CII-ITC Centre of Excellence
for Sustainable Development

Confederation of Indian Industry

Building Climate Resilience for Indian Industry

Summary Report

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Foreword

Mr Sanjiv Puri
President, Confederation of Indian Industry
Chairman & Managing Director, ITC Limited

"Building Climate Resilience for Indian Industry" has developed a framework to assess and quantify climate risks for Indian businesses and their value chains. The framework is designed to help enterprises identify risks from floods, droughts, heatwaves, cyclones, and other phenomena caused by climate change and guide them in prioritizing appropriate adaptation actions across sectors and in different regions.

Around the world, "including in India", an increased occurrence of extreme climate events has been noted over the years, resulting in significant human and economic losses. In India, while the central and state governments are taking action and allocating more resources to disaster recovery efforts, the private sector urgently needs to assess and effectively tackle the severe impacts of extreme climate events.

From an adaptation and resilience perspective, businesses are increasingly realising that they face significant challenges ranging from capital damages due to physical risks such as floods and cyclones, impact on social aspects including decline in productivity from extreme heat or heavy rainfall, and supply chain disruptions affecting transportation of raw materials and finished products.

Building adaptive capacity has its own share of challenges, including the absence of a unified framework for assessing climate risks across sectors, limited access to reliable climate data, inadequate use of technology in resilience strategies, lack of established funding sources and the complexity associated with modelling and forecasting extreme weather events.

Addressing these challenges demands coordinated efforts between industry, different tiers of government, urban planners, municipalities, and experts in the field, along with industry actors playing a key role in sharing best practices, offering technological solutions, and leading resilient infrastructure development.

Driven by these requirements and to actively engage with its members to enhance climate resilience, the Confederation of Indian Industry (CII) is working to stimulate collective action to address climate change risks faced by the Indian industry.

The study on "Building Climate Resilience for Indian Industry" has developed a framework to assess and quantify climate risks for Indian businesses and their value chains. The framework is designed to help enterprises identify risks from floods, droughts, heatwaves, cyclones, and other phenomena caused by climate change and guide them in prioritizing appropriate adaptation actions across sectors and in different regions. Although primarily focused on industry, the framework can also form the foundation for a national strategy to assess and manage climate risks.

As outlined in the report, under the ongoing development of India's National Adaptation Plan (NAP), the relevant state departments could work with stakeholders towards the creation of a climate change adaptation taxonomy. This taxonomy could establish clear definitions on building adaptive capacity and climate resilience in the Indian context, along with setting specific project guidelines. It would facilitate private sector adoption of adaptation practices, prioritize investments for building resilience and allow for greater public-private participation, eventually leading to building resilience at scale. The study highlights the role of industry in bringing in private capital, conducting in-depth site-specific studies that allow for clarity in investments, and building resilient infrastructure. Initiatives such as the climate risk assessment framework provide the necessary tools for Indian industry to play its part and should be further encouraged for uptake through appropriate incentives.

In the coming years, addressing existing data gaps by investing in required satellite technology, weather monitoring stations, and developing advanced predictive models complemented by evidence-based policy research will be crucial.

Addressing the impact of climate change is a very complex endeavour and calls for intensive collaboration among policymakers, businesses, and civil society. As we chart this course, CII remains committed to leading from the front, driving innovation, advocating for conducive policies, and facilitating the sharing of best practices.

Through concerted efforts, knowledge sharing and united and collaborative actions, businesses can play an indispensable role in driving transformative change towards a future with sustainable action that enhances social and economic well-being of individuals and communities. The present study is a step in this direction and I am confident that it will set a benchmark for future industry action in this critical area.

Foreword

Mr Chandrajit Banerjee
Director General,
Confederation of Indian Industry

"Building Climate Resilience for Indian Industry" highlights our commitment to helping industry assess the vulnerabilities to physical climate risks, prioritize adaptive strategies, strengthen resilience and help in contributing towards India's adaptation targets.

Indian industry is at a critical moment, facing dual challenges of mitigating climate change and adapting to its inevitable impacts. While India's commitment to achieving net-zero emissions by 2070 is a significant milestone, the urgency of prioritizing adaptation measures to build industry-wide resilience is equally critical.

As a nation that is significantly vulnerable to the impacts of climate variability, including extreme events such as heatwaves, floods, droughts & cyclones, prioritizing integration of climate concerns (both mitigation and adaptation measures), into the country's policy initiatives as well as development planning and priorities, will be essential to achieve the nation's goal of Viksit Bharat by 2047.

In recognition of this imperative, CII has been working on several fronts and is dedicated to spearheading climate action initiatives, driving policy advocacy, and assisting the industry in its transition towards a more sustainable and green economy. Through our Centres of Excellence (CoEs) on Green Business, Water, Food and Agriculture, Sustainable Development and Competitiveness for SMEs, among others, we have been working closely and proactively with industry to drive forward business-led climate action.

CII has facilitated the green buildings movement in India over the last two decades resulting in more than 14,000+ green buildings projects coming up with a registered footprint of 11.92 billion sq. ft.

One key initiative has been the CII Climate Action Charter (CCAC) through which MSMEs located across various industrial clusters in India have begun measuring GHG emissions by using a free to access toolkit. In addition to measuring emissions, we have also been conducting awareness building and knowledge sharing sessions for these MSMEs at the cluster level on assessing climate risk.

On the climate policy front, through the CII Mission Net Zero, we have been working towards developing a strategy and action plan which will ensure an efficient, expedited, and inclusive Net Zero transition for Indian Industry.

While reducing emissions is an important area, we are also keenly aware of the rising impacts of extreme-weather events such as floods and heat waves on India and industry. In recognition of this imperative, this study on "Building Climate Resilience for Indian Industry" highlights our commitment to helping industry assess the vulnerabilities to physical climate risks, prioritize adaptive strategies, strengthen resilience and help in contributing towards India's adaptation targets.

The survey conducted as part of this study has provided valuable insights into how climate risks are assessed and prioritized by specific sectors and their current realities.

These insights have helped identify low-cost yet highly effective strategies that can significantly enhance adaptive capacity while showcasing not only the immense potential of risk assessments and resilience planning, but also the appetite for it within the Indian industry.

Another key insight has been that there needs to be more dialogues and collaborations between Government at both the national and subnational level and industry on building climate resilient infrastructure. Given the highly location specific nature of extreme-weather events, it is essential that stakeholders work together to develop state and district-specific resilience plans with clearly defined guidelines and roles.

Through our regional and state offices, CII will help facilitate the dialogues and collaborations required to drive action on this key issue. In addition to taking forward this initiative through our offices, we also intend to leverage our CoEs and their expertise to help industry implement the framework developed as well as to identify key adaptive strategies as per their specific requirements.

Building climate resilience calls for a strategic and collaborative approach, uniting policymakers, industry stakeholders, and the financial institutions to address the multifaceted challenges of this incredibly complex challenge. By fostering innovation, enhancing awareness, co-developing solutions, and by leveraging public-private partnerships for joint initiatives, we can ensure that India is on the path towards economic prosperity while safeguarding ourselves from the vagaries of climate change.

