPMG, 2025). Most current nature risk analysis remains qualitative and relies heavily on sector-level proxies rather than borrower- or location-specific data (ECB, 2026; KPMG, 2025). Progress is constrained by a lack of geospatial data, limited supply-chain transparency, and the absence of robust ecosystem-service metrics. All of these make nature-related exposures difficult to quantify (ECB, 2026; GARP, 2025).

4.4.3 Pollution risk

Pollution risk presents a differentiated picture. Over three-fifths (61 per cent) of member bank responses are 'not integrated or minimally integrated'. However, pollution risk shows a notable performance in credit risk, with 29 per cent of respondents selecting 'largely integrated' or 'fully integrated'. This is consistent with the more direct link between pollution-related liabilities—e.g. environmental fines, asset devaluation, stranded asset risk—and borrower creditworthiness. Market risk and liquidity risk remain poorly considered, with 64 per cent and 68 per cent of respondents reporting 'no integration' of pollution risk into these frameworks, respectively.

GARP (2025) found that 50 per cent of responding banks examine or intend to examine air pollution as a driver of nature-related risk. A similar proportion (48 per cent) do the same for water pollution. Only around 20 per cent currently use metrics, targets, or limits to measure pollution as a risk driver. The FSB (2024) references pollution indirectly, noting that the ESRS includes it as one of five environmental reporting standards. Unlike most supervisors, the HKMA (2025) names air pollution, water pollution, and land contamination explicitly as constituent environmental risks alongside climate and nature.

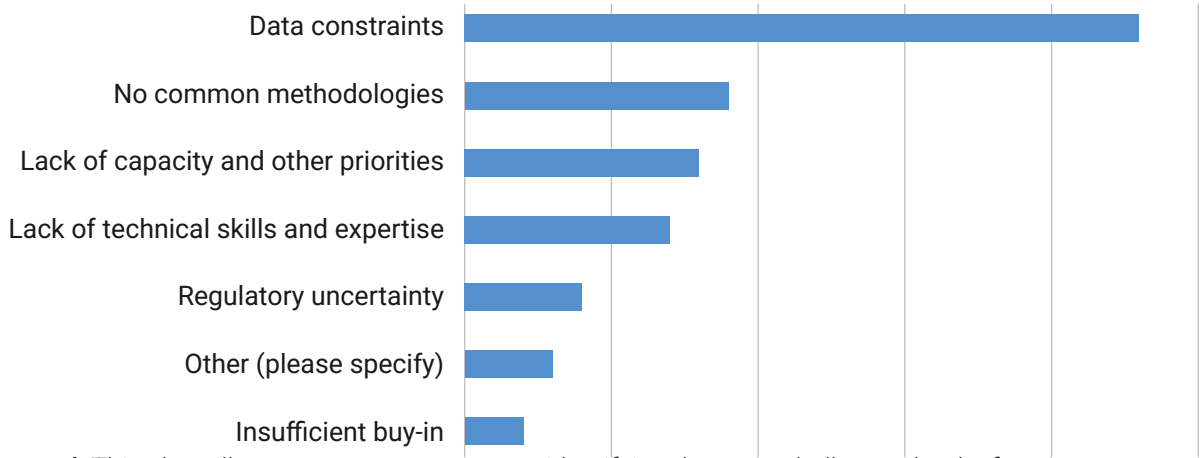
4.4.4 Social risk

Forty per cent of surveyed UNEP FI banks have 'partially, mostly or fully integrated' social risk, with higher levels of integration for credit risk and non-financial risks, reflecting the relative tractability of linking social factors to borrower creditworthiness and conduct or compliance risk frameworks. Liquidity and market risk are the least developed; 64 per cent and 54 per cent report 'no integration', respectively. Regarding strategy risk, 17 per cent of surveyed banks report social risk being 'largely or fully integrated', while 39 per cent report 'no integration'.

