CDRI
Coalition for Disaster Resilient Infrastructure

# Combating Physical Climate Risks

## A Pathway for Financial Institutions

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Coalition for Disaster Resilient Infrastructure

CDRI is a global coalition, dedicated to promoting resilience of infrastructure systems to climate and disaster risks. With more than 50 members, it supports knowledge sharing, research, and investment in disaster resilient infrastructure. Members benefit from access to global expertise, funding, technical support, research opportunities, innovative solutions, and international best practices. The Coalition is supported by a Secretariat headquartered in New Delhi, India. The Secretariat has the status of an International Organization.

The roadmap presented in this document is a summary of the Playbook on “Physical Climate Risk Assessment for the Financial Sector”. This playbook is an initiative of the Rockefeller Foundation and CDRI, created with the aim to help financial institutions navigate the evolving landscape of physical climate risks. It offers guidance on mitigating these risks using established frameworks and is a first step toward empowering financial institutions across several low- and middle-income countries to navigate the evolving landscape of physical climate risks.

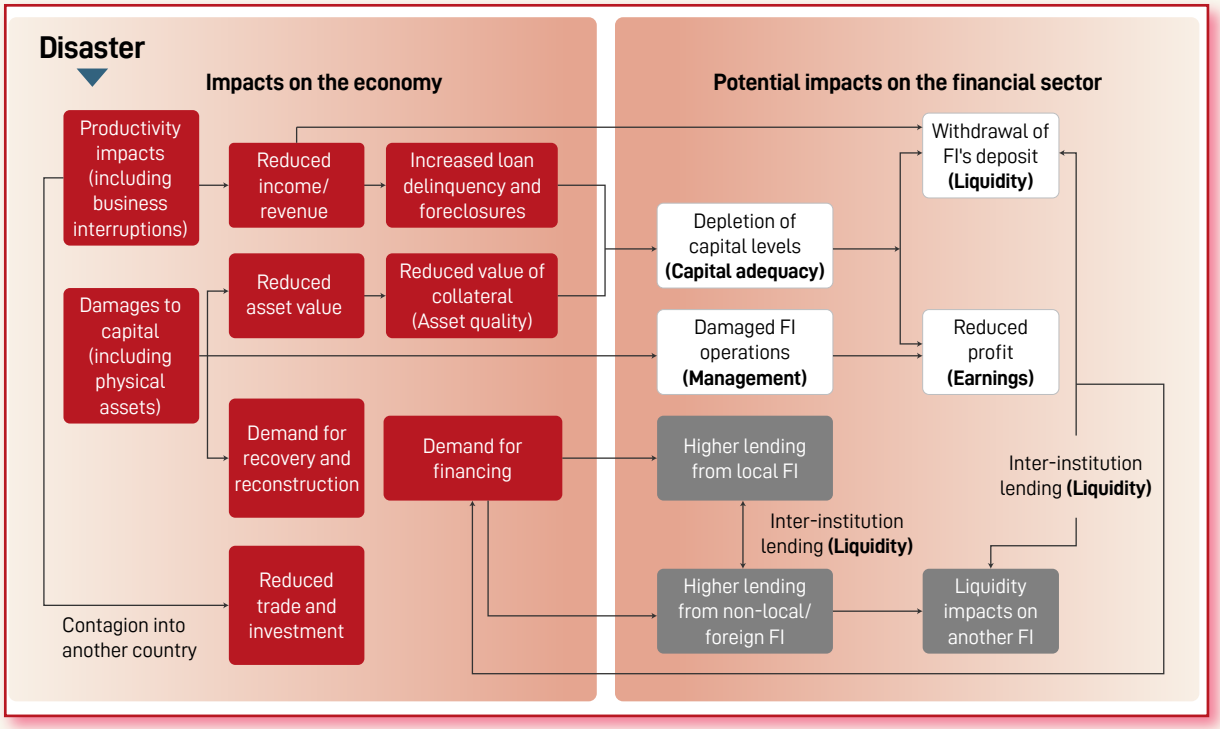
Read more:
https://www.cdri.world/upload/pages/1822653646671481_202501300619risk_assesment_playbook.pdf

# 1 How physical and climate risks affect Financial Institutions

The intensity and frequency of extreme weather events are expected to increase with climate change. As a result, infrastructure worldwide accumulates physical risk, which can potentially result in financial losses for institutions that finance them. Certain regions of the world, such as the Caribbean and Mexico, are especially susceptible to economic crises due to the compounding effects of natural hazards, economic downturns and financial risk.

