



Financing Adaptation in India

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CLIMATE
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LIST OF ABBREVIATIONS

AR6	Sixth Assessment Report
CCAP	Climate Change Action Programme
CDRI	Coalition for Disaster Resilient Infrastructure
COP	Conference of Parties
CSs	Central sector Schemes
CSSs	Centrally Sponsored Schemes
DEA	Department of Economic Affairs
DST	Department of Science and Technology
FC	Finance Commission
FRBM	Fiscal Responsibility and Budget Management
GCA	The Global Commission on Adaptation
GCF	Green Climate Fund
GDP	Gross Domestic Product
GoI	Government of India
GSDP	Gross State Domestic Product
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
MISHTI	The Mangrove Initiative for Shoreline Habitats & Tangible Incomes
MoEFCC	Ministry of Environment, Forest and Climate Change
MoF	Ministry of Finance
NABARD	National Bank for Agriculture and Rural Development
NAFCC	National Adaptation Fund for Climate Change
NAP	National Afforestation Programme
NAPCC	National Action Plan for Climate Change
NDC	Nationally Determined Contributions
PMCCC	Prime Minister's Council on Climate Change
PPP	Public Private Partnership
PSUs	Public Sector Units
RBI	Reserve Bank of India
SAPCC	State Action Plan for Climate Change
SDGs	Sustainable Development Goals
SDRMF	State Disaster Risk Management Funds
SPVs	Special Purpose Vehicles
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

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EXECUTIVE SUMMARY

India is exceptionally vulnerable to the adverse consequences of climate change, given its diverse geo-climatic features and socioeconomic conditions. These adverse consequences are already affecting the country's economy and livelihoods and could undermine progress made on development and poverty alleviation. Heat exposure in 2021 led to approximate losses of 167 billion potential labor hours in India, resulting in income loss of about USD 159 billion, or 5.4% of the country's GDP (Climate Transparency Report 2022). Estimates indicate that by 2040, India's national poverty rate could increase by 3.5% due to declining agricultural productivity and rising cereal prices alone, pushing an additional 50 million people below the poverty line, as compared to a zero-warming scenario (Picciariello et al. 2021).

To ensure economic growth and sustain development progress, India urgently requires investment in climate adaptation. Development and growth form the bedrock of India's approach to climate adaptation and resilience (MoEFCC 2022). While the government has made sustained efforts to finance adaptation action, available estimates indicate that investment needs at the national level are large and will likely increase in the future (MoEFCC 2015; DEA 2020).

This report reviews India's approach to climate adaptation, outlines the related policy environment, assesses adaptation investment needs and funding gaps at the state level, and explores the possibility of bridging the funding gap through public and private finance.

KEY FINDINGS

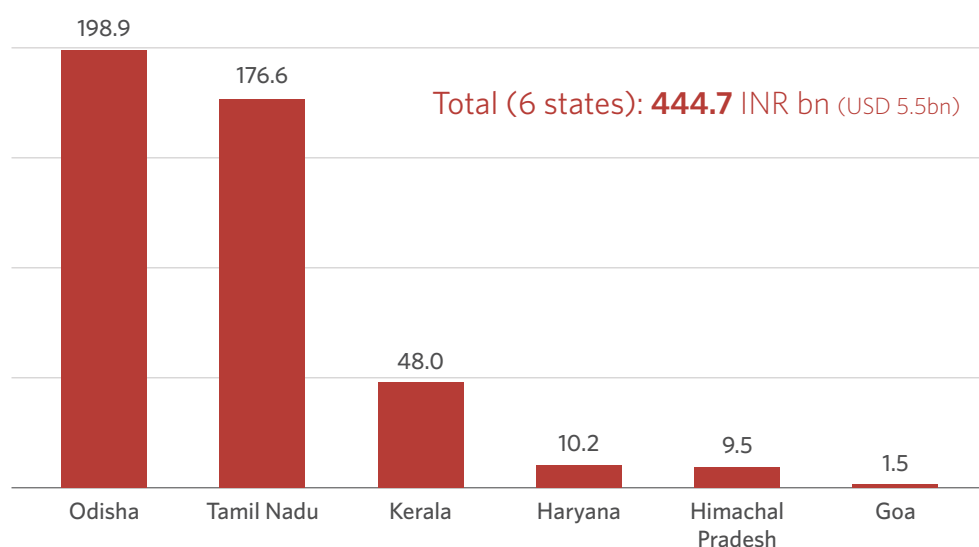
India has a common framework for climate vulnerability assessments but has not yet established one for climate risk, which focuses on future climate projections and the dynamic interplay between hazards, exposure, and vulnerability (DST 2020). As multiple assessments have been conducted based on different methodologies, their harmonization can lay the foundation for a consistent approach to climate risk and inform adaptation investment decisions (Comte 2021; Arora 2023).