Because social risk is reportedly difficult to quantify and often measured only qualitatively, it is hard to incorporate into the metrics applied to liquidity and market risks (ECB, 2026; KPMG, 2025). To identify early warning signs, banks are increasingly using media-screening tools and internal awareness programmes to monitor ESG-related controversies, including those linked to social issues (ECB, 2026; KPMG, 2025). In practice, social drivers such as labour practices, human rights, community impacts, and customer treatment are typically included in the longlists and shortlists used in sustainability risk-related materiality assessments (EBA, 2025; ECB, 2026). However, most banks remain at an early stage of systematically integrating these factors into risk models, stress testing, and portfolio steering (ECB, 2026; KPMG, 2025).

4.5 Common challenges to sustainability risk integration

The evidence presented in this report demonstrates that sustainability risk integration is an evolving discipline, and that the pace of progress across the banking sector remains uneven. This section sets out the principal challenges that banks face in embedding sustainability risk into prudential risk frameworks.



Legend: This chart illustrates survey responses identifying the main challenges banks face in integrating sustainability risk. The results are displayed as a count for each of the risk categories, where respondents could select up to 2 categories.

Figure 4: Findings on main challenges in sustainability risk integration

Data constraints are the dominant barrier to sustainability risk integration, cited by 75 per cent of UNEP FI banks as their primary implementation challenge—more than double the next most common barrier. Capacity gaps (32 per cent), absent common methodologies (29 per cent), and skills shortages (25 per cent) form a second tier of structural constraints. Third-party tools exist but are not widely utilized by member banks; 32 per cent make no material use of third-party sustainability risk

tools at all. Of those that do use external tools, 57 per cent cannot translate outputs into measurable financial metrics, while 50 per cent cannot integrate them with existing risk models. Blackbox methodologies and data coverage gaps are cited by 29 per cent. These compound the problem of integrating sustainability risk, especially for gaps relevant to nature and social risk. Supervisory findings across jurisdictions confirm this is a sector-wide constraint (BaFin, 2025; OSFI, 2025, PRA, 2025), and express concern with the reliance on proxy data, third-party data and models (OSFI, 2025; Federal Reserve, 2023) that reduce supervisory comparability and limit validation.

Requests by member banks for guidance reinforces this picture. Metrics and KRIs are the most sought-after resource (75 per cent), followed by toolkits and training materials (both 46 per cent). High demand for risk appetite framework examples (39 per cent) points to a specific gap in translating sustainability risk assessments into quantitative limits and operational boundaries.