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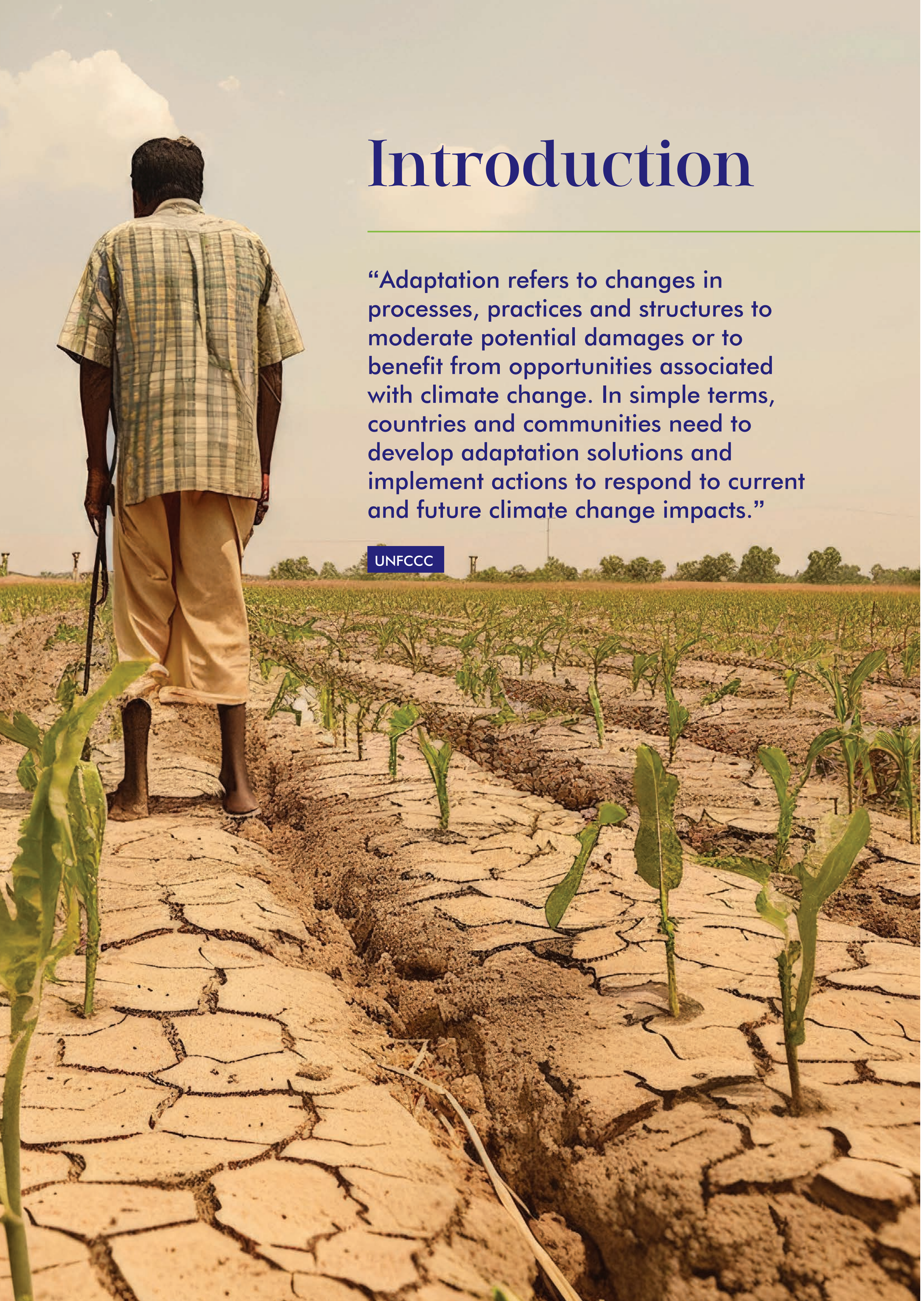
Glossary

AI	Artificial Intelligence
AAL	Annual Average Loss
ASI	Annual Survey of Industries
BCP	Business Continuity Plans
BRP	Business Resilience Plans
BRSR	Business Responsibility and Sustainability Reporting
CII	Confederation of Indian Industry
COP	Conference of Parties
DEM	Digital Elevation Model
DMP	Disaster Management Plan
EM DAT	Emergency Events Database
ESRI	Environmental Systems Research Institute
EWS	Early Warning Systems
GDP	Gross Domestic Product
GVA	Gross Value Added
HVAC	Heating, Ventilation, and Air Conditioning
IMD	India Meteorological Department
IPCC-AR5	Intergovernmental Panel on Climate Change's Fifth Assessment Report
LULC	Land Use Land Cover
ML	Machine Learning
MOSPI	Ministry of Statistics and Programme Implementation
MSME	Ministry of Micro, Small and Medium Enterprises
SMEs	Small and Medium Enterprises
NIDM	National Institute of Disaster Management
OEM	Original Equipment Manufacturer
SOP	Standard Operating Procedure
SRTM	Shuttle Radar Topography Mission
TANSIDCO	Tamil Nadu Small Industries Development Corporation Limited
TCFD	Task Force on Climate-related Financial Disclosures
UNDRR	United Nations Office for Disaster Risk Reduction
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFCCC	United Nations Framework Convention on Climate Change
WEF	World Economic Forum



Introduction

"Adaptation refers to changes in processes, practices and structures to moderate potential damages or to benefit from opportunities associated with climate change. In simple terms, countries and communities need to develop adaptation solutions and implement actions to respond to current and future climate change impacts."

UNFCCC

The impacts and consequences of climate change on human lives, businesses, infrastructure, natural ecosystems, and economies across the world are becoming increasingly evident. As a developing country in South Asia, India is particularly vulnerable to the escalating impacts of climate change.

The UNESCAP estimates India's Annualised Average Loss (AAL) from extreme weather events and slow-onset hazards at USD 93 billion, i.e., 3.35 per cent of India's GDP (UNESCAP 2019). Studies shows that from 1970 to 2019, extreme weather events in India increased significantly, with 280 heatwave days, leading to urban flooding, reduced agricultural productivity and power outages (Mohanty 2020, Vasantha Kumaran et al., 2020, Deshpande et al., 2021, CSE 2022).

A study on terminal heat stress for crops suggested that during the year 2021–22, the impact of heat stress became more evident in key wheat-growing states, including Punjab, Haryana, Uttar Pradesh, Uttarakhand, and Rajasthan. Wheat productivity in Punjab was reduced by 13.5% compared to the productivity in 2020–21.

The decline was primarily due to a sudden rise in minimum temperatures by 2.1–6.6°C and maximum temperatures by 2.6–6°C in March, which created unfavorable conditions for the crop (Indian Council of Agricultural Research, 2023).

Figure 1: a) Current state of extreme climate events in India

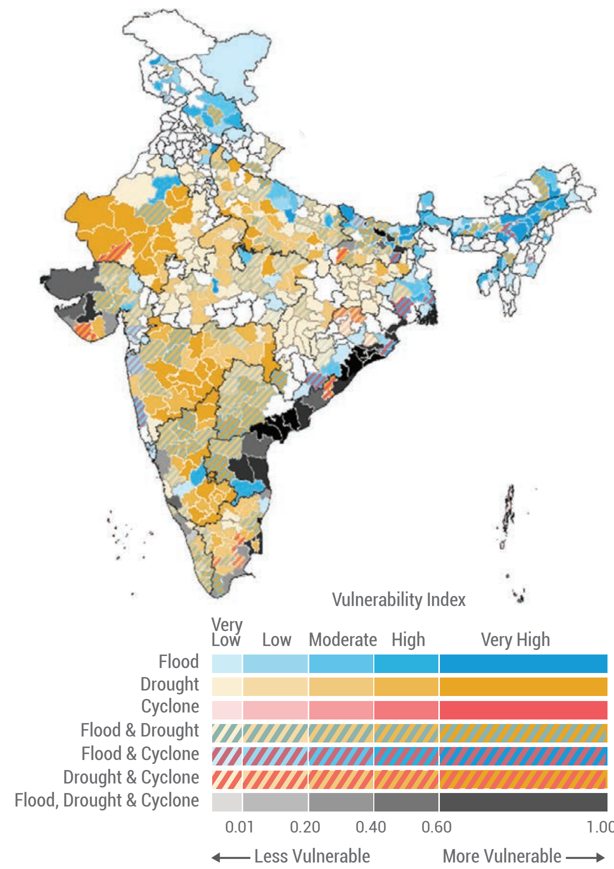
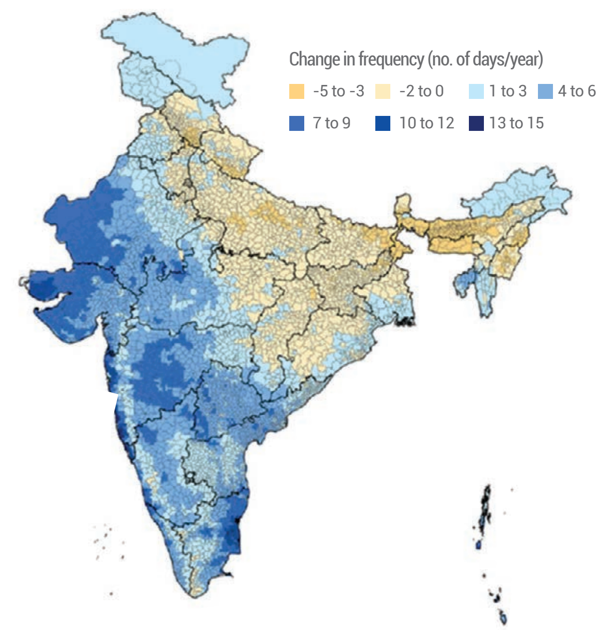


Figure 1: b) Change in heavy rainfall days between 2012-2022

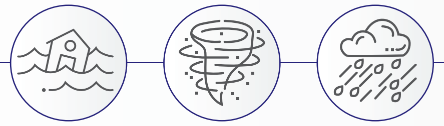


Source: Mohanty and Wadhawan 2021 and Prabhu and Chitale 2024

Industry is highly dependent on infrastructure like power, water supply and transportation. Climate-related risks adversely impacts industry both directly, by impacting physical assets such as manufacturing plants, factories, warehouses, equipment and machinery; and indirectly, by disrupting the supply chain of raw materials and components, as well as impedes logistics and transportation (Moodys 2021). The 2022 Climate Transparency report estimates that the loss in labour capacity due to extreme heat corresponded to a potential income loss of USD 159 billion in key industrial sectors such as manufacturing, agriculture, construction, and service industry in 2021 (Climate Transparency 2022).

