Macroprudential and Microprudential Perspectives on Implementing the Basel Principles on Climate-Related Financial Risks: Considerations for the Reserve Bank of India

Climate Bonds INITIATIVE

ODI Global

auctusESG

SOAS University of London

Report of the India Initiative on Climate Risk and Sustainable Finance (IICRSF) led by Climate Bonds Initiative with its partners ODI Global and auctusESG in collaboration with SOAS University of London

Table of Contents

Abbreviations and acronyms

BCBS Basel Committee on Banking Supervision

BIS Bank for International Settlements

CRFR Climate-related financial risk

CRR Cash reserve ratio

ECB European Central Bank

FGDs Focus group discussions

FSB Financial Stability Board

MSME Micro, small, and medium-sized enterprises

NDC Nationally determined contribution

NBFC Non-banking financial company

NGFS Network for Greening the Financial System

PPP Public penalty payments

PSL Priority sector lending

RBI Reserve Bank of India

RB-CRIS Reserve Bank – Climate Risk Information System

RBI Discussion Paper – RBI Discussion Paper on Climate Risk and Sustainable Finance 2022

RBI draft disclosure framework – RBI Draft Disclosure Framework on Climate-Related Financial Risks 2024

RE Regulated entities

SEBI Securities and Exchange Board of India

SLR Statutory liquidity ratio

Table CRFRA Qualitative information on climate-related financial risks (governance, strategy, and risk management)

Table CRFRB Qualitative information on climate-related financial risks (transition risk, physical risk, and concentration risk)

TPI Transition Pathway Initiative

TPT Transition Plan Taskforce

Report summary

The Basel Committee on Banking Supervision (BCBS) published principles for the effective management and supervision of climate-related financial risks in 2022, which identify how banks should analyse and address such risks in their corporate governance, internal control frameworks, and risk management processes.[1] They also identify the role that financial supervisors should play in supporting the effective management of climate-related financial risks. A distinct feature of these principles is that they have a microprudential orientation since they primarily focus on the exposure of banks to climate risks at the micro level. A macroprudential perspective which highlights the critical role of systems-based interactions between the macroeconomy and the banking sector is particularly relevant in the context of climate risks and impacts. Given that such interactions are particularly important for India, the implementation of the Basel principles by Indian banks and the Reserve Bank of India (RBI) could lead to side effects that may increase systemic climate-related macro-financial risks. To address this issue, Section 1 of the paper suggests two principles that could augment the Basel principles and would be conducive to the macro-financial resilience of India to climate risks. These principles focus on the supervisory framework for the development and promotion of transition plans as well as on the policy framework for the support of transition and adaptation finance.

At the microprudential level, the successful management of climate-related financial risks (CRFRs), integrated as part of the Basel Core Principles in 2024, would need to overcome practical hurdles, mainly in quantifying risks, data collection, and integrating climate risks into capital and liquidity assessments. The release of the voluntary framework for the disclosure of CRFRs by BCBS in June 2025 is further aimed at enhancing how banks disclose CRFRs and serves as a global reference point.[2] Section 2 of the paper discloses the knowledge gained from stakeholder consultations with Indian banks following the work initiated by the RBI on CRFRs. These suggest that banks will need detailed guidance on (a) data sources for climate and economic variables; (b) the selection and comprehension of climate risk categories; (c) the process of integrating climate-risk drivers into parameters in traditional risk management frameworks; (d) methodology for climate scenario analysis and stress testing; and finally, (e) the need for capacity building at all levels of banking operations to implement climate-risk integration methodologies, quantifying risks, data collection, and integrating climate risks into capital and liquidity assessments.

Introduction

There have been several initiatives by central banks and financial supervisors over recent years that aimed to analyse and address climate-related financial risks. The BCBS established the Task Force on Climate-related Financial Risks (TFCR) to contribute to one such initiative: the development of a set of 18 principles (Basel principles) for the effective management and supervision of climate-related financial risk, by both banks and financial supervisors.[3] The BCBS revised the Basel Core Principles for Effective Banking Supervision (BCP) to explicitly include CRFRs as a supervisory priority, reflecting a global consensus on the need for action. The BCBS had earlier planned to establish qualitative and quantitative disclosure requirements on CRFRs as part of its Pillar 3 disclosure framework by January 2026, aligning with international sustainability standards, an ambition contained in the voluntary framework for managing climate risks released in June 2025 (the Basel voluntary framework).[4,5]

The Basel principles are characterised by a microprudential orientation as their primary focus is the exposure of banks to climate risks at the micro level. A macroprudential perspective which highlights the critical role of systems-based interactions between the macroeconomy and the banking sector in line with the principle of double materiality does not yet find the attention it deserves. As explained in this report,

these interactions are particularly important for India. Therefore, the adverse side effects of increased systemic climate-related macrofinancial risk that may arise from implementing the Basel principles are pertinent to the Reserve Bank of India. These adverse effects may also be enhanced by the fact that the Basel principles do not explicitly reflect the specific features of emerging market economies whereby it is typically the case that (i) the transition to a net-zero economy can have adverse effects on development if not properly designed, (ii) the vulnerability to physical risks is on average much greater than in developed economies, (iii) the access to finance is much more challenging for micro, small, and medium-sized enterprises (MSMEs) and low-income households, (iv) public sector banks have a significant presence in the domestic banking sector, (v) banks hold a significant proportion of sovereign government bonds, and (vi) bank behaviour is reliant on financial regulation.

Section 1 analyses these issues and explains the need for developing a macro-oriented system of supervision and policy framework that prevent the likely consequences of implementing the 18 Basel principles on the Indian macro-financial system and appropriately support transition and adaptation finance. It provides a summary of the core features of the Basel principles, examines their microprudential orientation, describes the key features of the Indian financial system, and analyses why the microprudential orientation of the Basel principles might generate some adverse side effects when implemented in India. Two macroprudential principles to augment the Basel principles are put forward to complement the application of the existing 18 principles to the Indian financial system and the challenges related to the implementation of these principles are outlined.

Due to the heightening significance of climate-related financial risks, Section 2 of this paper examines the alignment of Basel principles with an RBI Discussion Paper on Climate Risk and Sustainable Finance published in 2022 (the RBI Discussion Paper) and the subsequent RBI Draft Disclosure Framework on Climate-Related Financial Risks 2024 (the RBI draft disclosure framework), the relevance and applicability of these guiding documents including the latest Basel voluntary framework for banks to integrate CRFRs, and additional guidance that banks seek from RBI towards management of CRFRs.

This section presents the insights gathered from secondary research and primary stakeholder consultations and engagements with senior bankers and policy experts. These discussions have underscored the practical challenges and opportunities for integrating climate-related financial risks into banking practices for the applicability of the Basel principles and the RBI draft disclosure framework. The findings reiterate the need for further standardised templates and guidance, information and knowledge on forward-looking climate-risk scenarios, easily accessible climate and economic data, methodologies to integrate climate-risk drivers, and guidance on financing the opportunities. Stakeholders press upon the need for building capabilities within banks, given the complexity and multidimensional aspects of climate-related financial risks, and a greater understanding of tools and instruments for financing the transition.

While the RBI is already taking a series of crucial steps, this report concludes by recommending seven ideas for further consideration by the RBI given that the national adoption of the Basel principles will need relevant contextualisation. Tables and templates contained in the Basel voluntary framework 2025 could inform and be adapted for the format that RBI is finalising for standardisation of disclosures on managing CRFRs, providing further guidance on transition plans, making bank-borrower engagement accountable and transparent, advancing towards a macroprudential approach on climate risks and finance for financial stability, advancing inter-agency coordination, and building capability of regulated entities as critical steps to put RBI ambition into action on managing CRFRs ensuring financial stability and financing transition.

1. Macroprudential principles for addressing climate-related financial risks in India

1.1 The microprudential orientation of the Basel principles

The Basel principles are classified into four broad categories: (1) corporate governance; (2) strategy and internal control; (3) risk identification and management (including scenario analysis); and (4) supervision. The first three categories capture the actions of banks while the last category refers to the practices and policies of financial supervisors. According to the corporate governance principles, banks should consider CRFRs and incorporate them into strategies, organisational structures, policies and procedures to ensure their effective management. The strategy and internal control principles suggest the identification and quantification of climate risks and their incorporation into capital/liquidity assessment processes and stress testing exercises. The risk identification and management principles recommend the monitoring and management of the impact of climate change on several types of risk that banks traditionally face, such as credit risk, market risk, and operational risk using scenario analysis. The supervision principles primarily capture the role of supervisors to ensure banks follow the BCP and have the capacity and resources to effectively do so. In their current form, the Basel principles tend toward a microprudential focus, in which an approach to regulation and supervision centres on how to protect individual financial institutions from exposures to risks without considering system-wide effects.[6] Regarding CRFRs, such approaches imply that financial institutions should manage their exposure to physical and transition risks without consideration for feedback effects on the real economy that the management of those risks might generate.[7]

By contrast, macroprudential approaches consider financial risks from a systems-based perspective, which considers how financial institutions interact with the macroeconomy and each other through financial networks.[8] Macroprudential approaches received close attention from prudential regulators after the Basel II regulation, based mainly on microprudential principles, was unsuccessful in preventing the global financial crisis despite its stated objective of mitigating financial risks. The Basel III framework developed after the crisis incorporated several macroprudential elements, such as the counter-cyclical capital buffer and the capital conservation buffer.[9]

With regard to CRFRs, macroprudential approaches are consistent with the concept of double materiality, which suggests that financial institutions are not only exposed to transition and physical risks, but that their actions, including how they manage these risks, affect climate macro-financial risks themselves and broader environmental outcomes (see Figure 1).[7]

Figure 1: Climate macro-financial risks from a double materiality perspective

Source: Authors' depiction

Basel principles have a microprudential focus since they identify how banks should develop strategies, policies, procedures, structures, and capacity to manage risks from a micro-oriented exposure perspective. This assumes that if banks manage to analyse and address their individual exposure to risks, the banking system as a whole will have successfully addressed climate-related challenges. There is no explicit attention to the broader system-wide implications that can arise, for example, when many individual banks try to simultaneously reduce their exposure to climate risks.

