

CLIMATE RISK MAINSTREAMING APPROACHES FOR INDIAN FINANCIAL INSTITUTIONS

Landscape Study For Investment Portfolios In India





Table of Contents

1.Executive Summary	1
2.Introduction	5
3.Climate Change And The Importance Of Mainstreaming Climate Risks In Financial Products	6
3.1.Task Force on Climate-Related Financial Disclosures (TCFD)	10
3.2.The journey of climate risk mainstreaming	12
4.Landscape of climate risk mainstreaming in India	14
4.1.Summary of discussion with Financial Institutions	16
4.2.Summary of discussion with Insurance Agencies	16
4.3.Summary of discussion with Government	17
4.4.Summary of discussion with Ecosystem Enablers	17
4.5.Summary of discussion with service providers	17
5.Key Analysis Highlighting Climate-Risk Mainstreaming Practices In India	21
5.1. Importance of climate risk in investment portfolio	21
5.2.Climate risk governance and management	23
5.2.1.Climate change modelling and analytics	24
5.3.Reporting on climate related risks	25
5.4.Policy landscape to support climate change mainstreaming and reporting	26
6.Case Studies	27
7.Key Recommendations For Stakeholders	36
7.1.Financial institutions	36
7.2.Insurance agencies	37
7.3.Government Institutions	37
7.4.Ecosystem enablers and service providers	38
8.Annexure	39
8.1.Annexure 1: Best practices of climate mainstreaming	39
8.2.Annexure 2: List of methodology for physical and transition risk assessments globally	44
8.3.Annexure 3: Data collection tools	47
8.3.1.List of respondents	47
8.3.2.Questionnaire for Banking and Non-Banking Finance Institutions	49
8.3.3.Questionnaire for Insurance Agencies	54
8.3.4.Discussion points for Government Institutions	61
8.3.5.Questions for Ecosystem Enablers and Service Providers	64



List of Figures

TCFD recommendations thematic areas ..	1
Journey of investors for adopting climate risk mainstreaming strategies	2
Suggestions of key respondents on climate risk mainstreaming	3
Summary of recommendations across stakeholders	4
Potential consequences of climate risk to all levels of operations	8
Examples of potential financial impact of climate change on businesses	9
Distribution of industries surveyed by the Task Force	12
Climate mainstreaming journey steps	14
Some recent events highlighting India's experience with climate change	15
Reasons for financial institutions not considering climate risk while making investment decisions (% of total respondents)	21
Key risks considered during investment by respondents	21
Percentage response on the reporting and pricing of climate risks	22
Most important physical risks considered by financial institutions	22
Motivation of the respondents to incorporate climate risks in the investment process	22
Consideration of Environmental, Social and Governance (ESG) factors in the investment decision	23
Type of risks considered by financial institutions while mainstreaming climate risks	23
Consideration of financial analysis to assess the impact of the climate-related financial risks during investment	24
Awareness on Task Force on Climate Related Financial Disclosures (TCFD)	25
Response on the climate risk disclosure by portfolio companies	25
Climate change, components and threats to business	6
Importance of TCFD for stakeholders	10
TCFD Recommendations and Disclosures	11



Acknowledgement

This report is the outcome of a study carried out by Intellecapt, supported by the Shakti Sustainable Energy Foundation. It aims to assist Financial Institutions (FIs) in understanding importance of climate risks and its quantification and suggest recommendations for adopting appropriate climate risk mainstreaming strategies.

Our heartfelt appreciation and thanks to the experts across Government agencies, financial institutions, investment funds, banks, insurance agencies, rating agencies, ecosystem enablers and entrepreneurs who gave us their valuable time and shared information, insights and experience. Their support was invaluable to this study.

Our special thanks to Pustav Joshi and Raghav Anand from the Shakti Sustainable Energy Foundation for their direction, guidance, and advice.

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1.Executive Summary

Global emissions are increasing at a fast pace making climate change a far bigger reality than one could ever imagine.

India, alone lost over USD 80 billion in economic losses over two decades (2000-2019) due to climate change¹. According to estimates, climate change could cost businesses and investors across the world over USD 1.2 trillion over the next 15 years².

Thus, there is a growing realization that the community including businesses and investors need to be more proactive in incorporating climate risk considerations in their operations along with Government which need to include climate change resilience initiatives in its policies. Climate risks are predominantly categorized into physical risks and transition risks, wherein physical risks are due to the physical effects of climate change such as extreme weather events, rise in sea levels, melting of glaciers etc.; and transition risks result from various policy, legal, technology and market changes that makes one shift to a low carbon economy.

Physical Risks

are due to physical effects of climate change such as rise in sea levels, wildfire, floods etc.

Transition Risks

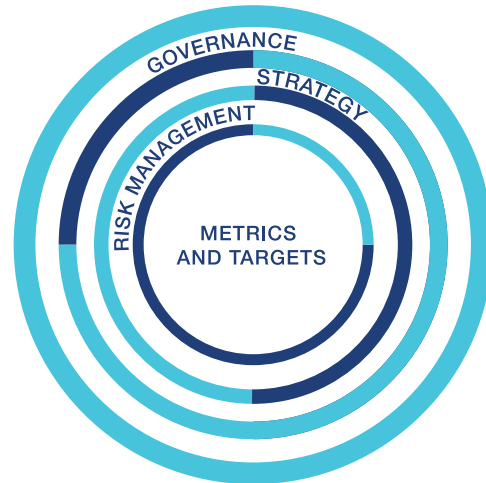
result from various policy, legal, technology changes in the organization in order to adopt low carbon economy.

Both kinds of risk have implications on the long term returns of businesses, particularly on the investors. If not addressed, these risks can impact the macroeconomic performance of the country and as a consequence increase the cost of capital for investing in the country. It is important, that these risks be analysed considering different scenarios and priced into investment decisions.

The discussions on climate risk mainstreaming has achieved the momentum only in 1980's with the support of various multilateral and bilateral organizations which includes formation of United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, among others. Recently, the Paris Agreement by UNFCCC has played a large role in implementing climate change initiatives across countries with the aim to restrict increase in the global average temperature among countries to below 2°C above pre-industrial levels by 2100. To achieve this, global

emissions need to be 25% lower than the 2017 level (2017 levels were at 53.5 GtCO₂e)³. A clear understanding of what constitutes climate change and the associated risk along with its long term effects will be very instrumental in curbing climate change.

TCFD Recommendations Thematic Areas



METRICS AND TARGETS

The metrics and targets used to assess and manage climate-related risks and opportunities.

RISK MANAGEMENT

The process used by organizations to identify, assess and manage climate-related risk.

STRATEGY

The actual and potential impacts of climate-related risk and opportunities on the organization's business, strategy and financial planning.

GOVERNANCE

The organization's governance around climate-related risks and opportunities.

Private sector initiatives such as the Task Force on Climate-related Financial Disclosures (TCFD) and Carbon Disclosure Project (CDP) also offer guidance and recommendations to stakeholders on how to incorporate climate risk mainstreaming decisions and also on how to disclose the information on climate related financial decisions.

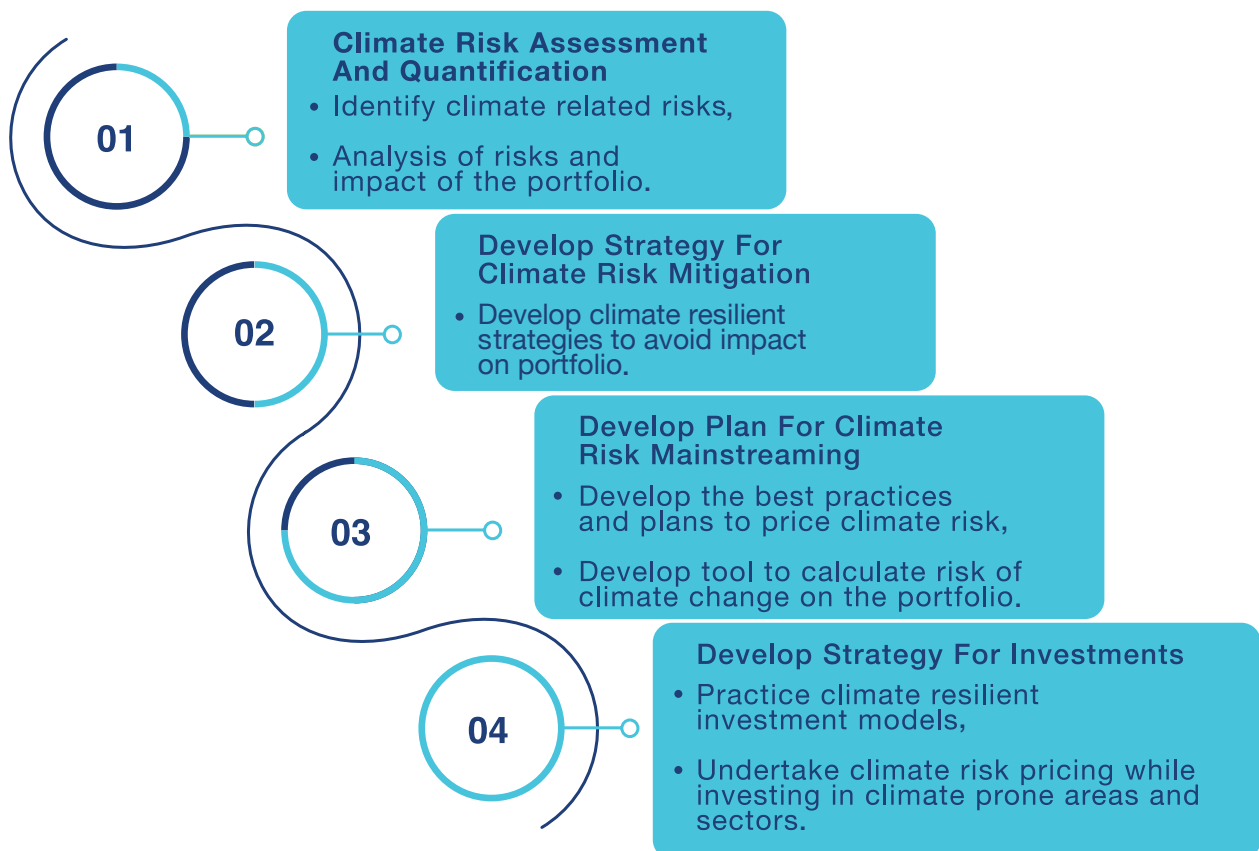
TCFD is one of the first initiatives taken by the finance sector aimed at increasing transparency around climate-related risks and opportunities; which are categorised into four thematic areas of governance, strategy, risk management; and metrics and targets. The TCFD Framework is slowly getting accepted with over 800 public and private organizations announcing their participation in climate finance disclosure related activities. While the acceptance is high, the implementation is still at nascent stages with most of the financial institutions still trying to understand how to assess the long term impact of climate change on their portfolios. Similarly, the World Bank in collaboration with other development agencies has also recommended Five Voluntary Principles to assist

financial institutions in making climate considerations a core of their operations.

These voluntary principles include incorporating basic principles such as having strategies that are prepared in discussion with the top management, proactively working on understanding climate risks, developing financing vehicles and monitoring tools, along with sharing of best practices with the larger community while keeping the progress transparent.

In addition to TCFD and initiatives by the World Bank, there are other coalitions and platforms as well that promote climate friendly practices such as Global Investor Coalition on Climate Change/Institutional Investor's Statement on Climate Change, United Nations Principles for Responsible Investment (PRI), The Equator Principles and The Portfolio De-Carbonization Initiative (PDC), among others. After careful analysis of the work of various institutions, Intellect categorized the journey of investors to mainstreaming climate change and incorporating climate risk in their investment decision into four stages.

Journey Of Investors For Adopting Climate Risk Mainstreaming Strategies



Source: World Bank

As indicated earlier, majority of financial institutions across the globe are at nascent stages (step 1 in above figure) in their journeys of mainstreaming climate risk in their portfolios. Financial institutions in India are also at the same stage with almost no considerations of climate risks in investment decisions. India is already facing severe climate change consequences and is at a risk of facing an overall

heating of over 1.5 degree Celsius by the end of the century which will also impact the overall economy to a large extent. In general, the country has faced intense and increased events of floods, drought, cyclones, erratic rainfall, heat and water stress which has impacted livelihoods, businesses, and thus portfolio of financial institutions. It is thus important for financial institutions to re-think their financing strategies

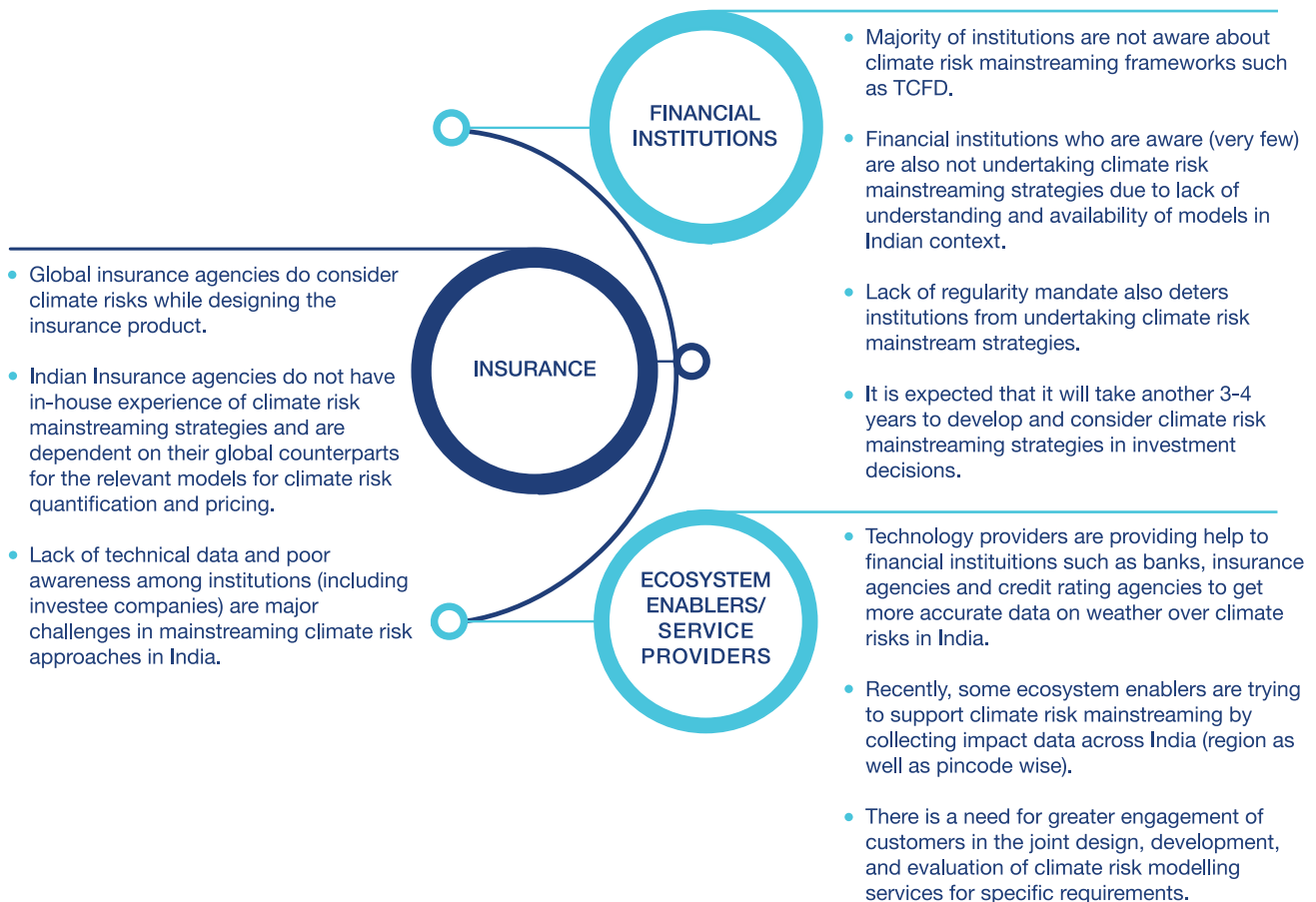
and deploy capital with careful consideration of climate risk mainstreaming strategies.

This research was thus conducted to map the understanding of financial institutions in India on climate risk mainstreaming requirement as well as implementation strategies. We tried to understand strategies for mainstreaming both physical and transition risk by financial institutions. We conducted primary interviews with over 40 stakeholders including financial institutions, investors, insurance agencies, ecosystem enablers and service providers to map landscape of climate risk mainstreaming in financial institutions in India. Post analysis, we concluded that in general there is a lack of understanding of the term “climate risk mainstreaming” among financial institutions. Even though, majority of financial institutions were incorporating Environmental, Social, Governance (ESG) framework, or consciously investing in climate friendly sectors/businesses, they were

not particularly considering the impact of climate risks while making investment decisions. Majority of them did not perceive climate risk to be a priority (over 35% of the respondents of our survey) over other risks such as operational risk or credit risk. Only 10% of the survey respondents who were considering ESG parameters were also trying to price the climate risk. However, none of the Indian financial institutions were conducting scenario analysis and modelling the risk.

Overall, lack of sufficient data and accurate models are cited as the primary reasons for not considering climate risk mainstreaming pro-actively. Financial institutions with small portfolio are awaiting recommendations from larger institutions (which could be considered as case study for benchmarking). This is augmented by the fact that there are no regulations by the Government of India mandating climate risk mainstreaming strategies in the investment decisions for financial institutions. Summary of our discussion with stakeholders is highlighted in brief below:

Suggestions Of Key Respondents On Climate Risk Mainstreaming



Our findings revealed that only 19% of the respondents that we surveyed are actively quantifying and pricing short term climate risks and most of them are insurance agencies, especially those working in the agriculture sector as the climate risk (especially flood or drought) is an inherent part of agriculture business. However, most of insurance agencies had global teams based out of India which assess and model the risk for all countries including India. Only a

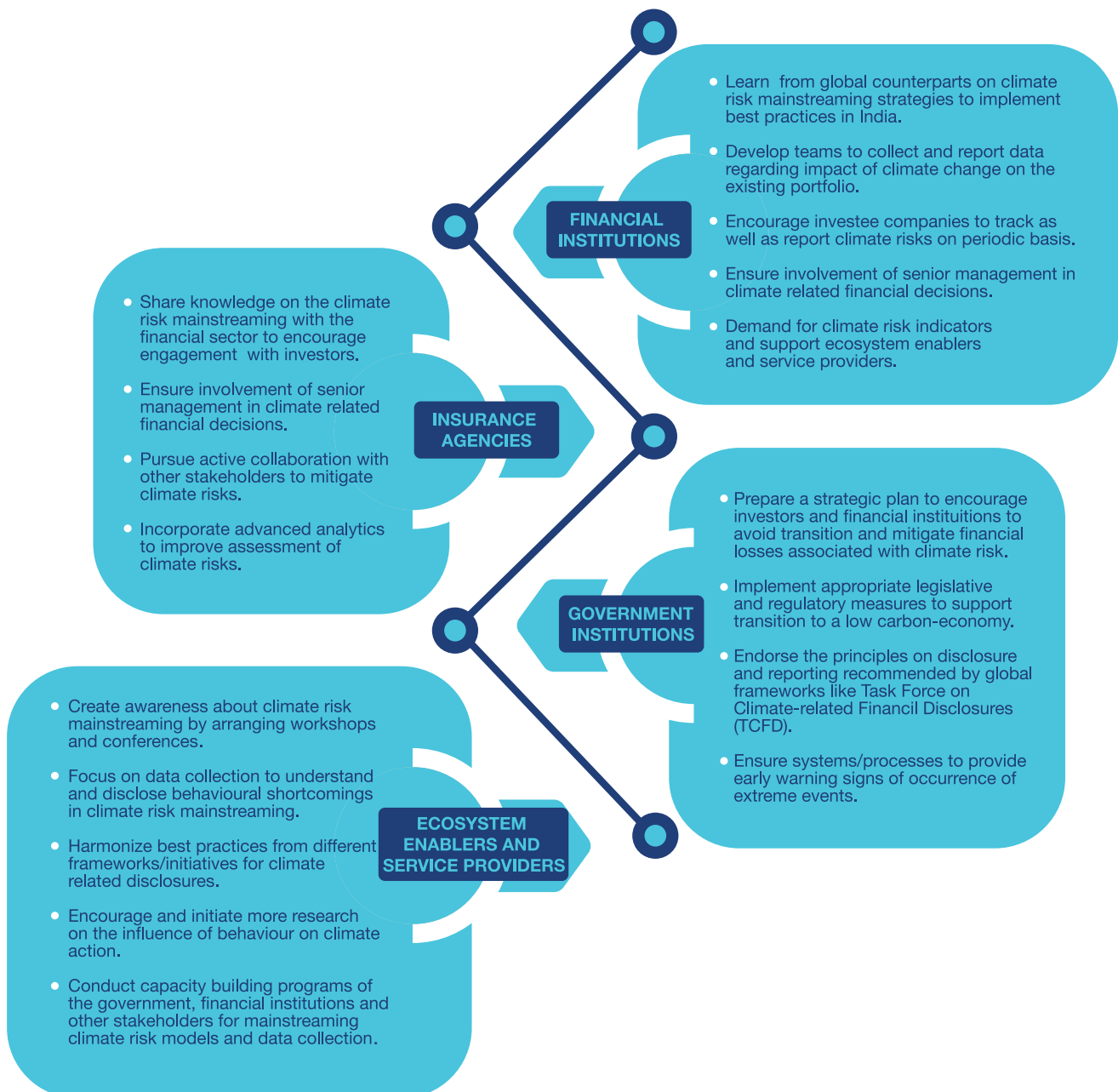
little over 17% of the respondents that we surveyed; are aware of the climate related risks. Similarly, only 37% of respondents that we surveyed are aware of frameworks such as the TCFD, out of which only one institution has started reporting on TCFD platform as per the guidelines.