India also lacks a systematic methodology for evaluating the extent to which development programs address climate risk and vulnerability, making it difficult to distinguish between adaptation and development, and to track funding specifically for adaptation measures (Jogesh and Paul 2020).

Despite some of these systemic issues, the growing drive for action on climate adaptation has resulted in relevant plans, policies, institutions, and schemes at national and state levels. However, the progress and focus of policies and schemes vary at the state level.

States in India have substantial adaptation investment needs. Based on the updated State Action Plans on Climate Change (SAPCCs), CPI analysis identifies that the collective annual investment needs of six states alone amount to INR 444.7 billion (USD 5.5 billion)¹ for 2021-30.

¹ Using 1 USD:80 INR, as the prevailing exchange rate in 2023.

Figure ES1: Estimated annual adaptation investment needs of six states (2021-30; INR bn)

Of the six analyzed SAPCCs, only those for Odisha and Tamil Nadu provide information on adaptation funding gaps,² though several others allude to having insufficient financial resources for adaptation-related interventions. For instance, Kerala's SAPCC mentions that limited resources are a barrier to implementation, and Goa's notes that actual climate investment needs could be much higher than those budgeted.

States hold primary responsibility for adaptation-related interventions, making them key to bridging adaptation funding gaps. Domestic public finance, particularly at the state level, is the main driver of adaptation actions in India.

However, over the last few years, state finances have been stressed by several factors including the economic slowdown in 2019-20 and the COVID-19 pandemic, constraining their ability to invest in adaptation. States also face borrowing constraints under new fiscal rules and pressure to reduce existing debt burdens, which further constrain their ability to bridge the adaptation funding gap.

CPI recommends the following actions to increase state fiscal capacity and mobilize private finance to bridge the adaptation funding gap:

- India's upcoming Finance Commission (for the five-year period beginning 2026-27) could include adaptation-related interventions as a variable when setting the criteria and formula for devolution of funds to state governments.
- Another mechanism could be the introduction of time-bound climate-incentivized borrowing ceilings that account for state-specific climate risk and vulnerabilities. This can help relatively more vulnerable states have access to increased finance (details in section 6.2).
- It is equally necessary to build effective and comprehensive green finance data. This is crucial for understanding investment needs based on sectoral targets set under the national missions, schemes, national/state action plans for climate change, building effective solutions, and for measuring progress. High-quality data can help, among

² The annual funding gap for Odisha and Tamil Nadu together is approximately USD 600 million.

other things, to increase transparency, which is critical to informing better decision making. It is hence important to develop a template for tracking and tagging adaptation-related expenditure.

- Governments could deploy financial mechanisms/instruments such as PPPs and blended financing, and offer assurance of minimum investment return, or assured revenues, to spur private capital in climate adaptation. Governments could also develop a Climate Risk Exposure and Adaptation Projects database of various locations, as well as project preparation facilities to reduce the searching and transaction costs of private financiers.

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1. INTRODUCTION

The impacts of climate change on people, economies, and ecosystems are already widespread and are increasing in severity and frequency (IPCC 2022; GCA 2019). Under the current global emissions trajectory, climate change could shave off 11-14% of global Gross Domestic Product (GDP) by mid-century (Guo et al. 2021). Accelerating climate change adaptation is a human, economic, social, and environmental imperative (GCA 2019). However, UNEP's latest Adaptation Gap Report (2023) shows that current global adaptation finance falls far short of addressing climate impacts. The adaptation finance gap continues to widen, estimated at between USD 194 billion and USD 366 billion per year for developing countries (UNEP 2023).