This report posits that climate-related macroprudential considerations are of value as the RBI progresses in designing and prescribing detailed guidance, drawing on the Basel principles and the Basel framework for the voluntary disclosure of CRFRs that relies on these principles.[2] To ensure financial stability, the unique features and the systemic dimensions of CRFRs may require the application of macroprudential policies complementary to the risk management and direct supervision of individual banks. Such complementary macroprudential and microprudential approaches may be needed to account for the long horizon of CRFRs and their complex interactions.

Prior to explaining why the lack of macroprudential perspectives might generate negative outcomes when the Basel principles are implemented by Indian banks and how these could be addressed, an overview of the main features of India's financial system from a macroprudential perspective is provided below.

1.2 Indian financial system: macroprudential perspective

India's banking system is dominated by public sector banks, which account for 60% of total bank assets; the remainder being held by foreign and private sector banks that operate in India.[10] The prominence of public sector banks implies a direct link between public finances and banking stability: if public sector banks face climate-related losses the public deficit or debt can be affected, which can have macroeconomic implications.

Banks are required to hold a specific proportion of their liabilities in cash, gold, and government securities. This is reflected in the statutory liquidity ratio (SLR) which is currently equal to 18%.[11] Moreover, banks must allocate 40% of their adjusted net bank credit (ANBC) to priority sector lending (PSL) sectors (agriculture, micro, small and medium-sized enterprises, export credit, education, housing, social infrastructure, and renewable energy).[12,13] This signifies that if banks face liquidity or solvency problems due to climate risks that their borrowers face, this could have adverse implications for the financing of public sector spending and the financial support of sectors that play a key role in India's development. While the government could increase the proportion of bank assets to be held in the form of government securities and PSL loans to avoid these adverse implications, a climate-impaired banking sector would restrict the credit available to other sectors of the economy, damaging macroeconomic activity and development.

The representation of non-bank financial corporations (NBFCs) in the Indian financial system is gradually increasing and they specialise in one or a few loan segments.[14] The share of credit that comes from market-based finance is also slowly increasing with the outstanding amount of corporate debt securities approaching 20% of GDP and likely to continue to increase due to initiatives aimed at promoting market-based finance.[10,13] Such initiatives include lending to infrastructure, housing, or economically disadvantaged groups. As a result, NBFC loan portfolios are less diversified in comparison to banks with the most significant sources of funding for NBFCs being debentures and bank borrowing.[15] As bank borrowing accounts for more than 30% of the liabilities of NBFCs, there is significant interlinkage between banks and NBFCs in two respects. Firstly, when banks face financial challenges, the ability of NBFCs to finance their loan activities can be directly disrupted. Secondly, if NBFCs cannot repay their debt, banks are likely to face financial losses on the asset side of their balance sheet.

1.3 Implementing the Basel principles in practice: macroprudential trade-offs

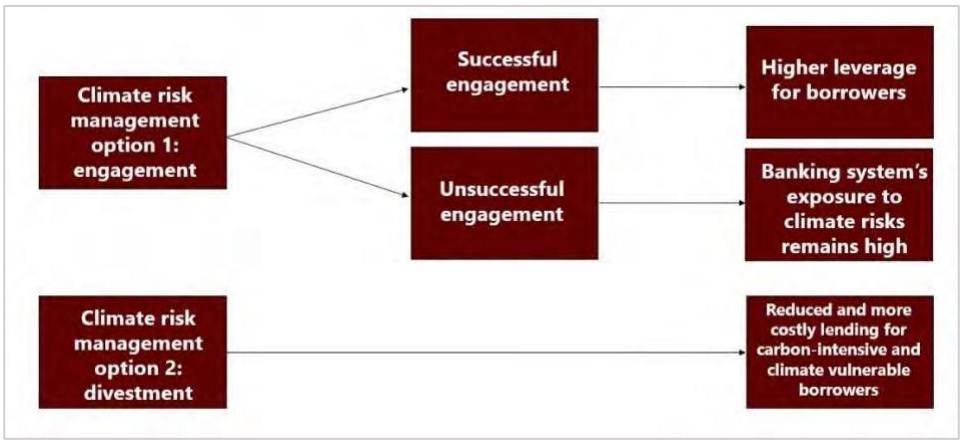
Implementing the Basel principles in the Indian context will not be without challenges as detailed in Section 2. Currently, there is a significant lack of consistent and sufficiently granular data both on transition and physical risks. Additionally, banks are uncertain about the scenarios they should apply to exploring climate risks and there is a lack of awareness of the metrics appropriate for analysing climate risks. Moreover, most banks lack the capacity, expertise, and resources that are necessary for analysing and managing CRFRs.

Addressing these challenges is crucial for the implementation of the Basel principles and will require a significant amount of time and commitment. The exercise undertaken by the RBI on stress testing and climate scenarios, and the BCBS voluntary disclosure framework will help in this respect.[16] However, more consideration is required as to how banks can manage these risks, the macro-financial implications of different risk management options, and addressing or minimising macroprudential trade-offs.

To manage climate-related financial risks, Indian banks can generally select one of two risk management options (see Figure 2).[17] The first option requires banks to engage with their carbon-intensive and climate-vulnerable borrowers, which if successful can lead to the provision of finance for investment in greener assets, covering the costs of decarbonisation efforts in the high-emitting sectors, and undertaking adaptation finance. This can take place in the context of borrowers' transition plans which should specify in a precise and credible way the actions companies intend to pursue in order to reduce their climate footprint and climate vulnerability. These actions include mitigation investments such as renewable energy technologies and energy efficiency, as well as adaptation investments in climate-smart agriculture and climate-resilient buildings. They can also include the relocation of assets in areas that are exposed to climate-related events.

From a macroprudential perspective, the significant advantage of this risk management option is that it does not cut off carbon-intensive and climate-vulnerable borrowers from access to finance. However, the significant demand for mitigation and adaptation investment financing requires borrowers to substantially increase their leverage, which also heightens their risk of default.[18] Retained corporate profits are insufficient to finance all the required investment while the public sector contribution to financing the transition is limited by fiscal policy space constraints. Higher defaults erode bank capital, which is exacerbated by the possibility of stranded assets that further increase bank losses, making banks more susceptible to insolvency.

Figure 2: Macro-financial implications of different climate risk management options



Source: Authors' depiction

Equally, bank engagement with borrowers may not always be successful. Borrowers might not have the capacity or will to change their business models or undertake the investments required to reduce their exposure to transition and physical risks. If Indian banks commit to engagement over divestment from specific borrowers in this scenario, the Indian banking sector will remain exposed to transition and physical risks for the foreseeable future. Transition risks not only involve the exposure of banks to national transition

policies but also to global transition ones, which can reduce the revenues of Indian carbon-intensive exporting companies through increased energy costs due to higher prices for imported fossil fuels.

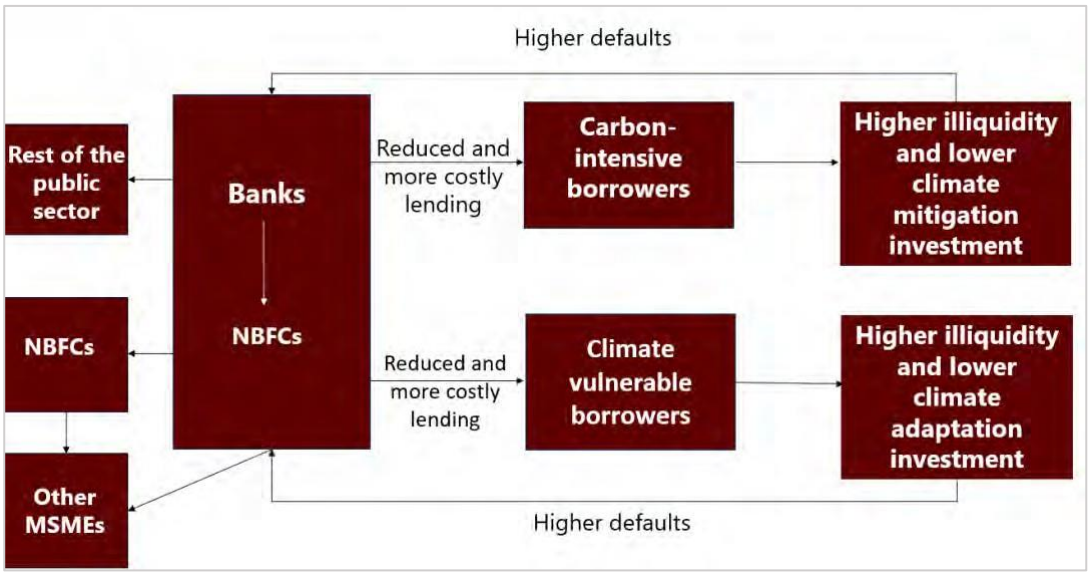
A second risk management option for Indian banks is to reduce lending to/or increase the cost of borrowing for corporates exposed to transition and physical risks that are failing to take action to reduce this exposure. While Indian banks are unlikely to follow this option in the short run, not least because this would have adverse socio-economic implications and would undermine development, this is not a possibility that should be excluded for the future. The RBI draft disclosure framework specifies that regulated entities should set specific targets for climate-related metrics, such as financed emissions.[19] In time, these targets may not be achievable without some form of divestment from borrowers with a carbon-intensive profile so banks could choose divestment to maintain credible climate commitments.

Furthermore, as physical risks become more prevalent, some corporate exposure to physical risks (e.g., assets in areas prone to floods and cyclones) might not decline substantially even with significant investment in adaptation. In such a scenario, banks might choose divestment as the safest option.

Bank surveys in other countries conducted as part of climate stress-testing exercises illustrate that several banks are considering divestment options as a response to the rise in climate risks. For example, in the 2020 Banque de France pilot exercise, banks were asked to identify how they would change their credit exposure to carbon-intensive sectors under different climate scenarios.[20] Bank submissions indicated high heterogeneity in terms of changes to sectoral exposures, with a significant proportion of banks indicating that they would reduce their exposure to high-carbon sectors. For instance, in respect of credit exposure to the coke manufacturing and refined petroleum product sector, two out of six banking groups indicated complete divestment from the sector with two further banking groups reducing exposure in line with the financial challenges faced by the sector as a result of the green transition, implied by climate transition scenarios. In the 2021 climate stress-testing exercise conducted by the Bank of England, several banks indicated plans to reduce exposure to some of the most carbon-intensive sectors of the economy.[21] They also indicated that in a hot-house world scenario they would reduce lending related to properties facing acute physical risks. These surveys illustrate that divestment from specific sectors and companies is not an implausible scenario especially in the medium to long run.