> "Climate resilience is defined as the capacity or ability to anticipate and cope with climate induced disasters, and to recover from their impacts in a timely and efficient manner"
>
> UNFCCC

Figure 2: Mapping the impacts of physical climate risks across the industrial supply chain



Acute Risk

Acute physical risks are those from rapid onset hazards such as cyclones, floods, extreme precipitation, usually driven by an individual event.

Operations

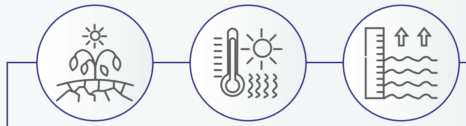
- Damage to production facilities, machinery, and power sources
- Damage / reduced crop yield causing risk to raw material supply and price volatility
- Increased risks to employee health and safety

Supply Chain

- Disruption in transportation
- Price volatility of raw materials due to disruptions in the supply chain

Market

- Temporary operational shutdown
- Increase in cost of services
- Immediate expenses for cleaning premises and restarting operations
- Altered product demand in consumer markets



Chronic Risk

Chronic physical risks are a result of long-term shifts in climate patterns, also known as slow-onset disasters. It includes hazards such as heatwaves, droughts, rising daytime & night-time temperatures, and sea level rise.

Operations

- Risk to water-intensive operations and manufacturing
- Reduced worker productivity
- Risk to employee health and safety
- Damage to sensitive machinery and equipments
- Reduced harvest and crop yield
- Increased costs due to disrupted energy access, water availability, and changing soil patterns.

Supply Chain

- Decline in raw material availability
- Transportation/ shipping disruption

Market

- Increased energy demand
- Increased expenses for air conditioning
- Higher energy cost

Source: Analysis based on literature review

Increasing adaptive capacity is crucial for building resilience and can be achieved through strategies like climate-proofing infrastructure, scaling up nature-based solutions, and making risk-informed decisions.

The World Bank estimates that investing in climate adaptation yields an average benefit-to-cost ratio of 4:1 (World Bank 2019). Effective adaptation strategies must be devised and implemented at every level, informed by science, supported by evidence-based policies, and guided by data-driven risk assessments.

Many industries also struggle to secure funding for resilience initiatives, as there is often a disconnect between financial institutions and industrial resilience needs. Inconsistent policies and regulatory frameworks further create barriers to the widespread adoption of resilience practices (S&P Global 2023, WRI 2023, GIZ 2013).

In addition to this, efforts by stakeholders to build resilient infrastructure are being hindered by rising 'worse-case' events. For example, Delhi has recorded cumulative rainfall in a single 24-hour period of 228 mm in the month of June 2024 (IMD 2024). Even infrastructure built to be resilient to rainfall would not be adequate for such situations, leading to damages. This is in part because we currently do not have sufficient technical capacity to forecast extreme-weather events with reasonable accuracy.

These factors limit the ability to accurately ascertain the most pertinent hazards they might be encountering, and to appropriately prepare for the level of risks associated. Given that adaptive capacity is the primary tool available to industry, prioritisation of areas for intervention becomes crucial.

Without a clear understanding of the specific risks posed by climate change, and in the absence of a unified framework, industries and other stakeholders struggle to allocate resources efficiently or implement effective adaptation strategies. This can result in missed opportunities for safeguarding assets, reducing vulnerabilities, and ensuring sustainable growth. Industry is limited to reacting rather than responding to physical climate risks and has a limited ability to plan.

> The challenges faced by industries related to finance and adaptive capacity arise from several factors, including the absence of a unified framework for assessing climate risks across sectors, limited access to reliable climate data, and inadequate use of technology in resilience strategies.

How does this study contribute?

Recognising these challenges, the study proposes a unified framework for assessing physical climate risks and highlights possible adaptation strategies for Indian industry. The framework can help industry actors access and quantify the level of exposure and sensitivity to the specific hazards faced by the industry and their value chains.

Further, it acts as a tool for prioritising the identified strategies, that can help increase adaptive capacity and build climate resilience over time.

The objectives of the study are:

1. Develop a framework for climate risk assessment and adaptation planning, focusing on climatic extremes such as heatwaves, floods, droughts, and cyclones for key priority sectors
2. Create a matrix of identified and prioritised adaptation strategies.
3. Enhance the capacity of selected stakeholders within prioritised sites to understand and adapt to climate risks.

Given the complexity in undertaking such an analysis for all industry, it was necessary to limit the study to a few key sectors in order to pilot the framework. The study focused on two major industry sectors: i) Manufacturing and ii) Agriculture and related value chains., recognising the higher degree of physical climate risks faced by these sectors due to both acute and chronic impacts of climate change.

To identify specific sectors and states, this study considered the sector/state contribution to GDP, working capital - focusing on capital intensive industries with significant workforce and infrastructure needs, employment numbers – potential job impacts due to disruptions and wages – analysing impacts on workforce in addition to capital assets.

The analysis led to the selection of automobile, agri-food processing and the iron and steel sectors in Tamil Nadu, Maharashtra and Odisha, for the pilot.

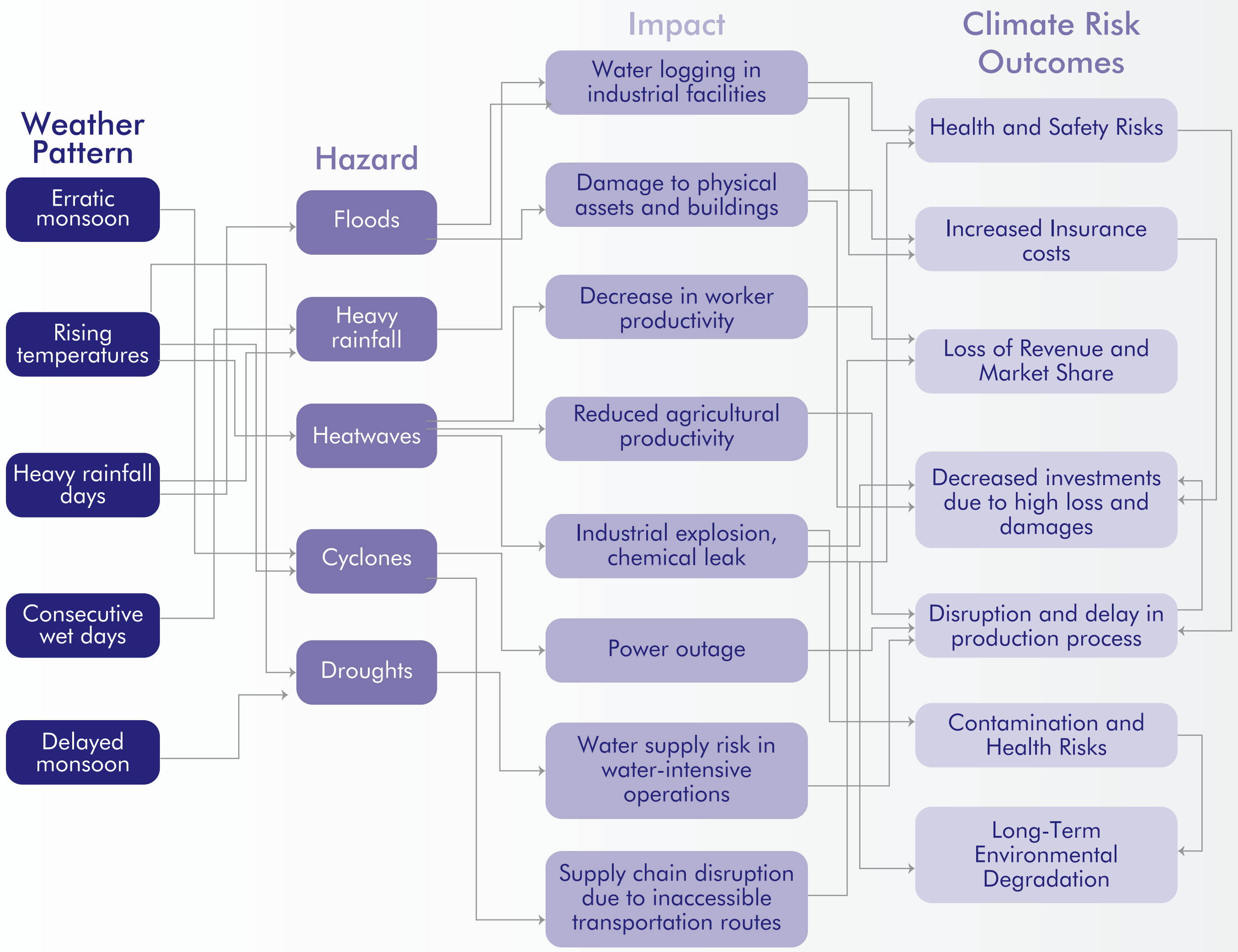
The increased susceptibility of manufacturing and agricultural activities to natural disasters or market fluctuations arising from such events emphasises the need for a detailed quantification of the risks.