Thus, financial institutions (FIs), especially in low- and middle-income countries (LMICs), must carefully assess climate and disaster risks and invest in infrastructure that is resilient to climate change. This document outlines policy recommendations for FIs to effectively address physical climate risks. It supports the integration of climate risk considerations into governance, risk management frameworks and regulatory compliance.

## Disaster impacts on the financial sector




**KEY MESSAGE**

**Financial institutions should inform and facilitate global investments in climate and disaster resilient infrastructure to ensure uninterrupted service amid disasters, rapid recovery and sustainability.**

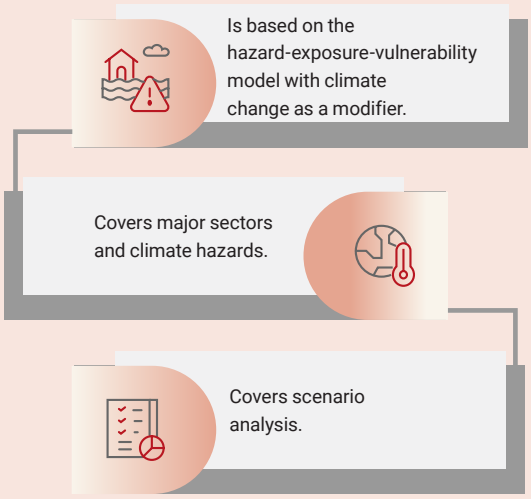
# How can FIs integrate physical climate risks into their strategies

FIs need to urgently integrate physical climate risk into their strategies as climate impacts escalate. These risks, including extreme weather events, threaten businesses and financial stability. With growing regulatory pressure, FIs need to assess and manage their exposure, especially in infrastructure investments.

Resources such as CDRI's Global Infrastructure Risk Model and Resilience Index (GIRI) platform play an important role in gaining a preliminary understanding of not only overall potential climate hazards and asset vulnerabilities, but also regional variations in the same.

The GIRI platform utilizes the first fully probabilistic model to identify and estimate the risk associated with six major hazards—earthquake, tsunami, tropical cyclone (wind and storm surge), landslide (rain and earthquake triggered), flood and drought—for seven principal infrastructure sectors—Power, Telecommunications, Transport (Ports and Airports, Roads and Railways), Water and Wastewater, Health, Education and Buildings—in all countries and territories.

The GIRI platform:




The platform can be accessed through this link.

https://giri.unepgrid.ch/

During climate risk assessment, GIRI can offer additional open-source data to help increase the effectiveness of risk analysis. It provides:

- Figures for climate scenarios.
- Exposed value of assets.
- Hazard maps.

The model combines its three main components using the catastrophic (CAT) risk assessment approach to produce financial risk metrics such as Average Annual Loss (AAL), Loss Exceedance Curve (LEC) and the Probable Maximum Loss (PML) curve for all countries and territories globally.

For more information, visit:
https://driconnect.cdri.world/resources/icdri/global-infrastructure-resilience-index-giri

# 2 What can FIs do

Climate risks are increasingly affecting investments and infrastructure assets, making it essential for FIs to quantify and disclose these risks. While physical climate risk assessments may entail short-term costs, they significantly enhance long-term resilience in the financial sector. Effective climate risk management involves projecting future climate scenarios, identifying potential climate events affecting infrastructure and quantifying asset exposure. A systematic assessment process can yield clear metrics like climate value-at-risk, enabling informed decisions and stronger infrastructure resilience.

1. **Conduct integrated climate risk assessments** to be prepared for climate crises which lead to macro-financial crises, such as hurricanes or pandemics.

2. **Optimize FI operations to minimize** climate-related physical risks to the infrastructure (owned or financed).