Figure 3 depicts the potential effects of divestment on the Indian macro-financial system. If several Indian banks and NBFCs simultaneously reduced or ceased lending to corporates deemed to be facing higher physical risks for example, including public sector companies and MSMEs, access to finance may cease or become more expensive. Firms would not only face liquidity issues, but they would not be able to invest in climate adaptation to reduce their climate vulnerability, making them more fragile as a result.

Figure 3: Potential effects of divestment on the Indian macro-financial system



Source: Authors' depiction

The effect of this risk management option would be reduced economic activity (as lower consumption and investment of households and firms has wider effects due to macroeconomic and supply chain interconnections), undermining the ability of the private sector to reduce its climate vulnerability. The overall result would be a system-wide increase in default rates that can make the Indian banking sector more prone to insolvency, exacerbating the macro-financial effects of physical risks.

The adverse macro-financial effects could extend beyond this as many Indian banks are owned by the public sector, so the coverage of bank capital needs could create pressures on public finances. In addition, many Indian banks could reduce their lending to NBFCs and other MSMEs apart from those MSMEs that are carbon-intensive and climate-vulnerable, to protect their financial position. This could further reduce economic activity with adverse effects on defaults facing the Indian banking system. It is important to note that in India, MSMEs constitute 30% of India's GDP, but their access to finance is limited and their reliance on short-term debt makes them particularly fragile.[22] [23] [24] The implementation of the Basel principles could disproportionally affect MSMEs that are vulnerable to climate as these enterprises have a lower capacity to invest in adaptation and can more easily lose access to finance in the case of divestment scenarios.[25]

The macro-financial effects could be similar in the case of transition risks. The divestment risk management option would not only affect fossil fuel companies, but also companies in the manufacturing and transport sectors with a high emissions profile and business models inconsistent with the green transition. Since these companies constitute a significant part of the Indian economy, losing access to finance (or higher borrowing costs) would exacerbate the system-level transition risks and the Indian macro-financial system would become more fragile. This fragility is reinforced if households that live in carbon-intensive properties also face challenges in terms of their access to finance. As in the case of physical risks, this could have spill-over effects on public finance, MSMEs, and NBFCs, if financial losses cannot be covered by banks.

The analysis above illustrates that both engagement and divestment can have adverse macro-financial effects and can, therefore, create trade-offs from a macroprudential perspective. While engagement ensures borrowers have access to mitigation and adaptation finance, as a consequence, their leverage may increase and unsuccessful engagement may create lock-in effects. Divestment can accelerate decarbonisation of the financial system but may undermine transition and adaptation finance, and cause macroeconomic and social instability. As the Basel principles do not provide guidance on how monetary and prudential authorities can take action to address these trade-offs, they may not necessarily safeguard macro-financial stability and, under specific cases, might generate macro-financial side effects.

Table 1: Advantages and side effects of engagement and divestment as climate risk management options for Indian banks

	Engagement	Divestment
Advantages	Access to mitigation and adaptation finance remains good	Can lead to rapid decarbonisation of the Indian financial system
Side effects	Borrower leverage may increase, and unsuccessful engagement may create lock-in effects	Can undermine transition and adaptation finance, and contribute to macroeconomic and social instability

Source: Authors' depiction

1.4 Augmenting the Basel framework with macroprudential principles

The analysis in the previous sub-section illustrates three different outcomes for RBI consideration in terms of the implications of potential climate risk management responses by Indian banks to the implementation of the Basel principles: (1) successful engagement with borrowers, (2) unsuccessful engagement with borrowers and (3) divestment. Macro-financial risks are arguably lower under outcome (1) because successful engagement can reduce the exposure of the Indian financial system to transition and physical risks without causing credit tightening. In contrast, unsuccessful engagement maintains climate risks for the Indian banking system at high levels, while divestment can kick-off a recessionary process with significant adverse feedback effects on the Indian banking and socio-economic systems.

Therefore, promoting a supervisory and policy environment that is conducive to successful engagement with borrowers, while at the same time limiting the increase in leverage of Indian companies (potentially generated by transition and adaptation finance as part of the engagement process), would be an action worth consideration by the RBI. Two principles are proposed in this respect.

Principle 1. Incentivising the development and successful implementation of credible transition plans

An effective system of banking supervision requires banks to submit plans to reduce transition and physical risks that put engagement with their borrowers at their core. These plans need to rely on the synthesis of the transition plans of their borrowers and should have well-defined decarbonisation and resilience targets. Capacity building programmes and clear guidelines about the development of transition plans need to be put in place to support banks. Moreover, banks that fail to develop credible plans before a specific deadline or meet their transition plan targets should face financial penalties or other consequences.

This principle encourages the engagement of banks with their borrowers in the context of the green transition. Through the development of transition plans, by both banks and borrowers, this engagement is more likely to be successful.[26] Transition plans should cover both mitigation and adaptation actions and specify targets using well-defined metrics and horizons.[27] This can be facilitated through clear supervisory guidelines as well as though programmes that will improve the capacity of banks to work on transition plans.

To ensure that banks and borrowers make sufficient progress in reducing physical and transition risks, this principle suggests that the RBI could specify a deadline after which banks would face financial penalties or other consequences for not developing credible plans or meeting transition plan targets. Such consequences may include fines or Pillar 2 capital add-ons, both of which have been recently considered by the European Central Bank (ECB) in the context of the climate risk management practices of euro-area banks.[28] The ECB is now in the process of potentially imposing periodic penalty payments on certain banks that do not meet the supervisory requirements in terms of internal climate-related risk management processes before a deadline specified by the ECB.[28] It must be noted that capital add-ons or fines could have some adverse side effects in the context of India (for instance they might reduce the lending capacity of banks), and will also require sound estimation of risks for which enough data must be available. It could be argued that without the introduction of potential adverse repercussions, banks in India might not be sufficiently incentivised to successfully engage with their borrowers. Insufficient motivation would increase the likelihood that the Indian banking system would remain exposed to transition and physical risks, with adverse implications for macro-financial stability. An alternative option would be for the RBI to disclose information on those banks that fail to submit plans and achieve climate targets, which could create the requisite public pressure on them to act on climate issues.

Principle 2. Supporting transition and adaptation finance

An effective monetary and financial policy framework ensures a relatively lower cost of borrowing and higher credit availability for companies that have credible transition plans and are making sufficient progress at reducing their climate footprint. It also incentivises mitigation and adaptation investments that reduce system-wide climate risks. The exact tools that can be used for developing such a framework need to be consistent with the Indian macro-financial and socio-economic context.

This principle aims at facilitating the financing of the green transition via the use of monetary and financial policy tools that would make it easier and less expensive for companies to undertake adaptation and mitigation investment. This would be conducive to a higher number of successful transition plans which as explained above, would be beneficial from a macro-financial stability perspective.

There is a range of tools that could be used to develop such a policy framework. Green deposits constitute one such tool. They have been introduced by the RBI and allow banks to collect funds that they can allocate towards green projects.[29] Refinancing operations and reserve requirements can also be used to incentivise banks to increase the proportion of their loans that are associated with credible transition plans and green financing more generally, which could be identified through the use of a taxonomy of sustainable activities.[30] In particular, the RBI could reduce the refinancing interest rate and the cash reserve ratio (CRR) for banks that support the financing of the green transition.[11]

The PSL is an important policy tool in the Indian financial system for supporting sectors and social groups that would otherwise have very limited access to finance, and already includes renewable energy.[31] In the context of Principle 2, one option would be to create a separate green lending (GL) scheme to focus on greening the loans that banks provide outside PSL by introducing a floor on the green non-PSL loans. For example, if the GL floor is 5%, banks would be instructed to provide at least 5% of their non-PSL loans to green activities and borrowers with sufficiently credible and successful transition plans. Initially, the GL floor could be relatively small and increase gradually to give banks and borrowers time to adjust their strategies. Having a separate scheme that refers to non-PSL loans would avoid side effects on the lending available for vulnerable groups and sectors of the economy that have limited capacity to green their activities. PSL was launched in the early 1970s with the aim of supporting socio-economic development in India. GL could be launched in the short term to support urgent financing required for India's green development. Pertinently, the International Financial Services Centres Authority (IFSCA) directs the financial institutions operating in the International Financial Services Centres (IFSCs), undertaking lending activities to at least 5% of their gross loans and advances towards green, social, sustainable, sustainability-linkedsectors/facilities.[32] The 5% target is computed on incremental loans and advances in a financial year and USD70m of lending has already been made in the thematic space by 26 banks present there.[33]

Green public investment (for example in energy and transport systems) has the potential to contribute directly to the decarbonisation and resilience of the Indian economy and crowd in green private investment. However, the cost of borrowing for the government is a barrier to the financing of this investment. To support green public investment, the RBI could consider introducing a floor on the bank holdings of green sovereign bonds, once the Indian green sovereign bond market has been sufficiently expanded.[34] This floor could be a separate to the existing floor related to the SLR. The RBI could also support green sovereign bonds by adjusting its collateral framework, which specifies what financial assets banks can pledge as collateral to gain access to central bank liquidity. Currently, government securities are among the assets that banks can use as collateral to receive loans from the RBI through the Liquidity Adjustment Facility and the Marginal Standing Facility.[35] The RBI could consider reducing the haircuts for green sovereign bonds compared to conventional sovereign bonds, which would increase demand for them as they are more valuable for banks from the perspective of getting access to RBI loans.[36] By increasing the demand for green sovereign bonds, the green sovereign floor and a green collateral framework would reduce the cost of public spending in green infrastructure, with positive spill-over effects on the ability of Indian companies to implement successful transition plans.

Irrespective of the precise tools that would be used to develop a monetary and financial policy framework that supports climate mitigation and adaptation, it is important for the RBI to consider the differentiated capacities of Indian borrowers. For example, policies that reduce the cost of green financing could be calibrated such that they generate higher reductions in the interest rates for MSMEs compared to large companies, taking into account the lower capacity of MSMEs to invest in climate mitigation and adaptation. This would be consistent with the way that MSMEs are treated in the PSL.

1.5 Acknowledging challenges

The Basel principles for the effective management and supervision of climate-related financial risks have been designed with an emphasis on climate-related financial risks at the micro level. In addition, these principles were not designed to adequately reflect the specific features of emerging market economies.