Overall, although the understanding of climate risk mainstreaming is abysmally low, financial institutions

agree that there is a growing need to consider these risks into investment decisions. However, it will take financial institutions at least 2 to 3 years for consideration of climate risks in each and every investment decision. Thus, it is important to harmonize different efforts undertaken by different stakeholders for mainstreaming climate risk

to ensure its consideration in near future. To encourage climate risk mainstreaming strategies in financial sector, insurance sector, and government policies following recommendations may act as catalysts, which needs to be considered in discussion with other ecosystem enablers and service providers.

Summary Of Recommendations Across Stakeholders

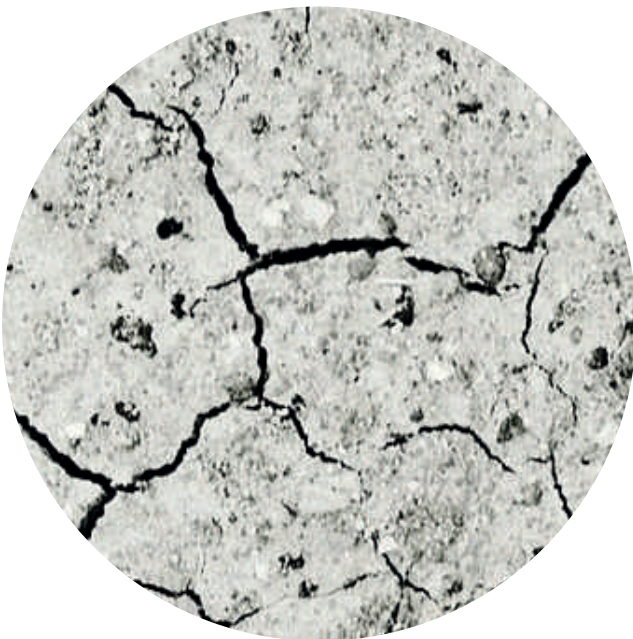


2. Introduction

This report “**Landscape study of climate risk mainstreaming approaches for investment portfolios in India**” aims to assist Financial Institutions (FIs) in understanding importance of climate risks and its quantification and suggest recommendations for adopting appropriate climate risk mainstreaming strategies. The impact of climate change resulted into USD 520 billion loss in annual consumption globally⁴ and India suffered an economic loss of USD 37 billion⁵ in 2018 alone. Globally FIs and investors are realizing that investments in many sectors are vulnerable to climate risks, making them wary of increasing their exposure in those sectors. Climate change can adversely impact many geographies and industries. This combined with introduction of climate related regulations can reduce business profits, and consequently investor returns leading to a reduction in their lending appetite. Although climate change can affect all sectors, it is particularly true for sectors such as agriculture, energy, construction etc. that get directly impacted due to an adverse climate event. However, since climate risk assessment, mitigation and pricing are relatively new domains for FIs, there is a lack of standardization in approaches adopted by FIs for dealing with investments in climate change sectors and managing climate risk leading to inadequate knowledge of best practices that can be adopted by players across sectors.



The report captures evidence on the potential overall exposure of financial sector stakeholders (insurance companies, financial institutions, ratings agencies) to climate change risks in India. It also provides targeted recommendations for best incentivising investments in India through a scientific climate-risk internalisation strategy that can be linked with existing frameworks such as TCFD/ Carbon Pricing etc. These findings were further fine-tuned and calibrated in our discussions with key stakeholders (financial institutions, government agencies, insurance agencies, service providers, among others) in the climate change domain. The summary of our secondary and primary research findings is captured in this report.



3. Climate Change And The Importance Of Mainstreaming Climate Risks In Financial Institutions

Climate change refers to a broad range of global phenomena mostly caused by burning of fossil fuels, which adds heat-trapping gases to Earth's atmosphere. It includes occurrences that cause global warming (overall increase in the temperature of earth) but also consist of other environmental changes such as the rise in sea level, loss of ice mass from glaciers, shifting of flower blooming season, and other extreme weather events⁶. These events have progressively been reshaping the Earth's climate, the impact of which is now being felt with rapid global warming due to global emissions reaching record high levels and showing no signs of saturation. Total annual greenhouse gases emission reached a record high of 53.5 GtCO₂e in 2017 after increasing by 0.7 GtCO₂e from 2016 levels. However, the emissions in 2030 need to be 25% lower than the 2017 level to limit warming to 2°C and 55% lower to limit warming to 1.5°C⁷.

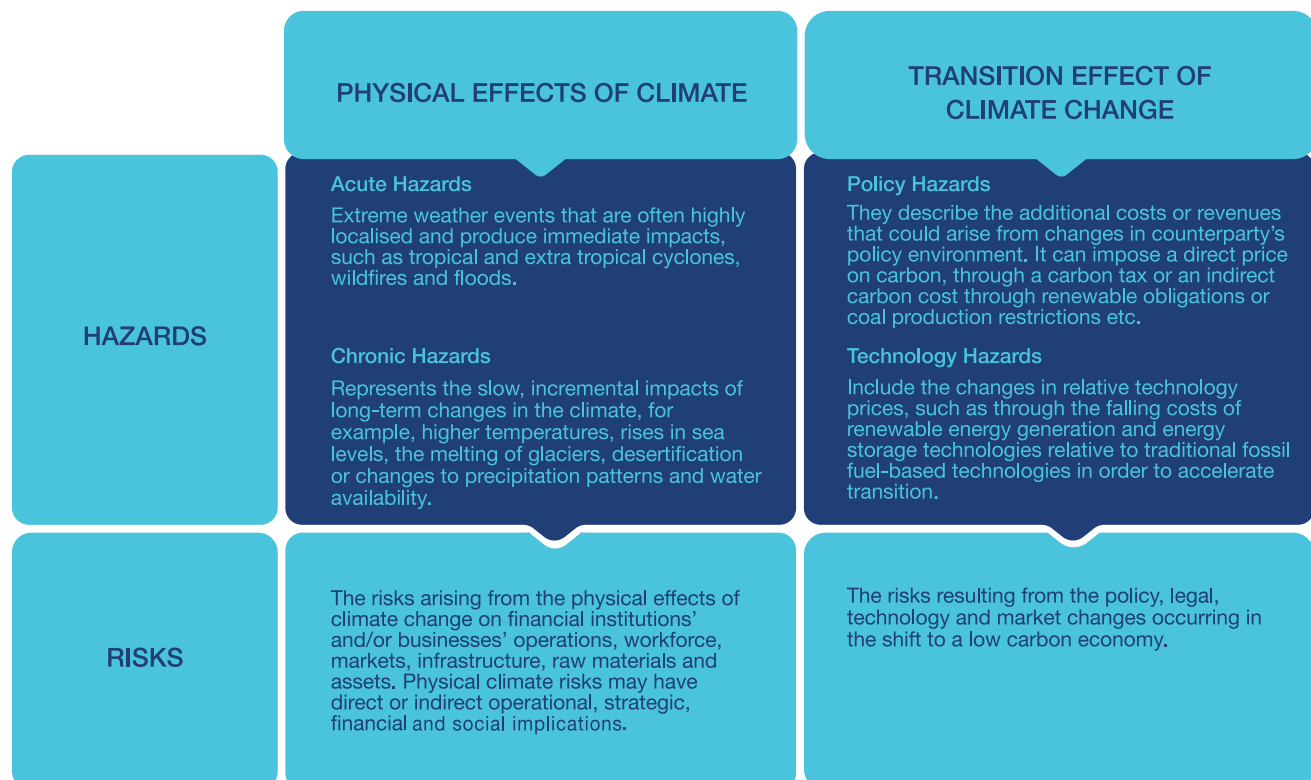
While there was a general awareness about the threats of

climate change in the late 1950', no action was initiated on the same till the 1980's. Post this, various efforts were made globally through science and scientists in order to estimate the impact of greenhouse gas emissions and their effects on humans and the society. The Intergovernmental Panel on Climate Change was established in late 1988 jointly by the United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO) after series of events such as a severe drought and heat in the United States and vast fires in the Amazon rainforest and Yellowstone National Park⁸. This followed various negotiations and efforts such as the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, etc.

The Paris Agreement of 2015 within the UNFCCC aims at restricting the increase in the global average temperature to well below 2°C above pre-industrial levels by 2100 and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels⁹. To meet the objective, there is a requirement for strict implementation of low carbon alternatives. The current level of 1°C of warming today relative to pre-industrial times is already having disruptive consequences on economies across the globe, through both its physical manifestations and mitigation actions aimed at avoiding these¹⁰.

An industry led task force called the Task Force on Climate-related Financial Disclosures (TCFD) has divided climate related risks into two categories: physical risks and transition risks. These risks are described in detail in the diagram below.

Climate Change, Components And Threats To Business¹¹



As per the United Nations, India has suffered USD79.5 billion in economic losses in 19 years due to climate-change disasters and delays in tackling these risks can cost businesses including investors nearly USD 1.2 trillion over the next 15 years.



As exhibited in the previous page, both physical and transition climate risks occur from certain events and can have severe negative (sometimes positive) impact on businesses as well as on the related stakeholders such as suppliers, customers, investors, insurers, etc. For instance, demand for construction materials can surge after a hurricane or demand for ski-tourism can steadily reduce in regions experiencing gradually warmer temperatures. However, climate change in any geography can also indirectly disrupt the entire value chain of a business in other regions. For instance, a car manufacturer Toyota experienced business interruptions at three of its plants in eastern Thailand during the Thai floods of 2011, not because they were directly affected by the floods, but due to shortage in supply of raw materials from key suppliers in the affected areas¹². All these examples will also have direct bearing on investor return and profits.

Along with catastrophic environmental consequences, these risk factors can also negatively impact businesses, resulting in poor financial performance, thus destabilising the entire financial ecosystem. As per United Nations, India suffered huge economic losses (around USD 79.5 billion in past 19 years) due to climate change disasters and delays in tackling these risks can cost businesses including investors nearly USD 1.2 trillion over the next 15 years. It is

therefore necessary for financial institutions and businesses to understand the long term impact of climate change and incorporate these impacts into strategic decision making such as increasing pricing for certain sectors, framing a negative screening list, investing more in climate friendly sectors, etc. These decisions require a structured governance plan along with concrete ways of assessing and measuring risk and performances.

Climate change impacts businesses in multiple ways. It can cause permanent disruption in the demand and supply dynamics of goods and services in the country. If left unattended, it can:

- Impact the broader macroeconomic environment.
- Impact country's macroeconomic performance.
- Threaten the country's sovereign rating and
- Increase the cost of capital for investing in the country.

A summary of such consequences is explained in the following page, breaking down the potential impacts of climate risk on the macro environment, supply chain, operations and the consumer market which in turn impact businesses.

Potential Consequences Of Climate Risk To All Levels Of Operations

PHYSICAL EFFECTS OF CLIMATE CHANGE

TRANSITION EFFECTS OF CLIMATE CHANGE

Extreme weather events can destroy output and reduce productivity, affecting the aggregate output of goods and services (GDP), create inflationary pressure and change real interest rates. Differential impact on countries can affect regional trade balances and exchange rates.

**MACRO
ENVIRON-
MENT**

Policy and technologies changes can impact the GDP, leading to changing sectorial composition and competitive positions of economies. It can sometimes also cause price shocks and create inflationary pressure.

Fluctuation in availability of inputs, which is independent of the location of the business and dependent on the location of the supplier.

**SUPPLY
CHAIN**

Policy shift affecting the supplier (For instance, due to a carbon technology regulation) could increase the cost of production of a business if the supplier passes the carbon prices to the business.

End users are affected by physical impacts of climate change that could affect the demand for the product creating demand shocks. That is dependent on the location of the customers and markets.

**CONSUMER
MARKET
REACTION
TO CLIMATE
EFFECTS**

For businesses whose products are emission intensive to consume, policy and technology shifts might cause customers to shift to other alternatives. For instance, greater substitution of paper or plastic products.

High temperature can permanently impact labour productivity and extreme weather can interrupt business due to forced evacuations, damage to physical assets, migration of labour force etc.

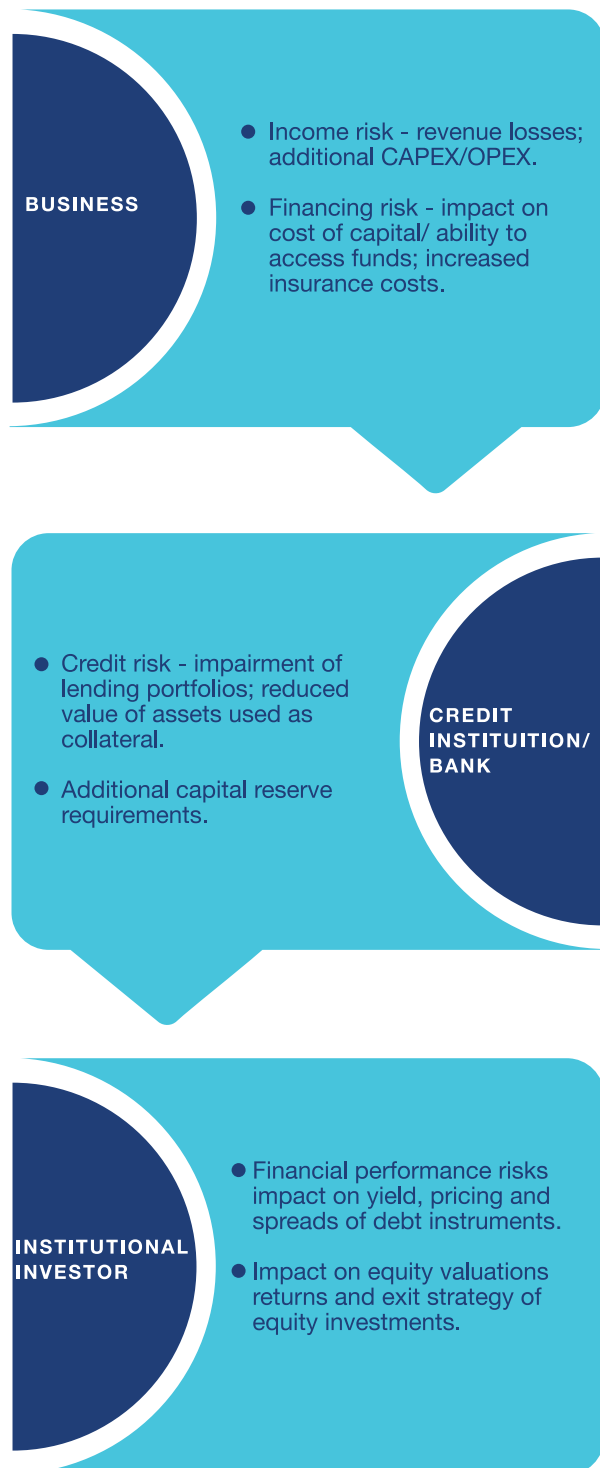
**OPERATIONS
& ASSETS**

Policy change promoting lower carbon technologies can have a cost impact to the operations of a business - A new regulation will cause an enterprise to adjust and invest in new technologies that are regulation friendly. The shift to new technology will render previous production ineffective leading to wastage and a further increase of cost to adhere to new technologies and regulations. Although temporary, this will impact the costs and profitability of the enterprise which will further reflect in investor returns.

Actions taken by an individual business or investor can impact the stability of the entire financial system of the economy. Thus, it is beneficial for them to propagate the positive impacts of considering climate change to other market participants as well. For instance, The International Association of Insurance Supervisors (IAIS) had proposed a framework for assessing and mitigating systemic climate risks and asserted that in case of failure to do so, it may result in underpricing / under reserving, thereby overstating insurance sector resilience.

It also identified channels for transmitting the sources of the risks to the broader economy: (i) the asset liquidation channel, (ii) exposure channel, and (iii) critical functions channel¹³. Considering the adverse consequences, it is prudent for businesses and investors to price climate risk in their long term strategies in order to protect themselves from the uncertain financial losses and ensure stability of the financial system. Possible financial impacts on these businesses are highlighted below.

Examples Of Potential Financial Impact Of Climate Change on Businesses¹⁴



agriculture, risk hedging, insurance etc. to withstand frequent hurricanes¹⁵. Thus, given the risks and opportunities, it becomes increasingly important for the stakeholders to-

- Assess and learn more about climate risk and the impact it can have on their portfolio of assets,
- Consider climate risk in the long term investment and business strategies; and
- Allocate capital to climate-resilient investments.

Climate Risk v/s ESG Compliance

Many asset management firms and pension funds are encouraging corporates to improve sustainability practices in ways that benefit their long term profitability and create broader impact by focusing on Environmental, Social and Governance metrics (ESG). It is widely believed that complying with ESG metrics will drive growth, market share and profitability; and as a result help in attracting capital. While ESG compliance strengthens trust and improves standards of transparency for all stakeholders, it does not eliminate climate risk that any enterprise might face. Data needs to be used to not only understand how companies manage risk, but also to understand the risks that they are exposed to. Currently, ESG does not cover climate risk as a part of one's ESG score. Hence, a business might have a high ESG cover but that does not mean that it is protected from climate risk.

While climate risk possesses certain threats, it also creates opportunities for investors to allocate their capital towards assets with lower climate risk and in favour of businesses that are providing goods and services to improve climate resilience mechanism/ adaptation planning. For instance, investment could be made in businesses that provide data analytics services such as weather analysis, catastrophe management, providers of solutions to physical climate risk like more efficient water processes, drought-resilient

Currently, most businesses in the developed world generally comply with ESG guidelines without much consideration of climate risks in their long-term strategies. To emphasise focus on climate risks and promote climate related disclosure, the Task Force on Climate-Related Financial Disclosures (TCFD) was formed in 2015. The aim of this taskforce is to provide a set of recommendations for disclosure of climate-related risks and opportunities which aims to increase transparency around assessment and management of climate-related

risks and opportunities. We have captured more information about TCFD, its objectives, roles, and recommendation in the next section.

3.1.Task Force On Climate-Related Financial Disclosures

TCFD is the first response from the finance sector in the form of recommendations for disclosure of climate-related risks and opportunities. It aims to increase transparency around assessment and management of climate-related risks and opportunities, in the absence of which investors and others are likely to collectively misprice assets and systematically misallocate capital, threatening financial stability and profit¹⁶.