Acknowledging the crucial role these sectors play in global and national economies, the research thoroughly examines the complex dynamics of their operations, evaluating the risks, vulnerabilities, and strategies for resilience.

The analysis of physical climate risks for the prioritised clusters in Maharashtra, Odisha, and Tamil Nadu reveals complex patterns in the impacts of climate change and associated disasters (Figure 3).

Increasing frequency and intensity of extreme weather events present a variety of symptoms, such as erratic rainfall, rising temperatures etc., that lead to climate events like flooding, droughts or heatwaves. The following graphic depicts the degree of interconnectedness between these events and the consequences that lead to risks faced by the industry.

Figure 3: Interlinkage of Climate Hazards and Outcomes: Key Physical Risks from Cluster-Level Analysis



Source: Analysis based on stakeholder consultation

Physical Climate Risk Assessment Framework (PCRAF) for Industry

The proposed framework for quantifying physical climate risk follows the 5-step methodology outlined in Figure 4. The approach, adapted from the Intergovernmental Panel on Climate Change's (IPCC) 2014 Assessment Report 5 (AR5), incorporates key elements of hazard, exposure, and vulnerability in the risk equation.

Risk = Hazard * Exposure * Vulnerability (Sensitivity/Adaptive Capacity)

Hazard

"The potential occurrence of climate-related physical events or trends or their physical impacts".

Indicators contributing to hazard are listed in Annexure 1

Exposure

"The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected"

Indicators contributing to exposure are listed in Annexure 1

Vulnerability

"The propensity or predisposition to be adversely affected"

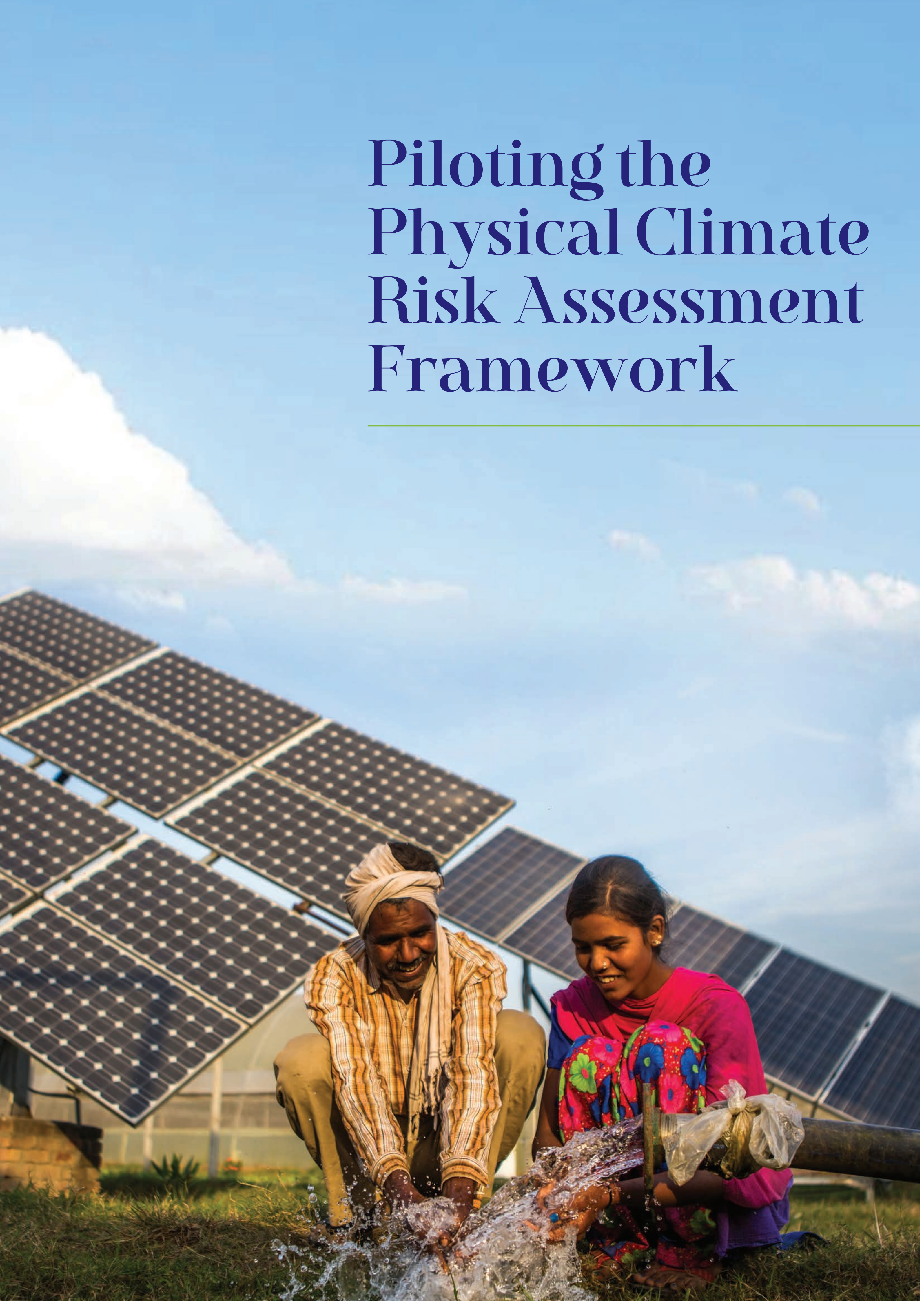
Indicators contributing to vulnerability are listed in Annexure 1

Figure 4: Using the Physical Climate Risk Assessment Framework (PCRAF)

Secondary data
Inputs from industry stakeholders

Indicators for Step 1, 2, 3 are available in Annexure 1
Analysis Data for Step 4, 5 can be referred to Annexure 2

Source: Analysis using the IPCC-AR5 framework



Piloting the Physical Climate Risk Assessment Framework

The study employs mixed methodology- that includes using literature review, and reports from reputed sources on climate risk and their impacts (secondary data) and stakeholder consultations across three states in the identified sectors (primary data). In the consultations, the full list of indicators that was part of the framework was contexualised through the stakeholders consultation and then ranked on the basis of feasibility and impacts. The full list of indicators along with the overall risk assessment scores for the industry clusters are placed in the Annexure 2.

Approach and Methodology

- Industrial sectors and states were identified through the analysis of a secondary dataset and a review of relevant literature.
- The selection criteria were validated through stakeholder consultations.
- Sector-specific indicators were compiled, and climate-related risks were quantified.
- An adaptation framework was developed for the industrial sectors and clusters.
- Stakeholder consultations were conducted to validate the results, prioritize adaptation strategies, and provide capacity-building training for industries.

Takeaways from the stakeholder consultations

Early stages of recognising climate risk

Need for collective action and expertise

Importance of business case and best practices

Regulatory support and policy guidelines

a) Indian industry is at the early stages of recognising climate risk

b) The industry identifies a need for collective action and expertise

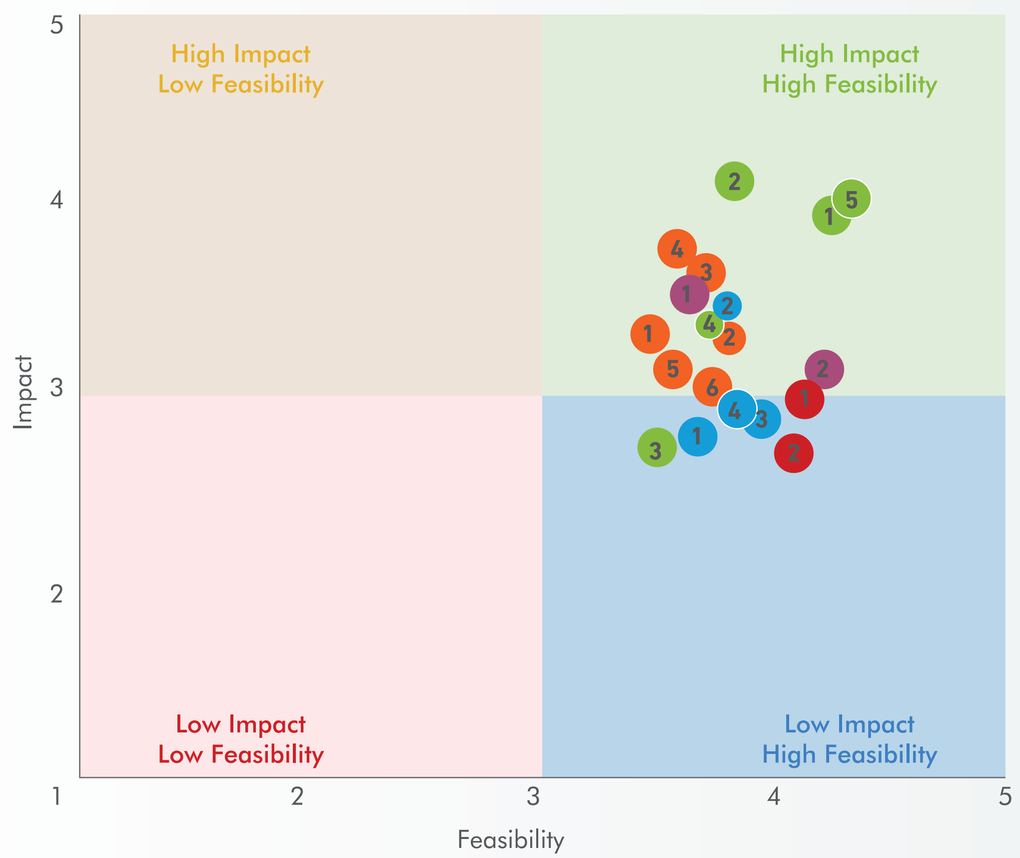
c) There is a need for a stronger business case for enhancing investments in adaptation, better documentation and sharing best practices