This section explained that the interconnectedness, spill-overs, and second-round effects of climate risks are not typically captured by traditional bank risk management and hence a macroprudential approach to climate risks is necessary to deal with these issues. The two principles proposed in this section could complement the 18 Basel principles so that attempts by Indian banks to address climate risks remain conducive to macro-financial stability with minimum side effects.

As with the 18 Basel principles, these two additional principles also face implementation challenges. Systemic risk management for climate change requires coordination between central banks, supervisors, fiscal authorities, and other stakeholders, which can be challenging due to differing mandates, priorities, and capacities. By working with other public authorities nationally and internationally, as it does for instance within the Network for Greening the Financial System (NGFS), the RBI could play a key role in developing methodologies and collecting data that would permit the implementation of the macroprudential principles put forward above. The RBI is in the process of creating a data repository to monitor climate related risks named Reserve Bank – Climate Risk Information System (RB-CRIS), which includes a web-based directory and a data portal forming climate-related data sets, which is an important step to provide standardised data sets on physical risks and emissions. Other challenges include the identification of green and dirty activities, which requires a robust taxonomy to be in place, and the development of standardised templates and metrics for the transition plans of banks and their borrowers.

Crucially, the principles discussed in this section should not be confined to the banking sector but extended to cover NBFCs, pension funds, and insurance companies. Given the growing importance of market-based finance for the Indian economy, modified versions of these principles could also be adopted by the Securities and Exchange Board of India (SEBI) as well as by the Pension Fund Regulatory and Development Authority (PFRDA) and the Insurance Regulatory and Development Authority of India (IRDAI).

2. Implementing Basel principles on climate-related financial risks: Perspectives from Indian banks

Banks, as capital providers, are significant players to integrate CRFRs into risk management practices, in order to safeguard loan portfolios from increasing climate risks. Closely aligning with the BCBS recommendations, the RBI Discussion Paper was published in July 2022, followed by the RBI draft disclosure framework in 2024, which uses the Pillar 3 disclosure guidance of the BCBS to provide a more structured and forward-looking information on climate risks and opportunities. This section summarises the feedback from a consultation process with banks and industry experts, (details provided in the methodology section) on implementing Basel principles and the successive RBI releases as well as analysis of key alignment features between the Basel voluntary framework on climate-related financial risk disclosures released in June 2025 and the RBI draft disclosure framework.

The RBI Discussion Paper followed the broad classification of recommendations under (a) Corporate Governance; (b) Strategy and Internal Control Framework; (c) Risk Management; and (d) Scenario Analysis. The Basel principles included an additional and significant section consisting of six principles dedicated specifically to the role of supervisors in guiding banks towards integrating climate risk drivers. The RBI as a supervisor is yet to outline the steps it intends to take on this set of principles. Additionally, the RBI gives due importance to green financing and adopting sustainable initiatives such as establishing green branches, all of which culminate in banks exploring climate transition opportunities.

The following table is a summary of key challenges in integrating CRFRs by banks, and suggestions to improve this integration process as expressed in the focus group discussions (FDGs). Elaboration on these points is presented in the following sections.

Table 2: Expectations of banks to aid climate risk integration

Issues discussed	Corporate Governance	Strategy and internal control framework	Risk Management	Scenario analysis
Challenges towards integration of climate-related financial risks				
Lack of credible climate data		✓	✓	✓
High complexity of climate stress testing and scenario analysis methodologies		✓		✓
Mismatch of climate and banking risks tenor complicates climate risk integration		✓	✓	
Impact on loan collateral by climate risks			✓	
Linking climate risks to board remuneration can lead to complications as it might increase risks of greenwashing	✓	✓		
Suggestions towards integration of climate-related financial risks				
Regulatory mandate on all aspects of climate-risk integration	✓		✓	✓
Regular capacity building at all levels within banks	✓	✓		✓
Set up a centralised institution to provide climate related data		✓	✓	✓
Homogenise climate information that banks seek from borrowers			✓	
Asset tagging is needed to identify climate transition opportunities			✓	
Detailed taxonomy for loan book diversification as per climate drivers			✓	

Source: Findings of stakeholder consultation

The 18 BCBS principles provide high level guidance for banks and supervisors: 12 for banks and 6 for supervisors. The principles seek to provide guidance on effective management of CRFRs and cover areas such as corporate governance, internal controls frameworks, capital and liquidity adequacy, and the risk management process.

The RBI Discussion Paper integrated the national priorities on decarbonisation and drew on global best practice to formulate a strategy for mitigating climate change impacts. It was published with the objective of encouraging dialogue among stakeholders and garnering inputs from regulated entities (RE) under the RBI. Broadly, the Basel principles and the RBI Discussion Paper recommend that banks need to identify, measure, manage, and disclose climate-related risks. The guidelines suggest integration of these risks across governance, strategy, risk management, and scenario analysis undertaken by banks.

Subsequently, the RBI draft disclosure framework elaborated on the RBI Discussion Paper on the implementation of a process for understanding and assessing climate risks: considering climate-related material impact and integrate within the overall risk management frameworks; adopting policies towards climate-related risk identification, management, and mitigation; ensuring that internal reporting systems are capable of monitoring climate risks; producing timely information for effective senior management decision-making, reporting in line with the International Sustainability Standards Board (ISSB) guidelines on forward looking disclosures, suggesting integrating green finance, establishing green branches (e.g., eliminating use of paper) and green data centres (e.g., use of renewable energy at data centres); and directing banks to consider climate transition related opportunities for financing.

The findings from secondary research for this section have been substantiated and enhanced by primary research through online stakeholder interactions in the form of FGDs, two of which were conducted with 13 experts comprising (a) senior management from public sector and private sector banks including chief risk and credit officers; (b) policy experts from research institutes, think tanks, and policy organisations.

The experts were chosen according to their extensive work on bank exposure to climate-related risks, as well as their experience in sustainability practices in bank lending and internal operations. Every FGD participant received two sets of questions (a) common questions on integration of CRFRs; (b) specific questions based on each of the Basel principles appropriate to their nature of work. For instance, senior banking officials were asked questions that addressed the granular detail of integrating climate related risks within bank credit-risk parameters, while the focus for policy experts was on the role of governance, or role of supervisors in integration of climate risks.

Guidance from the Basel principles, RBI Discussion Paper, RBI draft disclosure framework, and the Basel voluntary framework 2025, were mapped under categories based on the dominant themes. Under each of these categories, specific concerns and/or key observations, particularly on the Basel principles as they emerged from the FGDs, are highlighted in a separate box in each category: corporate governance, strategy – internal control framework, risk management, scenario analysis, and the role of supervisors.

2.1 Feedback and analysis per category

2.1.1 Corporate governance

Governance encompasses a wide range of factors, including board oversight on financially material climate risks, establishing climate risk management processes, and the integration of climate considerations into the business strategy of banks. Governance structures need to ensure that there is clear accountability within an organisation for climate-related risks and opportunities. Board level considerations of CRFRs influence lending and investment decisions. Risk management frameworks need to be consistent with the stated goals and objectives of banks. Hence, the board and senior management should ensure that their

internal strategies and risk appetite statements are consistent with any publicly communicated climate-related strategies and commitments. Support from board and senior management will signal a commitment to proactively manage climate-related risks, attract responsible investors, and build stakeholder confidence.

Given its significance, the first three Basel Principles for integrating CRFRs are centred on providing guidance for board and senior management under corporate governance**.** Prominence is given to (a) assessing materiality of physical and climate-related risks in the short-, medium- and long-term objectives of the bank's strategy; (b) identifying roles and responsibilities across the organisation to form committees and undertake the responsibility of integrating CRFRs into the banking risk management framework; (c) the board is also tasked with formulating appropriate policies for management of CRFRs.

The RBI Discussion Paper suggestions largely match those of the Basel principles. They also emphasise regular internal risk reporting to senior management as essential for mitigating likely CRFRs and developing guidelines for external disclosures, and ensuring sufficient internal or external expertise is available for managing financial risks arising from climate change and environmental degradation.

Table ~~3:~~ Corporate Governance – Basel principles and RBI Discussion Paper alignment

Basel Principles 2022	RBI Discussion Paper 2022
Require board members and senior management to	
Consider material climate-related financial risks over various time horizons and incorporate these risks into the overall business strategies and risk management frameworks *(Principle 1, page 2).*	Identify climate-related and environmental risks and opportunities and assessing the actual and potential impact of these risks on RE strategies and plans (pages 8–9).
Assign climate-related responsibilities to members and/or committees and exercise effective oversight of CRFRs *(Principle 2, page 3).*	Clearly define the roles and responsibilities of senior management as regards the management of climate-related and environmental risk (pages 8–9). Ensure sufficient internal/external expertise is available for managing the financial risks arising from climate change and environmental degradation (page 9).
Adopt appropriate policies, procedures and controls that are implemented across the entire organisation to ensure effective management of climate-related financial risks *(Principle 3, page 3).*	

Concerning governance, adding to the RBI Discussion Paper, the RBI draft disclosure framework places emphasis on the board designating a specific person or committee to consider climate-related issues, and to oversee business strategy and capital expenditure geared towards climate risks and opportunities.[19]

While the RBI draft disclosure framework talks of developing resources to identify, assess, monitor, and manage the climate-related issues (covering CRFRs and climate-related opportunities), the Basel principles focus on resource availability for the management of CRFRs alone. RBI draft disclosure framework requirements are also aligned to the details in the Basel voluntary framework (CRFRA table) which asks for qualitative information on resources, skills, and governance of CRFRs.

Table 4: Corporate Governance – RBI Draft Disclosure Framework and Basel Voluntary Framework alignment

RBI draft disclosure framework 2024	Basel voluntary framework CRFRA 2025
Qualitative discourses	
Baseline and enhanced qualitative disclosures cover board oversight, management roles, skill sets, frequency of climate discussions, and integration of climate-related risks and opportunities in relevant existing functions.	Table CRFRA covers similar governance fields and also explicitly links CRFRs to remuneration and trade-off decisions associated with those risks.

Integration of CRFRs at governance level can still be said to be at a nascent stage among Indian banks. There has been progress since the 2022 RBI survey which revealed few or no specific roles or responsibilities assigned exclusively for CRFRs.[37,38] Equally, there were no designated board roles assigned for oversight on climate and sustainability issues in public sector banks while foreign banks present in India which were surveyed had designated personnel from the board or senior management for such positions, due the mandate of their global parent institution. Driven by the RBI imminent CRFR disclosure requirements, 16 of the 35 largest scheduled commercial banks (SCBs) by market capitalisation on the Bombay Stock Exchange (BSE), with a combined market cap of USD529.18bn as on March 2024, have established dedicated ESG/climate risk committees or policies at board level and 12 other banks have established climate-related committees.