India is exceptionally vulnerable to the adverse consequences of climate change. The Germanwatch Global Climate Risk Index 2021 ranked the country 7th-most affected by weather-related losses and climate risks (Eckstein et al. 2021). The adverse impacts of climate change on the economy and livelihoods are evident, and the country's already substantial adaptation investment needs will grow over time as the effects of climate change worsen (MoEFCC 2022).

These effects also threaten progress on development and poverty alleviation. By 2040, declining agricultural productivity and rising cereal prices could cause India's national poverty rate to increase by an estimated 3.5%, equivalent to 50 million additional people in poverty, as compared to a zero-warming scenario (Picciariello et al. 2021). In 2021, heat exposure led to estimated losses of 167 billion potential labor hours in India, resulting in income loss of about USD 159 billion, or 5.4% of the country's GDP (Climate Transparency Report 2022). Indian districts that have experienced most rapid warming have observed 56% lower GDP growth than those that have warmed the slowest (Burke and Tanutama 2019).

The country urgently needs to intensify adaptation efforts to address its climate vulnerability and accelerate economic growth and development (MoF 2020). Development and growth form the bedrock of India's approach to climate adaptation and resilience, considering socio-economic development, including improving access to welfare services such as education, resilient infrastructure services, and healthcare, play a crucial role in reducing vulnerability to climate impacts (MoEFCC 2022).

This report aims to assess India's approach to adaptation as an integral part of its developmental strategy; identify estimated adaptation needs and the funding gaps therein, based on available literature; and to explore how to bridge these gaps.

In this context, the report responds to the following research questions:

- What is the investment required to implement planned adaptation action at the national and state levels?
- What is the funding gap, according to available estimates, and the challenges in bridging the gap?
- What are the possible ways to bridge the gap through public and private finance?

The report is structured as follows:

- **Chapter 2** discusses the conceptual premise for climate risk management and the challenges in operationalizing and assessing adaptation action. The chapter also outlines India's climate vulnerability context, as well as its approach to categorizing, planning, and implementing related interventions.
- **Chapter 3** outlines the enabling environment for adaptation action, including the policies, institutions, and programs that play a crucial role in establishing priorities, guiding action, and spending.
- **Chapter 4** examines available estimates of adaptation investment needs at India's national and state levels. To understand subnational investment needs, it assesses updated State Action Plan on Climate Change (SAPCCs) and delves into three (for Himachal Pradesh, Odisha, and Tamil Nadu) to identify funding gaps.
- **Chapter 5** explores avenues for bridging the adaptation funding gap through public finance by assessing the fiscal health of state governments, as well as the role of private finance.
- **Chapter 6** concludes by providing broad suggestions/recommendations.

1.1 APPROACH AND METHODOLOGY

This Report is based on desk-based research, focused on the review of the following:

- Global literature and standards on physical climate risk and adaptation
- India's domestic adaptation policies, plans and strategies, such as the National Action Plan on Climate Change, the updated State Action Plan on Climate Change, and international submissions such as the Nationally Determined Contributions, and Third Biennial Report submitted to the United Nations Framework Convention on Climate Change (UNFCCC)
- Secondary literature including academic papers and reports on the state of adaptation planning and investments in India at the national and sub-national levels

Nine updated SAPCCs³ (of Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Odisha, Rajasthan, and Tamil Nadu), available as of September 2023, are studied to collate data on adaptation investment needs and the adaptation funding gaps. Efforts have been made to locate proposed budgets/investment needs for adaptation-related interventions through a detailed review of these SAPCCs.

SAPCCs of Odisha and Tamil Nadu demarcate proposed budget/investment needs for adaptation-related interventions, mitigation interventions, and cross-cutting interventions across different sectors. These two SAPCCs also provide details on funding gaps for each such intervention across sectors. These are utilized to compute the total and sectoral adaptation investment needs and the funding gaps.

For SAPCCs of Goa and Himachal Pradesh, proposed budgets for sectors considered important for adaptation-related interventions are collated to arrive at the total adaptation

³ Nine updated SAPCCs were accessible as of September 2023.

investment needs. Finally, data on investment needs for SAPCCs of Kerala and Haryana is based on the consolidated figures that these two SAPCCs provide. The proposed budget covers the period 2021-30, except for Kerala which is from 2023-30.