d) Regulatory support and clear policy guidelines are required to improve industry readiness for strengthening climate resilience

e) Limited awareness and technical expertise among suppliers and operators highlight the need for regular training and workshops to build stakeholder capacity

Based on the ranking of adaptation strategies during consultation workshops, most of the proposed solutions fall within the high impact-high feasibility category.

Figure 5: Impact and feasibility score of 19 different adaptation strategies contextualised to address the physical climate risk of the Indian industry



Source: Analysis based on findings from stakeholder consultations

Adaptation strategies prioritized by stakeholders

Industrial Management

1. Conducting climate risk assessment and ensuring transparent disclosures
2. Integrating climate resilience considerations in Business Continuity Plans
3. Consistent updation of Business Continuity Plans to ensure robustness and ability to manage risks
4. Developing emergency or contingency plans
5. Implementing ecosystem management and optimizing natural resource use in business operations and supply chains
6. Identify and leverage co-benefits from mitigation efforts, that contribute to adaptation targets

Industrial Preparedness

1. Using climate monitoring processes or early warning systems
2. Providing emergency preparedness training to workers and employees
3. Updating OHS guidelines by integrating health and safety aspects
4. Providing technical assistance and capacity building for suppliers and producers across the supply chain
5. Regionally diversifying the buyer base
6. Risk-informed agreements with partners across global value chains

Structural Safeguarding

1. Using climate defences for existing infrastructures
2. Increasing the reliability of infrastructure services
3. Inclusion of climate risk assessment during new capex investments
4. Facilitating prompt restoration of critical infrastructures and services, when disruptions occur

Financial Preparedness

1. Robust financial planning like increasing insurance coverage to include climate hazards
2. Providing financial incentives for building adaptive capacity

Technology & Innovation

1. Using advance technology to embed redundancy into infrastructure system design and operations
2. Expanding research, development, and investement in new adaptation solutions

Three strategies from the Industrial preparedness category: a) using early warning systems, b) providing emergency preparedness training for workers and employees, and c) risk-informed agreements with partners across global value chains, ranked high on the scale of impact and feasibility, and as lower-cost, relative to other strategies.

On the other hand, d) providing technical assistance to suppliers across the supply chain, e) using climate defences for existing infrastructures, and f) providing financial incentives for adaptation ranked lower on both the scale of impact and feasibility and were considered more cost intensive. This could be attributed to two factors: i) the current capacities of the industry stakeholders are limited in adopting adaptive solutions, and ii) there is a lack of an enabling environment that hinders the prioritisation of the strategies.

Impact of adaptive capacity on addressing physical climate risks

It is important to note that across the indicator categories that comprise our framework – Hazard, Exposure, Vulnerability (comprising of Sensitivity and Adaptive Capacity) – adaptive capacity is the only category that can be within the control of industry and government. The adaptive capacity of a site, reliant on infrastructure, can be strengthened by implementing structural and management processes and hence reduce the overall risk score, even if the site has higher exposure or sensitivity.

The case study below demonstrates the role of adaptive capacity in lowering the risk score for two Iron & Steel industrial clusters located in Odisha (Jagatsinghpur and Bhadrak). Both sites are exposed to similar climate hazards of water stress and cyclones howeevr the effective management of adaptive capacity measures at one site (Jagatsinghpur) has reduced the overall climate risk impact.

Cluster- level comparison

From our piloting of the framework, the overall risk faced by two sites in Odisha, from the iron and steel sector – Jagatsinghpur and Bhadrak – are shown below. The key for categorising these scores is placed in the Annexure 2.

Site	District	Composite Risk	Hazard	Exposure	Sensitivity	Adaptive Capacity
A	Jagatsinghpur	0.016	0.57	0.17	0.79	0.79
B	Bhadrak	0.039	0.55	0.14	0.86	0.41

The analysis clearly shows that the major difference between these two districts is the score on adaptive capacity where Jagatsinghpur (0.79) is outperforming Bhadrak (0.41). This is due to the proactive actions taken by industry in Jagatsinghpur that contribute positively to the overall adaptive capacity (Table 1). This lends further weight to the fact that proactive actions to build resilience is the best approach to addressing the impact of extreme weather events.

Table 1: Comparative analysis of two sites from Iron and steel industry cluster of Odisha

Adaptive capacity	Score	Site A (Jagatsinghpur)	Score	Site B (Bhadrak)
Industrial Preparedness	0.14	- BCPs and DMPs with SOPs for dissemination of EWS	0.08	- BCPs and DMPs but no SOPs for dissemination of EWS
Industrial Management	0.20	- Water and power continuity measures in place - Cooling shelters for employees	0.16	- Water and continuity measures not ensured - No cooling shelters
Structural Safeguarding	0.20	Elevated platforms for machinery and raw materials as well as maintaining pumping systems and rainwater drains.	0.05	Does not safeguard its assets. No elevated platforms, or rapidly deployable measures to prevent water inundation.
Financial Preparedness	0.20	Insurance coverage for all buildings, raw material, finished products, and transportation	0.08	Industry B only has insurance coverage for building
Technology & Innovation	0.05	Cold chain transportation and water consumption reduction	0.04	No technological innovation except for water consumption reduction
Total score	0.79		0.41	

Source: Analysis using the risk assessment framework

Suggested Actions and Policy Recommendations

Based on the study, industry consultations and dialogues with other experts, a set of policy recommendations for government and recommended actions for industry (both sector-specific and sector-agnostic) across the short-term (2-3 years) as well as long-term (5-7 years) are summarized in the table below. Sector specific recommendations for the clusters analysed in this pilot are made available in Annexure 3, along with best practices in Annexure 4.

	Recommendations for Industry	Recommendations for Policy makers
	To strengthen capacity for reporting physical risks	
Short term	(Physical) Implement the physical climate risk assessment framework to identify and quantify physical climate risks across industrial assets and supply chains	(Physical) Under the ongoing efforts of the Ministry of Environment, Forest and Climate Change towards developing a National Adaptation Plan (NAP): • Develop an open-access utility providing data on extreme weather and climate projections for industry and stakeholders to assess physical climate risks • Encourage uptake and mainstreaming of the Physical Climate Risk Assessment Framework (PCRAF) from the report and promote its implementation under SAPCCs, as seen in Telangana and Andhra Pradesh's adaptation projects for industrial parks
Long term	(Financial) Assess and incorporate financial impacts from decreased productivity due to loss in labour hours, rising labour costs, and direct infrastructural damages, into financial projections	(Financial) The RBI's 2024 Disclosure Framework on climate-related financial risks requires Regulated Entities (REs) to report on governance, strategy, risk management, and metrics and targets, including physical risks. These directives could propose integrating climate risk assessment and adaptation measures in new projects
	To create an enabling environment for climate-resilient industry	
Short term	(Physical) Invest in flood barriers and wind-resistant infrastructure to minimise risks from extreme rainfall, flooding and cyclonic storms, upgrade existing stormwater drains in the industrial units (Physical) Invest in water conservation methods such as rainwater harvesting and artificial aquifer recharge, especially in water-stressed districts (Physical) Implement worker rotation mechanisms, staggered working hours, increased ventilation, smart cooling systems, water and electrolytes availability within premises, and exterior shading devices to minimise heat stress to workers	(Physical) State governments need to collaborate with industry and urban planners to develop guidelines for establishing green, climate-resilient industrial parks and zones. These guidelines could include adaptive solutions for climate-induced disasters, such as improved stormwater management to reduce flooding risks. A relevant example is the collaboration between Telangana, Andhra Pradesh, and GIZ on climate adaptation measures for industrial parks from 2014-18 (Financial) Create incentive mechanisms for fostering effective public-private partnerships towards shared goals for better coordination and tackling implementation challenges