TCFD has been formed as a response to the growing interest of the businesses and financial institutions to consider and assess climate risk as well as developing the skills to manage the same. Additionally, the Paris Agreement aims to strengthen the action towards climate change and has called on the financial institutions to play an active role in limiting global warming to below 2°C. The agreement proposes financial institutions to allocate their capital for assets that encourage low greenhouse gas emissions and promote climate resilient development¹⁷.

However, to price climate risk, investors and other stakeholders need the right information along with adequate guidance. Long term impacts of both the physical and transition risks of climate change need to be considered for financial decision making. The costliest consequences of climate change are likely to occur over time periods greater than a decade and even longer. Secondary research revealed that fund managers generally had horizons that did not extend beyond the next five years while the considerations of technocratic authorities such as the central bank were somewhat closer to a decade¹⁸. However, primary research suggests that most fund managers, especially in India are not looking beyond one year to assess climate risk. These are mostly insurance agencies, while other financial institutions are still in the process of learning how to model and price climate risk.

TCFD is an industry led initiative that aims to encourage investors and businesses to conduct forward-looking, scenario-based assessment of risks and opportunities surrounding climate change and to incorporate these effects into their strategic decisions. The task force released its final recommendations in 2017. The recommendations were put together by G20's Financial Stability Board which mandated 32 international experts to come up with these recommendations. It seeks to develop recommendations for voluntary climate-related financial disclosures that are consistent, comparable, reliable, clear, efficient, and provide decision-useful information to lenders, insurers, and investors¹⁹.

Importance Of TCFD For Stakeholders²⁰

Importance Of TCFD For Stakeholders

Better access to data will enhance how climate-related risks are assessed, priced, and managed



The recommendations are structured around four thematic areas covering core elements of how organizations operate – governance, strategy, risk management, and metrics & targets.

These recommendations are supported by climate related financial disclosures (recommended disclosures) that organizations should include in their financial filings which can help understand how they assess climate-related risks and opportunities. Additional guidance is provided to all sectors and supplement guidance is provided to certain financial (banks, insurance companies, asset owners, asset managers) and non-financial sectors (energy, transportation, materials & buildings; agriculture, food & forest products) which consist of suggestions for implementing the recommended disclosures:



● Governance

Investors and other stakeholders should be supplied with information that supports evaluations of whether climate-related issues receive appropriate board and management attention.



● Strategy

Investors and other stakeholders should be supplied



● Risk Management

Investors and other stakeholders should be supplied with information that explains how the organization's climate-related risks are identified, assessed, and managed and whether those processes are integrated into existing risk management processes. This will help the users evaluate the overall risk profile of the organization.



● Metrics And Targets

Investors and other stakeholders should be provided with the metrics and targets used by the organization to measure and monitor it's climate-related risks and opportunities which will help them assess the organization's potential risk-adjusted returns, ability to meet financial obligations and general exposure to climate-related issues²¹.

The key features of the recommendations are highlighted in the table below.

TCFD Recommendations And Disclosures

GOVERNANCE	STRATEGY	RISK MANAGEMENT	METRICS & TARGETS
Disclose the organization's governance around climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	Disclose how the organization identifies, assesses, and manages climate-related risks.	Disclose the metrics and targets used to assess and manage relevant climate -related risks and opportunities where such information is material.

RECOMMENDED DISCLOSURES

Describe the board's oversight of climate-related risks and opportunities.	Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	Describe the organization's processes for identifying and assessing climate-related risks.	Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.
Describe management's role in assessing and managing climate-related risks and opportunities.	Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	Describe the organization's processes for identifying and assessing climate-related risks.	Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
—	Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

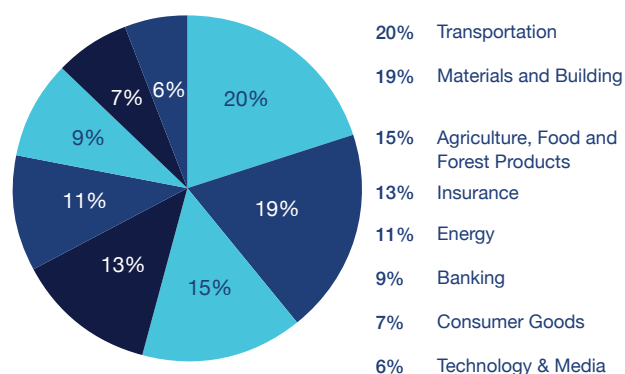
The Task Force has gained acceptance from recognized investors and businesses across the globe. Increasingly, evidence of climate-related financial risks and the acknowledgment of the same are gaining prominence which is motivating businesses and investors to consider the recommendations in their disclosures. Nearly 800 public and private-sector organizations have announced their support for the TCFD including global financial firms responsible for assets in excess of USD 118 trillion. The recommendations have also seen acceptance from the Network for Greening the Financial System (NGFS) and other stakeholders that have encouraged businesses to disclose risks in line with the TCFD recommendations²²:

- *340 investors with over USD 34 trillion in asset under management (AUM) as of have asked businesses to report under TCFD.*
- *5 governments support TCFD: Belgium, Canada, France, Sweden and the UK²³.*

Additionally, the Task Force reviewed and surveyed over 1,000 businesses and investors to get feedback on the recommendations and an update on the status of the implementation of the same. It was observed that in light of the urgent need to meet the goals of the Paris **Agreement**, **businesses mention that they comply with TCFD** but in reality they were not disclosing information about their climate-related risks and opportunities²⁴. Even from the businesses disclosing the information, more clarity was needed on the potential financial impact of the risks they faced. *Over 60% of the businesses that claimed to use scenario analysis to assess the resilience of their strategies did not disclose the information on the resilience of their strategies.* This highlighted that businesses were still in nascent stages of using climate related scenarios internally.

The 1,000 businesses included a mix of 8 industries consisting of banking, insurance, energy, materials & buildings, transportation; agriculture, food & forest products; technology & media, and consumer goods. The break-up of the industries is given below.

**Distribution Of Industries
Surveyed By The Task Force**



3.2.The Journey Of Climate Risk Mainstreaming

World Bank propagates that mainstreaming climate change considerations throughout financial institution's operations, and in their investing and lending activities, will enable financial institutions to deliver better, more sustainable, short-term and long-term development and financial returns. *"Mainstreaming" by definition implies a shift from financing climate activities in incremental ways, to making climate change, both in terms of opportunities and risk as a core consideration and "lens" through which institutions deploy capital.* Based on practices implemented by many types of financial institutions worldwide over the last two decades, World Bank offers the following **Five Voluntary Principles for Mainstreaming Climate Action** to support and guide financial institutions moving forward in the process of adapting to and promoting climate smart development²⁵.

● Commit To Climate Strategies

Be strategic when addressing climate change. Institutional commitments to address climate change are demonstrated by senior management leadership, explicit strategic priorities, policy commitments and targets, which allow for the integration of climate change considerations within a financial institution's lending and advisory activities over time.

● Manage Climate Risk

Be active in understanding and managing climate risk. Assess your portfolio, pipeline and new investments, and work with clients to determine appropriate measures for building resilience to climate impacts and improving the long-term sustainability of investments.

● Promote Climate Smart Objectives

Promote approaches, instruments, tools and knowledge on how best to overcome risks and barriers to investment in low-carbon and resilient investments. This may include mobilizing and catalyzing additional financing and developing specialized financing vehicles/ products, such as green bonds, risk sharing mechanisms or blended finance. Engage clients and other stakeholders (e.g., rating agencies, accounting firms) on climate change risks and resilience, and share lessons of experience to help further mainstream climate considerations into activities and investments.

● Improve Climate Performance

Set up operational tools to improve the climate performance of activities. Financial institutions track and monitor indicators tied to climate change priorities, including GHG reporting, lending and advisory volumes supporting green investment, climate related asset allocations, and the institution's own climate footprint.

● Account For Your Climate Action

Be transparent and report, wherever possible, on the climate performance of your institution, including increases in financing of clean energy, energy efficiency,

climate resilience or other climate-related activities and investments. Be transparent and report, wherever possible, the climate footprint of the institutions' own investment portfolio, and how the institution is addressing climate risk.

World bank has suggested these principles in collaboration with Agence Francais de Development (AFD), Africa Development Bank (AfDB), Asian Development Bank (ADB), CAF Latin American Development Bank (CAF), Credite Agricole S.A., Cassie des Depots Group (CDC), Development Bank of South Africa (DBSA), European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD), Inter-American Development Bank (IADB), International Bank for Reconstruction and Development (IBRD), International Finance Corporation (IFC), Japan International Cooperation Agency (JICA), KfW Bankengruppe (KfW), and the Multilateral Investment Guarantee Agency (MIGA)²⁶.

The **Five Voluntary Principles for Mainstreaming Climate Action** within Financial Institutions incorporates on-going work as well as new areas where some institutions are only now beginning to engage. However, existing initiatives give a voice and platform for a range of financial institutions to show leadership on climate change. Many involve a call for action by policy makers to set the right policies and market signals so finance can flow towards climate-smart and resilient investment. Some of the initiatives are highlighted below:

- **The Carbon Disclosure Project (CDP)** holds the largest global collection of self-reported climate change, water and forest-risk data. Partners including businesses, governments and investors agree to share information with CDP and use aggregated information to make investment and purchasing decisions. In 2018, 525 institutional investors representing over \$96 trillion of assets disclosed climate data to CDP²⁷. In the same year, 52 Indian companies responded to CDP's Climate Change questionnaire. Out of these, 50 stated to having board-level oversight of climate-related issues, and 44 of them provided incentives to the management for achieving targets²⁸.
- **Institutional Investor Group On Climate Change/ Climate Change Investors Solutions Guide** provides non-binding guidelines on how to better address climate change from an investor's perspective. A range of strategies and solutions are presented including on carbon pricing, low carbon investment, managing and reducing carbon exposure in portfolios and engagement.

- **Global Investor Coalition On Climate Change/ Institutional Investor's Statement On Climate Change** sets out the contribution that investors can make to increase low-carbon and climate-resilient investments. The 2018 statement was signed by 415 investors representing more than \$32 trillion in assets²⁹.

- **United Nations—Principles For Responsible Investment (PRI)**. Launched in 2006 at the New York Stock Exchange, the PRI were convened by the U.N. Secretary-General and developed by an international group of institutional investors to reflect the increasing relevance of environmental, social and corporate governance issues in investment practices. In signing the Principles, the 2,450 investors³⁰ publicly committed to adopting and implementing them where they are consistent with their fiduciary responsibilities.

- **The Equator Principles** is a binding risk-management framework adopted by financial institutions. It seeks to determine, assess and manage environmental and social risk in projects, and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. As of 2018, the Equator Principles has a total of 97 signatories³¹.

- **The Portfolio De-Carbonization Initiative (PDC)** is a multi-stakeholder initiative that aims to decrease GHG emissions by mobilizing institutional investors committed to gradually decarbonizing their portfolios. Co-founded by Amundi, AP4m CDP and UNEP, the PDC requires asset owners and managers to support, or firmly plan to support, clients seeking portfolio de-carbonization or similar climate-related capital re-allocation efforts and are fully and publically committed, at CEO level, to promoting the PDC and its recruitment activities among peers.

We identified that some organizations across the globe have been following voluntary principals recommended by institutions such as the World Bank, TCFD recommendations and other initiatives available in the market. After studying various literatures and assessing the same, we categorized the stages of their journeys into four buckets which represent a step-by-step approach to identifying and mainstreaming climate risk in their overall portfolios. These buckets are- Assessment of the risks, Quantification of the risks, Mitigation of the risks, Pricing of the risks and Investment strategy for the risks. Please refer to figure on the next page for an explanation on the same.

Climate Mainstreaming Journey Steps

1

**CLIMATE RISK ASSESSMENT
AND QUANTIFICATION**

- Climate change risk assessment is to identify the climate change related risks.
- Climate risk quantification includes data selection and generation, adaptation of risk analysis methods and the interpretation of the results.

2

**DEVELOPING STRATEGY FOR
CLIMATE RISK MITIGATION**

- The approach seeks to promote sustainable development by reducing the vulnerability associated with climate risk.

3

**DEVELOPING ACTION PLAN
FOR CLIMATE RISK PRICING**

- Develop strategy to price climate risk based on risk aversion, prudence and the curvature properties of marginal damages.

4

**DEVELOPING STRATEGY
FOR INVESTMENTS**

- Develop strategies to increase investments in green/alternative energy and investing in climate proofing portfolio.

Literature review also suggested that financial institutions were undertaking various activities for climate mainstreaming which fell under one of the four buckets discussed above. For instance, financial institutions such as HSBC had assessed their portfolio in 2016 and committed to provide \$100 Billion in sustainable financing and investment by 2025.

Similar to HSBC, many other financial institutions were allocating capital to environmentally friendly businesses. While allocation of capital was observed, distinct pricing of climate risk of their overall portfolio was not.

4. Landscape Of Climate Risk Mainstreaming In India

Owing to a high growth rate of population and great dependence on agriculture as a source of livelihood, India is one of the most vulnerable countries to climate change and has been at the receiving end of many climate change events including heat waves, water stress, droughts, cyclones, floods etc.

Particularly over the last couple of years, extreme weather events and rising temperatures have adversely impacted businesses and livelihoods. Given the speed at which the economic activity of the country is increasing, India can experience an overall heating of over 1.5 degree Celsius by the end of the century which can cause severe damage to not just businesses and financial institutions in general, but also human lives and the economy in specific.

Some Recent Events Highlighting India's Experience With Climate Change³²



As a developing country, India needs to increase its GDP at an accelerated pace. However, this is causing a detrimental damage to the environment and its people. India ranks among the top 20 countries with highest per-capita CO₂ emissions³³. It is in the bottom three emerging economies along with Russia and South Africa in terms of greenhouse gas intensity (CO₂ emission/GDP)³⁴.

While no one extreme weather event can be said to be induced by climate change, it is a fact that the increased frequency along with the intensity of these events are due to human actions. These events also have an economic cost to them. Disasters cost the global economy over USD 520 bn dollars every year³⁵. In the year 2014, 102 million people were impacted and USD 110 bn was lost due to disasters across the globe³⁶. India lost over USD 79.5 billion between 1998 – 2017 due to disasters including earthquakes, tsunamis, storms, floods,

droughts³⁷. Some instances of individual economic impact include:

- Chennai witnessed non-stop torrential rains in December 2015 and in the absence of a proper drainage system, it led to extensive flooding. This impacted the industrial activity of the city where major manufacturing units had to suspend operations with estimated economic losses at USD 2.2 billion³⁸.

- Unchecked mining and soil piping in Kerala has increased floods and landslides in the state. The state suffered losses over INR 31,000 crore due to floods in the year 2018. It also submerged 140,000 ha of agriculture land causing a damage of INR 6,700 crore³⁹.

Given the above, India needs to re-think its growth strategy and deploy capital to sectors and regions that can enable a more sustainable growth and; reduce and check investments in sectors that are highly sensitive to climate risk. Some examples include:

- Construction sector is dependent on granite and sand which are water dependent. With water stress increasing, it is important to re-consider investments in such sectors and be cautious while allocating capital.
- States like Odisha, Andhra Pradesh and West Bengal are more prone to cyclones. It is therefore prudent for financial institutions to assess the probability of loss due to cyclones while investing in industries situated in these regions and price the risk accordingly.
- According to a survey conducted by CBRE, nearly 75% of Indian companies are not prepared for disaster management. With 85% of Indian land prone to disasters, unpreparedness poses a great threat to the environment, human lives as well as the economy⁴⁰. Public and private financial institutions should demand more accountability from investee companies and price this risk while lending and investing. Regular assessment of such risks can greatly reduce future losses that may arise as a result of a disaster.

Landscape of climate risk mainstreaming in India is at a very nascent stage and requires increased awareness, willingness and collaboration between different stakeholders. There is a visible lack of understanding of what climate risk means and why it needs to be considered across all sectors and not be limited to certain environmentally harmful sectors only. This is augmented by a lack of substantial evidence in the form of adequate and reliable forecast data that can motivate stakeholders to consider the risk and act on it. Indian insurance agencies are relying on their global counterparts to model climate risk and price the products they offer. Service providers and ecosystem enablers are slowly understanding the climate change risks and modelling requirements and trying to generate/provide relevant data but lack of historical data limits their ability to generate results and support modelling. Stakeholders including banks, insurance agencies and other investors look up to the Government to mandate regulations incentivise and provide data wherever possible in order for them to price climate risk in their portfolios.

Government ministries have started developing models for short-term weather forecasts, and prediction models for lightning, thunderstorms and cyclones. A few Doppler Weather Radars are being set up over three hilly states of northwest India and over ten radars are being erected on the plains, including Mumbai⁴¹. Such efforts are helping in making broad level data available to stakeholders, however deeper insights are yet to be delivered on the same. Further, Government does not require financial institutions to report or disclose climate related information to their stakeholders.

Risk reduction due to climate change needs to be strengthened with better governance, active participation and, innovative models and processes. Information captured in this section highlights the summary of survey responses and stakeholder consultations across different stakeholders.

4.1. Summary Of Discussion With Financial Institutions

Majority of the respondents are aware about climate change mainstreaming but are not undertaking climate risk mainstreaming in their investment decisions. The institutions are also aware of climate risks and its adverse impact on their investment portfolio. However, there is still a lack of clarity between climate risk pricing and climate finance among financial institutions.

Due to lack of knowledge and information, financial institution are also unable to consider TCFD recommendations which were developed to help them take more informed decisions by improved reporting on exposure and management of climate change risks and opportunities. Also, there is no dedicated team that track this segment and consider climate risk modelling and integrating climate risk in their products / operations.

Majority of financial institutions suggested that it will take another 3-4 years for them to develop and consider climate risk mainstreaming models for their investments. Lack of historical data and modelling experience contribute to the time lag in implementing climate risk mainstreaming models.

Financial Institutions (respondents)

Private equity **35%**
Banks and NBFCs **43%**
Grant makers **13%**

Insurance Companies 9%

4.2. Summary Of Discussion With Insurance Agencies

Insurance agencies are the key actors and have a major role to play in supporting climate risk mainstreaming. Majority of the respondents were also aware about the climate risk pricing and even have products to support/promote climate risk pricing. These agencies do consider climate risks while designing the insurance product.

Agriculture sector is more prone to climate change according to the insurance agencies in India (due to floods, droughts, etc.). However, most of the Indian insurance agencies do not have in-house experience of climate risk mainstreaming and are dependent on their global counterparts for the relevant models for climate risk pricing. Lack of technical data and poor awareness among institutions (including investee companies) are major challenges for insurance

industry in mainstreaming climate risk approaches in India. However, recently insurance agencies have started working with lot of the technology providers that can provide climate and weather forecasting data to make robust products for the climate change prone sectors.

“Climate is very uncertain, limited amount of past data results in lack of ability to predict what is going to happen in the future.”

-
An Indian Insurance Company Representative

“Climate change and risk prediction is a complex topic because there is no academic consensus on how climatic changes will impact the actual climate risk.”

-
A Global Insurance Company Representative

4.3. Summary Of Discussion With Government Agencies

Government agencies are responsible for designing and implementing policies that encourage a speedy transition to clean energy such as wind energy, geothermal energy, and solar energy as well as encourage financial institutions to report their investment in climate change sectors. Governments at all levels (central, state, as well as local level) have a lot of tools at their disposal to accelerate climate risk assessment and mainstreaming. On the other hand, Government can also provide assistance on the climate change mitigation side by restructuring the existing programs and policies.

Government along with multilateral development agencies have dedicated funds for climate action and climate finance and are trying to support financial institutions with supportive climate finance strategies but are not working on climate risk mainstreaming. Government is focusing more and more on adaptation priorities and strategies, and mobilize funds needed to implement them.

There are anticipated capacity limitations of the government as the development of climate risk mainstreaming strategies faces a number of challenges including effectively engaging stakeholders, establishing government ownership of the program, and fitting the design and approach of the strategy to the rapidly evolving context for climate action. Including

climate mainstreaming strategies across all interventions is a daunting exercise, given the lack of clear and consistent signals from governments and the uncertainty about technological and economic developments that could affect climate change mainstreaming (both quantification and pricing of climate risk).