Data gaps and assumptions: As mentioned, these SAPCCs also provide information on cross-cutting interventions that include both mitigation and adaptation-related interventions. While such interventions constitute a small proportion of the total investment needs of the featured SAPCCs, the idea is to capture all investment needs for adaptation-related interventions. However, the challenge is to delineate the proportion of investment needs for adaptation-related interventions in these cross-cutting interventions. To deal with this challenge, 50% of the proposed budgets for cross-cutting interventions have been taken as that for adaptation-related interventions. This is based on the logic that in all the featured SAPCCs (other than Haryana and Kerala), adaptation-related strategies constitute the major proportion of the total proposed budget. Therefore, even for cross-cutting interventions, it is safe to assume that 50% is meant for adaptation-related strategies.

1.2 SCOPE AND LIMITATIONS

This report follows the approach of India's central and state governments to identifying and categorizing adaptation-related development interventions. It assesses adaptation investment needs and funding gaps based on official estimates, rather than tracking investment.

While the report touches upon the needs of India as a whole, its main focus is on the investment needs of states.

The report is a first-of-its-kind analysis of SAPCCs, which have been updated over the last couple of years. It refers to SAPCCs that are publicly available and do not have restrictions regarding citation (e.g., Madhya Pradesh's SAPCC is publicly available but prohibits citation). Nine SAPCCs that were accessible as of September 2023 were referred to (others are either still being updated or are not publicly available).

Calculation of adaptation investment needs and related funding gaps are subject to the following limitations:

1. Several SAPCCs (e.g., those of Haryana, Himachal Pradesh, and Karnataka) do not clearly distinguish between adaptation and mitigation activities, making it difficult to determine adaptation investment needs and funding gaps.
2. Some SAPCCs mention that actual investment needs could be much higher than the budget estimates for climate-related activities presented (e.g., those of Goa and Kerala).
3. Some states have proposed activities without allocating budgets, affecting the accuracy of estimated investment needs.

2. ADAPTATION ACTION IN INDIA

Climate risk and vulnerability assessments are crucial for designing, planning, and implementing adaptation measures. This section discusses the conceptual foundation for and various approaches to physical climate risk management, as well as existing challenges in operationalizing and assessing adaptation action. This section also outlines key physical climate risk and vulnerability analyses conducted in India over time. Finally, it elaborates on the Government of India's approach to adaptation action.

2.1 CONTEXT

Climate change-related events such as heatwaves, floods, droughts, cyclones, and wildfires are increasingly affecting different parts of the world (IPCC 2022). Rising temperatures, shifting rainfall patterns, and sea level rises are also gradually impacting the long-term wellbeing of human and natural systems (IPCC 2022).

While no region is immune to the effects of climate change, the consequences differ across populations, even within relatively small geographies, due to various social, economic, political, environmental, and geographical factors (Thomas et al. 2019) (see Table 1). In the absence of timely and adequate adaptive action, the impacts of climate change will also undermine poverty alleviation and economic development initiatives (Picciariello et al. 2021).

Table 1: Factors shaping the differing consequences of climate change among populations