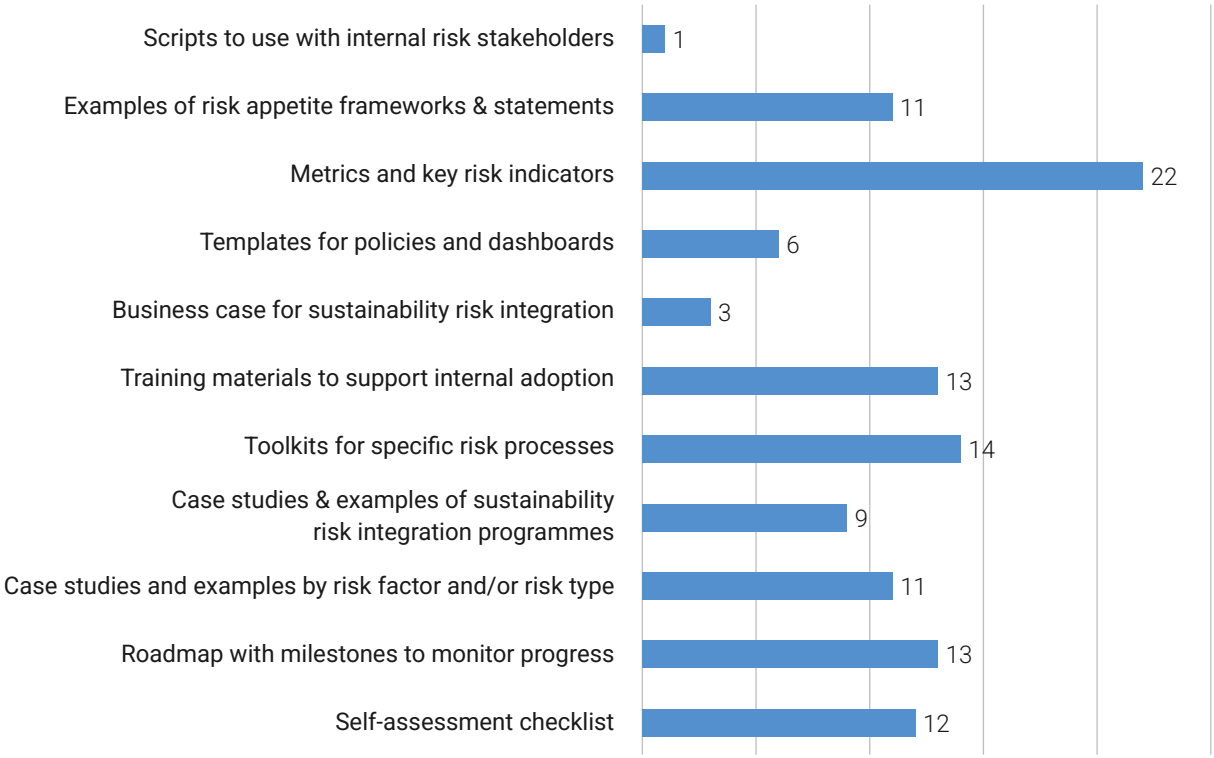


Figure 5: Findings on banks' guidance needs for sustainability risk integration.

Conclusions

The trajectory of sustainability risk management over the past 25 years shows why a more systematic approach to integration is now needed. What began as ad hoc environmental due diligence and reputational risk controls has evolved into a more structured discipline alongside credit, market, liquidity and operational risk. Selective exclusions have expanded into voluntary standards, disclosure frameworks, supervisory expectations, and, increasingly, mandatory prudential requirements. In many jurisdictions, as well as in many banks, sustainability risk is now treated as financially material and relevant to financial stability.

The differing levels of maturity across climate, nature, pollution, and social risk highlight the importance of a coherent integration pathway. Climate risk remains the primary focus globally, while nature risk is emerging; pollution and social risks continue to lag. For banks, environmental factors are increasingly embedded in governance, risk appetite, controls, and capital planning, although the depth of integration varies considerably. Social risk remains less developed in both regulation and practice.

The shift from high-level governance to operational embedding reinforces the need for structured methods that support implementation. Structural foundations are in place at many large banks, with board oversight, high-level policies and governance structures increasingly established. The challenge has moved from recognizing sustainability risk to embedding management of these risks in credit limits, provisioning, risk appetite, ICAAP, and routine risk models. Governance comprises the most advanced dimension of risk management, particularly for climate risk.

Persistent data and methodological constraints show why a systematic approach to integration is essential. Banks still face major data limitations. Counterparty-level climate data are often incomplete. Nature risk assessments often rely on sector-level proxies. Many banks also depend on third-party models. Materiality judgements and quantitative risk models directly depend on granular, reliable data; without which banks cannot accurately size exposures or estimate loss magnitudes. Full quantification of environmental risk drivers remains uncommon. Integrating these drivers into core risk models will therefore remain a central challenge in the coming years. The evidence base is also still developing. Sustainability risks can clearly transmit into financial losses, but robust portfolio-level evidence is still limited and methodologically contested. A methodological challenge also exists. Sustainability risks are often systemic, correlated across portfolios, and long-term in nature. This makes them harder to assess using standard risk tools. Counterparty disclosures, whether voluntary or regulated, may need to be supplemented by banks with data from other sources, including satellite and physical asset mapping. This will help to enhance the independence and reliability and robustness of sustainability risk quantification. These data uncertainties are not reasons to delay integration. Instead, they are the reason that a structured and systematic approach is needed. Such an approach can accommodate evolving evidence, support consistent measurement, and help build a stronger empirical foundation over time.

Evolution of sustainability risk management in banking: the need for an approach to integration. The growing breadth and complexity of sustainability risks make a coherent integration framework increasingly important. Supervisory expectations are rising faster than institutional capabilities, methods are advancing faster than data infrastructure, and the risk landscape is expanding from

climate to nature and social issues. These dimensions are interconnected and can amplify one another; a narrow focus on climate or on a single risk type risks, for example, leaves vulnerabilities in market, liquidity, operational, and strategic risk frameworks unaddressed.