Greater efforts are needed to engage Government more effectively and the capacity constraints within government demand more innovative approaches, including broader participation of multiple stakeholder groups at the national, subnational, and community levels. Together there is a need to ensure awareness of climate change, policy dialogue on climate change mainstreaming, national and sector strategy development, vulnerability and capacity assessment, and monitoring and evaluation (M&E) to ensure climate risk mainstreaming strategies are adopted at all levels.

4.4. Summary Of Discussion With Ecosystem Enablers

Ecosystem enablers are playing a major role in promoting climate risk mainstreaming in the industry, due to their reach and ability to articulate India's increased exposure to climate change risk. Technology providers are helping institutions such as insurance agencies, credit rating agencies and financial institutions to get more accurate data on the climate and weather forecast. Some of the organization are working towards creating knowledge banks of climate data according to the region or pin codes.

Some of the organizations are working on creating awareness and capacity building for financial institutions, private equity firms, credit rating companies regarding climate risk mainstreaming. For instance, CDP is an organization based in the UK with operations in India as well which supports companies and cities to disclose environmental impacts of major corporations. It encourages firms to conduct regular audits and report the same in order to reduce greenhouse emissions and mitigate climate change risk. In India, over 62 companies have reported their data to CDP.

4.5. Summary Of Discussion With Service Providers

The current market for climate risk and related modelling services is not developed in India but is evolving slowly – mainly due to a lack of demand and limited awareness of the services providers. At present, climate services primarily require data and information on climate change science, e.g. data model and scenario projections, observations and dedicated products that might be useful in modelling as well as pricing climate risks.

There is potential for climate risk modelling and pricing support services to be used more widely, but in general,

other drivers take priority as climate change is not seen as priority by most of the financial institutions, insurance agencies, as well as credit rating agencies. Majority of the respondents pointed out the need for greater engagement

of customers in the joint design, development and evaluation of climate risk modelling services for specific consideration of the type and level of information needed to inform decisions.

Summary Of Discussion With Service Providers

	FINANCIAL INSTITUTIONS (LENDERS & INVESTORS)	INSURANCE COMPANIES	ENTERPRISE & ECOSYSTEM PLAYERS
CLIMATE RISK PROPORTION ON THEIR PORTFOLIO	Relatively lower; depends on the nature of the sector and the region of investment.	High due to the inherent nature of the business; especially for agriculture insurance.	High due to the inherent nature of the business; especially for agriculture related business.
FINANCIAL IMPACT OF CLIMATE CHANGE	High if not hedged or checked depending on the nature of investment.	High due to high pay-outs.	Impact vary depending on the nature of the business and location.
NEW PRODUCTS	Not at the moment. Few ESG funds are starting in the country that will look at climate risk actively.	Products look at short term weather risk.	Enterprises are coming up which are developing products to tackle climate change.
PRICING MODELS	No. Some have started exploring the input technologies that can be used to get more clarity on climate and analytical tools.	Most insurance companies price short term weather risk according to the product.	Pricing of the product depends on the cost of lending and insurance product.

Recommended Framework For Achieving Climate Risk Mainstreaming

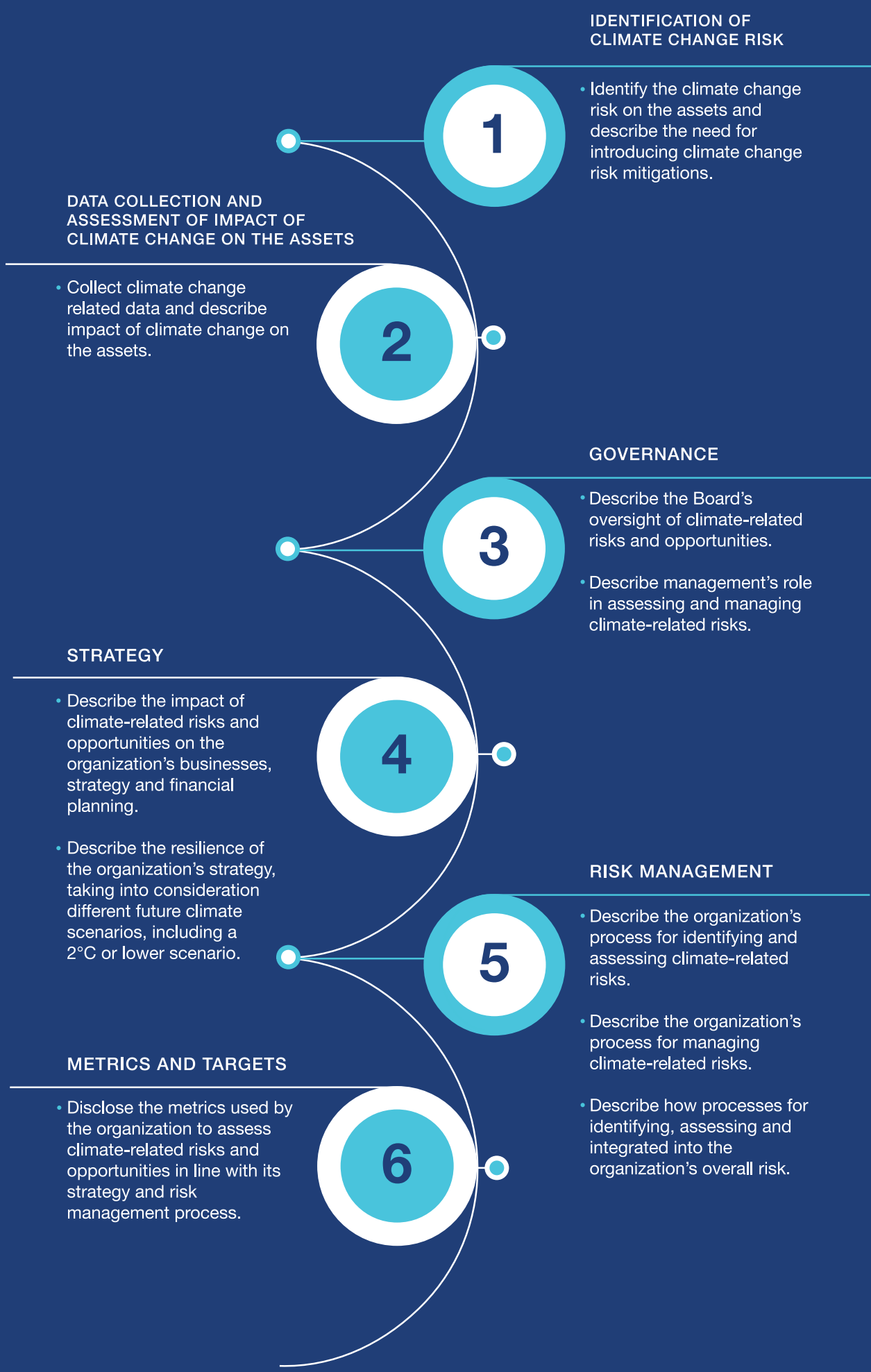
Climate change represents one of the biggest systemic risks for society, the economy and private institutions. Climate-related disclosures are a first step to building climate awareness and taking action and eventually following TCFD recommendations. The catastrophic effects of climate change are already visible, with extreme weather around the

world damaging property, disrupting economic activity and harming human life. Mitigating climate change and reducing greenhouse gas (GHG) emissions are major global challenges. The framework on the next page can help to start integrating the TCFD recommendations into standard business processes.

The first step to incorporate climate change risk and pricing in the current investment decision is to identify the climate change risks and respective catastrophic effects of climate change on the assets as per the above mentioned framework. The next step is collecting the data of climate change risks, mitigation and creating a knowledge database, which can be referred by consumers, evaluators, credit rating companies, investment managers, risk managers, and credit managers. The Governance parameter of a framework, demands companies to describe management's role in assessing and managing climate-related risks and opportunities. The Strategy parameter of framework asks companies to describe the climate-related risks and opportunities they have identified over the short, medium, and long term and to describe the

resilience of their strategies, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. The Risk Management parameter from the framework represents the company's processes for managing climate-related risks. The last parameter is Metrics and Target which requires investors to disclose targets and tools being used for climate change mitigation.

According to our survey, most of the financial institutions and investors are still at the first and second stage of identifying climate change risks and the catastrophic effects of climate change on their assets. Very few of them have recently initiated the process of forming teams under the Governance parameter.

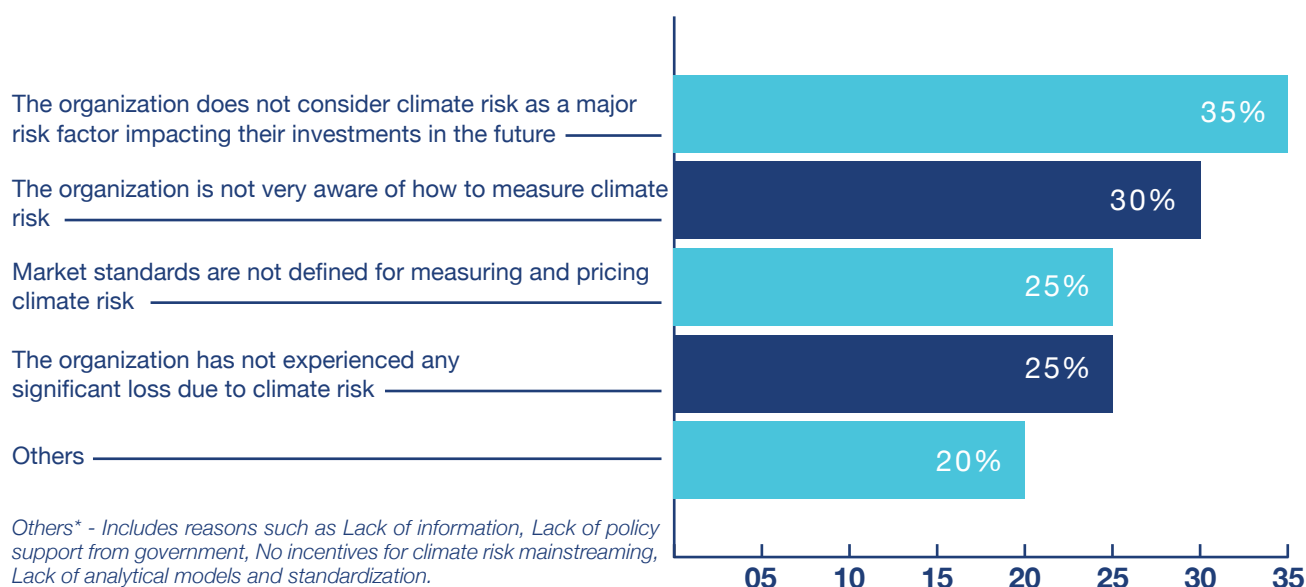


5. Understanding of Climate-Risk Mainstreaming Practices In India

Intellec conducted in-depth interviews with respondents associated with financial institutions including investors, banks, insurance agencies and credit rating agencies to understand how they price the risks of climate change.

We learnt that majority of respondents were aware of these risks but were not thoroughly convinced of the importance for mainstreaming climate risk at the time of investments. Over 35% of these respondents did not consider climate risk as a major risk factor impacting their investments in the future. One of the most important reasons for this was the lack of data for respondents to study the impact of climate change on their investments. This combined with an absence of market standards for measuring the risk had led them to de-prioritise climate risk for other operational risks while assessing investments. In this chapter we have presented the key highlights of our interviews with the respondents to understand the reasons behind their strategies surrounding climate risk.

Reasons For Financial Institutions Not Considering Climate Risk While Making Investment Decisions (% of total respondents)



5.1. Importance Of Climate Risk In Investment Portfolio

Majority of the stakeholders were aware of climate risks, predominantly physical impacts of climate risk such as droughts, floods, sea level rise, heat stress, cyclones and earthquakes, and the consequences they can have on businesses and their portfolios. Their understanding of the consequences of climate risks was primarily limited to the loss in investment portfolio or delay in repayment due to climate risks. Due to this reason, climate risk ranked as the least important risk considered while making pricing decisions.

Key Risks Considered During Investment By Respondents



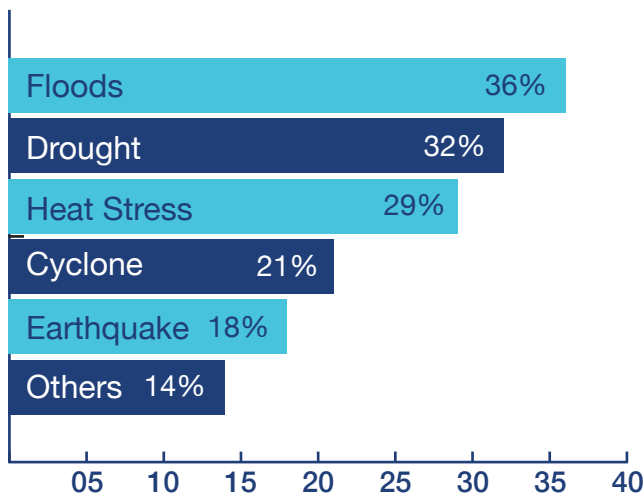
Note: "Other risks" include compliance risk and reputational risk which is currently considered while taking investment decisions

Despite high awareness, 55% of the respondents did not consider analysing and pricing climate risk on a priority basis. Most of these financial institutions, however, considered climate friendly investments such as investment in sectors like clean technology (solar, wind, etc.) as well as limited investments in polluting sectors/products such as thermal power plants. They also considered ESG factors and assisted investee companies in case of disasters. Some were in the process of studying their regions and investments and learning about climate models in order to price investments in the future. For instance, for one of the biggest public sector bank, SBI, climate risk was among the top three most important risks, while for Yes Bank it featured in the top ten risks. However, currently these institutions were not pricing climate risks for investment due to lack of data and insufficient knowledge of pricing models.

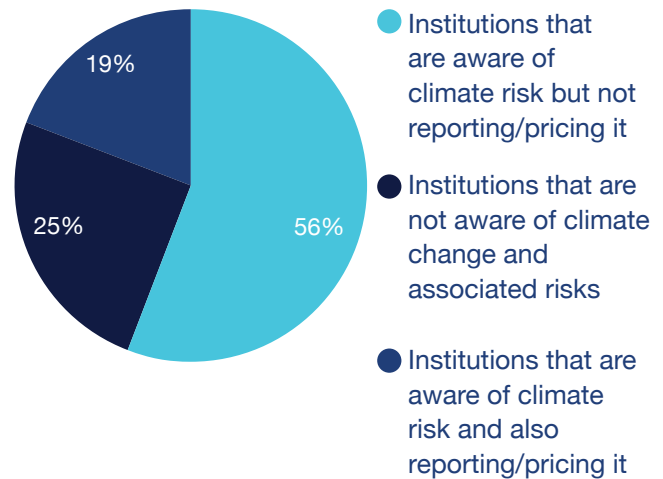
19% of the respondents were actively pricing weather risk and considered it important from an overall portfolio performance perspective. These were mostly insurance agencies insuring agriculture activities. The nature of their business and the inherent risk of adverse climate events for the agricultural sector made short term climate risk or weather risk very important for insurance agencies. Overall, most of the respondents stated that overall portfolio risk and investment returns were the biggest motivations for them to consider climate risk.

However on a whole, climate risk did not feature as a priority risk for most respondents. Operational risk, strategic risk and credit risk were cited as the most important risks as they had a direct financial impact on the respondent's returns.

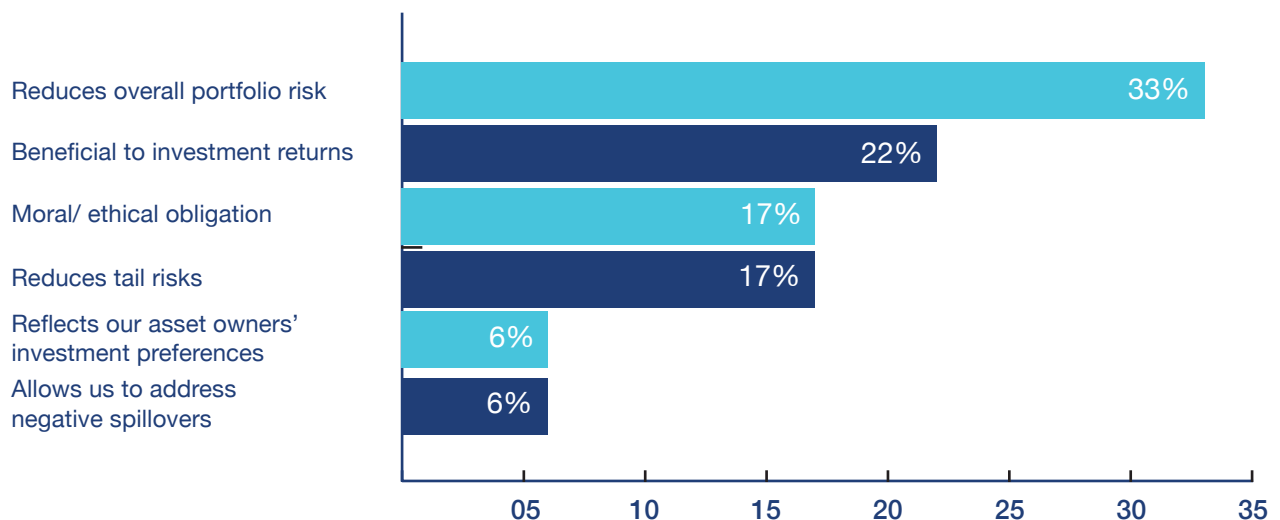
Most Important Physical Risks Considered By Financial Institutions



Percentage Response On The Reporting And Pricing Of Climate Risks



Motivation Of The Respondents To Incorporate Climate Risks In The Investment Process



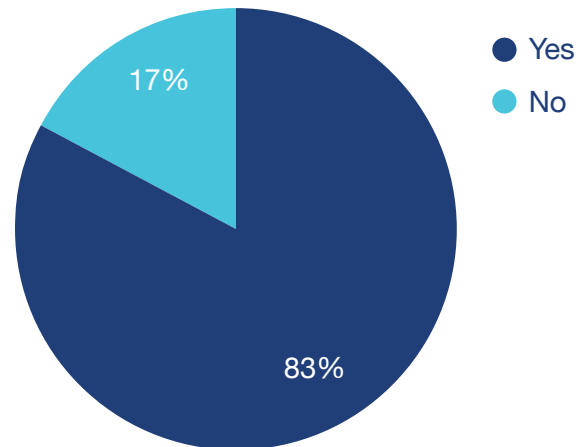
5.2.Climate Risk Governance And Management

The respondents who were aware of climate risk were asked if they had a governance structure in place to manage the risk. Governance included having defined strategies to assess the risk and a team that looked into it as well. 83% of the respondents who were aware of the risk were considering ESG norms while making investments. Some of the parameters considered by investors included information on greenhouse gas emissions (E), plastic consumption and reduction (E), protection of biodiversity (E), water usage by crops (E), air and other pollution emitted (E), consequences of climate patterns (E), social livelihoods (S), human rights (S), promoter track record (G) and ethics policy (G) among others. These norms supported in calculating the credit score and also mandated engagement with investee companies to understand if any catastrophe had impacted the business in the past.

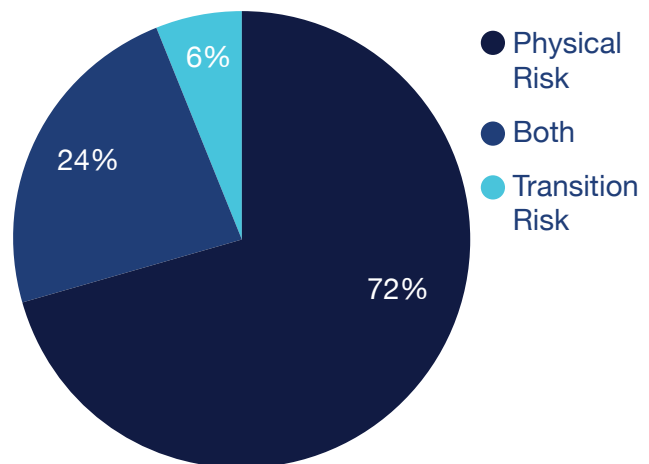
83% of the respondents mostly included one of the three ESG parameters while analysing investments. Such financial institutions were predominantly investing in information technology products where the impact of ESG could not be directly measured or deemed relevant. Outside of integrating ESG norms, respondents also looked at analysing carbon footprints of portfolio firms and encouraged initiation of activities to reduce the same. Other measures included divestment, hedging against climate risk, use of third-party ESG ratings, and firm valuation models that could help them incorporate climate risk.