Box 1: Corporate Governance – Inputs from primary stakeholder consultations

- **Regulatory mandate** is likely to propel board and senior management towards integrating CRFRs. Until there is such a compliance risk, complexities of incorporating climate drivers will prevent banks from embracing the practice voluntarily.
- **Rating by credit rating agencies** for integration of CRFRs (akin to ESG rating) will drive banks to speedily adopt integration of these risks.
- **Building internal competency in identifying counterparty risks and enhancement of board and C-suite executive capabilities** helps comprehension of internal reporting on climate-related risks, which are forward looking anticipatory risks, unlike the usual internal reporting on ESG issues which are predominantly backward facing.
- **Linking board remuneration** with climate related issues is not yet relevant in the Indian context. The risk of green washing will increase if such polices are introduced, while banks are unprepared for integration of CRFRs.

Source: Feedback from primary stakeholder consultations

2.1.2 Strategy and internal control framework

The RBI Discussion Paper recommend that banks develop a forward-looking business strategy to assess and integrate CRFRs, as historical data or backward-looking risk assessment methods are unsuitable for such risk. For an effective climate strategy, banks must consider: (a) decarbonisation goals across timeframes; (b) the financial impact of worst-case scenarios and the business-as-usual climate-risk scenarios; (c) the opportunities in building resilience to climate-related financial risks.

Unlike the RBI Discussion Paper, the Basel principles do not have exclusive principles listed under the strategy category but the Basel voluntary framework builds this into Table CRFRA on qualitative information. The RBI Discussion Paper and the Basel principles place emphasis on inclusion of climate-related risks across the *three lines of defence.*[39]

The RBI draft disclosure framework and the Basel voluntary framework 2025 cover important aspects such as the strategy to guide identification of material CRFRs under physical and transition risk categories: assessment of time horizons when the risks could materially impact a bank's prospects (inter alia, the bank's cash flows, its access to finance, and its cost of capital); transition plan exercise; details on scenario analysis; impact of CRFRs on the financial position; and bank business model resilience to CRFRs. The RBI draft disclosure framework gives focus to localisation of NGFS scenarios and using the NDC scenario, on assessment of advantages of climate-related opportunities as well as the effect of the current and planned investments in climate-related mitigation, adaptation, and opportunities for climate resilience.

Transition plans feature under *enhanced disclosure* under the strategy pillar in the RBI draft disclosure framework while it is a standard requirement under the Basel voluntary framework 2025.[40] This could be a highly enabling aspect of the RBI framework as it allows a multi-year approach beyond the usual financing or investment time horizons to facilitate a more comprehensive assessment of climate risks and opportunities. It is also a way to build accountable bank-borrower engagement to expedite shifts in capital allocation, and transition planning and plans also allow for a more cogent approach to mitigation and adaptation. More details from the RBI or adoption of available third-party guidance and good practice will help guide the regulated entities. The finalised RBI disclosure framework is awaiting release.

Table ~~5:~~ Strategy – RBI Draft Disclosure Framework and Basel Voluntary Framework Alignment

RBI draft disclosure framework 2024	Basel voluntary framework 2025
Strategy: Qualitative discourses	
Strategy to take into account the identified physical and transition risks, scenarios used and if aligned with the NDCs, business model resilience, transition plans; assessment of climate-related opportunities in mitigation, adaptation, and resilience.	Table CRFRA covers similar themes such as identified physical and transition risks, scenarios used, business model resilience, transition plans as part of a bank's strategy.

The RBI Discussion Paper, the Basel principles, and the RBI draft disclosure framework, all recommend incorporation of climate-related risks under the *internal capital and liquidity adequacy assessment process* based on the results of stress testing.

Table 6: Strategy and Internal Control Framework – Basel principles and RBI Discussion Paper alignment

Basel Principles	RBI Discussion Paper	RBI Draft Framework
	Banks are recommended to	
Incorporate CRFRs into internal control frameworks across the three lines of defence *(Principle 4, page 4).*	Have a clear definition and assignment of responsibilities and reporting across the three lines of defence *(Risk management, page 11).*	
Identify and quantify CRFRs. Incorporate material relevant risks over relevant time horizons into internal capital, liquidity adequacy assessment processes, in stress testing programmes *(Principle 5, page 4).*	Determine impact of climate-related and environmental risks on their business strategy in the short, medium and long term (page 9).	Integrate CRFRs within internal capital and liquidity adequacy assessment processes.
	Address financial risk emanating from climate and environmental degradation within the overall business strategy and risk appetite (page 9–10).	

Unless CRFRs are accounted for in internal strategy through climate stress testing, adequate capital and liquidity provision cannot be ensured. RBI climate stress testing results have revealed that public sector banks in India are at higher sensitivity to climate risks than their private sector counterparts.[43] Moreover, the results also show that in the event of a climate shock, larger capital shortfalls were likely if banks had to repay both assets and liabilities, as opposed to only liabilities.

Box 2: Strategy and Internal Control Framework - Inputs from primary stakeholder consultations

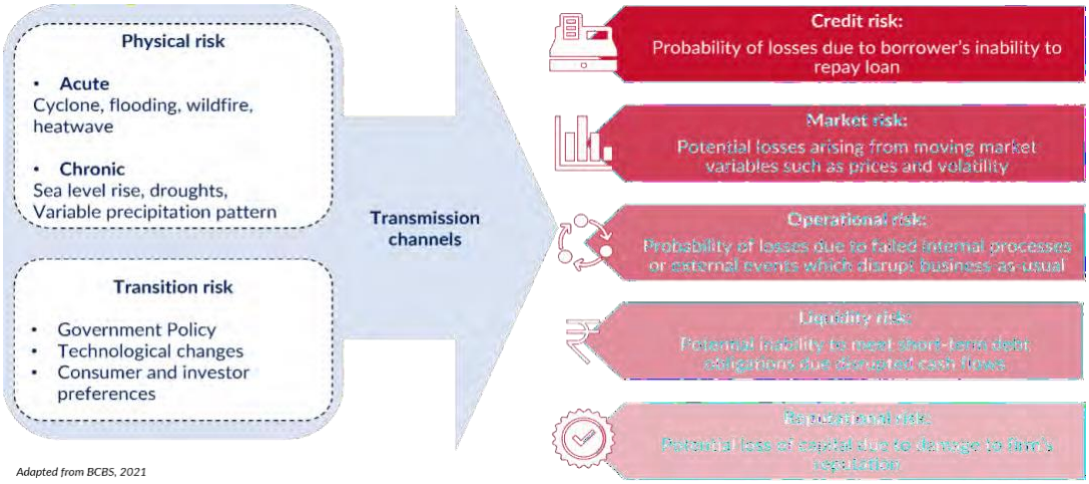
- **Lack of credible climate data** to formulate an effective internal strategy for climate change considerations is the most pertinent challenge for banks. To calculate bank exposure to counterparties in high carbon-emitting sectors, GHG emissions data of its borrowers is crucial, which is typically unavailable.
- **The longer tenor for climate risks** (20–30 years) makes it challenging to price climate risks into capital and liquidity adequacy requirements, which have short-term considerations.
- **Guidance is required from the supervisor on climate stress testing methodology, data sources** for customisation of stress tests, as per the lending portfolio of the bank (e.g., focus on lending to retail, agriculture, and/or infrastructure) towards effective integration of climate risk drivers in internal strategy.

Feedback from primary stakeholder consultations

2.1.3. Risk management

Climate-related risks were traditionally viewed as reputational risks which could be managed through an environmental, social, and governance (ESG) agenda. Recently however, they have been accepted as a financial risk that requires a granular and forward-looking methodology to be integrated into existing bank risk management frameworks.[41]

Figure 4: Transmission channels for climate-related risks into financial risks



The complex nature of CRFRs makes capturing relevant metrics and choosing appropriate methodologies highly challenging, and one that is still evolving.

The guidance from both the Basel principles and RBI Discussion Paper, and subsequently the draft disclosure framework, give emphasis to identification, management, monitoring, and reporting of CRFRs by banks. RBI, as early as 2021, had established the Sustainable Finance Group (SFG) within its Department of Regulation to build strategies and frameworks for integrating climate-related risks and financing opportunities. Aside from the risk management aspects, the RBI draft disclosure framework requires the processes used to identify, assess, prioritise, and monitor climate-related opportunities to be outlined, including information on if and how climate scenario analysis/climate stress testing is used for identification of climate-related opportunities.

Table 7: Risk management – Basel principles, RBI Discussion Paper, and RBI draft disclosure framework alignment

Basel Principles	RBI Discussion Paper	RBI Draft Framework
	Risk management process to	
Identify, measure, monitor and manage all climate-related financial risks that could materially impair financial condition, including capital	Identify, measure, monitor, manage, and report the exposure related to climate-related and environmental risks in a manner proportionate to the size and	

resources and liquidity positions *(Principle 6, page 5).*	complexity of business operations and risk profile *(page 10).*	
Ensure internal reporting systems are capable of monitoring material climate-related financial risks and producing timely information to ensure effective board and senior management decision-making *(Principle 7, page 5).*	Implement plans to manage and mitigate these risks; regularly review and assess the effectiveness of those plans; and timely reporting on implementation and mitigation provided to the Board of Directors *(page 13).*	The inputs and parameters used to identify, assess, prioritise, and monitor CRFRs (for example, information about data sources, economic sectors covered, counterparties covered).
Understand the impact of climate-related risk drivers on the following risks and to ensure respective risk management systems and processes: *(Credit risk – Principle 8; Market risk – Principle 9; Liquidity risk – Principle 10; Operational and other risks such as strategic, reputational, and regulatory compliance risk – Principle 11, page 6–7).*	Understand the interaction between climate-related and environmental risks and their business activities, and identify the potential effect of such risks through various prudential risk categories including credit, market, liquidity, and operational risks *(page 8)*.	Identify, assess, and manage impact of CRFRs on credit risks, market positions, liquidity risk profiles, operational risk and integration of these processes into the overall risk management processes.