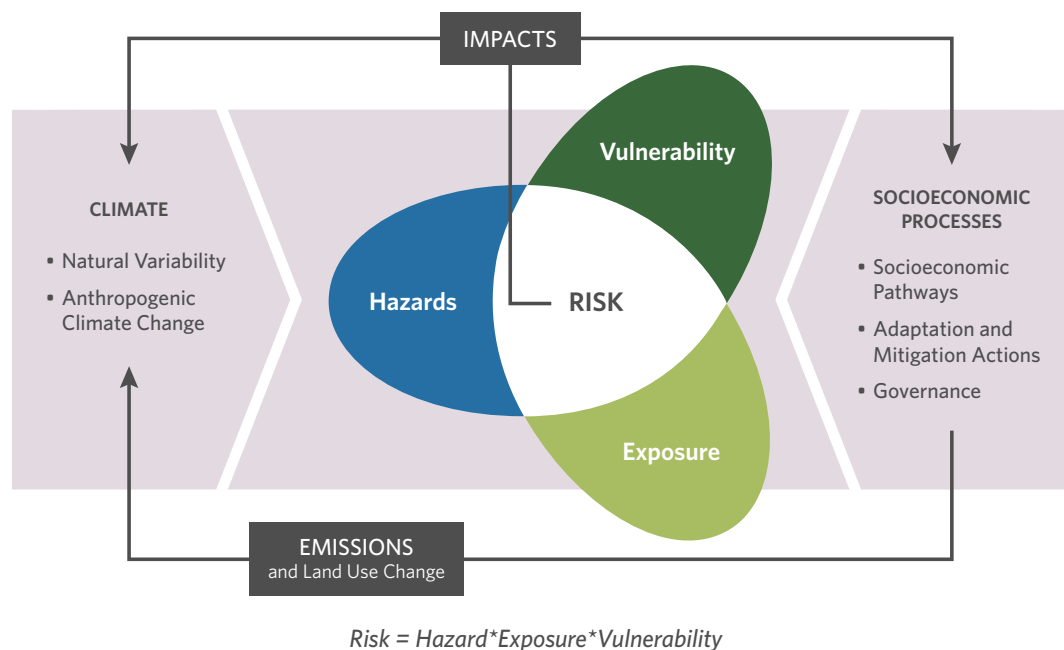
Economic	Social	Political	Environmental	Geographical
<ul style="list-style-type: none"> Poverty, low-income levels, and macroeconomic challenges faced by countries, such as rising debt and lack of structural capacities (Bloomfield and Henderson 2023) 	<ul style="list-style-type: none"> Marginalization of populations due to class, gender, caste, and ethnicity, among others, leading to lack of access to welfare services, infrastructure, and decision-making power (Eriksen 2015) 	<ul style="list-style-type: none"> Political disempowerment (Eriksen 2015) Inadequate institutional structure and capacity Geopolitical conflict (UNCTAD 2023) 	<ul style="list-style-type: none"> Dependence on climate sensitive sectors and ecosystems such as agriculture, fisheries and tourism Lack of access to adequate and clean water (UN DESA [date unknown]) 	<ul style="list-style-type: none"> In situ populations in areas susceptible to flooding, cyclones, droughts, heatwaves, sea level rise and other acute and chronic events

2.2 PHYSICAL CLIMATE RISK AND ADAPTATION

Physical climate risk forms the premise upon which the adverse impacts of climate change are assessed and response pathways are built (Reisinger et al. 2020). The Intergovernmental Panel on Climate Change (IPCC) in its Sixth Assessment Report (AR6) defines climate risks as those that 'result from dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological

system to the hazards' (IPCC 2022) (Figure 1). Climate change induced physical risks can 'arise from the potential impacts of climate change as well as human responses to climate change' (Reisinger et al. 2020). These can be in the form of adverse consequences of climate change on lives and livelihoods, health and wellbeing, economic, social and cultural systems, infrastructure and assets, investments, and ecosystems (Reisinger et al. 2020).

Figure 1: Climate risk and vulnerability assessment framework (IPCC 2014)



2.2.1 HAZARDS, EXPOSURE, AND VULNERABILITY

Climate risks are shaped by hazards, exposure, and vulnerability:

- Climate-related hazards include climate-induced acute and chronic events.
- Human and ecological systems are exposed to these hazards due to their presence in settings or areas that could be adversely affected.
- The vulnerability of these systems to climate-related hazards is based upon their sensitivity or susceptibility to harm and their lack of ability to adapt or adaptive capacity (see Table 2).

Table 2: Definitions of sensitivity and adaptive capacity

Sensitivity	Adaptive capacity
<p>Sensitivity is the degree to which people and ecosystems are affected by the changing climate (IPCC 2022). Sensitivity of a population can be measured through development and environmental indicators such as:</p> <ul style="list-style-type: none"> ▪ Dependency ratio (number of children and elderly people) ▪ Morbidity rate ▪ Poverty level ▪ Gender inequality ▪ Income dependence on natural resources ▪ Incidence of water-and-vector-borne diseases <p>The higher the level of sensitivity of human and natural systems to climate change, the higher their climate vulnerability.</p>	<p>The adaptive capacity of human and natural systems is based on their potential to respond and/or adjust to the impacts of climate change or take advantage of opportunities that may arise from them (IPCC 2022). This can be measured through sustainable development and welfare indicators including:</p> <ul style="list-style-type: none"> ▪ Political stability ▪ Participation of marginalized communities in local organizations ▪ Increase in GDP ▪ Literacy ▪ Access to emergency shelters ▪ Women’s employment levels ▪ Access to social protection <p>Increased adaptive capacity contributes to reduction of climate vulnerability.</p>