Most respondents did not have separate teams to look into climate risks. The respondents that were pricing risk were depending on their global teams/headquarters to price the risk for them. Overall, only 17% of the respondents that were aware of the risk reported to have separate and dedicated teams that were responsible to take climate related decisions for the investment. For example, Yes Bank's Board of Directors had a direct oversight on climate change mitigation and adaptation plans. They periodically reviewed the progress made towards achieving the set mitigation targets by investing with climate risk considerations. Also, India's largest public sector bank, State Bank of India (SBI) had set up a dedicated sustainability team to study the impact of climate change on its portfolio across different geographies in order to understand key climate change catastrophes and related impact of each of them on the overall investment portfolio.

Consideration Of Environmental, Social And Governance (ESG) Factors In The Investment Decision



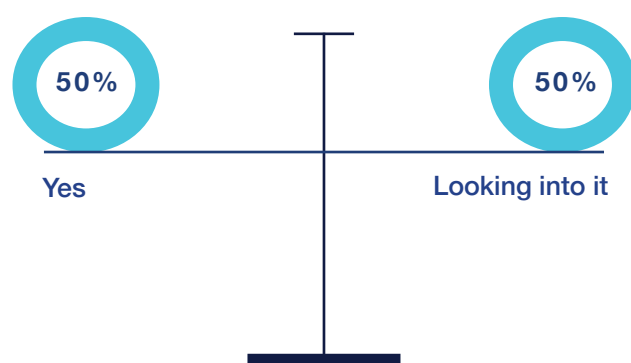
Type Of Risks Considered By Financial Institutions While Mainstreaming Climate Risks



5.2.1. Climate Change Modelling And Analytics

An important component of climate management risk includes pricing that risk while making investment and lending decisions. In order to do so, firms have to model and analyse past and future climate scenario projections. Only one in every ten respondents considering ESG norms was also actively pricing climate risk in their portfolios. Further, they were mostly considering the physical effects of climate risk over transition risk as they were easier to evaluate and assess. The institutions undertaking pricing were mostly global financial institutions with active operations in India. The Indian counterparts were not involved directly in pricing of climate risk but had their international centres with dedicated teams to price this risk on the basis of historical data, impact on portfolio, country risks, and other factors. However, due to lack of long-term reliable data availability, these institutions generally considered modelling for every year and relied on short term prediction analysis.

Consideration of Financial Analysis To Assess The Impact Of The Climate-Related Financial Risks During Investment



Only half of the institutions considering climate risk were actively conducting financial analysis to assess the impact of climate related financial risks. The other half was in the process of looking into it and learning more about the same. None of the respondents from Indian financial institutions were actively conducting scenario analysis and modelling of climate risks for investments. Mainstreaming of climate risk might happen in the next 2-3 years, but not immediately as per the respondents. Multiple reasons were cited for not considering climate risk mainstreaming in immediate future such as:

- Lack of knowledge on how to conduct climate risk modelling;
- Limited information on the historical data on the impact of climate change;
- Limited experience in the team to undertake climate change risk modelling and pricing;

- Limited impact of climate change on the existing portfolio of the investment.

Further few institutions are not integrating climate change into investment decisions due to following reasons:

- Too complex to evaluate (65% of respondents);
- Not well entrenched across the industry (55% of respondents);
- Time and resource intensive (35% of respondents);
- Hard to defend if it goes wrong (18% of respondents).

“Unless climate risk starts affecting the top or bottom line of businesses, it will not be a priority for us.”

-
A PE Investor

“Large financial institutions need to create market standards and practices that smaller firms can learn from and incorporate.”

-
An NBFC Representative

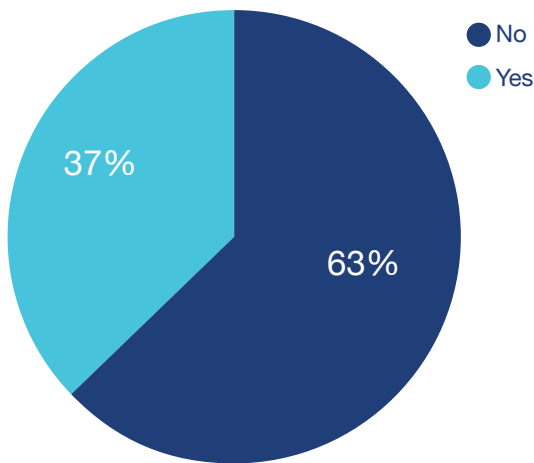
“Standardized and mandatory reporting on climate risk is necessary. Subsidies need to be given to encourage investors to consider climate risk seriously.”

-
A PE Investor

To address some of these challenges, especially knowledge and understanding, financial institutions are now revising internal policies, engaging with experts, building capacities and developing tools to undertake climate risk mainstreaming. However, full-fledged involvement of climate risk mainstreaming will require some time which is estimated to be 2-3 years by financial institutions.

Lack of peer pressure or a sense that other investors are not really taking strong action on climate risk was also seen to undermine the willingness and motivation to take action and model climate change in investment analysis by financial institutions.

Awareness On Task Force On Climate Related Financial Disclosures (TCFD)



Important ESG factors reported included information on carbon emissions, negative screening lists and mitigation activities considered to reduce emissions and make investments environmentally friendly. These were reported in annual financial reports, investor presentations and sustainability reports if available.

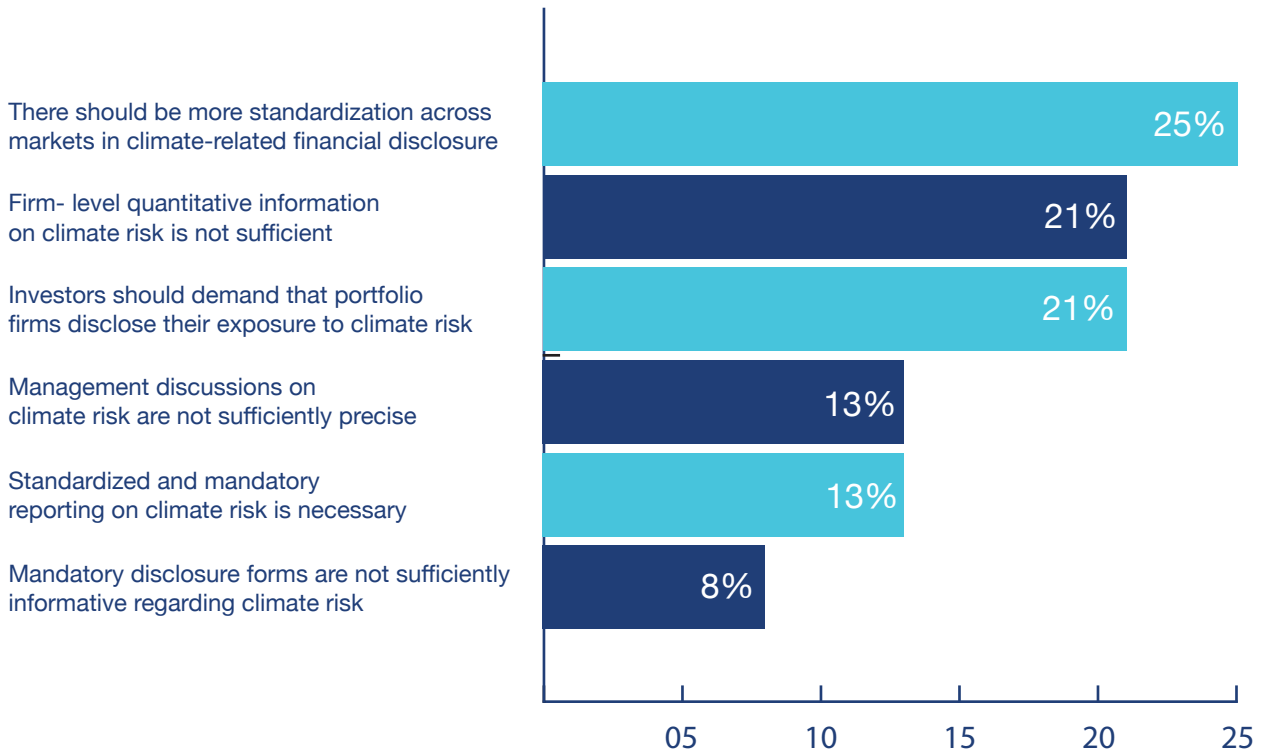
Additionally, only 37% respondents who were aware of climate risk were also aware about supportive climate finance frameworks like TCFD, which is a market-driven initiative, set up to develop a set of voluntary recommendations for consistent climate-related financial risk disclosures in mainstream filings. However, only 11% of them had started reporting according to the framework suggested.

While compliance and reporting on ESG norms is mandatory for Indian firms, pricing and reporting of climate risk is not. Over 25% of the respondents who were aware of the risk felt that the current mandates are not sufficiently informative when it comes to climate risk. Standardization and mandatory reporting of climate risk is needed in order to ensure consistent compliance by all institutions. 21% of the respondents who were aware of the risk felt that investors need to take the first step in demanding investee firms to disclose all climate related financial information while also acknowledging that the firm level quantitative information on climate risk was not sufficiently accurate.

5.3. Reporting On Climate Related Risks

Most of the respondents were complying with mandated norms of considering and reporting of ESG parameters.

Response On The Climate Risk Disclosure By Portfolio Companies



5.4. Policy Landscape To Support Climate Change Mainstreaming And Reporting

Institutions in India do not consider climate risks due to lack of regulatory push in India. Additionally, there is a general lack of awareness about global policies and considerations related to climate risk mainstreaming and/or reporting.

Most of the respondents stated that regulation or government push for considering climate change risks in the investments is necessary as it will lead to climate resilient investments.

Information On Paris Agreement

The Paris Agreement is a landmark environmental accord that was adopted by nearly every nation in 2015 to address climate change and its negative impacts. The deal aims to substantially reduce global greenhouse gas emissions in an effort to limit the global temperature increase in this century to 2 degrees Celsius above preindustrial levels, while pursuing means to limit the increase to 1.5 degrees. The agreement includes commitments from all major emitting countries to cut their climate-altering pollution and to strengthen those commitments over time.

The pact provides a pathway for developed nations to assist developing nations in their climate mitigation and adaptation efforts, and it creates a framework for the transparent monitoring, reporting, and ratcheting up of countries' individual and collective climate goals.

6. Case Studies

This section captures case studies of financial institutions that are considering climate risk mainstreaming in their investment decision/ operations.

1. Hongkong and Shanghai Banking Corporation (HSBC)⁴²



Hongkong and Shanghai Banking Corporation (HSBC)

Tool/Policy: HSBC Annual Report and TCFD recommendations

METHOD OF IMPLEMENTATION

- HSBC has a strong governance system, the Board oversees the Group's sustainability and ESG initiative.
- Group Management Board is accountable for achieving climate change goals, reflected in sustainability targets within the long-term incentive scorecards for Executive Directors, and selected scorecards of Group Managing Directors.
- It developed a transition risk questionnaire with some customers to improve understanding of their climate transition strategies in 2018.
- HSBC France carried out an initial assessment of the alignment of their financing portfolio with the International Energy Agency's 2°C scenario in 2016.
- It is incorporating climate-related risk, both physical and transition, into how HSBC can manage and oversee risks internally and with the customers.
- It identified six higher transition risk sectors based on their contribution to global carbon dioxide emissions such as Oil and Gas, Automobile, Construction, Chemical, Automotive, Power and Mining.

KEY HIGHLIGHTS:

- HSBC has committed to providing \$100 Billion in sustainable financing and investment by 2025 and will adopt TCFD recommendations and was to start reporting in 2018.
- It scored the highest mark (A) for its climate strategy and disclosure in the global assessment completed by the Carbon Disclosure Project (CDP).

2. Interamerican Development Bank (IDB) Invest⁴³

IDB Invest



Tool/Policy: Annual Report 2018 and TCFD recommendations

METHOD OF IMPLEMENTATION

- IDB Invest has taken on the role of Chairman of the Working Group for IDB, managing the Corporate Governance Development Framework in 2018.
- IDB Invest's Corporate Governance Symposium has special emphasis to include the most pressing and complex corporate governance challenges for companies (including climate change), while addressing relevant challenges that are important to businesses.
- It developed comprehensive governance framework in terms of sustainability for the private sector in Latin America and the Caribbean with innovation and training, in the environmental, social and governance fields.
- It is supporting countries like Brazil to achieve climate mitigations goals by increasing its capacity to generate clean energy such as solar / wind energy.

KEY HIGHLIGHTS:

- IDB Invest is accredited to the Green Climate Fund (IDB Invest's first accreditation in a multilateral fund) and also obtained funding for natural capital activities to expand the experience with climate change into other areas of environmental sustainability.
- It financed more than US\$100 million in climate change related activities in Brazil.
- It mobilised blended finance for climate change and gender totalling to \$382 million.

3. Axa Insurance Company⁴⁴

AXA Group



Tool/Policy: Adoption of Article 173 and TCFD recommendations

METHOD OF IMPLEMENTATION

- AXA Insurance Company have a dedicated climate change team with a well defined governance structure for climate related disclosure activities. The Responsible Investment Committee is headed by the Group Chief Investment Officer.
- It conducts quantitative and fundamental analysis using proprietary tools to determine ESG performance. It has recently extended the methodology to include physical and transition risks.
- It assesses how climate change and more specifically extreme weather events impact real assets.
- It has developed its own model to assess the sustainability performance of its entities, across the 60 countries of its presence.
- AXA's management of sustainability risks is integrated within a broader risk management framework, and climate risks are modeled using a significant amount of exposure and claims data, combined with advanced climate science.

KEY HIGHLIGHTS:

- AXA has conducted ESG Analysis for over 7,200 companies.
- Its "company cost of climate" may represent on an average a 4.8% reduction on the revenues of the companies they invest in, leading to a 0.2% reduction in AXA's investment value.
- It has a target of reaching 12 billion euro in green investments by 2020, and has also launched its third impact fund focused on climate and biodiversity. Additionally, it also follows a sector exclusion list.
- It protects customers against natural catastrophes, for example by developing "parametric insurance" products dedicated to climate-related impacts.

4. DBS Group⁴⁵



DBS Group

Tool/Policy: United Nations (UN) Global Compact, The Global Reporting Initiative, Responsible Financing and 10 Principles of UN Global Compact.

METHOD OF IMPLEMENTATION

- DBS delivers products and services that promote sustainable development, and conduct the business in a fair and responsible manner. These products include advancing responsible financing and financial inclusion, to ensure that DBS takes a proactive stance to protect the customers' information.
- The Group Sustainability Council responsible for climate related financial disclosures is chaired by the Chief Sustainability Officer and consists of senior members from various business and support units.
- DBS's sustainability strategy reflects directly in the balanced scorecards of the Group. The balanced scorecard is used to set objectives, drive behaviors, measure performance and determine the remuneration of our people.
- DBS has developed seven Sector Guides which outline the ESG standards required of the borrowers. These cover the agricultural commodities, palm oil, chemicals, oil and gas, mining and metals, power generation and infrastructure sectors, and provide data with a structured approach to assess ESG risks.

KEY HIGHLIGHTS:

- DBS has conducted inaugural scenario analysis according to TCFD recommendations.
- It provided sustainable financing amounting to more than \$ 1.75 billion.
- It issued green bonds that quantified 11,423 MWh of energy saved and 4,848 tonnes of carbon emissions avoided.
- It launched initiatives to raise awareness on the issue of climate change and to encourage the public and passionate change makers to take steps in effecting change.
- It sponsored the Climate Action theme at UNLEASH 2018.
- It secured > 50,000 pledges to reduce the use of single-use plastics- #RecyclemoreWasteless.

5. Aviva Group⁴⁶



6. ASR Nederland NV⁴⁷

ASR Nederland NV



Tool/Policy: TCFD recommendations, Spitsbergen Ambition for Climate Agreement

METHOD OF IMPLEMENTATION

- A.S.R. has a strong system of governance, with two-tier board structure and, socially responsible remuneration. This structure protects the integrity and reputation of A.S.R.
- The implementation of a strong governance practiced at all levels of the organisation, together with the establishment and continual updating of policies, procedures, codes of conduct and internal controls helps in achieving excellence in TCFD recommendations.
- A.S.R. pays special attention to impact investing to make a sustainable contribution to society, for instance, through waste recycling, renewable energy (solar and wind), social enterprises or contribution to health improvements.
- It started linking scientific climate data to Asset Liability Management /Strategic Asset Allocation tooling which is a novel approach to map potential climate impacts on investment performance.
- It follows forward-looking, scenario-based disclosure along the lines of the framework set out by the TCFD.

KEY HIGHLIGHTS:

- A.S.R made specific investments in sustainable sectors and companies aligned to the SDG mapping from the UN.
- It aims to improve the sustainability of portfolio by focusing on achieving Green Building certificates.
- It ensures transparency by providing quarterly updates on the carbon footprint of its investment portfolio on www.asrnl.com.
- Its strategic target is to measure 95% of the carbon footprint and make impact investment of \$1.3 billion by 2021.

7. Macquarie Group⁴⁸

Macquarie Group



Tool/Policy: Carbon Disclosure Project (CDP) and TCFD recommendations

METHOD OF IMPLEMENTATION

- Macquarie's Board is responsible for approving its risk management framework which includes the environmental, social and governance (ESG) framework and key ESG policies.
- The Board Governance and Compliance Committee (BGCC) through its Charter, assists the Board by overseeing and monitoring the effectiveness of the ESG framework including the approach and management of climate-related risks.
- Its Chief Risk Officer is responsible for embedding climate change risks into the risk management framework.
- Its climate change approach supports the transition to a low carbon and climate resilient economy and focuses on assessing and managing the risks arising from climate change, managing the carbon footprint and engaging with all stakeholders for capacity building.
- It considers assessment of changes to laws and regulations; technology developments and disruptions; physical and reputational risks; and the evaluation of adaptation and mitigation measures for transactions and counterparties in exposed industry sectors.

KEY HIGHLIGHTS:

- Macquarie has a longstanding commitment and expertise in the renewable energy and clean technology sectors through its investment activity, its cross-industry collaboration to accelerate the growth of the green economy and its industry-leading analysts dedicated to alternative energy research and the impact measurement of climate mitigation projects.
- It is a signatory to the Carbon Disclosure Project (CDP) and has responded annually since 2010 and is also supporting TCFD recommendations since 2017.

8. Manulife Investment Management⁴⁹



9. Kommunal Landspensjonskasse⁵⁰

Kommunal Landspensjonskasse



Tool/Policy: TCFD Recommendations, Carbon Delta Framework, UNEPFI analysis, Carbon Disclosure Project

METHOD OF IMPLEMENTATION

- Initiated a climate risk screening process following an analytical approach designed in alignment with the TCFD recommendations in 2018.
- Its overall approach to climate risk screening includes (i) identify risk factors; (ii) consider their development in different climate change scenarios and consider whether new risk factors could emerge in the future described in the scenario's depictions; and (iii) undertake an initial, high-level consideration of the possible consequences.
- KLP has analyzed the CVaR for all its funds, as well as for the cumulative listed equity and bond holdings of its managed pensions on behalf of its owners.
- It addresses climate-related issues each year at Board level within the established strategic processes. CFO is responsible for executing KLPs investment strategy, making climate-related investment issues a key responsibility of the CFO.
- It divested from the most environmentally damaging fossil fuel sectors. In 2014, it divested from companies deriving more than 30% of their revenues from coal related activities. Further in 2017, it divested from companies deriving more than 30% of their revenues from oil-sand related activities.