The Basel voluntary framework 2025 asks both qualitative and quantitative details. Table CRFRA asks for information on processes and integration of CRFRs in overall risk management processes, and Table CRFRB asks for specific details on methodologies employed to assess physical, transition, and concentration risks, including how banks assess client transition plans and engage with borrowers on climate-related risks. It is important to note that the format of the table is flexible and that the content becomes a mandatory requirement only after being transposed in a national jurisdiction.

Table 8: Risk Management – RBI Draft Disclosure Framework 2024 and Basel Voluntary Framework 2025 alignment

RBI draft disclosure framework 2024	Basel voluntary framework 2025
Risk Management	
Identify, assess, and manage impact of CRFRs on credit risks, market positions, liquidity risk profiles, operational risk, and integration of these processes within the overall risk management processes.	Table CRFRA covers process-related aspects of assessment of CRFRs and their integration within the overall risk management processes. CAFRB asks for details of methodologies to compute physical, transition, and concentration risk; templates to disclose gross carrying values and financed emissions by sector; impact on credit quality and maturity profile for transition risk

	(CRFR1); and gross carrying values by geographic region/location for physical risk (CRFR2).
Includes all on-balance and off-balance sheet exposures; paying specific attention to mortgages (energy efficiency) only in narrative form.	Has specific templates separating corporates, mortgages, undrawn commitments; real-estate exposures dissected by EPC band (CRFR3).

Box 3: Risk management and mitigation – Inputs from primary stakeholder consultations

- **Climate-related risks were considered as purely material risks** and most banks only began ESG integration within the past 18–24 months. Hence banks, and particularly the smaller banks, lack the required capacity and skills for the current additionality of climate-related financial risk integration.
- **There is a dearth of reliable and easily accessible data on climate-risk drivers** to be incorporated at the ICAAP level, where sectoral climate risk data and tools are not evolved, particularly for transition risk.
- **Climate-related financial risks cannot be integrated within credit risk** because their varied risks require different metrics, data sources, and frequency of data availability. Credit quality is also contingent on other factors such as economic cycles or industry-specific factors (supply chain issues) and so climate factors are amplifiers (or moderators) of credit risk.
- **Mismatched tenor between climate risks and traditional banking risks** adds to challenges. For instance, climate risk considerations are longer in term (50–100 years), which are difficult to integrate into the shorter-time frame for ICAAP (3–5 years).
- **Incorporating climate within credit risk assessment in retail banking is especially challenging** due to lack of awareness, resistance to change, complexity involved, and limited historical data, especially for products such as home or vehicle loans.

Source: Feedback from primary stakeholder consultations

Despite the complexity, a few Indian banks have started to integrate CRFRs into their credit risk policy. For instance, one of the private sector banks in the stakeholder consultations indicated that in relations to India's NDC, caps have been placed on their credit policy in hard-to-abate sectors (thermal power, steel, aluminium, transport). This has been achieved by mapping internal portfolio emissions of the bank's borrowers and by undertaking monthly evaluation of the exposure to hard-to-abate sectors. Hence, despite the slow uptake, banks such as Kotak Mahindra, RBL, and YES Bank have begun the process to institute tools and assessment frameworks geared towards integrating climate-related risk drivers into their portfolios.[42] While some banks have demonstrated progress in adopting frameworks like Partnership for Carbon Accounting Financials (PCAF), the majority of Indian banks lack comprehensive climate strategies, adequate green finance portfolios, and integration of climate risks in their credit and lending decisions. Banks which participated in the climate stress testing exercise undertaken by the RBI have continued to

undertake further work on climate scenario analysis. However, the majority of banks continue to express the need for clearer regulatory guidelines and guidance that provides a format and comparable framework.

Box 4: Inputs from primary stakeholder consultations

- **There is no uniformity among banks** in seeking climate-related information from borrowers. Lack of homogeneity disincentivises borrowers from sharing information and instead steers them towards banks that have a less stringent screening policy
- **Integration of climate-related risks into market and liquidity risks are poorly understood**, as these climate risks are transmitted only when a specific nature-related event like floods, heatwaves occur. The uncertainty of occurrence of these events makes proactive integration of climate risks complex
- **The collateral that banks seek may itself be prone to climate risks**, like flooding can damage the physical property offered as collateral. Hence asset classes traditionally pledged as collateral, might prove counterproductive, increasing risk of bad loans
- **Asset tagging by the regulator** will provide direction to grow sustainability linked portfolios. This will help banks to identify transition opportunities, especially for subsector level lending
- **There is need for a centralised public institution as a provider of climate-related data** to add credibility, conformity, standardisation, and accessibility. For instance, collaborations with institutions like Indian Space Research Organization (ISRO) or India Meteorological Department (IMD) can be considered for physical risks data, and a national GHG emissions data repository can be maintained for transition risks

Source: Feedback from primary stakeholder consultations

2.1.4. Scenario analysis

Climate scenario analysis involves forward-looking simulations of possible climate-related outcomes in addition to other factors such as climate-related policies, technological evolution, and socio-economic considerations. These scenarios form the basis for bank CRFR management processes, by supporting senior management in developing climate strategy. Internationally, although there are various options, the NGFS scenarios provide a global high-level reference so banks have expressed the need for indigenisation of scenarios. The RBI acknowledges the need to make NGFS scenarios more granular for India, and is working towards releasing guidance on scenario analysis.

Table 9: Scenario Analysis – Basel principles and RBI Discussion Paper alignment

Basel Principles	RBI Discussion Paper
Banks are recommended to	

Use scenario analysis to assess the resilience of business models and strategies to a range of plausible climate-related pathways and determine the impact of climate-related risk drivers on their overall risk profile *(Principle 12, page 7).*	Explore forward-looking tools such as stress testing and climate scenario analysis to identify and assess vulnerabilities *(page 14).*

The Basel principles on scenario analysis recommend that banks explore different climate-related pathways and analyse their impact on their overall risk profile. To this end, it suggests consideration of scenarios for both physical and transition risks across the short, medium, and long term, and to engage external climate experts if necessary.

Table ~~1~~0: Scenario Analysis – RBI Draft Disclosure Framework and Basel Voluntary Framework alignment

RBI draft disclosure framework 2024	Basel voluntary framework 2025
Scenario Analysis	
Asks banks if a diverse range of climate scenarios (IPCC, IEA, NGFS, NDCs) covering both transition and physical risks are considered, reasons for selection, time horizons and scope for scenario analysis; assumptions at national/state level, macroeconomic trends.	CRFRA asks whether and how climate scenario analysis for physical and transition risks is used for strategic decision making, targets, and transition plans; considers whether time horizons aligned with latest international agreement on climate change; scope of operations considered.
If and how climate scenario analysis/climate stress testing is used for identification of climate-related opportunities.	Does not cover climate related opportunities.

Notably, there is increased appreciation among Indian banks of the need to increase their knowledge on climate scenario selection and analysis. Of 35 banks, 13 are now conducting or initiating climate scenario analyses where none had done so from 2021–22. The challenge on scenario selection and analysis remains for banks and requires both guidance from the RBI and external/internal expertise and support.

Box 5: Scenario Analysis: Inputs from primary stakeholder consultations

- **Climate scenario analysis is highly complicated for banks.** Detailed guidance is required from the supervisor on various aspects such as choice of assumptions; nature and sources of appropriate data; choice of top-down or bottom-up approach; which scenarios to consider under NGFS and/or from the NDC; time horizon to consider (until 2030 or a later period); and scenarios for any major policy announcement towards transition.
- **Internal capacity building across the organisation, from board level to relationship managers,** is essential for banks to choose and run the appropriate scenarios that match their portfolio.

Source: Feedback from primary stakeholder consultations

2.1.5. Role of supervisors

The primary role of central banks is to ensure financial stability in an economy, maintain low and stable inflation, and aid economic growth. While central bank mandates may differ in different jurisdictions, management of CRFRs is imperative due to their potentially significant impact on economic variables such as consumption, production, inflation, in addition to implications for the banking sector in terms of loan recovery, liquidity positions, and impact on operations due to extreme weather events.

In consideration of the significant role of supervisors in integrating CRFRs within banking supervision, six principles (*Basel principle 13–18*) are dedicated to requirements, role, and functions of supervisors. These principles are divided equally: the first three focus on prudential regulatory requirements for banks, the remaining three outline the responsibilities, powers, and functions of supervisors.

Unlike the previous section, where the tables displayed alignment between Basel principles and RBI efforts, the RBI's role as supervisor on CRFRs and opportunities does not find a direct mention in the RBI Discussion Paper, and the RBI draft disclosure framework is applicable to the regulated entities. 5 below contains the list of Basel principles focusing on the role of supervisors in CRFR integration. Notably, the Basel voluntary framework 2025 does not elaborate on supervisory principles.

Figure 5: Basel Principles on the role of supervisor

The RBI has made considerable progress since the publication of the RBI Discussion Paper in 2022. The regulator has undertaken climate scenario analysis and a stress-testing exercise as published in its Report on Currency and Finance (2023).[43] In February 2024, the release of the RBI draft disclosure framework applied not only to commercial banks, but also other financial institutions such as Tier IV Urban Co-operative Banks, all-India financial institutions such as Export-Import Bank of India (EXIM Bank), National

Bank for Agriculture and Rural Development (NABARD), National Bank for Financing Infrastructure and Development (NaBFID), National Housing Bank (NHB), and Small Industries Development Bank of India (SIDBI), as well as top tier NBFCs.[44] These guidelines were a crucial step in spurring climate action, ultimately resulting in the mandatory disclosures to be completed by FY2025–26 once the final disclosure requirements are released.

Banks have started to accumulate knowledge but continue to grapple with the issues of understanding and integrating climate-risk drivers into their operations and activities. 10 b elow outlines key concerns highlighted by FGD participants regarding CRFR integration and their expectations of the RBI in addressing these concerns.

For instance, there are multiple sources from which to procure climate-related data, from global sources like IPCC to national level emissions inventories and hazard data. The lack of granular and decision-relevant data poses a challenge in interpretation and estimation of CRFRs. Hence, a comprehensive climate-related information system is required to arrive at risk matrix that will aid the pricing of risks in loans or decision making relevant to keeping banks net-zero aligned. This is especially valid where sectoral data on climate risks and data tools have not evolved, particularly for transition risks.