3. **Facilitate resilient infrastructure development by:**
   - Informing governments and private players.
   - Helping infrastructure recover from disaster shocks quickly.
   - Providing continued service.

4. **Leverage training programmes to help stakeholders identify, measure, disclose and manage climate risk in the financial sector.**

**KEY MESSAGE**

**A systematic assessment of physical climate risks can help financial institutions translate climate hazards into clear risk metrics, supporting informed decision making for risk management.**

# How do FIs take physical climate risks into account

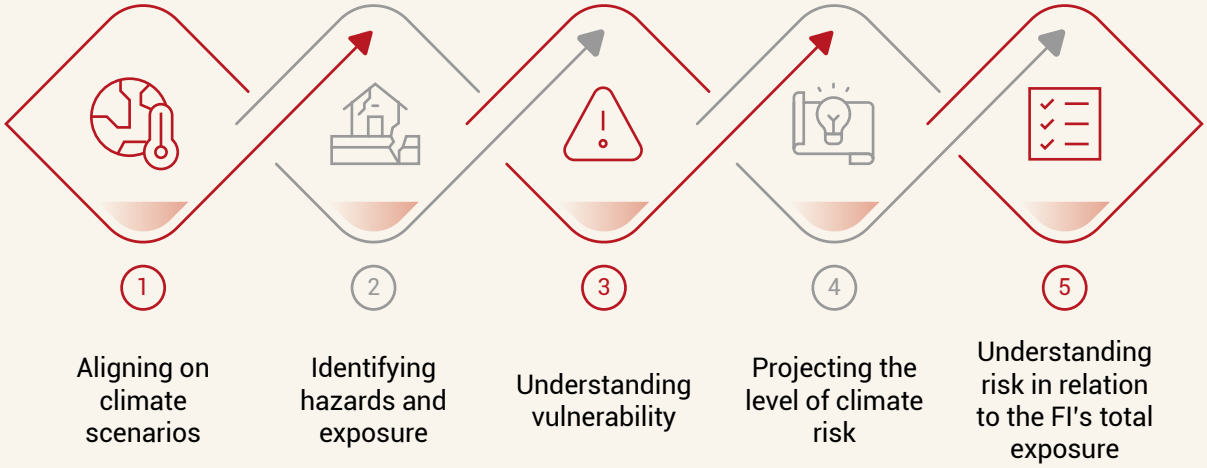
"Climate value at risk" is the most common approach utilized by FIs to incorporate impacts of physical and transitional climate risk. This approach assesses the probability of the occurrence of a hazard and its range of severity, thereby estimating the impact on capital expenditure and potential earning in any given year. However, this approach is not sufficient as it does not take into consideration many elements such as penalties and the non-availability of services.

## The four phases of conducting physical climate risk assessment

| Phase | Definition | How to implement (indicative) |
|---|---|---|
| 1 **Define the needs and objectives** | Set clear goals aligned with organizational needs, priorities and stakeholder expectations. | • Consult with key stakeholders to understand expectations.<br>• Identify relevant hazards and vulnerabilities using available literature and information.<br>• Finalize objectives after an iterative approach. |
| 2 **Establish scope and approach** | Chalk out a Risk Assessment methodology by utilizing an appropriate approach based on needs and objectives. | |
| 3 **Choose appropriate climate scenarios** | Define accountable climate variance through selection of scenarios according to organizational objectives. | • Select from standard scenarios or construct a customized scenario.<br>• Utilize the hazard-exposure-vulnerability framework to quantify the level of risk that an FI faces.<br>• Include indirect losses wherever possible. |
| 4 **Interpret and report the results** | Interpret the results and report them effectively to facilitate decision making. | • Communicate findings clearly and include all assumptions, uncertainties and limitations.<br>• Emphasize on trends and magnitude rather than precise numbers. |

# 3 How can FIs conduct physical climate risk assessments

Globally, the impact of physical climate events on assets is estimated using the hazard-exposure-vulnerability (HEV) framework. The HEV framework can allow FIs to quantify and compute potential losses or a qualitative risk score through a thematic approach. The figure below illustrates the key steps in using the HEV framework for physical climate risk assessment.[1]