Intervention type:

Physical | Financial

	Recommendations for Industry	Recommendations for Policy makers
	Avail suitable insurance products for climatic extremes Invest in climate resilient power and water infrastructure, decentralised renewable energy sources, and energy efficient technologies, to minimise operational disruptions caused by power outages and water shortages during extreme events	Insurance Regulatory and Development Authority of India (IRDAI) can play a crucial role in introducing guidelines for enabling industries to access innovative climate insurance products. The following action points are recommended: • Simplify the regulatory environment to encourage innovation and accessibility to climate disaster related insurance products. e.g., microinsurance and climate risk insurance • Generate awareness among industry stakeholders about the benefits of insurance, with a focus on emerging products like parametric insurance
Long term	Promote resource sharing and collaboration through cluster development approach. Encouraging collaboration among industries present in the same cluster will help reduce individual costs and increase the feasibility of adopting climate-ready assets	To help MSMEs tackle climate change impacts, the government can offer greater support, both financial and non-financial. This can begin by integrating climate adaptation and resilience elements into existing schemes. For example, skilling programs could include sessions on managing climate risks, and credit schemes could allocate funds to encourage climate-resilient infrastructure and adaptation-friendly technologies As India develops its National Adaptation Plan (NAP), the Ministry of Environment, Forest & Climate Change can consider working with stakeholders to create a climate change adaptation taxonomy. The taxonomy would define adaptive capacity and resilience, set project guidelines, and facilitate private sector adoption of adaptation practices. It would clarify investments, aid decision-making, and promote private sector involvement, potentially leading to large-scale resilience projects through public-private partnerships The government could establish dedicated legal entities to resolve climate insurance disputes and expedite claims. For example, Kenya's Livestock Insurance Program (KLIP) uses satellite data to trigger drought-related payouts, offering timely support to pastoralists
	Building capacity to future-proof against climate-related physical risks	
Long term	Large industries should invest in conducting in-depth site-specific studies that attempt to identify future worst case extreme weather scenarios. This will enable prioritized investments when building resilient infrastructure (whether retrofitting or for new projects)	There are several challenges in modelling and forecasting extreme-weather events, particularly in the South Asian region. Government of India needs to invest in strengthening capabilities in this area through: • Addressing currently existing data gaps by investing in required satellite technology, weather monitoring stations and research • Developing advanced predictive models using AI/ML tools, which integrate a wide range of factors and worst-case scenarios, will enable stakeholders to plan for extreme weather events at the state/district level. Reliable forecasts will aid in accurately estimating the costs of building future-resilient infrastructure • For environmental sustainability, stakeholders should collaborate towards natural resource-use efficiency

Intervention type:

Physical | Financial

Way Forward

Considerations towards building future-proof climate resilience

Indian industry is at a critical moment, facing dual challenges of mitigating climate change and adapting to its inevitable impacts. While India's commitment to achieving net-zero emissions by 2070 is a significant milestone, the urgency of prioritizing adaptation measures to build industry-wide resilience is equally critical.

As industries across the country confront climate change realities—such as devastating floods, prolonged droughts, and rising heat stress—the need for robust adaptation becomes clear. The Physical Climate Risk Assessment Framework presented in this study, along with its recommendations, provides a comprehensive roadmap for enhancing climate resilience. The framework presented in the study not only serves as a key reference for Indian industries but also offers insights applicable to other nations in the global South facing similar challenges.

The report emphasizes both short-term strategies for addressing immediate risks and long-term approaches to fostering sustainable practices and policies. By adopting these strategies—ranging from improving climate risk reporting to developing green and climate-resilient industrial parks—Indian industry can secure their operations and contribute to national adaptation goals.

However, a dedicated public utility is needed to raise awareness, build stakeholder capacity, and mainstream these actions. The B20 Summit 2023 in India under the Action Council 'ESG in Business Action Council' recommended establishing a Centre of Excellence (CoE) under the B20 institute by 2025 to develop a disclosure framework for adaptation and awareness generation on business resilience, adaptation, and disaster management.

A similar public utility, that follows a multistakeholder approach, could be established in India to facilitate dialogue between industry and policymakers to strengthen the overall ecosystem's resilience.

Addressing the physical risks of climate change is complex and multifaceted. The framework, though primarily focused on industry, could form the foundation for a national strategy to assess and manage climate risks.

While the report offers a starting point for building climate-resilient infrastructure, India also confronts the rising severity of climate impacts, including the challenge of improving weather forecasting. Enhanced forecasting and early warning systems amongst other measures will be crucial to safeguarding industries and communities in the face of increasing climate extremes.

The report highlights that Government, along with support from Industry, Academia, Civil Society and Experts, need to work together on the following:

Strengthening existing weather monitoring and data collection capabilities

There is a strong need for India to further invest in strengthening its existing capacities in weather monitoring stations and satellite technology, for improvement in accurate forecasting. It needs to be augmented with increasing budgets and financial support towards research and innovation in this area.

Developing forecasting capacities and integrating digital technologies

To improve the accuracy of predictions and better prepare for extreme weather events, there is a need to invest in advanced weather forecasting technologies and modelling capabilities. Leveraging AI/ML tools in development of these predictive models will be essential to integrate a broader range of factors and variables, as well as to forecast considering 'worse case' scenarios.

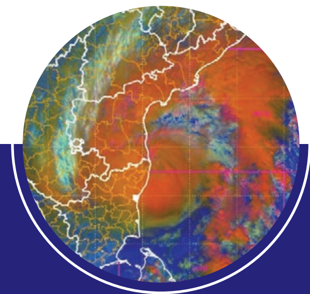
Updating existing guidelines and regulations

Significant efforts have been made by various government and regulatory bodies on integrating climate risk considerations across several areas, such as financial regulations and disclosure requirements. These guidelines and regulations need to be constantly reviewed and updated based on scientific data generated through advanced modelling exercises.

Greening urban infrastructure

The built environment has a big role to play in meeting adaptive capacity needs. Guidelines around using better building materials and making climate-proofing (heating and cooling needs) more energy efficient, need to be easy to understand, with simplified processes. Putting good incentives in place will effectively increase the uptake of such building codes. These codes need to be regularly updated and refined basis new climate data collected or new forecasts.

Defining 'extreme-weather resilience' at various levels



Central and State governments could - in consultation with stakeholders such as industry, subject-matter experts or researchers in the field undertake the complex task of identifying guidelines/standards as to what constitutes extreme-weather resilience at various levels (state, district, tehsil etc.). These guidelines can be based on current data but should be updated to include reliable data generated through the earlier mentioned forecasting models. It would provide clarity on where investments need to be made and towards specific risk (flood, drought, heat wave etc).

Promoting nature-based solutions towards resilience building

Integrate nature-based solutions as central elements in the transformation towards climate resilience. It would involve mapping potential ecological corridors, planning ecosystem restoration, and testing other innovative nature-based approaches.

Integrating considerations on health and ensuring access to essential services

As new technologies and solutions are developed and implemented, stakeholders (state and non-state actors) need to integrate community-based emergency and risk management plans to safeguard critical infrastructure and ensure that essential services are accessible during emergencies. It would include enhancing health services and protecting vulnerable populations from climate impacts.

Enhancing social resilience

Develop social mechanisms to manage trade-offs associated with transformational changes and increase societal engagement in building climate resilience. Addressing the protection gap through insurance solutions and promoting social resilience, particularly for vulnerable groups, is crucial.