Table 11: Challenges to integration of climate-related risks and expectations from RBI

Roadblocks in integration of climate-related risks	Expectations from RBI		
	Regulatory	Technical	Capacity building
Data unavailability		Provide appropriate climate data sources	Capacity building for board of directors, frontline bank officers, risk and credit officers on end-to-end climate-risks strategy and integration
Unharmonized approach to Climate risks integration	Regulatory mandate will compel banks to integrate climate related risks	Guidance on choice of variables and methodology is necessary	
Insufficient knowledge on Scenario analysis and stress testing		Choice and the manner of scenario such as NGFS, IEA and nature of climate risks for stress testing	
Unclear criteria for transition lending	Standardise transition lending framework	Taxonomy that helps in asset tagging and to choosing activities that are oriented to climate transition	

While valid, some of these concerns may diminish in significance with evolving clarity from the RBI, and the launch of the forthcoming scenario guidance as well as periodic updates.

Conclusions and recommended actions for RBI consideration

As jurisdictions are moving toward binding rules on managing and disclosing CRFRs, several important features are emerging. These include baseline transparency, comprising qualitative narratives and quantitative targets; forward-looking resilience informed by scenario analysis and climate stress tests; and transition planning with a focus on bank borrower engagement to manage CRFRs and methodically decarbonise portfolios to shift capital allocation to low-carbon and resilient activities while managing climate risks.

In parallel, many central banks are creating national data hubs, and regional and global platforms are emerging backed by NGFS, the BIS, and the EU to tackle the data gap challenge in climate risk assessment. The challenge is typified by fragmented data sources, inconsistent methodologies, varying formats and frequencies, and lack of forward-looking indicators. The Indian Reserve Bank-Climate Risk Information System (RB-CRIS) covers data related to physical risk assessment, transition risk assessment, and a carbon-emission factor database.

In the short term, the RBI is establishing the building blocks necessary for a sound assessment of the impact of CRFRs on individual institutions at the micro level as well as on the Indian financial system at a macro level. It also plans to conduct the top-down climate stress test in due course. Aside from the management of CRFRs, the proposed RBI data pool of climate-aligned bankable projects will aim to facilitate standardisation of greenhouse gas (GHG) accounting methodologies and screening of projects through a climate taxonomy criterion. The aim is to provide transparency to encourage preferential lending by banks to climate-responsive projects.

Recommended actions for further consideration by the RBI are listed below:

- **Adapting BCBS tables and templates**. The Basel voluntary framework 2025 provides a standardised template for the requirements for CRFRs contained in the Basel principles, which serves as a useful guide for national adoption.[2] Many central banks, such as the Monetary Authority of Singapore (MAS) and the Bank of England (BoE), have already implemented comprehensive frameworks with mandatory climate scenario analysis, stress testing, and strategy and governance requirements. Emerging economies such as India have adopted a phased approach to allow the regulated entities time to prepare, but the BCBS tables and templates provide specific details that could inform the final format for standardised disclosures being finalised by the RBI, based on its draft disclosure framework released in 2024.
- **Providing transition plan guidance**. The Basel principles 2022 do not explicitly mandate a transition plan. While this is clearly a disclosure requirement in both the Basel voluntary framework 2025 and the RBI draft disclosure framework 2024, it only applies if regulated entities already have disclosed one as per the national requirement. Both require detail on the key assumptions used to develop the plan, its integration with the overall strategy, and risk appetite framework of the bank with elaboration of the dependencies in making the plan actionable.[2] Neither provides the necessary guidance on transition plan content. The guidance on core components of credible transition planning from a microprudential perspective, and recommended practices for central banks and supervisors to assess the credibility, feasibility, and integration of transition plans within bank risk management frameworks has been developed by the NGFS. Complementary to this guidance are several prominent international frameworks such as the Transition Pathway Initiative (TPI), Climate

Bonds Initiative (Climate Bonds), Transition Plan Taskforce (TPT), in addition to reference standards such as the ISSB S1 and S2, which provide useful guides for banks on developing and disclosing climate transition plans from the perspective of financing transition and decarbonising portfolios. These go into the details of the construction and disclosure of transition plans.

The evolving regulatory and market landscape suggests that financial institutions will increasingly need to achieve an integrated perspective and sophisticated transition planning capabilities that can serve prudential, disclosure, investor, and financing needs. The RBI could take this into account and suggest a comprehensive framework for transition plans that adapts and recognises existing international guidance for the Indian context.

- **Making bank-borrower engagement accountable and transparent**. The RBI draft disclosure framework also emphasises regulated entities financing transition and assessing these opportunities in dialogue with their borrowers (including NBFCs). It asks banks to disclose how climate scenarios influence their assessment of financing opportunities. The opportunity for increasing capital allocation aligned to net zero and methodical decarbonisation of bank portfolios needs to be explicitly built in as part of client engagement for bank transition planning in a way that is transparent and comparable, while based on climate scenarios, sector transition pathways, and taxonomy considerations.
- **Creating a separate green lending scheme for non-PSL loans**. By introducing a floor for green non-PSL loans, e.g., 5%, banks could be required to provide the target amount of their non-PSL loans to green activities and to borrowers with sufficiently credible and successful transition plans. The green lending floor could increase gradually to allow banks and borrowers time to adjust their strategies. Having a separate scheme for non-PSL loans would reduce the trade-off on access to finance to vulnerable groups and sectors of the economy that have lower capacity to green their activities.
- **Advancing towards a macroprudential approach on climate risks and finance for financial stability**. The interconnectedness, spill overs, and second-round effects of climate risks are not typically captured by individual bank risk management and hence a macroprudential approach to climate risks is required to deal with these gaps. The Financial Stability Board's (FSB) survey and report explores the possible use of transition plans as a macroprudential instrument for maintaining financial stability.[45] Aggregated transition plan analysis could enable insights into potential correlated exposures and concentration risks across the financial sector to justify an increase in systemic risk buffers in the case of widespread misalignment with climate pathways that create systemic vulnerabilities. Regardless, assessing mid- to long-term implications for financial stability and macroeconomic impacts of climate-related risk drivers and transition pathways will be fundamental to calibrating macroprudential measures. Notably, there will need to be a fine balance between provisioning for climate induced financial shocks without tightening credit to the growing real economy sectors or transferring risks to other parts of the financial system including the NBFCs. Efforts in this direction by the RBI could be supported by the system-wide assessment of CRFRs, peer exchange, and evidence emerging globally.
- **Advancing inter-agency coordination**. Financial institutions cannot manage systemic climate risks alone. Public authorities need to create enabling frameworks and synergies between monetary, prudential, and fiscal policies for managing climate risks and financing critical opportunities. As India formulates its climate finance taxonomy, it becomes critical that it is internationally interoperable and provides quantitative thresholds with sector emissions-reduction trajectories for it to be integrated with the RBI screening and data pool to enable regulated entities to align their lending. Given the growing importance of market-based finance for the Indian economy, modified versions of transition plans and preferential financing conditions could also be adopted by the PFRDA and

IRDAI. SEBI and IFSCA, which have mentioned transition plan as disclosure requirements, could reference and adapt international frameworks for guidance on their content.

- **Building capability of regulated entities.** Regular capacity building at all levels of bank management to upskill on the integration of climate-related issues needs to be a steady endeavour. The RBI has been conducting knowledge-building outreach with banks already. Training for banks as well as NBFCs, sensitisation and tailored support on transition plans, and asset tagging to identify opportunities for sustainable financing would all benefit greatly from national and international peer-group learning, collaborations with national and international expert institutions, initiatives, and associations such as the Indian Bank Association (IBA) affiliate training institutions as well as those of the RBI.

Endnotes

[1] BCBS (2022). Principles for the effective management and supervision of climate-related financial risks, Basel Committee on Banking Supervision, June. (Available online at: https://www.bis.org/bcbs/publ/d532.htm)

[2] BCBS (2025). A framework for the voluntary disclosure of climate-related financial risks, Basel Committe on Banking Supervision, June (available online at: https://www.bis.org/bcbs/publ/d597.pdf).

[3] The BCBS is the primary global standard setter for the prudential regulation of banks and provides a forum for regular cooperation on banking supervisory matters

[4] To address climate-related financial risks within the banking sector, the Basel Committee on Banking Supervision (BCBS) established a high-level Task Force on Climate-related Financial Risks in 2020, to contribute to the Committee's mandate to strengthen the regulation, supervision and practices of banks worldwide with the purpose of enhancing financial stability. The next key milestone as part of its standard setting exercise on climate risks was in the form of "Principles for the effective management and supervision of climate-related financial risks" released in June 2022. It issued a public consultation paper on a Pillar 3 disclosure framework for climate-related financial risks in November 2023 which for the basis of its June 2025 "Framework for the voluntary disclosure of climate-related financial risks" being referred to as the Basel Voluntary Framework 2025 in this paper.

[5] Basel. (2023). *Basel committee consults on a Disclosure Framework for climate-related financial risk*. Bank for International Settlements. https://www.bis.org/press/p231129.htm

[6] Hanson, S. G., Kashyap, A. K., Stein, J. C. (2011). A macroprudential approach to financial regulation. Journal of economic Perspectives, 25(1), 3-28 (available online at: https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.25.1.3)

[7] Dafermos, Y., Nikolaidi, M. (2022). Greening capital requirements, The INSPIRE Sustainable Central Banking Toolbox, Policy Briefing Paper 8, SOAS Centre for Sustainable Finance; LSE Gratham Research Institute on Climate Change and the Environment. (Available online at: https://www.lse.ac.uk/granthaminstitute/publication/greening-capital-requirements/)

[8] Coelho, R., Restoy, F. (2023). Macroprudential policies for addressing climate related financial risks: challenges and trade offs, FSI briefs, Bank for International Settlements (Available online at: https://www.bis.org/fsi/fsibriefs18.pdf)

[9] BCBS (2011). Basel III: A global regulatory framework for more resilient banks and banking systems, June (available online at: https://www.bis.org/publ/bcbs189.pdf).

[10] Schipke, A., Turunen, J., Choueiri, N. and Gulde-Wolf, A.-M. (2023). Macro-financial Setting and Overview, in: Schipke, A., Turunen, J., Choueiri, N. and Gulde-Wolf, A.-M. (eds) *India's Financial System: Building the Foundation for Strong and Sustainable Growth*, pp. 3-22, Washington, DC: International Monetary Fund (available at: https://www.elibrary.imf.org/display/book/9798400223525/9798400223525.xml)

[11] Reserve Bank of India (2011). Master Circular - Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) (available online at https://www.rbi.org.in/commonman/english/scripts/Notification.aspx?Id=891).