**KEY MESSAGE**

**Physical Climate Risk Assessment is a multifaceted process that requires developing an understanding of the impacts of potential climate events on infrastructure assets and an FI's investment exposure. While climate scenarios offer only a broad view of the future, they form a key input in climate impact models that help FIs understand potential financial losses due to physical climate risk.**

[1] https://www.cdri.world/upload/pages/1822653646671481_202501300619risk_assesment_playbook.pdf

# How to convert climate scenarios into an impact model

To estimate the impact of physical climate risks on their assets, FIs can follow a three-step process. The first step is to choose a climate scenario that aligns with their view of future climatic conditions (such as RCP 8.5). At this step, FIs must also ensure that they have data with sufficient granularity to develop hazard and exposure models, the latter of which is the second step. The third step is to combine outputs from these models with exposure data to model impact.

## Three-step process for converting climate scenarios into a localized exposure model

1. Choose or develop the climate scenario for inputs (e.g., RCP 8.5).
2. Leverage scenarios to develop internal hazard and exposure models.
3. Combine the inputs from the internal model with vulnerability and FI exposure to model impact for FIs.

# 4 How to use climate risk assessment in decision making

There are four key areas where FIs need to integrate climate risk assessment: strategy, governance, risk management, and metrics and targets.

**Develop strategy:**
FIs need to integrate climate-related risks into their business and financial planning by setting clear goals, prioritizing critical areas for engagement and developing a roadmap for climate adaptation.

**Implement changes:**
FIs need to ensure that climate risk management remains a priority throughout the credit life cycle.

**Establish governance:**
FIs need to establish efficient governance that considers climate risk carefully, facilitating accountability and proactive management within the organization.

**Track metrics and targets:**
FIs need to set up measurable targets and design a target-tracking system to continuously monitor efforts, assess performance and reorient strategy when necessary.