KEY HIGHLIGHTS:

- KLP has a specific target to increase climate-friendly investments by 6 billion NOK each year (~1% of AUM annually).
- It has taken extensive steps to make low-carbon and environmentally friendly financial options available to its customers. For example, in 2018 it launched the worlds first SWAN-labeled global index-fund.
- It published a report in collaboration with the Norwegian foundation for climate, called "how to deal with climate risk" in order to give the investee companies a blueprint on how to start analyzing climate risks.

7.Key Recommendations For Stakeholders

This section highlights stakeholder-wise recommendations that may be needed to mobilize or augment the climate risk assessment, pricing, and reporting ecosystem in India.

7.1.Financial Institutions

Learn and implement best practices followed by global counterparts on climate risk mainstreaming.

Although global counterparts implement strategies for climate risk mainstreaming, Indian financial institutions are not doing it owing to a lack of general awareness about climate risk and how it differs from ESG Guidelines. There is also a need to demonstrate consequences that climate change can have on their investment portfolios. There is a need to have dedicated setup for learning from case studies and/or TCFD recommendations on how to undertake climate risk monitoring and also spread information to all stakeholders.

We recommend Indian financial institutions to engage with their global counterparts, participate in global summits, participate in climate related discussions etc. to update themselves on best practices for measuring, pricing and reporting climate risk including TCFD and other related disclosure frameworks. For instance, the World Business Council for Sustainable Development and the TCFD Consortium of Japan organised the first ever TCFD Summit in Tokyo in October 2019. Such events can help financial institutions understand and learn from best practices in climate related financial disclosures.

Undertake dedicated efforts to collect and report data regarding climate change impact on investment portfolio, especially of the loss due to climate change.

Financial institutions should make an effort to start collecting data regarding the loss/ impact on the investment portfolio due to climate change. They can also collaborate with independent climate data providers for this purpose. For instance, PR Climate Studio is in the process of preparing a database of climate risk for the US market. Collaboration with such players for the Indian market can help make relevant data available for Indian industries as well that can be used for further assessment by the financial institutions. This data collection and reporting will help, amidst scarcity of data to undertake historical as well as futuristic impact of various climate scenarios on investment and businesses. Financial institutions (especially banks) should utilize their capability and networks to collect data points across

Financial institutions need to encourage investee regions in India, including pin code wise data on climate change impact and associated losses. These data points could be used to create climate risk models and associated mechanisms.

Financial institutions need to encourage investee companies to track as well as report climate risks on a periodic basis.

Financial institutions need to mandate their investee companies to track the impact of climate risks over the period of investment. This will help them understand the overall impact that climate risks could have on the investment portfolio. At present, most financial institutions are not mandating their investee companies to track and report climate change impact and it also limits their ability to develop database/insights for future investment. However some large banks such as DBS and HSBC have adopted TCFD disclosures and expect information to be captured on the same from their investee companies. Learning from such large international financial institution, has led to there has been a significant demand across for the entire industry to undertake their own respective disclosures, especially directly from the investee companies.

Financial institutions need to have dedicated team for assessing and mainstreaming climate change risks.

Financial institutions are recommended to have dedicated teams that could potentially assess and price climate change risks and also ensure climate related financial disclosure to support financial institutions in their low carbon transition. Similar to a team for ESG analysis and experts to ensure ESG compliance, there needs to be a team that can predict climate risk as well as model and design associated products for climate risks. Such teams or experts will help financial institutions take conscious decisions in climate change modelling and pricing.

Financial institutions need to be provided with climate risk indicators.

Climate risk indicators should be created and modes of collecting relevant data required for climate risk modelling should be provided for consideration to financial institutions. Availability of a standard dataset alongwith incorporation of this data into the existing risk management framework might help institutions understand these risks better. Climate-related risks need to be systematically identified and should be factored into existing risk models of the financial institutions with the help of technology/ service providers of climate related services. These indicators will also help in scenario analysis, which could be applied more frequently in the due diligence of credit note or equity investment. Global Parametrics, a UK based technology firm offers financial and technological platforms for climate and seismic-based datasets and analytics. Such firms can be consulted to understand climate risk indicators and models better which can later be incorporated in financial institution's own risk assessment models.

7.2. Insurance Agencies

Share knowledge on climate risk mainstreaming with the whole financing sector.

Insurance companies need to share knowledge and experience in managing climate risk owing to the nature of the business they are involved in where it is essential to factor all important risks in their mainstreaming. They need to share their existing knowledge to educate the broader group of financial institutions about the models and different methods they use to price climate risk. This can be done in the form of webinars, conferences, reports, etc. Most of the insurance agencies we spoke with priced short term weather risks. Agencies such as AXA, HDFC Ergo and Allianz can take the lead in this, which can later be expanded to include long term climate risk as well.

Ensure involvement of senior management in taking strategic climate decisions.

Insurer's top level management need to consider climate risk while reviewing corporate strategies as it is the next big concern for investors and financial institutions. Further, there is a need to have an overall corporate strategy that can incentivise executives for collecting on-ground data on climate risks and implement climate related strategies while reviewing insurance targets.

Pursue active collaboration with other stakeholders.

Insurance agencies need to institutionalise climate change as a core business issue, expand its contributions towards building financial resilience to climate risks and support the transition to a low-carbon economy by collaborating with governments and other key stakeholders. Customized products need to be offered to all stakeholders via active collaboration by understanding local needs and requirements.

Use/incorporate advanced analytics to improve assessment of climate risks.

Analytics can help accurately predict the consequences of climate change at a future time period. Not only are climate events becoming more frequent, they are also becoming more intense, rendering predictions useless. Insurers need to develop models and also actively engage with academicians, experts and climate scientists to remain updated about the latest data and loss control technologies and software applications. Advanced analytics can help in refined assessment of weather records and improve the assumptions regarding future climate conditions leading to improved results and mainstreaming. Similar to financial institutions, insurance agencies can collaborate with service providers such as Global Parametrics, PR Climate Studio, Weather Risk Management Services and others to refine and augment their understanding of climate risk mainstreaming.

7.3. Government Institutions

The most important and relevant tool for reducing the risk of catastrophic climate change and promoting climate finance is **effective climate risk management policy**. Climate risk management policy, together with the deployment of technology to track and report climate change impact, is critical for safeguarding financial institutions and economy from the far-reaching impact of climate risks.

The government can prepare a strategic plan to encourage investors and financial institutions to avoid transition and mitigate financial losses associated with climate risk.

The government especially the Ministry of Finance or Reserve Bank of India (RBI) can draft best practices and a rule book for financial institutions which will help them in decision-making process for investments in climate change prone areas and sectors. Policy makers can design the product to encourage asset managers to offer climate change related products and potentially further claim the incentives from the government. For example, a declaration from RBI for climate related disclosure will enable domestic regulations in support of climate finance and it will also help to create supporting structures for investors and financial institutions to follow climate related disclosure/ reporting frameworks. Overall strategic roadmap can include consultation with consultants, service providers and credit rating agencies with a component to build the capacity of their own employees and customers for climate risk disclosures. At the time of policy implementation, the government can also invite all stakeholders to discuss the policy implementation procedures by addressing everyone's concerns and taking their consent.

Implement appropriate legislative and regulatory measures to support transition to a low-carbon economy.

Lack of regulatory measures and regulatory policy limits interest of stakeholders in undertaking dedicated climate change specific investment decisions. A mandatory push is needed from RBI to encourage financial institutions to undertake risk analysis for climate change along with the existing risks. Risk analysis requires additional capital and manpower, hence, a regulatory mandate, can only encourage climate change risk assessment which otherwise will remain secondary for financial institutions.

Government needs to endorse the principles on disclosure and reporting recommended by global frameworks like the Task Force on Climate-related Financial Disclosures (TCFD).

Regulatory push with endorsement of TCFD will create awareness and also support better understanding of climate risks - both at the investor as well as investee level. It will also help to solicit consistent, decision-useful, forward-looking information on the financial impacts of climate-related risks and opportunities, including those related to the global transition to a lower-carbon economy. Such frameworks

need to be implemented at the national level for a large number of financial institutions to understand and reap the benefits. For instance, in the Netherlands, the Sustainable Finance Platform chaired by the central bank has a working group on climate risks that is developing tools for measuring and managing climate related risks and assessing gaps in approaches to the TCFD recommendations. Such reporting also serves to enhance transparency and becomes a basis for better climate risk management and improved decision-making.

Government needs to have systems in place to identify early warning signs of occurrence of extreme events.

Early warning systems will solve the challenge of lack of data which was a significant hurdle which was preventing financial institutions from looking at climate risk and taking appropriate climate action. Government institutions such as the National Disaster Management Authority (NDMA) need to set up appropriate and dedicated climate collection data mechanisms in the country and make them available to relevant stakeholders. These will act as inputs to scenario analysis. Legitimate inputs are essential for accurate predictions and will greatly aid investors to initiate climate action.

7.4.Ecosystem Enablers And Service Providers

Organize arrange events and workshops for creating awareness about climate risk mainstreaming.

Organizations should develop models and present to financial institutions highlighting the historical impact of climate change catastrophes (floods, droughts, earthquakes, etc.) on the economy. Further, discussion and presentation to financial institutions on the expected impact of climate change across geographies and regions will also help financial institutions understand the importance of climate change risks and associated modelling. Integration of such models with ESG frameworks will help financial institutions take conscious decisions in their investments. For instance, institutions like Climate Action in Financial Institutions, a coalition of public and private financial institutions need to organize workshops/seminars in India as well to systematically integrate climate change considerations across investor's strategies, programs and operations.

Harmonize best practices from different frameworks/ initiatives for climate finance related disclosures.

Each investor or financial institution has a unique outlook and perception when it comes to reporting data in the public domain (including climate finance disclosures). A holistic/ standard template or framework could definitely support financial institutions in uniformly undertaking effective climate finance disclosures.

Ecosystem enablers need to document and highlight the best practices from various climate related disclosures frameworks for better understanding and reporting. A leading DFI or Foundation that is working towards SDGs can play a vital role in developing a platform with service providers, consultants and sector experts. Learning from different frameworks like PRI by UN, TCFD by G20, others need to be combined and harmonized for greater adoption and supporting climate finance related disclosures.

Expand the focus from collecting data driven information to also understanding and disclosing behavioral shortcomings.

Many financial institutions do not feel the requirement of any immediate action to address the climate risk since they have not faced any severe loss due to climate change so far. Data collection and analysis will help them visualize monetary loss arising from climate change in the near future which they were not considering earlier. These ecosystem players can also help by raising awareness on various cognitive and behavioral biases that people possess in this regard, and also consider social and cultural influences while strategizing plans on climate action. There is a need to have a dedicated TCFD consortium in India like the one in Japan to motivate and mobilize stakeholders for understanding climate risks, data collection and its reporting.

Design and implement training on development and utilisation of climate risk mainstreaming models and data collection tools for the government, financial institutions and other stakeholders.

Training is indispensable to understand how to properly collect, analyse and model data. The service providers can design operating manuals on their products and coordinate with the stakeholders to deploy the learning. This can happen by way of online or offline training. Better understanding of products and their applicability will make it easier for the stakeholders to implement mainstreaming of climate risk. Training/ information on activities of organizations like Skymet which helps in mitigating climate risks associated with agriculture through the use of IoT, SaaS (software as a smart solution) and DaaS (Data as a Services) will also help financial institutions in evaluating risks and take conscious decisions before investment.

8. Annexure

8.1. Annexure 1: Best Practices Of Climate Mainstreaming

SR. NO	INSTITUTION NAME	TYPE (BANK/ INVESTOR)	COUNTRY	YEAR OF FOCUS	BRIEF
1	Asian	Financial Institution	Multi-country	2017	<p>1. ADB developed Climate Change Operational Framework (CCOF, 2017-2030) to meet its commitment to double climate financing. It has a commitment of \$6 billion per year from its own resources by 2020.</p> <p>2. CCOF provides broad direction and guidance for enhancing resilience and strengthening climate actions in ADB's operations and business processes including country partnership strategies, country operations business plans, sector and thematic strategies etc. It also provides a framework for ADB to support its Developing Member Countries (DMCs) in achieving their climate commitments.</p>
2	HSBC France	Bank	France	2016	<p>1. HSBC France carried out an initial assessment of the alignment of their financing portfolio with the International Energy Agency's 2°C scenario in 2016. The Assessment focused on investments in energy and transport. Combined, the energy and transport sectors account for 10% of HSBC France's on-balance-sheet assets and the sample used covered 86% of those assets.</p> <p>2. HSBC has committed to providing \$100 Billion in sustainable financing and investment by 2025.</p>
3	Interamerican Development Bank Group (IDBG)	Financial Institution	Latin America	2016	<p>1. In 2016, IDBG adopted the goal of increasing the financing of climate change-related projects in Latin American countries to 30% of the IDBG's portfolio by December 31, 2020. To implement the same, it has approved Climate Change Action Plan 2016-2020 which has details of all actions to achieve the goals.</p> <p>2. It has adopted the MDB methodology and applies its metrics on both adaptation finance and mitigation finance.</p> <p>3. Some of the tools used include mainstreaming climate change into all portfolios, preparing country profiles with their Nationally Determined Contributions (NDCs), enhancing existing tool for screening disaster and physical climate change risk of projects etc.</p> <p>4. Between 2012 and 2016, the IDBG financed more than US\$10 billion in climate change.</p>

4	Japan International Cooperation Agency	Financial Institution	Multi-country	2017	<p>1. In 2017, JICA considered reporting of climate change centered on an annual basis. It has also published a position paper on SDG 13 on combating climate change.</p> <p>2. It has drafted a strategy consisting of background and analysis of international trends, situations in developing countries and donor agencies, results of JICA'S past operations, JICA's principles for future operations, tangible measures of JICA's cooperation including internal financial target aligning with the Japanese government's 'Actions for Cool Earth (ACE2.0)', among other objectives. The strategy covers a 5-year period and this is to be reviewed annually by JICA's board.</p>
5	The European Investment Bank	Financial Institution	Multi-country	2015	<p>1. In September 2015, the EIB's Board of Directors approved the Bank's Climate Strategy. It articulates the long-term vision for EIB's approach towards climate action, to support the Bank's mission, which is "to play a leading role, amongst financial institutions, in mobilising the finance needed to achieve the worldwide commitment to keep global warming below 2°C and to adapt to the impacts of climate change."</p> <p>2. The EIB's Climate Strategy identifies the following three main strategic areas for action:</p> <ul style="list-style-type: none"> ● Reinforcing the impact of the EIB's climate financing; ● Building resilience to climate change; and ● Further integrating climate change considerations across all of the Bank's standards, methods and processes. <p>3. The Strategy is currently under implementation.</p>
6	Industrial Development Corporation (IDC)	Financial Institution	South Africa	2017	<p>1. In 2017, IDC Established a Climate Change Response Strategy.</p> <p>2. IDC has taken a number of steps over the last years to support the mainstreaming of climate-related issues internally:</p> <ul style="list-style-type: none"> ● Developing and implementing strategy to ensure that climate change and environmental sustainability issues and opportunities are adequately mainstreamed and addressed in Bank operations, and in line with South African strategy program (CSP) and commitments to emission reduction. ● Establishing a centralized climate change department or unit within the corporation which will assist to streamline all climate change related business, coordinate, provide an oversight, work with government and other private sector clients to develop and finance energy and climate change resilient programmes. ● Carbon Risk Management Guidelines that stipulate clear reporting lines and provide structural information with respect to responsibilities & functions with respect to tools, strategy, and support to build climate business and oversight.

					<ul style="list-style-type: none"> Monitoring and reporting periodically on the implementation of the operational translation of the Bank's Climate Risk Management Policy and on the overall Bank's efforts in relation to energy, climate change in project finance. Clear communication and reporting guidelines to ensure consistency in carbon disclosure reporting across all IDCs subsidiary operations.
7	International Development Finance Club (IDFC)	Financial Institution	Multi-country	2012	<p>1. Since 2012, IDFC publishes yearly IDFC Green Finance Mapping Reports. The reports provide consistent information on green finance flows from this major group of national, sub-regional and international development banks based in OECD and non-OECD countries, including domestic flows.</p> <p>2. Since the initial IDFC Green Finance Mapping Report, total green contributions have increased by more than 10% and had reached \$98 billion in 2014</p>
8	Industrial Development Bank of Turkey (TSKB)	Financial Institution	Turkey	2005	<p>1. In 2005, TSKB developed Environmental Management System which evolved to become Sustainability Management System in 2012. The system has helped support the development of new sustainable finance products, including: thematic loans for renewable energy, energy efficiency (EE) and resource efficiency (RE) finance, and green bonds.</p> <p>2. The system is designed to ensure that all of the internal and external impacts of TSKB including environmental and social risks & opportunities, greenhouse gas emissions, client risks, legal requirements and internal audit are managed via system's internal processes.</p> <p>3. TSKB is also Turkey's first Carbon-Neutral Bank - The share of sustainability-themed loans was 57% of the portfolio as of 2016 year-end.</p>
9	Credit Agricole (CACIB)	Financial Institution	France	2016	<p>1. CACIB developed a transition risk index in 2016 which has been operational since 2017 and developed as a part of their CSR activities.</p> <p>2. The transition risks in the medium-term (2020 to 2030 period) was found to be the most important for CA CIB to take into consideration, based on two criteria: materiality; and the identification of actionable means of managing risks. CACIB used a methodology called P9XCA to assess materiality of climate risk.)</p>
10	Development Bank of Southern Africa (DBSA)	Financial Institution	Africa - Multi Country	2014	<p>1. In 2014, Development Bank of Southern Africa (DBSA) established a Debt Facility to finance and catalyze the small scale renewable energy (RE) market under the South African (SA) government's Independent Power Producer Programme (IPP).</p> <p>2. DBSA with its partners developed a financing mechanism aimed to address barriers to accessing financial resources by small and medium enterprises in the renewable energy sector.</p>

					<p>The mechanism aims to catalyze the small scale renewable energy market, creating jobs, improving the South African economy and averting the emission of greenhouse gases (GHGs).</p> <p>3. The Small Projects Independent Power Producer Programme (SP-IPPP) was designed with the objective to contribute to at least 400MW of the total RE target.</p>
11	European Bank for Reconstruction and Development (EBRD)	Financial Institution		2004	<p>1. EBRD piloted a tool in 2004 which is considered as a key delivery mechanism under the EBRD's Green economy Transition (GET) approach. GET was launched in 2015 and aims to raise the share of the Bank's green business volume from an average of 25 per cent over the last decade to 40 per cent by 2020.</p> <p>2. The EBRD Green Economy Financing Facilities (GEFF) programme provides access to the finance needed to invest in higher performance technologies through lines of credit to local banks, microfinance institutions and leasing companies.</p> <p>3. The true added-value of the GEFF programme comes from technical expertise – delivered via competitively selected local and international experts – that provides direct support to financial institutions and their clients throughout the entire project cycle.</p> <p>4. From the time when the EBRD financing facilities were established, more than 130 financial institutions have participated, reaching over 120,000 clients and avoiding more than 7 million tonnes of CO2 equivalent emissions annually. Today, these efforts support more than €4 billion in EBRD finance per year.</p>
12	Yes Bank	Financial Institution	India	2014	<p>YES BANK has incorporated an inclusive approach to mainstreaming sustainable development and has aligned its core business strategies to maximize stakeholder value.</p> <p>YES BANK was the first Indian signatory to TCFD, and has also been the first and the only Indian bank on CDP's Carbon Disclosure Leadership Index (India)</p>
13	Citi Bank	Financial Institution	Global	2019	<p>Citigroup Inc. this year established a working group to integrate climate issues into its risk management controls. The group was created by the direction of the bank's chief risk officer, Bradford Hu, in response to the TCFD's recommendations, as well as an increasing number of regulatory inquiries on climate-related matters.</p>
14	Johnson and Johnson	Investor	Global	2004	<p>Johnson and Johnson established strategies and programs to reduce the carbon footprint of its operations, supply chain, and products by improving energy and water efficiency, addressing commodity-driven deforestation, and increasing use of renewable energy.</p>