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Annexures

Annexure 1: Detailed list of all shortlisted indicators for physical climate risk assessment

Table A1: Shortlisted list of indicators for physical risk assessment

Component	Selected indicators	Source	Correlation
Hazard	Occurrence of floods in the past 50 years	EM-DAT database	Direct
	Occurrence of droughts in the past 50 years	EM-DAT database	Direct
	Occurrence of cyclones in the past 50 years	EM-DAT database	Direct
	Frequency of hot days in the past 30 years	IMD data	Direct
	Frequency of heavy rainfall days in the past 30 years	IMD data	Direct
	Projection of hot days for 20 years	IMD data	Direct
Exposure	No. of manufacturing plants	Primary data from Industry	Direct
	No. of warehouses	Primary data from Industry	Direct
	No. of distribution centres	Primary data from Industry	Direct
	Distance between industry's plants, warehouses, distribution centres and the coast (in km)	Euclidean distance from coastline	Direct
	Length of national highways (in km)	Open Street Map Data base 2024	Direct
	Length of state highways (in km)	Open Street Map Data base 2024	Direct
	Length of railway tracks (in km)	Open Street Map Data base 2024	Direct
	No. of railway stations	Indian Railways website (link)	Direct
	No. of ports exposed to cyclones	Indian Ports Association (link)	Direct
	Water availability and proximity from sea, river (in Km)	Open Street Map Database 2024	Direct
Sensitivity	Built up area (%)	ESRI Sentinel-2 LULC	Direct
	Site topography (elevation, drainage)	United States Geological Survey - SRTM DEM data	Inverse
	Water Stress in the region (%)	India - Water Resources Information System	Inverse
	Soil permeability (%)	India - Water Resources Information System	Inverse
	Land use change in last 20 years	ESRI Sentinel-2 LULC	Direct
	Number of people coming to work	Primary Data	Inverse

Component	Selected indicators	Source	Correlation
Adaptive Capacity (Industrial management)	Presence of a Business Continuity Plan	Primary data	Inverse
	Presence of a Disaster/ Crisis Management Plan	Primary data	Inverse
	Identifying extreme climate event as a material risk (as per BRSR reporting standards)	Primary data	Inverse
	Identifying heat related illness as an occupational hazard in the OSH guideline	Primary data	Inverse
	Presence of adaptation strategies to address physical climate risks (as per BRSR reporting standards)	Primary data	Inverse
	Presence of a nodal/focal point officer for disaster management	Primary data	Inverse
	Presence of a nodal/focal point officer for disaster management	Primary data	Inverse
	Access to flood and cyclone early warning systems	Primary data	Inverse
	Presence of SOPs for disseminating early warnings for climate action	Primary data	Inverse
	Sourcing of raw materials from multiple locations	Primary data	Inverse
	Sourcing of raw materials from nearby locations	Primary data	Inverse
Adaptive Capacity (Industrial preparedness)	In-house power generation (e.g.: captive power, renewable energy)	Primary data	Inverse
	Presence of power storage solutions (e.g.: redox batteries)	Primary data	Inverse
	Presence of a water storage facility for industrial purposes	Primary data	Inverse
	Presence of a structure for rainwater harvesting	Primary data	Inverse
	Presence of a water treatment facility within industrial premises	Primary data	Inverse
	Access to emergency water supply tankers	Primary data	Inverse
	Maintaining safety stock of finished products	Primary data	Inverse
	Storing raw material and finished products in multiple locations	Primary data	Inverse
	Presence of cooling systems (HVAC)/cooling shelters for employees	Primary data	Inverse
Adaptive Capacity (Structural Safeguarding)	Elevated platforms for critical machinery/ assets above the base flood level	Primary data	Inverse
	Rapidly deployable measures to prevent water inundation	Primary data	Inverse
	Connection to a functional storm water drain	Primary data	Inverse
	Flood water pumping system connected to back-up power source	Primary data	Inverse
	Elevated platforms for storage of raw materials and finished products above the base flood level	Primary data	Inverse

Component	Selected indicators	Source	Correlation
Adaptive Capacity (Financial preparedness)	Budget allocation for training employees for disaster safety	Primary data	Inverse
	Periodic repair and maintenance of machinery	Primary data	Inverse
	Regular maintenance of industrial buildings and assets according to ISO standards	Primary data	Inverse
	Insurance coverage for industrial buildings, raw material, finished products, and transportation facilities	Primary data	Inverse
Adaptive Capacity (Innovation and Technology)	Presence of a mechanism to reduce water consumption for industrial operations	Primary data	Inverse
	Research in developing more climate resilient raw material	Primary data	Inverse
	Research and development in building a more climate resilient supply chain and transportation facility	Primary data	Inverse
	Presence of a cold chain transportation facility	Primary data	Inverse
	Presence of warehouses and distribution centres with climate-controlling measures (Eg: HVAC, heat proof rooftop)	Primary data	Inverse

Annexure 2: Overall risk assessment scores for the industrial clusters

Table A2-i: Results of physical climate risk assessment for the identified industrial clusters

Risk = Hazard * Exposure * Vulnerability (Sensitivity/Adaptive Capacity)

Key	Very low	Low	Medium	High	Very high
Hazard	0- 0.20	0.21- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1
Exposure	0- 0.20	0.21- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1
Sensitivity	0- 0.20	0.21- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1
Adaptive Capacity*	0- 0.20	0.21- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1
Risk	0-0.01	0.011- 0.02	0.021- 0.04	0.041- 0.08	0.081- 0.2

*Note: Adaptive capacity is inversely proportional to risk. An increase in adaptive capacity will decrease the risk, therefore it is shown in different colours.

Industry	District	Risk	Hazard	Exposure	Sensitivity	Adaptive Capacity
Dairy and food processing industry in Maharashtra						
A	Thane	0.018	0.49	0.37	0.22	0.56
B	Nagpur	0.007	0.17	0.70	0.47	0.87
Automobile industry in Tamil Nadu						
A	Chennai	0.195	0.68	0.66	0.5	0.13
B	Chennai	0.201	0.68	0.65	0.5	0.09
Iron and steel industry in Odisha						
A	Jagatsinghpur	0.016	0.57	0.17	0.79	0.79
B	Bhadrak	0.039	0.55	0.14	0.86	0.41
C	Keonjhar	0.039	0.29	0.5	0.77	0.65
D	Jajpur	0.022	0.24	0.33	0.66	0.57

Source: Analysis from stakeholder consultation

Table A2-ii: Final impact and feasibility score of different adaptation strategies

Indicator	Impact score	Feasibility score
Industrial Management		
Conducting climate risk assessment and ensuring transparent disclosures	3.40	3.47
Climate resilient considerations in the Business Continuity Plans	3.77	3.40
Robust business continuity planning and management	3.63	3.80
Developing emergency/contingency plans	3.53	3.87
Implementing ecosystem management practices across businesses operations and supply chains	3.53	3.87
Leveraging adaptation opportunities contributing to net-zero transition	3.70	3.13
Industrial Preparedness		
Using climate monitoring/early warning systems	4.33	4.17
Providing emergency preparedness training to workers and employees	3.80	4.33
Providing technical assistance and capacity building for suppliers/producers across the supply chain	3.80	4.33
Regionally diversifying the buyer base	3.73	3.53
Risk-informed agreements with partners across global value chains	4.33	4.17

Indicator	Impact score	Feasibility score
Structural Safeguarding		
Using climate defences for existing infrastructures	3.63	2.90
Increasing the reliability of infrastructure services	3.73	3.57
Increasing investments in climate-ready assets	3.93	2.97
Facilitating prompt restoration of critical infrastructures and services	3.80	3.03
Financial Preparedness		
Robust financial planning and tools for building climate resilience	4.17	3.13
Providing financial incentives	4.07	2.80
Technology & Innovation		
Using digital technologies to embed redundancy into infrastructure system design and operations	3.60	3.67
Expanding research, development, and investment in new adaptation solutions	4.23	3.20

Source: Authors' analysis based on findings from stakeholder consultations

Annexure 3: Sector-specific actions recommended for better adaptation for building resilience

Table A3: Sector-specific actions recommended for different industries

Steel and Iron	
Short-term	• Develop and practice robust disaster management plans and invest in strengthening and safeguarding critical infrastructures such as cost-intensive machinery and equipment. E.g., a leading steel industry in Sambalpur district Odisha has built an internal drainage system within plant premises to deal with flooding and flash floods. Resource sharing and collaboration through cluster development approach. • Encouraging collaboration among secondary steel industries will help reduce individual costs and increase the feasibility of adopting climate-ready assets. • Develop holistic water management practices for water security in water stressed districts, e.g., a leading iron and steel industry has developed water management plan which includes- improving water consumption efficiency, recycling, rain water harvesting and storage to ensure water security for industry as well as the neighbouring communities.
Long-term	• Adopt Long Duration Energy Storage (LDES) solutions and Vanadium Redox Flow Batteries (VRFBs) strategically. In urban and industrial park locations with reliable power, short to medium-duration batteries are cost-effective, but LDES can be beneficial where diesel genset regulations are strict. For areas with high outage frequencies, particularly rural regions, LDES technologies may offer long-term savings and environmental benefits compared to gas/biogas generators. Assessments should align with operational needs, financial capacity, and regulatory requirements.