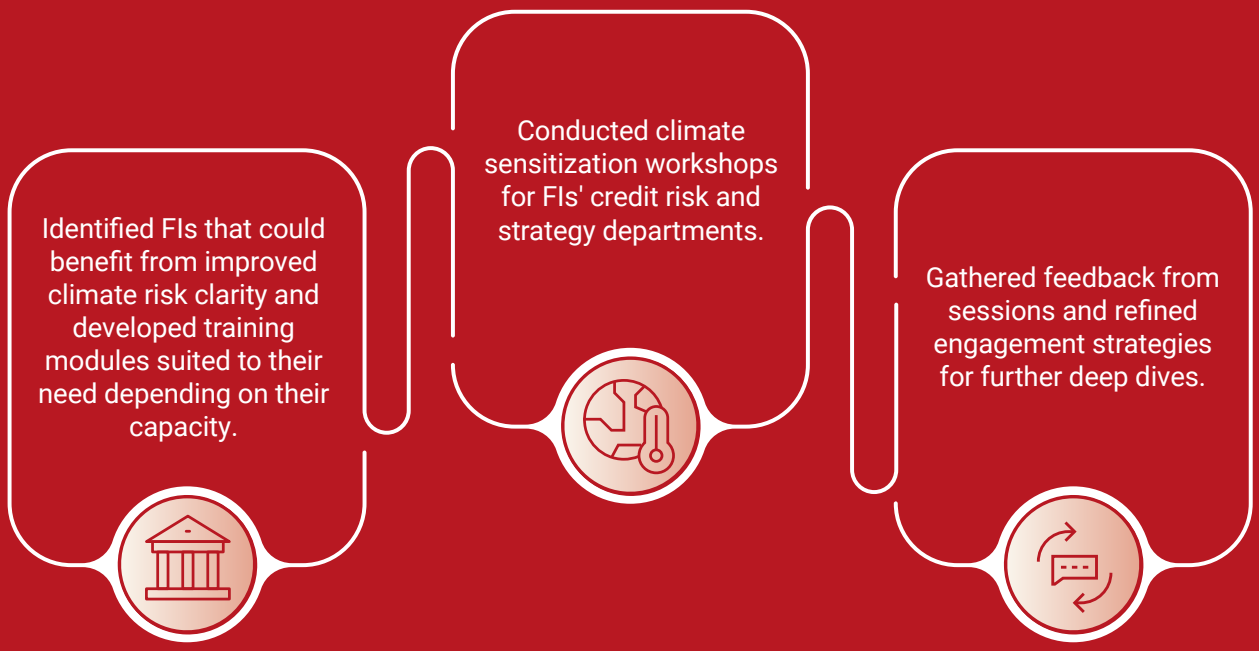
**KEY MESSAGE**

**Policymakers, regulators, financial institutions and data providers must collaborate to foster macro-level action tying climate risk assessments to capital allocation decisions.**

# What can we learn from real-world cases

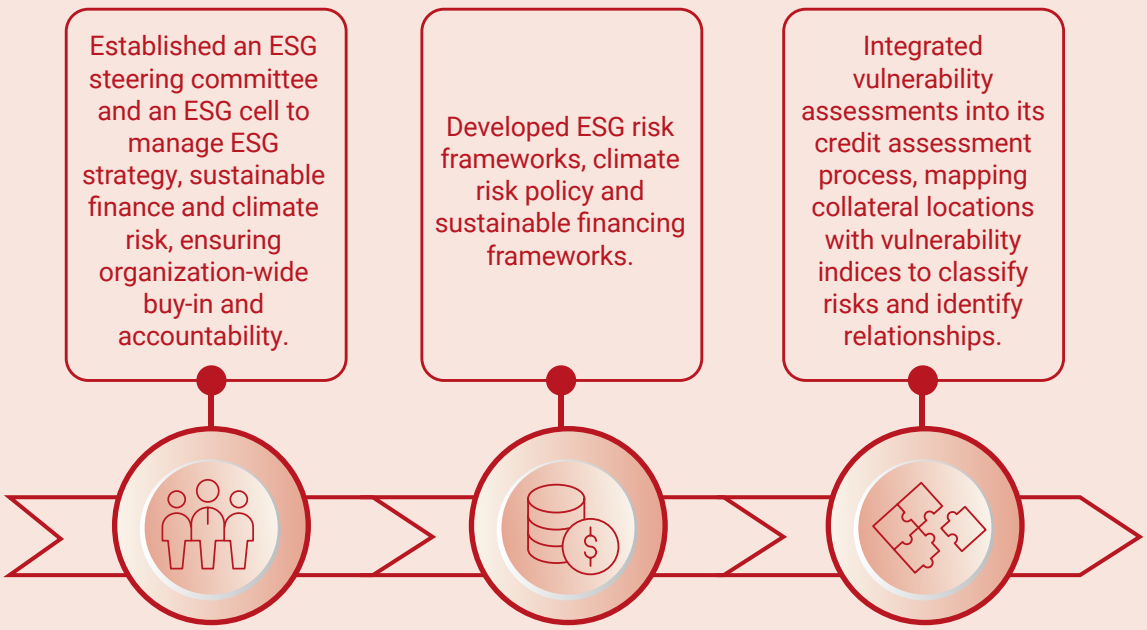
## 1 India Initiative on Climate Risks and Sustainable Finance (IICRSF)

IICRSF, a collaborative anchored by Climate Bonds Initiative (CBI), with partners auctusESG and Overseas Development Institute ODI, works to enhance FIs' capacity to understand and integrate climate risks and opportunities into their operations. IICRSF has taken several steps to facilitate the inclusion of climate-related factors in financial risk management.