				<p>It has set both short- and long-term science-based goals for GHG emission reductions, and is working toward powering 100 percent of our operations with renewable energy.</p> <p>It ensured the availability of information and resources to meet its goals, and report regularly and transparently on its progress toward those goals.</p> <p>It has engaged suppliers and customers to improve transparency and collaboration, and minimize the environmental impact—including the carbon footprint—of its purchased goods and services and products</p>
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8.2. Annexure 2: List Of Methodology For Physical And Transition Risk Assessments Globally

NAME OF METHODOLOGY/ TOOL	PROVIDER	TYPE OF RISK	BRIEF
Climate Value-at-risk	Carbon Delta	Physical and Transition	Climate Value-at-risk provides forward looking and return-based valuation assessments to measure the potential impact of climate change on company valuations. It provides with the means to identify assets that may be at risk from the worst effects resulting from climate change, while helping to identify innovative low carbon investment opportunities, through security specific modeling. The tool provides insights into the potential stressed market valuation of investment portfolios and downside risks, translating climate-related costs into potential valuation impacts.
Physical and Transition Risk Framework	ClimateWise	Physical and Transition	The ClimateWise physical risk framework demonstrates the relevance of insurance industry modeling tools and expertise in understanding the longer-term climate impacts on real estate lending and investment portfolios. The framework provides an illustrative analysis from 12 real estate portfolios with a total market value in excess of £2 trillion. The transition risk framework supports investors and regulators to assess how the transition to a low-carbon economy will affect the financial performance of infrastructure investments. The framework guides investors through three steps to assessing their asset types exposed to transition risk and opportunities, defining the potential impacts for their assets and incorporating transition impacts into their financial models
TRIP framework	Mercer	Physical and Transition	Technology (T), Resource Availability (R), Impact (I), and Policy (P) are considered to calculate the prospective economic impacts of climate change at the industry and asset class levels. It is based on integrated assessment models and scenarios were developed to reflect possible outcomes and represent a global and broad consensus on how +2°, +3°, and +4° future may unfold.
Sovereign Risk Ratings	Moody's Investor Service	Physical and Transition	Sovereign bond rating methodology captures the potential impact from climate risks in the broad set of key rating factors – Economic Strength, Institutional Strength, Fiscal Strength, and Susceptibility to Event Risk - which, collectively, influence sovereigns' ability and willingness to repay debt
Equity and fixed income risk scores	Four Twenty Seven (427)	Physical	427 physical climate risk scores for corporate equity and fixed income instruments captures the climate risk exposure of companies based on the precise location of their facilities. Scores are developed using precise climate and flood risk data accounting for facility activity, and are expressed relative to a benchmark of over one million facilities globally. The scores also include indicators for supply chain and market risk

Aware for Projects	Acclimatise	Physical	Aware for Projects is an online tool that allows users to screen their investments for climate risk. It uses the latest climate model outputs (CMIP5) and other climate-related and geological hazard data. The tool combines the data with information about the sensitivity of the project to the hazards, and determines risk ratings for each individual hazard the project may face. It is designed to help any organization investing in infrastructure-related projects to ensure building resilience within the portfolios
Climate Risk Impact Screening (CRIS)	Carbone 4	Physical	CRIS aims to provide physical risk indices at the issuer and portfolio level based on 7 direct and 9 indirect climate hazards, 60 sectorial vulnerability profiles and 210 sovereign vulnerability profiles. CRIS integrates the economic and geographical data related to the underlying assets and combines them with climate hazard projections and sector-specific vulnerability profiles in order to derive a company-level risk rating. This is then aggregated at the portfolio level.
Climate Change Physical Risk Dataset	Trucost	Physical	Trucost Climate Change Physical Risk dataset helps companies understand the exposure of their owned facilities and capital assets to climate change physical impacts under future climate change scenarios. The insights inform TCFD aligned reporting, risk management and climate change adaptation strategies.
PACTA Tool	Trucost	Transition	Paris Agreement Capital Transition Assessment (PACTA) tool has been available for investment portfolios since 2018. It aggregates global forward-looking asset-level data (such as the production plans of a manufacturing plant over the next five years), up to parent company level. The tool then produces a customized, confidential output report, which allows investors to assess the overall alignment of their portfolios with various climate scenarios and with the Paris Agreement.
2 degrees of separation	Carbon Tracker Initiative	Transition	2 degrees of separation provides a way of understanding whether the supply options of the largest publicly traded oil and gas producers are aligned with demand levels consistent with a 2 degree Celsius (2D) carbon budget. This analysis focuses on the metric: "percentage of potential CAPEX outside 2D budget". This effectively give investors a sense of what proportion of the company's investment plans may fail to deliver an acceptable return in the scenario of a world limited to 2°C global warming outcome (i.e. which project CAPEX is within budget and which is "unneeded").
UNEP FI Banking Pilot	Oliver Wyman	Transition	The framework assess the impact of climate scenario on loan book through national level variables (macro-economic level), assessment of scenario impact on the economic sectors (sector level), and the impact of climate scenario on borrower level financials on credit risk factors (borrower level)
Carbon Value at Risk	Schroders	Transition	Carbon Value at Risk (Carbon VaR) framework highlights the inadequacies of traditional measures of climate risk and the problems investors face evaluating the impact climate change will have on company profits. It focuses on companies' business models and profit drivers and measures the impact of rising carbon costs on a company's profitability.

TPI Tool	Transition Pathway Initiative (TPI)	Transition	TPI tool assess companies' management quality against a series of indicators, covering issues such as company policy, emissions reporting and verification, targets, strategic risk assessment and executive remuneration. Overall carbon performance is assessed using the modeling conducted by the International Energy Agency (IEA) for its biennial Energy Technology Perspectives report. This modeling is used to translate emissions targets made at the international level into sectorial benchmarks, against which the performance of individual companies is compared
Climate Risk Toolkit	Vivid Economics	Transition	Climate Risk Toolkit enables financial institutions to integrate climate risk into their governance, strategy, risk management and reporting. It uses a suite of climate, economic and financial models that allow institutions to estimate the climate risk exposure of their financial assets under different scenarios, and to apply those insights to their decision making. The toolkit covers over 20,000 listed companies, and associated corporate bonds, as well as real estate, infrastructure, private equity, major commodities and sovereign bonds for major economies.

8.3. Annexure 3: Data Collection Tools

Intellecapt has developed a hypothesis to collect data from various stakeholders. Apart from the survey-based data collection, Intellecapt conducted in-depth interviews with different stakeholders to get a nuanced understanding of the climate risk dimensions in FIs operations and how they deal with them. We have used a combination of the following data collection initiatives:

- **Expert interviews with financial institutions** to understand the steps being taken by them to manage their exposure to climate change and risk mainstreaming.
- **Expert interviews with insurance companies** to understand the steps taken to manage their exposure to climate change.
- **Focus group discussion and expert interviews with**

individual investors, fund managers to understand their perspective towards climate change mitigation. Understand types of assessments and steps taken to mitigate and include climate risks mainstreaming for investment.

- **Expert interviews with government institutions** to understand their plans for mitigating climate change impact and regulations to support climate risk mainstreaming.
- **Expert interviews with technology providers /service providers** to understand technology perspective and adaptation of technology in the industry. Understand emerging products and concepts that can be provided to support climate mitigation programs.

A detailed survey questionnaire/module has been developed for data collection and below mentioned stakeholders have participated in the discussion/survey.

8.3.1. List Of Respondents

A detailed survey questionnaire/module had been developed for primary interviews and collection of data. Few

ecosystem players were also consulted to understand their offerings and general perception of climate risk. The list of stakeholders is given in the table below.

Organization	Name Of Respondent	Designation
Aavishkaar Impact Fund	Venkat Narayan	Partner
Asian Development Bank	Karan R. Gulshan	Investment Specialist
AXA Paris	Mangold Kristian	Public Sector Business Developer
Asha Impact Fund	Aparna Dua	Senior Manager
Asian Healthcare Fund	Sameer Wagle	Managing Director
Barclays Investment	Anand Beria	Vice President
Bharat Innovation Fund	Shyam Menon	Co-founder
Bharti AXA Insurance	Alok Shukla	Senior Vice President
Canara Bank	Rama Rao	Chief Risk Officer
CARE Ratings	Saikat Roy	Director, West Region
Carpe Diem Capital	Kabir Malhotra	Analyst
Caspian Impact Investments	Ayan Paul	Senior Associate
CDP	Damandeep Singh	Director – India
Chiratae Ventures	Vidya Chandy	Vice President
Circulate Capital	Karina Cady	Operations and Investment Director
Climate Collective Foundation	Pratap Raju	Founding Partner
Dolma Fund	Matthew Ribeiro-Norley	Business Development
E-Cube	Chandru Badrinarayanan	Managing Partner
Equitas Bank	Dheeraj Mohan	Head – Strategy & Investor Relations
Fosun Capital	Tej Kapoor	Co-Executive President

GIZ	Jai Kumar Gaurav	Technical Advisor
Global Parametrics	Toby Behrmann	Head, Innovations and Partnerships
Grameen Impact Investment	Gayathri Vijayaraghavan	Senior Associate
Hannover Insurance	Vijayarangan Arunmozhiselvan	Part Time Employee, Agriculture Reinsurance
HDFC Ergo	Balachandran.M.K	Vice President
IndusInd Bank	Raj Kumar	Manager, Impact Investing Group
Lighthouse Aspada	Vignesh Nandakumar	Partner
KKR Equity	Bhuvan Srinivasan	Director
Loans4SME	Simmi Sareen	Founder
Netafim Agricultural Financing Agency	Prabhat Chaturvedi	CEO
Oikocredit	Anirudh Sarda	Equity Officer
Omnivore Ventures	Jinesh Shah	Managing Partner
Samunnati Financial Intermediation	Ganesh P G	Consultant, Business Development
Sangam Ventures	Karthik Chandrasekar	Partner
State Bank of India	Rajeev Diwakar Khond	General Manager, ERM
Shell Foundation	Abhay Srivastava	Business Development Advisor
Swiss RE	Mangesh Patankar	Head of Agriculture Reinsurance
TPG Capital	Simit Batra	Vice- President
Triodos Investment Management	Itske Lulof	Director, Energy & Climate
United Nations Development Programme	Riya Saxena	Innovative Finance Associate
United Nations Environment Programme	Anubha Prasad	National Coordinator, PAGE
Vimo SEWA	Shreekant Kunar	CEO, National Insurance
Weather Risk Management Services	Sonu Agrawal	Founder & MD
Yes Bank	Chaitanya Sravanthi Kommukuri	Senior Vice President

8.3.2. Questionnaire For Banking And Non-Banking Finance Institutions

General Information And Awareness

Nature Of The Institution

- A. Bank
- B. NBFC
- C. Insurance
- D. Fund
- E. Development Finance Institution
- F. Others

Which sectors do you have exposure in?

Which states do you have exposure in?

Annual revenue of the firm? (Range)

What is the typical holding period for investments in your portfolio, on average?

- A. Short (less than 6 months)
- B. Medium (6 months to 2 years)
- C. Long (2 years to 5 years)
- D. Very long (more than 5 years)

Do you consider climate risk in the investment?

- A. Yes
- B. No

Climate risks in the investment process - When did you start to incorporate climate risk into your investment process? (Number of years ago)

0, 1, 2, 3, 4.. >10?

Motivations to incorporate Climate Risks into investment process (the options will not be read out but used to capture responses)

- A. Protect our reputation
- B. Is increasingly stressed by proxy voting advisors
- C. Helps attract fund flows
- D. Allows us to address negative spill overs
- E. Reduces tail risks
- F. Reflects our asset owners' investment preferences
- G. Reduces overall portfolio risk
- H. Is beneficial to investment returns
- I. Is a legal obligation/fiduciary duty
- J. Is a moral/ethical obligation
- K. Follows the concern of other financial investors
- L. Other

How would you define your organizational approach to climate related risks? (Options to be read out or marked by us as per our understanding of the discussion)

- A. Responsible
- B. Responsive
- C. Strategic

Understanding Of Climate Risk

How important is climate risk to your business as compared to other risks?

- A. Very important
- B. Somewhat important
- C. Not important at all

Rank the most important investment risk perceived by your business (1 being the most important)

- A. Strategic risk
- B. Operational risk
- C. Credit risk
- D. Reputational risk
- E. Compliance risk
- F. Climate risk

If yes, any information on climate science models that may be applied to assess the geographical exposure to risks from catastrophic event mentioned above

Does the company have plans to regularly assess such risks?

- A. Yes
- B. No, but actively considering it
- C. Maybe

Your organisation's consideration of climate change risk been influenced by which of the following

- A. Investor expectation
- B. Customer expectation
- C. Community expectation
- D. Regulatory requirement
- E. Others (please specify)

What implications may climate change have on liquidity and capital needs?

Climate Risk Policy And Reporting

Within climate risk, do you consider physical climate risk or transition climate risk that may be impacting your business?

- A. Physical risk
- B. Transition risk
- C. Both
- D. Other, please specify

Does the company have plans to regularly assess such risks?

- A. Yes
- B. No
- C. If yes, how?
- D. If no, why not?

Which of the events below constitute significant risk to the institution's financial operations?

- A. Drought
- B. Floods
- C. Transportation challenges
- D. Sea level rise

Is climate risk mainstreaming a part of your broader management framework?

- A. Yes
- B. No
- C. If yes, how?
- D. If no, why not?

Has there been any catastrophic event that has impacted a project/ investment's liquidity/ return?

- A. Yes
 - B. No
- If yes, what measures have been adopted in such a case?

In which of the following reports/ presentations you undertake reporting on climate risk mainstreaming? (Can be one or many)

Do you follow TCFD recommended disclosures?

- A. Yes
- B. No, but actively considering it
- C. No, but might consider it in the future
- D. No, have not considered and no plans in the near future
- E. If no, why not?

If you follow TCFD disclosures, can you mention the disclosure type that your organization reports to TCFD?

- A. Governance
- B. Strategy
- C. Risk Management
- D. Targets and Metrics

If you are not following TCFD disclosures, why are you not planning to report on the TCFD recommendations?

- A. Do not feel they are applicable to our organisation
- B. Have not had the opportunity to assess whether they are appropriate to our organisation
- C. Consider that other disclosures our organisation makes adequately cover this area
- D. Do not have all the available data
- E. Resource constraints
- F. Others (please specify)

If not TCFD, what is the method you follow for reporting climate change and climate risks mainstreaming related information?

Since when are you reporting information on climate risk? (In Years?)

Has the company issued a public climate change/ climate risk policy statement?

- A. If yes, what information is captured in that policy statement?
- B. If no, why not?

What support is required from the policy/regulatory perspective to incorporate climate change mainstreaming in the investment decisions?

Governance

In your institution, who is responsible for the implementation of climate risk in the investment process?

- A. Fund/Portfolio Manager
- B. Chief Executive Officer
- C. Investment Analyst/Strategist
- D. Executive/Managing Director
- E. Chief Investment Officer
- F. ESG/Responsible Investment Specialist
- G. CFO/COO/Chairman/Other Executive
- H. Other (please explain)

What is the role of the board of directors in governing climate risk management?

Does the company consider climate risk management metrics and performance as key factors in executive compensation policies?

- A. Yes
- B. No
- If yes, what are the parameters being considered
- If no, why not?

Climate Risk Assessment And Measurement

Is your organisation taking any steps to improve its understanding of financial/business risks due to climate change?

- A. Yes
- B. Not yet
- If yes, please explain what steps?
- B. If no, why not?

Do you think assessing climate risk offers some opportunities to your portfolio enterprise to manage those risks?

- A. Yes
- B. No

If yes, can you share some instances where your assessment supported portfolio enterprises?

Has your organisation considered climate change related business opportunities that may exist or emerge in the future?

- A. Yes
- B. No

If yes, what are these opportunities?

Has your organisation undertaken financial analysis to assess the impact of the climate-related financial risks?

- A. Yes
- B. No

If yes, in which areas have the financial impact of climate change been analysed? (Select all that apply)

- A. Investment strategy;
- B. Portfolio allocation;
- C. Insurance risk;
- D. Credit risk;
- E. Market risk;
- F. Liquidity risk;
- G. Operational risk;
- H. Technology risk;
- I. Policy and legal risk;
- J. Strategic risk;
- K. Reputation risk;
- L. Other (please specify)

Are you undertaking scenario analysis to assess the financial impact of climate change?

- A. Yes
- B. No, not currently but our organization will consider it in the future
- C. No, not considering at the moment

Is your organisation also disclosing any climate related financial risks?

- A. Yes
 - B. No
- If no, why not?

Which approach has been taken in the past five years to incorporate climate change mainstreaming in your investment process?

- A. Analysing carbon footprint of portfolio firms
- B. Divestment
- C. Reducing stranded asset risk
- D. Negative/exclusionary screening
- E. Hedging against climate risk
- F. Shareholder proposals
- G. Use of third-party ESG ratings
- H. Firm valuation models that incorporate climate risk
- I. Reducing carbon footprint of portfolio firms
- J. ESG integration
- K. General portfolio diversification
- L. Analysing stranded asset risk
- M. None

Which of the following approaches, if any, do you use to evaluate the consequences of climate risk for your portfolio?

- A. Scenario analysis and stress tests of climate scenarios
 - B. Assessment of the impact of climate change on returns
 - C. Measurement of carbon footprint of investments
 - D. Others
- If a or b, what are the frameworks do you use to measure the same?

Climate Risk Assessment And Measurement With Respect To Investee Company

What measures of direct engagement over climate-risk issues have you taken in the past five years with any of your portfolio companies?

- A. Voting against re-election of any board directors due to climate-risk issues

- B. Publicly criticizing management on climate-risk issues
- C. Questioning management on a conference call about climate-risk issues
- D. Submitting shareholder proposals on climate-risk issues
- E. Voting against management on proposals over climate-risk issues at the annual meeting
- F. Proposing specific actions to management on climate-risk issues
- G. Holding discussions with management regarding the financial implications of climate risks
- H. Legal action against management on climate-risk issues

If you indicated “Firm did not respond” or “Resistance” in the previous question, how did you typically react? (Select one only)

- A. No further actions taken
- B. Initiated next level of engagement
- C. Selling of shares/divestment
- D. Tried to hedge the climate-risk issue
- E. Other actions (please explain):

Views on climate-risk disclosure by portfolio companies

- A. Investors should demand that portfolio firms disclose their exposure to climate risk
- B. Firm-level quantitative information on climate risk is not sufficiently precise
- C. Management discussions on climate risk are not sufficiently precise
- D. Standardized disclosure tools and guidelines are currently not available
- E. Standardized and mandatory reporting on climate risk is necessary
- F. There should be more standardization across markets in climate-related financial disclosure
- G. Mandatory disclosure forms are not sufficiently informative regarding climate risk

Discuss steps, if any, the company has taken to engage key constituencies on the topic of climate change

- A. How has the company supported improved research and/or risk analysis on the impacts of climate change?
- B. What resources has it invested to improve climate awareness among its customers in regulated and unregulated lines?
- C. What steps did you take to educate shareholders on potential climate change risks the company faces?

8.3.3. Questionnaire for Insurance Agencies

The questionnaire will be slightly tweaked for insurance agencies to include the questions on asset management along with investment activities, suited to the nature of their business

General Information And Awareness

Name of the insurance company and its nature including information on typical clients and insurance products

Which sectors do you have exposure in across liability and asset management?

- A. Sectors in liability segment
 - B. Sectors in asset segment
- Also understand sectors of insurance which are responsible for majority of the premium amount in a year for the organization*

Which states do you have exposure in?

- A. Major states for Liability segment
- B. Major states for Asset segment

What is the typical holding period for investments in your portfolio, on average?

- A. Short (less than 6 months)
- B. Medium (6 months to 2 years)
- C. Long (2 years to 5 years)
- D. Very long (more than 5 years)

What risks do you consider imminent from investments point of view?

(strategic risk, operational risk, credit risk, reputational risk, compliance risk etc.)

Which of the events below constitute significant risk to the assets insured by you or the investment made by you (of the premiums collected)?