A structured, bankwide approach is needed to embed sustainability across prudential risk management in a consistent and practical manner. Such an approach should combine guidance on sequencing, governance, and capability-building with the technical tools required for robust integration.

Progress depends on clear leadership, cross-functional coordination, appropriate skills, and data infrastructure, plus the ability to translate risk insights into business and capital decisions. Feedback from banks that were consulted points to a strong demand for a structured reference to guide integration efforts. Even though 50 per cent of respondents already have a sustainability risk integration framework, over 90 per cent of respondents still believe that banks would benefit from having a reference.

The progress documented in this report shows that while banks have advanced significantly, important gaps remain. The forthcoming set of publications on the **UNEP FI Risk Centre's Approach to Sustainability Risk Integration** is intended to help close these gaps by providing a clearer, more structured path to risk integration.

References

Auert-Bohlander, N., Buck, W., & Wienstroer, S. (2025, June 23). Considerable room for improvement. Deutsche Zeitschrift für Wirtschafts- und Insolvenzrecht (DZWIR).

APRA. Australian Prudential Regulation Authority (2024). *Climate risk self-assessment survey: Key findings report*. apra.gov.au/climate-risk-self-assessment-survey-key-findings-report

Bank of England (2025). *SS5/25—Enhancing banks' and insurers' approaches to managing climate-related risks*. bankofengland.co.uk/prudential-regulation/publication/2025/december/enhancing-banks-and-insurers-approaches-to-managing-climate-related-risks-ss.

Basel Committee on Banking Supervision (2022, June). *Principles for the effective management and supervision of climate-related financial risks. Bank for International Settlements*. bis.org/bcbs/publ/d532.htm

Basel Committee on Banking Supervision (2023, November). *Newsletter on the implementation of the principles for the effective management and supervision of climate-related financial risks*. Bank for International Settlements. bis.org/publ/bcbs_nl33.htm

Basel Committee on Banking Supervision (2024, April). *The role of climate scenario analysis in strengthening the management and supervision of climate-related financial risks* (Discussion paper). Bank for International Settlements. bis.org/bcbs/publ/d572.htm

Basel Committee on Banking Supervision (2025, June). *A framework for the voluntary disclosure of climate-related financial risks. Bank for International Settlements*. bis.org/bcbs/publ/d597.htm

BaFin—Bundesanstalt für Finanzdienstleistungsaufsicht (2024). *Physical climate risks at smaller German banks*. bafin.de/EN/Aufsicht/Nachhaltigkeitsrisiken/nachhaltigkeitsrisiken_node_en.html

De Nederlandsche Bank (2025, September). *Updated guide to managing climate and nature-related risk*. dnb.nl/en/sector-news/supervision-2025/q3/updated-guide-to-managing-climate-and-nature-related-risk-also-available-in-english/

Ellen MacArthur Foundation (2025). *Circular business models: Rethinking how value is created.* ellenmacarthurfoundation.org/circular-business-models

European Banking Authority (2023, October). *Report on the role of environmental and social risks in the prudential framework (EBA/REP/2023/34)*. eba.europa.eu/sites/default/files/document_library/Publications/Reports/2023/1062711/Report%20on%20the%20role%20of%20environmental%20and%20social%20risks%20in%20the%20prudential%20framework.pdf

European Banking Authority (2025, January 9). *Guidelines on the management of ESG risks (EBA/GL/2025/01)*. eba.europa.eu/activities/single-rulebook/regulatory-activities/sustainable-finance/guidelines-management-esg-risks

ECB & European Systemic Risk Board (2023, December). *Towards macroprudential frameworks for managing climate risk. ECB/ESRB Project Team on Climate Risk.* esrb.europa.eu/pub/pdf/reports/esrb.report202312~d7881028b8.en.pdf

European Central Bank (2023, December 18). Banks and insurance have key role to play in reducing climate-related financial stability risks, joint ECB/ESRB report finds [Press release]. ecb.europa.eu/press/pr/date/2023/html/ecb.pr231218_1~6b3bea9532.da.html