## 2 Union Bank of India

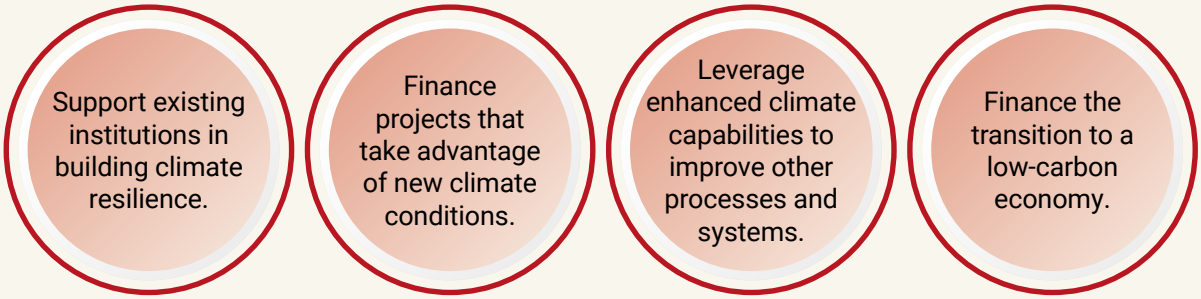
Union Bank of India streamlined its climate risk management processes by setting up dedicated governance structures, including an environmental, social and governance (ESG) steering committee and an ESG cell.



# 5 What are the opportunities and challenges for FIs

While climate change escalates risks, it also unlocks significant opportunities for FIs, driven by the rapid expansion of climate-focused initiatives. By integrating climate risk assessments into the credit life cycle, FIs—especially in LMICs—can pioneer new green finance solutions. Globally, FIs are innovating with diverse debt and equity instruments to accelerate sustainable development and climate resilience. However, this transformation faces critical challenges, including data scarcity, a lack of standardized risk metrics and weak macro-level guidance linking climate risks to capital allocation. Overcoming these barriers demands a unified effort from policymakers, regulators, FIs and data providers.

## Opportunities arising from climate risk assessments




| Gaps | Action needed |
|---|---|
| There is no common database for climate-related hazards, nor are data collection metrics standardized. | **As a public good, build a platform for climate-related hazard data** and prescribe norms for collecting asset-level climate data. |
| Once a climate risk assessment has been conducted, more guidance is needed on how to convert physical climate risk into financial risk. | **Standardize methods for** deriving financial risk from physical climate risks. |
| Guidance is lacking on how to apply climate risk to capital allocation decisions. | **Standardize guidelines** for applying climate considerations to credit and capital decisions. |

**KEY MESSAGE**

**Beyond risks, climate change presents a unique opportunity for FIs to lead the green transition by driving resilience, funding projects that are adapting to new climate realities and accelerating the transition to a low-carbon economy.**

# Can FIs catalyze green finance

Green finance presents significant environmental and social benefits, though its commercial and financial viability has to be established before FIs adopt it on a large scale. Hence, risk assessments of all such investments will be necessary to ensure that they provide intended returns even under climate shocks.

## Enhancing accessibility of climate data

Any kind of climate risk assessment needs accessibility to climate data. One such example is Cal-Adapt, which is a public data platform designed to support climate adaptation planning in California. Developed by UC Berkeley's Geospatial Innovation Facility with guidance from the California Energy Commission and Strategic Growth Council, Cal-Adapt offers essential climate data and tools. It serves as a vital resource for researchers, policymakers, stakeholders and communities to build resilience and inform decision-making in response to climate challenges.

Learn more here: https://cal-adapt.org/

# 6 How can CDRI support the financial sector

Integrating physical climate risk assessment into the financial sector requires urgent collaboration among policymakers, regulators, FIs and data providers. **The three key barriers that demand immediate action are:**


CDRI is uniquely positioned to drive collaboration across the financial sector to address key challenges in climate risk management. By partnering with regulators, FIs and other stakeholders, **CDRI can help bridge critical gaps by:**


**KEY MESSAGE**

**While LMICs have yet to adequately incorporate climate risks into financial planning, initiatives that improve understanding of climate risk can accelerate risk management by financial institutions and catalyze increased adaptation finance for vulnerable regions.**

# How can CDRI help

## 1 Knowledge sharing and capacity development

CDRI can spearhead knowledge sharing through its platform DRI Connect and can leverage its academic networks and other relevant partners to conduct capacity development programmes for FIs. Know more about DRI Connect here: https://driconnect.cdri.world/

## 2 Technical assistance

CDRI may leverage expertise from the Coalition to provide technical assistance to FIs for conducting assessments.

## 3 Supporting and setting up data platforms

CDRI may support FIs to conduct climate risk analyses.

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