[12] The PSL operates under the statutory provisions of the Banking Regulation Act, 1949, has been in force since the 1970s and is periodically revised.

[13] IMF/World Bank, 2017; Financial Sector Assessment, India, October 2017 (available online at: https://documents1.worldbank.org/curated/en/704231513810603813/pdf/121478-Revised.pdf)

[14] NBFCs originated as a response to the unmet financial needs in the market and was codified by regulation as early as 1960s. They are regulated by the RBI.

[15] Ahmed, F., Casiraghi, M. and Ogawa, S. (2023). Banking Sector and Nonbanking Financial Companies, in: Schipke, A., Turunen, J., Choueiri, N. and Gulde-Wolf, A.-M. (eds) *India's Financial System: Building the Foundation for Strong and Sustainable Growth*, pp. 51-68, Washington, DC: International Monetary Fund (available at: https://www.elibrary.imf.org/display/book/9798400223525/9798400223525.xml)

[16] Sinha, A., Bhanvadia, S. (2024). Climate Stress Testing and Scenario Analysis: Navigating Uncharted Waters, RBI Bulletin 2024, pp. 137-145 (available online at: https://www.rbi.org.in/Scripts/BS_ViewBulletin.aspx?Id=22327)

[17] A third option could be for banks to transfer risks, for example through securitisation or by asking borrowers to receive insurance against climate-related risks (see NGFS, 2025). However, transferring risk options might not be available, they can be very costly and do not necessarily reduce risks from a macroprudential perspective.

[18] According to Singh and Sidhu (2021), India needs USD 10.1 trillion in green investment to achieve net zero by 2070. Although there is a lot of uncertainty about such figures (and several assumptions need to be made to calculate them), it is clear that the green financing challenge is substantial.
Singh, V. P., Sidhu, G. (2021). Investment sizing India's 2070 net zero target, Issue Brief, November, Council on Energy, Environment and Water (CEEW) (available online at: https://www.ceew.in/gfc/solutions-factory/publications/CEEW-CEF-Investment-Sizing-India%E2%80%99s-2070-Net-Zero-Target.pdf)

[19] Reserve Bank of India (2024). Draft Disclosure Framework on Climate-related Financial Risks (available at: https://www.rbi.org.in/Scripts/bs_viewcontent.aspx?Id=4393)

[20] Clerc, L., Bontemps-Chanel, A.L., Diot, S., Overton, G., Soares De Albergaria, S., Vernet, L. and Louardi, M. (2021). A first assessment of financial risks stemming from climate change: The main results of the 2020 climate pilot exercise, Banque de France. (Available online at: https://acpr.banque-france.fr/en/main-results-2020-climate-pilot-exercise)

[21] Bank of England (2022). Results of the 2021 Climate Biennial Exploratory Scenario (CBES). (Available online at: https://www.bankofengland.co.uk/stress-testing/2022/results-of-the-2021-climate-biennial-exploratory-scenario)

[22] Ministry of Micro, Small & Medium Enterprises (2024). Contribution of MSMEs to GDP, July (available online at: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2035073)

[23] Kumar, S., Rao, P. (2016). Financing patterns of SMEs in India during 2006 to 2013–an empirical analysis. Journal of Small Business & Entrepreneurship, 28(2), 97-131.

[24] Ps, R.K., Trivedi, P. (2019). Determinants of SME credit in Mumbai-Empirical analysis on factors. The Journal of Developing Areas, 53(2).

[25] Volz, U., Knaack, P. (2023). Inclusive green finance: A new agenda for central banks and financial supervisors, The INSPIRE Sustainable Central Banking Toolbox, Policy Briefing Paper 12, SOAS Centre for Sustainable Finance; LSE Gratham Research Institute on Climate Change and the Environment (available online at: https://www.lse.ac.uk/granthaminstitute/publication/inclusive-green-finance-a-new-agenda-for-central-banks-and-financial-supervisors/)

[26] For a detailed analysis on how to combine the plans of borrowers and banks, see NGFS (2024a).

NGFS (2024a). Connecting transition plans: financial and non-financial firms, Network for Greening the Financial System (available online at: https://www.ngfs.net/sites/default/files/media/2024/04/17/ngfs_connecting_transition_plans.pdf).

[27] For an analysis of what constitutes a credible plan in the context of emerging market and developing economies, see NGFS (2024b, 2024c).

NGFS (2024b). Credible transition plans: the micro-prudential perspective, Network for Greening the Financial System (available online at: https://www.ngfs.net/sites/default/files/media/2024/04/17/ngfs_credible_transition_plans.pdf).

NGFS (2024c). Tailoring transition plans: considerations for EMDEs, Network for Greening the Financial System (available online at: https://www.ngfs.net/sites/default/files/media/2024/04/17/ngfs_tailoring_transition_plans.pdf.pdf).

[28] Elderson, F. (2025). Banks have made good progress in managing climate and nature risks – and must continue, ECB blog, 21 July 2025. (available online at: https://www.ecb.europa.eu/press/blog/date/2025/html/ecb.blog20250711~f5c6a0259f.en.html)

[29] Reserve bank of India (2023). Framework for acceptance of green deposits. (available online at: https://rbi.org.in/Scripts/NotificationUser.aspx?Id=12487&Mode=0)

[30] Vaze, P., Kumar, N., Colenbrander, S., Burge, L., Sharma, N. (2022). Identifying, managing and disclosing climate-related financial risks in India: Options for the RBI of India. ODI Report. London: ODI (available online at: https://odi.org/en/about/our-work/strengthening-climaterisk-assessment-in-indias-financial-sector)

[31] Reserve bank of India (2025). Master Directions - Reserve Bank of India (Priority Sector Lending – Targets and Classification) Directions, 2025 (available online at: https://www.fidcindia.org.in/wp-content/uploads/2025/03/RBI-PSL-MASTER-DIRECTIONS-24-03-25.pdf)

[32] IFSCA. (2022, April 26). *Guidance framework on Sustainable and Sustainability linked lending by financial institutions*. International Financial Services Centres Authority. https://ifsca.gov.in/Document/Legal/sustainable-lending-framework-26-04-20222604202206571 7.pdf

[33] *At GIFT city, we have put in place a green finance ecosystem for Indian corporates': IFSCA chairperson - BusinessToday*. (2024, March 22). Business Today. https://www.businesstoday.in/industry/banks/story/at-gift-city-we-have-put-in-place-a-green-finance-ecosystem-for-indian-corporates-ifsca-chairperson-422639-2024-03-22

[34] Kumar, N. (2023). India's sovereign green bonds: steps for building on a successful debut, commentary, Gratham Research Institute on Climate Change and the Environment, London School of Economics and Political Science, 15 March 2023 (available online at: https://www.lse.ac.uk/granthaminstitute/news/indias-sovereign-green-bonds-steps-for-building-on-a-successful-debut/

[35] Reserve Bank of India (2018). Review of margin requirements under the Liquidity Adjustment Facility and Marginal Standing Facility (available online at: https://rbi.org.in/Scripts/NotificationUser.aspx?Id=11291&Mode=0)

[36] The haircut captures the reduction applied to the value of an asset when it is used as collateral. For example, if an asset is worth INR 1000 and the haircut is 10%, it can only be accepted as collateral for INR 900 in borrowing.

[37] RBI. (2022, July). *Report of the Survey on Climate Risk and Sustainable Finance.* Retrieved from RBI: https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/SURVEYCLIMATERISK3DB3ABB0E087445797BF79BC940AEFC6.PDF

[38] Survey of 34 scheduled commercial banks comprising of public sector banks, private sector banks, and foreign banks with a strong presence in India

[39] The first line of defence involves on-boarding new clients, reviewing applications, or creating new banking products or processes. At this stage, the appraisal team is required to be well-versed in climate-related financial risks. The second line of defence is to monitor climate-related risk assessment independently of first line of defence, as part of the entity's regular risk management practice. The third line of defence is the Internal Audit Function, which ensures compliance with the overall risk management framework that has included climate risk assessment.

[40] RBI has designed disclosures in two categories as 'baseline and 'enhanced' to include banks across the maturity ladder.

[41] Paisley, J., & Nelson, M. (2019, May). *Climate Risk Management at Financial Firms: Challenges and Opportunities.* Retrieved from GARP: https://f.hubspotusercontent20.net/hubfs/20013225/Website/GRI/PDF/Challenges_052919_PDF.pdf

[42] Asapur, S., & Fernandes, A. (2022). *Unprepared: India's big banks score poorly on climate challenge.* Climate Risk Horizons.

[43] RBI. (2023). *Report on Currency and Finance.* Mumbai.

[44] Reserve Bank of India (2021) Scale Based Regulation (SBR): A Revised Regulatory Framework for NBFCs (available at: Notifications - Reserve Bank of India)

[45] Financial Stability Board, (2025, January). The Relevance of Transition Plans for Financial Stability https://www.fsb.org/uploads/P140125.pdf

NGFS (2025). Integrating adaptation and resilience into transition plans (available online at: https://www.ngfs.net/system/files/2025-07/NGFS_G20_Input%20paper_final%20%281%29_0.pdf).

Authors
Neha Kumar (Climate Bonds); Section 1: Dr Yannis Dafermos, Professor Ulrich Volz (SOAS University of London);
Section 2: Sudha Meiyappan, Smitha Hari, Ritu Valia, Namita Vikas (auctusESG)

Acknowledgements/reviewers
Lily Burge, Magali Van Coppenolle, Mireille Martini, Rawson Gonsalves, Sanjana Kapoor (Climate Bonds);
Prashant Vaze (ODI Global)

Design: Godfrey Design, Joel Milstead

Contact: Neha Kumar, Head, South Asia
neha.kumar@climatebonds.net

This is a knowledge product of the **India Initiative on Climate Risks and Sustainable Finance (IICRSF)** led by **Climate Bonds Initiative** with its partners **ODI Global** and **auctusESG**, which is a collaborative endeavour with the overarching purpose of supporting the efforts of financial regulators and policymakers at navigating the imminent transition; and simultaneously preparing and engaging with banks, DFIs, and businesses on disclosures, transition plans, and finance to build the required narrative and consensus, with the tools required to augment financial flows from domestic and international sources.

The knowledge product was developed in collaboration with **SOAS University of London.**