- A. Drought

- B. Floods
- C. Transportation challenges
- D. Sea level rise
- E. Heat stress
- F. Bushfire
- G. Cyclone
- H. Other

Probable motivations to incorporate climate risk mainstreaming into investment process

- A. Protect our reputation
- B. Is increasingly stressed by proxy voting advisors
- C. Helps attract fund flows
- D. Allows us to address negative spillovers
- E. Reduces tail risks
- F. Reflects our asset owners' investment preferences
- G. Reduces overall portfolio risk
- H. Is beneficial to investment returns
- I. Is a legal obligation/fiduciary duty
- J. Is a moral/ethical obligation
- K. Follows the concern of other financial investors

Has there been a change in the demand for your product due to climate change?

Understanding Climate Risk

Is climate risk considered before making investments (of the collected premium)?

- A. Yes
 - B. No
- If no, why not?

Is climate risk considered before rolling out insurance policies?

- A. Yes
 - B. No
- If no, why not?

If yes, when did you start to incorporate climate risk into your investment process?
(number of years ago)
0, 1, 2, 3, >10?

If no, are there plans of considering climate risk in the future? (on both Asset and Liability side)

- A. Yes, we are considering it now (Please explain what steps are being taken in this regard)
- B. Yes, but we are not considering it now in the immediate future (Please explain why)
- C. No, might consider
- D. No, no plans of considering anytime soon

How would you define your organizational approach to climate related risks?

- A. Responsible
- B. Responsive
- C. Strategic
- D. Other

How would you define your organizational approach to climate related risks?

- A. Strategic risk
- B. Operational risk
- C. Credit risk
- D. Reputational risk
- E. Compliance risk
- F. Climate risk

Your organisation's consideration of climate change risk been influenced by which of the following

- A. Investor expectation
- B. Customer expectation
- C. Community expectation
- D. Regulatory requirement
- E. Others (please specify)

Within climate risk, do you consider physical climate risk or transition climate risk that may be impacting your business? t

- A. Physical risk
- B. Transition risk
- C. Both
- D. None
- E. Other, please specify

Has there been any catastrophic event that has impacted a project/ investment's liquidity/ return?

- A. Yes
- B. No

If yes, what measures have been adopted to ensure that the same event does not impact your payout in future in case of such event?

Has there been any catastrophic event that has impacted a project/ investment's liquidity/ return?

- A. Yes
- B. No

If yes, what measures have been adopted to ensure that the same event does not impact your payout in future in case of such event?

Have you considered creative methods of risk distribution such as contingency plans to reduce financial leverage and resolve any liquidity issues in the event of a sudden loss in surplus and cash out flows as a result of a catastrophic event?

If yes, can you share more information on the approach of the insurers

Does the company have plans to regularly assess such risks?

- A. Yes
 - B. No, but actively considering it
 - C. Maybe
- If no, why not?

How might climate change affect limits, cost and terms of catastrophe reinsurance, including reinstatement provisions?

Has the company considered the implications of climate change for all of its investment classes, e.g. equities, fixed income, infrastructure, real estate?

Does the insurer use a shadow price for carbon when considering investments in heavy emitting industries in markets where carbon is either currently regulated or is likely to be regulated in the future?

If you follow TCFD disclosures, can you mention the disclosure type that your organization reports to TCFD?

- A. Governance
- B. Strategy
- C. Risk Management
- d. Targets and Metrics

If you are not following TCFD disclosures, why are you not planning to report on the TCFD recommendations?

- A. Do not feel they are applicable to our organisation
- B. Have not had the opportunity to assess whether they are appropriate to our organisation
- C. Consider that other disclosures our organisation makes adequately cover this area
- D. Do not have all the available data
- E. Resource constraints
- F. Others (please specify)

Climate Risk Policy And Reporting

Is climate risk mainstreaming a part of your broader management framework?

- A. Yes
- B. No
- C. If yes, how?
- D. If no, why not?

In which of the following reports/presentations you undertake reporting on climate risk mainstreaming? (Can be one or many)

- A. Sustainability report
- B. Annual financial report
- C. Investor presentations
- D. Internal management reports
- E. Other (please specify)

Do you follow TCFD recommended disclosures?

- A. Yes
- B. No, but actively considering it
- C. No, but might consider it in the future
- D. No, have not considered and no plans in the near future
- E. If no, why not?

If not TCFD, what is the method you follow for reporting climate change mainstreaming related information?

Since when are you reporting information on climate change mainstreaming and what is covered in that? (In Years?)

What support is required from the policy/regulatory perspective to incorporate climate change mainstreaming in the insurance decisions?

Governance

In your institution, who is responsible for the implementation of climate change mainstreaming in the investment process?

- A. Fund/Portfolio Manager

- B. Chief Executive Officer
- C. Investment Analyst/Strategist
- D. Executive/Managing Director
- E. Chief Investment Officer
- F. ESG/Responsible Investment Specialist
- G. CFO/COO/Chairman/Other Executive
- H. Other (please explain)

What is the role of the board of directors in governing climate risk management?

Does the company consider climate risk management metrics and performance as key factors in executive compensation policies?

- A. Yes
 - B. No
- If no, why not?*

Has the company issued a public climate change/ climate risk policy statement?

If yes, what information is captured in the statement
If no, why not?

How does your organization correlate risks affecting asset management and underwriting?

Who is responsible for correlating risks and what steps have been taken for the same?

Climate Related Assessment And Measurement

Is your organisation taking any steps to improve its understanding of financial/ business risks due to climate change?

- A. Yes
 - B. Not yet
- If yes, please explain what steps?*

Do you think assessing climate risk offers some opportunities to your portfolio of insurance to manage those risks?

- A. Yes
 - B. No
- If yes, can you share some instances where your assessment supported portfolio of insurance?

Has your organisation considered climate change related business opportunities that may exist or emerge in the future?

- A. Yes
 - B. No
- If yes, what are these opportunities?

Has your organisation undertaken financial analysis to assess the impact of the climate-related financial risks?

- A. Yes
- B. No

Has your organisation undertaken financial analysis to assess the impact of the climate-related financial risks?

- A. Yes
- B. No

If yes, in which areas have the financial impact of climate change been analysed? (Select all that apply)

- A. Investment strategy;
- B. Portfolio allocation;
- C. Insurance risk;
- D. Credit risk;
- E. Market risk;
- F. Liquidity risk;
- G. Operational risk;
- H. Technology risk;
- I. Policy and legal risk;
- J. Strategic risk;
- K. Reputation risk;
- L. Other (please specify)

If no, what were the key challenges involved in undertaking the financial analysis? Why is your organization not undertaking financial analysis?

- A. Limited availability and/or access to climate risk data
- B. Lack of understanding of best practice in this area
- C. Limited availability of skillsets and resources in this area
- D. Limited understanding of Taxonomy/risk terminology
- E. Regulatory barriers
- F. Others (please specify)

Is this price being included in your cost for investments or projects that you are investing in/ undertaking?

- A. Yes
- B. No

Is your organization disclosing any climate change mainstreaming and related financial risks?

- A. Yes
- B. No

Are you undertaking scenario analysis to assess the financial impact of climate change?

- A. Yes
- B. No, not currently but our organization will consider it in the future
- C. No, not considering at the moment

Which approach have you taken in the past five years to incorporate climate-risk management in your investment process?

- A. Analyzing carbon footprint of portfolio firms
- B. Divestment
- C. Reducing stranded asset risk
- D. Negative/exclusionary screening
- E. Hedging against climate risk
- F. Shareholder proposals
- G. Use of third-party ESG ratings
- H. Firm valuation models that incorporate climate risk
- I. Reducing carbon footprint of portfolio firms
- J. ESG integration
- K. General portfolio diversification
- L. Analyzing stranded asset risk
- M. None

Does your organization factor the physical risks of climate change (water scarcity, extreme events, weather variability) into security analysis or portfolio construction? If so, for what asset classes and issuers (corporate, sovereign, municipal)?

Are you using financial and scenario analysis to price climate risk?

- A. Yes
- B. No

Which of the following approaches, if any, do you use to evaluate the consequences of climate risk for your portfolio?

- A. Analyzing carbon footprint of portfolio firms
- B. Divestment
- C. Reducing stranded asset risk
- D. Negative/exclusionary screening
- E. Hedging against climate risk
- F. Shareholder proposals
- G. Use of third-party ESG ratings
- H. Firm valuation models that incorporate climate risk
- I. Reducing carbon footprint of portfolio firms
- J. ESG integration
- K. General portfolio diversification
- L. Analyzing stranded asset risk
- M. None

Does your organization considered longer term scenario modeling: Whether the company has conducted, commissioned, or participated in scenario modeling for climate trends beyond the 1-5 year timescale?

Which approach have you taken in the past five years to incorporate climate-risk management in your investment process?

- A. Scenario analysis and stress tests of climate scenarios
- B. Assessment of the impact of climate change on returns
- C. Measurement of carbon footprint of investments
- D. Others

If you have directly engaged portfolio companies over climate-risk issues in the past five years, how has the management of the portfolio firm typically responded? (Liability side)

- A. Resistance (against issues raised)
- B. Issues were acknowledged
- C. Issues were acknowledged, but no actions were taken
- D. Actions were initiated, but not successfully implemented
- E. Actions were successfully implemented

Climate Related Assessment And Measurement With Respect To Investee Company

Do you engage with your portfolio companies/ clients on climate change related issues? (Liability side)

- A. Yes
 - B. No, but considering it
 - C. No, not considering it anytime soon
- If yes, what approach is followed for the same?

If you indicated “Firm did not respond” or “Resistance” in the previous question, how did you typically react? (Select one only)

- A. No further actions taken
- B. Initiated next level of engagement
- C. Selling of shares/divestment
- D. Tried to hedge the climate-risk issue
- E. Other actions (please explain):

What measures of direct engagement over climate-risk issues have you taken in the past five years with any of your portfolio companies? (Liability side)

- a. Voting against re-election of any board directors due to climate-risk issues
- b. Publicly criticizing management on climate-risk issues
- c. Questioning management on a conference call about climate-risk issues
- d. Submitting shareholder proposals on climate-risk issues
- e. Voting against management on proposals over climate-risk issues at the annual meeting
- f. Proposing specific actions to management on climate-risk issues
- g. Holding discussions with management regarding the financial implications of climate risks
- h. Legal action against management on climate-risk issues

How your organization employed price incentives, new products, or financial assistance to promote policyholder loss mitigation? In what lines have these efforts been attempted, and can the outcome of such efforts be quantified in terms of properties retrofitted, losses avoided, etc.?

For insurers underwriting D&O, CGL and professional liability policies, what steps has your organization taken to educate clients on climate liability risks or to screen potential policyholders based on climate liability risk? How does the company define climate risk for these lines?

Views on climate-risk disclosure by the portfolio of insurance companies

- A. Investors/ insurers should demand that portfolio firms disclose their exposure to climate risk

- B. Firm-level quantitative information on climate risk is not sufficiently precise
- C. Management discussions on climate risk are not sufficiently precise
- D. Standardized disclosure tools and guidelines are currently not available
- E. Standardized and mandatory reporting on climate risk is necessary
- F. There should be more standardization across markets in climate-related financial disclosure
- G. Mandatory disclosure forms are not sufficiently informative regarding climate risk

Discuss steps, if any, the company has taken to engage key constituencies on the topic of climate change

- A. How has the company supported improved research and/or risk analysis on the impacts of climate change?
- B. What resources has it invested to improve climate awareness among its customers in regulated and unregulated lines?
- C. What steps has it taken to educate shareholders on potential climate change risks the company faces?

8.3.4.Discussion Points For Government Institutions

Country Consideration Of Emission And Climate Risk

Government's plan to implement carbon taxes or restrictions on carbon dioxide emissions, which could rapidly increase the costs of energy producers, airlines or infrastructure groups

Government's plan to make available emission/ carbon related data from the investors

Information provided by the Government to foreign investors with regards to climate mainstreaming or climate risk scenarios in India

Information on the agency (supported by Government) that collect data related to climate risks and associated impact while investing within India as well as outside India

Government perspective on measuring climate change impact

- A. Looking to implement climate related scenario in stress-test
- B. Actively considering climate related scenario for stress testing
- C. Not considering inclusion of climate related scenarios

Views on reporting or measurement of ESG criteria while preparing balance sheet by investors including Central Bank and others

Data required/mandated by Government/ RBI to ensure commercial banks are disclosing their climate-related risk, if applicable

Country's Investment In Other Countries And Consideration Of Climate Risk

How much of the country's emissions does the Government finance with its investments

What is the approach used to calculate the emissions financed
(For example - ownership approach, carbon intensity approach, etc.)

Steps to associate the exposure of a specific financial instrument to a specific sector of economic activity with a level of detail that would allow us to distinguish between carbon-intensive (and thus highly exposed to climate policies) and low-carbon sectors?

Typical holding period for investments in the portfolio/bonds, on average?

- A. Short (less than 6 months)
- B. Medium (6 months to 2 years)
- C. Long (2 years to 5 years)
- D. Very long (more than 5 years)

Risks considered by Government while providing sovereign guarantees?
(Strategic risk, operational risk, credit risk, reputational risk, compliance risk etc.)

Are there plans of considering climate change risks in the future investments

- A. Yes, we are considering it now (Please explain what steps are being taken in this regard)
- B. Yes, but we are not considering it now in the immediate future (Please explain why)
- C. No, might consider
- D. No, no plans of considering anytime soon
- E. If no, why not?

Consideration of climate change impact on a 10-year or other long term bonds in the invested countries

Is the Government considering using any mechanism to measure the financial impact that can arise from the occurrence of catastrophic events that can be used before pricing investments in countries in the future?

- A. Protect our reputation
- B. Helps attract fund flows
- C. Allows us to address negative spillovers
- D. Reflects our asset owners' investment preferences
- E. Reduces overall portfolio risk
- F. Is beneficial to investment returns
- G. Is a legal obligation/fiduciary duty
- H. Is a moral/ethical obligation
- I. Other

Climate Risk Policy And Reporting

Which policies cover compliance related information on climate risk?

Does the Government report/ disclose information on various climate risk initiatives in any form to the public?

How would you define the Government's approach to climate related risks?

- A. Responsible
- B. Responsive
- C. Strategic
- D. Other

How important is climate risk to the Government as compared to other risks?

- A. Very important
 - B. Somewhat important
 - C. Not important at all
- If not important, why?*

Governance

Which Ministries are tasked to work around drafting policies around climate risk and further, implementing the same?

What kind of data is collected by Ministry to report on climate change impact and climate risks?

Please proceed further if climate risk is considered important/ measured

Rank the most important investment risk perceived by Government at the time of Sovereign Guarantees (1 being the most important)

- A. Strategic risk
- B. Operational risk
- C. Credit risk
- D. Reputational risk
- E. Compliance risk
- F. Climate risk

Rank the most important investment risk perceived by Government at the time of Sovereign Guarantees (1 being the most important)

- A. Physical risk
- B. Transition risk
- C. Both
- D. None
- E. Other, please specify

Understanding Climate Risk

Motivations to Incorporate Climate Risks into Sovereign Guarantees

Does the Government have plans to regularly assess such risks?

- A. Yes
 - B. No, but actively considering it
 - C. Maybe
- If no, why not?*

Has the Government considered climate change related opportunities that may exist or emerge in the future?

- A. Yes
 - B. No
- If yes, what are these opportunities?*

What implications may climate change have on liquidity and capital needs?

Has the Government undertaken financial analysis to assess the impact of these climate-related financial risks?

- A. Yes
- B. No

Climate Related Assessment And Measurement

Is the Government taking steps to improve its understanding of climate change financial risks?

- A. Yes
 - B. Not yet
- If yes, please explain what steps?*

Is there any model that allows to price climate transition scenarios in the value of individual sovereign bonds?

Method for computation of overall gains or losses for your portfolio under mild or tight climate policy scenarios, by country and sector of economic activities

Do you think assessing climate risk offers some opportunities to the Government? (If yes, can you please elaborate)

- A. Yes
- B. No

Views on climate-risk disclosure

- A. Investors should demand that portfolio countries disclose their exposure to climate risk
- B. Country-level quantitative information on climate risk is not sufficiently precise
- C. Standardized and mandatory reporting on climate risk is necessary

8.3.5. Questions For Ecosystem Enablers And Service Providers

Enterprises Seeking Funding (any enterprise who is seeking funds but we will limit our interaction with energy and climate change enterprises)

What is the nature of your business? What product or service do you offer?

What is the annual revenue?

Where is your office located in India? Also, which are the other cities where you operate?

Do you consider climate change as having substantial operational and financial impact to your business?

A. Yes

B. No

If yes, please explain how and did you document it anywhere?

Who are your investors?

How many times have you sought investments? From whom?

What is the nature of investment in your enterprise? (Debt, equity, grant etc.)

While interacting with the investor, were you asked to submit any document relating to -

A. ESG compliance

B. Environmental policies

C. Pollution certifications

D. Climate disclosures

E. Any other emission related document

Have your investors ever discussed the importance of climate risk to the success of your business?

A. Yes

B. No

If yes, please explain how

Has the investor asked you to regularly consider the impact of climate change on the operations of your business?

A. Yes

B. No

Please provide any information related to climate change or impact of catastrophe on your business provided/ prepared by you in the past

Service Providers (who are supporting in climate risk reporting like Four Twenty Seven)

What is the nature of your business? What product or service do you offer?

What is the nature of your clients? Which organizations have availed your services in the past?

How do you assess climate related emergency situation that might encounter? What kind of technology and tools do you use?

Share information on the defined process for assessing and implementing climate change related projects?

How do you propose to protect investments from climate change impacts with your services?

What skill sets should the person have that need to be working on climate change risk assessment, monitoring, and reporting platform?

How do you justify the services which have been provided to financial institutions to price the climate change risk?

How do you determine what needs to be done for deriving climate risk pricing services initially?

Do you have database centers and what is the format in which you deliver data to your client on climate change scenarios and climate related risks?

Has there been a change in the demand for your services over a period of time? What kind of information changes has your experienced from the investor in the past?

What approach do you follow to acquire customers?

A. Extensive marketing and outreach is required
 B. Clients approach organically
 If marketing is required, what do you think are the reasons for the lack of understanding among investors?

Did you experience a change in the way your clients perceive climate change and the risks associated with it?

A. Yes
 B. No
 If yes, what do you think has contributed to this change?

Ecosystem Enablers

What are the services that you offer? Since when have you been offering these services?

What is the nature of your clients?

A. Investors
 B. Government
 C. Insurance agencies
 D. Credit rating agencies
 E. Others, please specify

Have you supported financial institutions in assessing climate risk?

A. Yes
 B. No
 If yes, which are these institutions and what are the services offered to them?

Did you experience a change in the way your clients perceive climate change and the risks associated with it?

A. Yes
 B. No
 If yes, what do you think has contributed to this change?

Which tools do you use to assess the risk of climate change?

What are the current regulations around climate change in the country? What is your opinion on the same?

How can climate change mainstreaming and climate risk pricing can be made more proactive consideration by investors in the country?

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About The Organizations

Intellectcap Advisory Services Private Limited

Intellectcap, a part of the Aavishkaar Group, is a pioneer in building enabling ecosystems and channelling capital to create and nurture a sustainable & equitable society. Founded in 2002, Intellectcap works across critical sectors like Agriculture, Livelihoods, Climate Change, Clean Energy, Financial Services, Gender & Inclusion, Healthcare, Water and Sanitation, and has delivered over 500 global engagements across 40+ countries and syndicated investments of over \$500 Million USD in Capital. Intellectcap through its presence in India and Africa, provides a broad range of Consulting, Research and Investment Banking Services, to Multilateral Agencies, Development Finance Institutions, Social Enterprises, Corporations, Investors, Policy Makers and Donors. Select clients of Intellectcap include the Shakti Sustainable Energy Foundation, USAID, Rockefeller Foundation, World Bank, Ford Foundation, The Hans Foundation, Doen Foundation, GIZ, DFID, Hindustan Unilever, P&G, International Finance Corporation, Asian Development Bank and Michael and Susan Dell Foundation.

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Shakti Sustainable Energy Foundation

Shakti Sustainable Energy Foundation seeks to facilitate India's transition to a sustainable energy future by aiding the design and implementation of policies in the following areas: clean power, energy efficiency, sustainable urban transport, climate change mitigation and clean energy finance. This initiative has been partially supported by Shakti Sustainable Energy Foundation.

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