While the intensity and frequency of climate-related hazards are influenced by anthropogenic climate change and natural climate variability, exposure, and vulnerability are also shaped by geography and socioeconomic conditions and processes (IPCC 2012). For example:

- Informal settlements in developing countries are often constructed in areas susceptible to climate-related hazards such as river floodplains. These are usually inhabited by low-income and/or marginalized groups, who lack access to basic welfare resources and the safety nets to cope with and recover from climate-related events.
- Some areas that are exceptionally exposed to climate events such as cyclones and sea level rise (e.g., coastal cities) might require communities to be relocated to other areas as climate impacts may render the region uninhabitable.

2.2.2 DEFINING ADAPTATION AND RESILIENCE

Adaptation is the ‘process of adjustment to actual or expected climate and its effects’ (IPCC 2022). This can be anticipatory (before impacts have been observed), reactive, or a combination of both (IPCC 2007). Climate resilience is broadly defined as ‘the capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure’ (IPCC 2022). Disaster resilience is ‘the ability of a system, community or society exposed to one or more hazards to resist, absorb, accommodate, adapt to, transform, and recover from disasters in a manner that is timely, efficient, and reduces risk, including through the preservation and restoration of essential basic structures and functions’ (CDRI 2023).

Climate change adaptation and resilience can reduce the vulnerability of human and natural systems to climate-related hazards, thereby reducing climate risk and enhancing their resilience (IPCC 2012). As climate hazards can be altered over decades by reducing global warming, climate risk reduction focuses on the reduction of exposure and vulnerability to climate change. Reducing exposure requires measures with long time horizons such as

building climate-resilient infrastructure or climate-proofing existing infrastructure (WMO 2009), or, in some cases, moving communities and settlements to new locations (UN [date unknown]). Short- to medium-term adaptation and resilience initiatives often focus on reducing sensitivity and enhancing the adaptive capacity of people and ecosystems to the adverse impacts of climate change (DST 2020; WHO 2021).

Adaptation and resilience complement each other, but also have crucial differences.

Resilience requires a multi-dimensional and systemic approach to coping with and recovering from climate change impacts, as opposed to comparatively more standalone adaptation projects (e.g., building sea walls) (LSE 2022). However, it is to be noted that these conceptual divergences between adaptation and resilience become blurred in practice, and terms are often used interchangeably in policy and practice (LSE 2022). The authors recognize the difference between the two approaches, but do not differentiate between them in this report.

2.2.3 OPERATIONALIZING AND ASSESSING ADAPTATION

In many regions, identifying causal links and disaggregating adaptation from development interventions are challenging in the absence of clear correlations between climate risk and initiatives categorized as adaptation (GCA 2021). While there are established global frameworks for assessing climate risk and enabling adaptation (see Annex 1), these need to be carefully tailored to specific contexts, given the local and cross-sectoral nature of adaptation (UNDP 2023). This poses a major challenge for policymakers and practitioners, especially in the Global South (Tanner et al. 2019). A lack of data, technical capacity, human and financial resources, institutional and governance structures, and conflicting development priorities make it difficult to integrate climate-risk-informed measures into broader decision-making cycles and development processes (Tanner et al. 2019).

The lack of universally agreed methodologies for implementing and assessing climate adaptation measures makes it difficult to standardize and compare adaptation processes across countries, institutions, and time (UNEP 2022). Multilateral and bilateral organizations, climate funds, governments, and private actors use different criteria, methodologies, and processes to plan, implement, finance, and track adaptation action (see Annex 1).