European Central Bank (2025, July 11). Banks have made good progress in managing climate and nature risks—and must continue. *ECB Banking Supervision: The Supervision Blog*. bankingsupervision.europa.eu/press/blog/2025/html/ssm.blog20250711~6b58023889.en.html

European Central Bank (2025, November 10). ECB Banking Supervision: Periodic penalty payments imposed on ABANCA Corporación Bancaria [Press release]. bankingsupervision.europa.eu/press/pr/date/2025/html/ssm.pr251110~3e0b6f579e.en.html

European Central Bank (2026, February 13). ECB Banking Supervision: Periodic penalty payments imposed on Crédit Agricole S.A. [Press release]. bankingsupervision.europa.eu/press/pr/date/2026/html/ssm.pr260213~d0ac373293.en.html

European Central Bank (2026, May). *Good practices for climate and nature risk management: Observations from the ECB's five-year climate and nature risk programme (2020–25).* ecb.europa.eu/pub/pdf/supervision/ecb.goodpracticesclimateandnatureriskmanagement.en.pdf

Equator Principles (2020). *The Equator Principles (EP4).* equator-principles.com; Equator Principles (2025). *EP Association members & reporting.* equator-principles.com/members-reporting/

Federal Reserve (2024, May 23). *Pilot climate scenario analysis exercise: Summary of participants' risk-management practices and estimates.* federalreserve.gov/publications/2024-may-pilot-climate-scenario-analysis.htm

Financial Stability Board (2017, June). *Recommendations of the Task Force on Climate-related Financial Disclosures: Final report.* assets.bbhub.io/company/sites/60/2021/10/FINAL-2017-TCFD-Report.pdf

Financial Stability Board (2022, October). Supervisory and regulatory approaches to climate-related risks: Final report. fsb.org/2022/10/supervisory-and-regulatory-approaches-to-climate-related-risks-final-report/

Financial Stability Board (2023, July). *FSB roadmap for addressing financial risks from climate change: 2023 progress report.* fsb.org/uploads/P130723.pdf

Financial Stability Board/NGFS (2022, November 15). Climate Scenario Analysis by Jurisdictions: Initial Findings and Lessons [Press releases]. fsb.org/2022/11/climate-scenario-analysis-by-jurisdictions-initial-findings-and-lessons/

Financial Stability Board (2024, July 18). *Stocktake on nature-related risks: Supervisory and regulatory approaches and perspectives on financial risk.* fsb.org/uploads/P180724.pdf

Financial Stability Board (2024, November). *Achieving consistent and comparable climate-related disclosures: 2024 progress report.* fsb.org/uploads/P121124.pdf

Financial Stability Board (2025, January). *The relevance of transition plans for financial stability.* fsb.org/2025/01/the-relevance-of-transition-plans-for-financial-stability/

Financial Stability Board (2025, July). *FSB roadmap for addressing financial risks from climate change: 2025 progress report.* fsb.org/uploads/P140725-2.pdf

GARP Risk Institute (2025, May). *2025 global survey of nature risk management at financial firms.* garp.org/risk-intelligence/sustainability/2025-garp-global-survey-nature-risk

Grantham Research Institute on Climate Change and the Environment (2025). *Global trends in climate and environmental litigation: 2025 snapshot.* lse.ac.uk/granthaminstitute/publications

Hong Kong Monetary Authority (2024, August 22). *Good practices on climate-related risk governance* [Circular]. hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2024/20240822e1.pdf

Hong Kong Monetary Authority (2025, February 28). *Climate Risk Stress Test 2.0: Annex—Climate Risk Stress Test 2.0 report 2023–2024.* brdr.hkma.gov.hk/eng/doc-ldg/docId/getPdf/20250306-2-EN/20250306-2-EN.pdf

International Finance Corporation (2025). *Approach paper for the update of IFC's sustainability framework*. ifc.org/content/dam/ifc/doc/2025/approach-paper-updated.pdf

IFRS Foundation (2025). *Jurisdictional adoption of ISSB standards*. ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/