Automobile	
Short-term	• Conduct asset-level climate risk assessments to identify vulnerable assets within the company/ manufacturing facility to devise targeted adaptation solutions Evaluate climate-related supply chain vulnerabilities twice a year including those related to raw materials and component suppliers; while companies generally monitor geopolitical risks, suppliers' financial health and quality, it would be important to also incorporate climate risks into such assessments • Strengthen technical expertise in the suppliers and operators regarding physical climate risks, underscoring the need for building their capacities through regular training and workshops (for instance, a leading automobile manufacturer in Tamil Nadu, supported by knowledge partners, facilitated climate resilience capacity building workshops for 10 MSMEs from its supply chain)
Long-term	• Diversify supply chains (particularly relevant for EV-specific supply chains); increase the use of local suppliers to reduce dependency on long-distance transportation, which can be disrupted by extreme weather • Enhance inventory capacities, build strategic reserves of critical components and raw materials to reduce losses and enhance adaptive capacity; it would also be important to sensitise and collaborate with the government to develop a mineral policy and national strategic mineral reserves (as we do with strategic petroleum reserves)

Cereal	
Short-term	• Explore and apply sustainable agricultural practices and systems that have proven effective to reduce losses due to climate change impacts For e.g., Pre-Monsoon Dry Sowing (PMDS) allows farmers even in semi-arid regions like Marathwada in Maharashtra, to grow three crops a year; Alternate Furrow Irrigation (AFI) is a water-efficient irrigation method that conserves water, lowers irrigation costs while ensuring high grain yields. • Adopt sustainable irrigation practices using accessible technologies such as drip and micro-irrigation and small farm ponds, tailored to regional agro-ecological conditions. With the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) successfully expanding micro-irrigation in states like Gujarat and Andhra Pradesh, industries can further facilitate this by investing in local manufacturing and distribution. This will optimise water use, increase efficiency, and align with the National Water Mission goals. • Engage Farmer Producer Organisations (FPOs) in a phased approach to diversify cropping systems and encourage resource-efficient farming practices.
Long-term	• Mainstream sustainable food systems practice by investing in accessible, affordable technologies that benefit farmers of all scales and incorporating a gender-sensitive approach to improve livelihood security and household productivity. This strategy will not only enhance climate resilience but also drive economic growth by increasing agricultural output and contributing to industrial productivity. • Industries can enhance their resilience by supporting the transition to sustainable agricultural practices. This can be achieved by promoting and adopting agroecological methods, such as natural farming, agroforestry, and nature-based solutions. For instance, the Andhra Pradesh Community Natural Farming Programme exemplifies a nature-based solution that enhances soil health, diversifies incomes, and reduces the cost of cultivation by minimizing dependency on market-based inputs like fertilizers and pesticides. • Agro-industries can further this transition by sourcing produce from sustainable farms that practice agroecology, thereby ensuring the sustainability of their supply chains. Additionally, they can invest in community-led land restoration projects, which not only benefit the environment but also secure the long-term viability of their raw material sources. These actions, while contributing to the broader goal of sustainability, directly enhance the industry's resilience to environmental and market fluctuations.

Dairy	
Short-term	• Enhance the cold chain infrastructure by integrating Decentralised Renewable Technologies (DRE), such as solar-powered refrigeration and battery storage systems, which provide reliable, cost-effective energy solutions, which will be crucial for while adapting to the impacts of heatwaves. Develop hybrid energy systems combining renewable sources with conventional power for backup, and establish localised microgrids to support cold storage and transport in remote areas. Invest in training for effective implementation and maintenance of these technologies. • Subscribe to parametric insurance models for ensuring coverage for productivity losses during weather extremes e.g., Kerala has introduced parametric insurance for livestock
Long-term	• Incorporate heat-resilient cattle breeds such as 'Red Sindhi', 'Bhadawari' into breeding programs in arid regions like Rajasthan and Gujarat, using custom shelters and trace mineral supplements, and change in feed type, time and frequency. Integrate resilient indigenous breeds such as 'Tharparkar' and 'Gir', identified by the ICAR*, that are naturally heat-tolerant and suited for arid regions. Industry can put efforts on enhancing the productivity of indigenous breeds on the lines of Rashtriya Gokul Mission.

Annexure 4: Five sector-specific best practices on climate adaptation

Table A4 a: For Automobile industry

Hazard	Best practice	Key intervention
All extreme climate events	Diversification of raw material sourcing	Companies prioritise diversification of raw material sourcing for consistent supply of quality raw materials and uninterrupted operations. They focus on real-time monitoring of raw material prices and transportation. One company in Tamil Nadu mentioned engaging with 52 MSMEs to procure quality components consistently.
Drought/Water scarcity, heat stress	Taking measures for water security	Companies use the collected water through rainwater harvesting and treating industrial wastewater for industrial applications. One of the companies mentioned that they achieved a 5% year-on-year increase in water reuse, with 2,284,154 tons of water being reused, up from 2,179,600 tons in 2021, resulting in a reuse ratio of 21 per cent.
Cyclone, flood, extreme precipitation	In-house power generation	Companies rely on in-house power generation for critical operations. One company mentioned that renewable power contributes to 88 per cent of its total power requirements, the majority of which comes from wind energy and the rest from hydroelectric and solar power generation.
Drought, heat stress, flood	Adapting strategies for mitigating climate risk	Companies are taking specific measures to mitigate physical climate risks. One big company in flood-prone areas focuses on landscaping and building design to mitigate the climate risk. Cooling systems are installed in the manufacturing facility to prevent productivity loss due to heat stress.
All extreme climate events	Capacity building of workforce	Health and safety training sessions are conducted regularly.

Source: Compilation based on company consultations

Table A4 b: For Food Processing industry

Hazard	Best practice	Key intervention
All extreme climate events	Diversification of raw material sourcing	Companies rely on the supply of raw materials from local MSMEs.
Drought/Water scarcity, heat stress	Taking measures for water security	To reduce water consumption, the companies recycle and reuse water, place water metres on every line, and track water use.
Cyclone, flood, extreme precipitation	In-house power generation	Companies rely on power generation through renewable sources such as hybrid solar thermal systems and rooftop solar.
Drought, heat stress, flood	Adapting strategies for mitigating climate risk	Food products are stored in cold storage facilities to ensure quality and safety for more extended periods during heat stress.
All extreme climate events	Capacity building of workforce	Training programs are conducted for capacity building of the farmers, making them aware of good farming practices, and helping them to grow high genetic seeds that could sustain extreme climate events.

Source: Compilation based on company consultations

Table A4 c: For Iron and steel industry

Hazard	Best practice	Key intervention
All extreme climate events	Diversification of raw material sourcing	Companies focus on diversifying their raw materials sourcing, such as iron ore and fuel, for consistent supply. Later, they blend them to ensure consistent quality of raw materials for smooth operations.
Drought/Water scarcity, heat stress	Taking measures for water security	The companies address water security through the '4R framework' of reduce, reuse, recycle, and recover by utilising the available technologies. One company developed and adopted a water management plan, which helped it reduce its water intake by 6 million m3/year despite a 17 per cent increase in production.
Cyclone, flood, extreme precipitation	In-house power generation	For uninterrupted critical operations, companies in the steel sector have traditionally relied on the by-product gases and conventional fuel for power generation. However, they have shifted their focus towards renewable and non-conventional power sources and started investing.
Drought, heat stress, flood	Adapting strategies for mitigating climate risk	Companies are at the identification of physical climate risks. Some of the companies have identified the risks and are in the process of developing mitigation strategies.
All extreme climate events	Capacity building of workforce	Health and safety training sessions are conducted regularly.

Source: Compilation based on company consultations

CII-ITC Centre of Excellence for Sustainable Development

CII-ITC Centre of Excellence for Sustainable Development (CESD) is one of CII's 12 Centres of Excellence. The Centre is a not-for-profit, industry-led institution that helps businesses become sustainable organisations. It is on a mission to catalyse innovative ideas and solutions, in India, and globally, to enable business, and its stakeholders, in sustainable value creation. Its knowledge, action and recognition activities enable companies to be future ready, improve footprints profiles, and advocate policymakers and legislators to improve standards of sustainable business through domestic and global policy interventions.

The Centre leverages its role of all-inclusive ecosystem player, partnering industry, government, and civil society. It has been a pioneer of Climate Change, environment management systems, biodiversity mapping, sustainability reporting, integrated reporting, and social & natural capital valuation in India, thus upgrading business in India to sustainable competitiveness. The Centre operates across the country and has also been active in parts of South and South-East Asia, the Middle East, and Africa. It has held institutional partnerships and memberships of the United Nations Global Compact, Global Reporting Initiative, International Integrated Reporting Council, Carbon Disclosure Project, development agencies of Canada, the USA, the UK, and Germany.

CII
Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. With its extensive network across the country and the world, CII serves as a reference point for Indian industry and the international business community.

In the journey of India's economic resurgence, CII facilitates the multifaceted contributions of the Indian Industry, charting a path towards a prosperous and sustainable future. With this backdrop, CII has identified "Globally Competitive India: Partnerships for Sustainable and Inclusive Growth" as its Theme for 2024-25, prioritizing 5 key pillars. During this year, it would align its policy recommendations, initiatives, and activities with this overarching framework to facilitate strategic actions for driving India's global competitiveness and growth through a robust and resilient Indian Industry.

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