Despite such differences based on project contexts and outcomes, one common factor that emerges is the need for adaptation actions that are planned, designed, and operationalized based on context-specific climate risk and vulnerability. Several of these methodologies are based on the premise that retrofitting development activities as adaptation measures without categorically addressing climate risks often yields marginal adaptation and resilience benefits and may even cause maladaptation (World Bank 2019; GCF 2021; UNEP 2022; UNEP 2023).⁴

⁴ Maladaptive actions are those 'that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas (GHG) emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare. Most often, maladaptation is an unintended consequence (IPCC AR6)

2.3 CLIMATE VULNERABILITY AND ADAPTATION IN INDIA

India is already experiencing the adverse consequences of increasing and intensifying trends of extreme weather events, such as heavy rainfall, floods, droughts, and heatwaves (Arora 2023). The impacts are unequal across the country, based on the extent of exposure and vulnerability of different areas (DST 2020). India recognizes development and growth as primary considerations for climate adaptation, meaning that its adaptation actions attempt to achieve multiple development and climate goals (MoEFCC 2022). These include assessing risks and vulnerabilities, furthering economic and infrastructure development, strengthening the resilience of individuals and communities through improved livelihoods and incomes, governance and institutional development, and increasing resources for adaptation, among others (MoEFCC 2022).

2.3.1 CLIMATE RISK AND VULNERABILITY ASSESSMENTS

Multiple climate risk and vulnerability assessments have been conducted in India across sectors and at the national, regional, and subnational levels (Rao, et al 2019; DST 2020; Kumar, et al. 2021; Mohanty and Wadhawan 2021; Arora 2023).

The Government of India (GoI), in consultation with state governments, released its official climate vulnerability assessment using a common framework in 2020 (DST 2020). This state and district-level vulnerability assessment incorporates biophysical, socioeconomic, institutional and infrastructure vulnerability indicators, and attempts to standardize subnational vulnerability assessments across the country. This initiative was undertaken as part of India's two climate missions⁵ following the Ministry of Environment, Forest and Climate Change (MoEFCC)'s call for state climate action plans to be revised and strengthened based on rapidly evolving climate science, policies, and action (MoEFCC 2020).

Existing vulnerability assessments in India primarily focus on present scenarios and do not incorporate the dynamic interplay between climate-induced hazards, exposure, and vulnerability (DST 2020; Arora 2023). For example, the Department of Science and Technology (DST) Common Vulnerability Assessment Framework includes state and district-level sensitivity and adaptive capacity indicators, thereby providing a crucial entry point for designing local adaptation interventions but falls short of assessing climate risks arising from future climate projections.

Climate risk and vulnerability assessments in India are yet to be harmonized and adopted at scale, due to differences in spatial resolution, sectors, and methodologies.

⁵ The Climate Vulnerability Assessment for Adaptation Planning in India Using a Common Framework was prepared as part of the capacity building program under two national missions on climate change: The National Mission on Sustaining the Himalayan Ecosystem, and the National Mission on Strategic Knowledge for Climate Change, coordinated by the Department of Science and Technology of the Government of India.

Concepts and methodologies underpinning India's climate risk and vulnerability assessments must be harmonized to better inform decision making (Comte 2021; Arora 2023). Data, resources, expertise, and capacity must also be improved, and assessment processes simplified (Arora 2023).

Variations in levels of readiness, resources, and climate planning at state and local levels make it challenging to assess the extent to which adaptation action is informed by climate science and risk (Jogesh and Paul 2020). The DST Common Framework calls for a comprehensive and common framework, methodology, and guidelines for overall climate risk assessment, as well as the establishment of a climate risk atlas (DST 2020). India's strengthening climate commitments and state planning also provide a foundation to synergize adaptation planning and action at the national, subnational, and local levels.

2.3.2 INDIA'S APPROACH TO CLIMATE ADAPTATION

India's 2008 National Action Plan on Climate Change (NAPCC) identifies key measures for achieving the country's development objectives 'while also yielding co-benefits for addressing climate change effectively' (Prime Minister's Council on Climate Change 2008). This plan emphasizes that accelerated and sustained development is needed to generate the financial and technological resources required for climate adaptation. Hence, rather than presenting initiatives exclusively aimed at climate impact, the plan prioritizes those that further the country's development goals, while serving climate objectives in the process. This approach to climate benefits as co-benefits of development interventions may diffuse focus on adaptation.