IFRS Foundation (2026, April 22). ISSB agrees on the proposed way forward for nature-related disclosures [Press release]. ifrs.org/news-and-events/news/2026/05/issb-agrees-proposed-way-forward-nature-related-disclosures/

IMF (2024, January 24). Taking Steps to Ensure Financial Stability in Sub-Saharan Africa in the Face of Climate Change. imf.org/en/news/articles/2024/01/19/sp012424-taking-steps-ensure-financial-stability-sub-saharan-africa-climate-change

International Transition Plan Network (ITPN) (2026). *What does the IFRS's new guidance on transition plans mean for preparers?* itpn.global/what-does-the-ifrss-new-guidance-on-transition-plans-mean-for-preparers/

KPMG (2025, January). *ESG risk survey for banks: Market survey whitepaper.* assets.kpmg.com/content/dam/kpmg/gr/pdf/2025/01/gr-kpmg-esg-risk-survey-for-banks.pdf

Monetary Authority of Singapore (2026, March 5). MAS sets supervisory expectations on financial institutions for transition planning practices in addressing environmental risk [Press release]. mas.gov.sg/news/media-releases/2026/guidelines-on-transition-planning

Network for Greening the Financial System (2023, December). *Recommendations toward the development of scenarios for assessing nature-related economic and financial risks* (Technical document). ngfs.net/en/publications-and-statistics/publications/ngfs-recommendations-toward-development-scenarios-assessing-nature-related-economic-and-financial

Network for Greening the Financial System (2023, September). *Conceptual framework for nature-related financial risks* (Beta version). ngfs.net/en/publications-and-statistics/publications/nature-related-financial-risks-conceptual-framework-guide-action-central-banks-and-supervisors

Network for Greening the Financial System (2024). *NGFS membership and global regulatory trends.* ngfs.net/en/about-us/membership

Network for Greening the Financial System (2024, April). *Transition plan package: Credible transition plans—The microprudential perspective; Connecting transition plans—Financial and non-financial firms; Tailoring transition plans—Considerations for EMDEs* [Package of three reports]. ngfs.net/en/publications-and-statistics/publications/ngfs-transition-plan-package

Network for Greening the Financial System (2024, July). *Nature-related financial risks: A conceptual framework to guide action by central banks and supervisors* (Final version). ngfs.net/en/publications-and-statistics/publications/nature-related-financial-risks-conceptual-framework-guide-action-central-banks-and-supervisors

Network for Greening the Financial System (2025, January). *Guide for supervisors: Integrating climate-related and environmental risks into prudential supervision* (Updated version). ngfs.net/en/publications-and-statistics/publications/guide-supervisors-integrating-climate-related-and-environmental-risks-prudential-supervision

Network for Greening the Financial System (2025, January). *Guide on climate-related disclosure for central banks* (2nd ed.) ngfs.net/en/publications-and-statistics/publications/guide-climate-related-disclosure-central-banks-second-edition

Network for Greening the Financial System (2025, November). *Guide to climate scenario analysis for supervisors* (Updated edition). ngfs.net/en/publications-and-statistics/publications/ngfs-guide-climate-scenario-analysis-supervisors

Network for Greening the Financial System (2026, April). *Note on the supervision of nature-related financial risks.* ngfs.net/en/publications-and-statistics/publications/note-supervision-nature-related-financial-risks

Network for Greening the Financial System (2026, April). *Summary note on the improvement of modelling tools for nature-related financial risk scenarios*. ngfs.net/en/publications-and-statistics/publications/summary-note-improvement-modelling-tools-nature-related-financial-risk-scenarios

Office of the Superintendent of Financial Institutions & Autorité des marchés financiers (2025, September 11). *Strengthening climate risk financial resilience: Insights from the standardized climate scenario exercise*. osfi-bsif.gc.ca/en/about-osfi/reports-publications/strengthening-climate-risk-financial-resilience-insights-standardized-climate-scenario-exercise

Office of the Superintendent of Financial Institutions (2023). *Guideline B-15: Climate risk management.* osfi-bsif.gc.ca/en/guidance/guideline-b-15-climate-risk-management

Office of the Superintendent of Financial Institutions (2025, November 20). *Insights from the 2025 climate risk returns.* osfi-bsif.gc.ca/en/about-osfi/reports-publications/insights-2025-climate-risk-returns

Organisation for Economic Cooperation and Development (2024). *Business models for the circular economy.* OECD Publishing. oecd.org/environment/waste/business-models-for-the-circular-economy.htm

Prudential Regulation Authority & Financial Conduct Authority (2024). Climate Financial Risk Forum. Bank of England. bankofengland.co.uk/climate-change/climate-financial-risk-forum

Prudential Regulation Authority (2024, September 27). *Thematic feedback on accounting for IFRS 9 expected credit losses and climate risk (Dear CFO letter)*. Bank of England. bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2024/thematic-feedback-on-accounting-for-ifrs-9-ecl-and-climate-risk.pdf

Prudential Regulation Authority (2025, December). *Supervisory statement 5/25: Enhancing banks' and insurers' approaches to managing climate-related risks. Bank of England*. bankofengland.co.uk/prudential-regulation/publication/2025/december/enhancing-banks-and-insurers-approaches-to-managing-climate-related-risks-ss

Prudential Regulation Authority (2025, January 30). *PRA climate change adaptation report 2025. Bank of England.* bankofengland.co.uk/prudential-regulation/publication/2025/january/pra-climate-change-adaptation-report-2025

Swiss Financial Market Supervisory Authority (2024, December 17). FINMA publishes new "nature-related financial risks" circular [Press release]. finma.ch/en/news/2024/12/20241207-mm-rs-2026-01-naturbezogene-finanzrisiken/

Swiss Financial Market Supervisory Authority (2024, February 1). Nature-related financial risks: FINMA launches consultation on new circular [Press release].

finma.ch/en/news/2024/02/20240201-mm-rs-naturbezogene-risken/

Taskforce on Inequality and Social-related Financial Disclosures (2024, September). *People in scope: TISFD foundational paper.* tisfd.org/downloads

United Nations Environment Programme Finance Initiative (2024, April). *2024 climate risk landscape report.* unepfi.org/wordpress/wp-content/uploads/2024/04/Climate-Risk-Landscape-2024.pdf

United Nations Environment Programme Finance Initiative. unepfi.org/themes/climate-change/sustainability-disclosure-landscape-report-for-risk-management-insights-from-climate-focused-case-studies/

United Nations Environment Programme Finance Initiative (2024). *Guidance on resource efficiency and circular economy target setting. United Nations Environment Programme Finance Initiative.* unepfi.org/publications/guidance-on-resource-efficiency-and-circular-economy-target-setting

United Nations Environment Programme Finance Initiative (2023). *Finance for circularity and a pollutionfree planet. United Nations Environment Programme.* unepfi.org/publications/finance-for-circularity-and-a-pollution-free-planet/

United Nations Environment Programme Finance Initiative (2025, October). *Responsible banking: A six year journey of systemic change. Principles for Responsible Banking Third Biennial Progress Report.* unepfi.org/industries/banking/principles-for-responsible-banking-third-biennial-progress-report-2/

University of Cambridge Institute for Sustainability Leadership (2025, June). *Building capacity to identify and assess nature-related financial risks.* cisl.cam.ac.uk/news-and-resources/publications/building-capacity-identify-and-assess-nature-related-financial-risks

World Bank (2024). *Finance and prosperity 2024. World Bank Group.* documents.worldbank.org/curated/en/099082824134011957/pdf/P5006691ec24eb091192dc12ab75189fc76.pdf

UN environment programme

finance initiative

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Convened by a Geneva, Switzerland-based secretariat, more than 550 banks and insurers are individually implementing UNEP FI's Principles for Responsible Banking and Principles for Sustainable Insurance. Financial institutions work with UNEP FI on a voluntary basis to apply these industry frameworks and develop practical guidance and tools that drive institutional change, shaping the future of sustainable finance and positioning their businesses for the transition to a sustainable and inclusive economy. In parallel, UNEP FI also drives systems change and fosters enabling conditions in service of the broader mission to mobilize and align private finance to help achieve the UN Sustainable Development Goals.

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