At the global level, co-benefits are defined differently based on what projects primarily aim to achieve. Co-benefits arise when a policy or measure aimed at achieving a certain objective (e.g., combatting climate change) has positive spillover effects on secondary development objectives (IPCC 2022). Multilateral organizations define co-benefits differently, depending on their project's core objectives and additional benefits deliberately planned or accrued. For example, the World Bank defines climate co-benefits as the share of financing that specifically supports climate action in its larger operations (World Bank 2021). In contrast, the Green Climate Fund (GCF) defines co-benefits as those that demonstrate wider environmental, social, and economic benefits that are additional to its core climate goals.

India prioritizes development and growth in its adaptation efforts. However, in the absence of a systematic methodology to distinguish adaptation and development, it is difficult to measure, allocate resources for, and implement adaptation initiatives.

India's view of adaptation as a co-benefit is based upon the country's prioritization of development and achieving the Sustainable Development Goals (SDGs) (GoI 2022). The country's numerous development programs have great potential to generate such co-benefits, but the absence of evidence and common methodologies for evaluating the extent to which these address climate risk makes it onerous to distinguish adaptation from development (Srinivasan et al. 2018). Without a common understanding of what constitutes adaptation, 'good' development often tends to be equated with adaptation action (Jogesh and Paul 2020).

The adaptation co-benefits approach also risks being used ambiguously to justify business-as-usual initiatives, which may not have climate benefits (Sreenivas et al. 2013). In the process, the fundamental objective of India's adaptation co-benefits approach to mainstreaming climate impacts and adaptation in state development planning, implementation and budgetary allocation remains difficult to enable and measure (Jogesh and Paul 2020).

3. ENABLING ENVIRONMENT

The Lima Conference of the Parties (COP 20), the Paris Agreement, the 2030 Agenda for Sustainable Development and associated SDGs, and the Sendai Framework for Disaster Risk Reduction, have set international agendas on adaptation. COP 20 agreed on elevating adaptation to the same importance as curbing GHG emissions, and the Paris Agreement set the first global goal on adaptation and emphasized maintaining a balance between adaptation and mitigation finance.

Both India's NAPCC and Intended Nationally Determined Contribution (INDC) emphasize the importance of adaptation for development. Over the last 15 years, India has increased both its climate adaptation and mitigation action, including via i) plans, policies, and frameworks, ii) institutions at both the national and subnational levels, and iii) programs and schemes (Dubash and Ghosh 2019). This chapter outlines some of these developments.

Plans, policies, and frameworks are crucial for establishing priorities and guiding adaptation action; institutions are primarily responsible for executing these policies and plans; while programs and schemes translate them into action.

3.1 PLANS, POLICIES AND FRAMEWORKS

The architecture for adaptation action has evolved significantly in the last 15 years, with the emergence of climate action plans at national and state levels; the mainstreaming of adaptation in sectoral policies; and the establishment of frameworks to encourage private investment (Kumar 2018).

3.1.1 EARLY ADAPTATION ACTION

While some sectors already had regulations and policies in place for environmental protection, the National Environment Policy 2006 was the first integrated policy to mainstream environmental concerns in all development activities (MoEFCC 2006). Its objective to conserve critical environmental resources, provide livelihood security, and integrate environmental concerns in social and economic development provided a framework to support adaptation action (MoEFCC 2006; MoEFCC 2015).

In 2007, the Bali Action Plan released at COP 13 urged countries to step up climate adaptation and mitigation action, and in 2008 the Prime Minister's Council on Climate Change released India's NAPCC, which launched eight related national missions (PMCCC 2008) (see Annex 2). This is considered a landmark in India's adaptation journey for the following reasons:

1. It outlined India's approach to climate action, emphasizing co-benefits by 'identifying measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively' (GoI 2008; p-2). The co-benefit approach provided

opportunities for mainstreaming adaptation action within the development agenda (Dubash and Ghosh 2019).

2. Each of the national missions were supported by an institutional setup under the purview of a nodal ministry, putting adaptation action on the agenda for different ministries and departments (Singh 2017).

3.1.2 STATE-LEVEL ACTION

Following the launch of the NAPCC, the central government directed states to draft SAPCCs that were aligned with the NAPCC, in 2009. This was driven by the understanding that climate vulnerabilities are local, as well as the fact that several crucial adaptation sectors (e.g., agriculture and water) are state subjects (Dubash and Jogesh 2014; Jogesh and Paul, 2020)⁶.

States created their SAPCCs based on a common framework while incorporating local context (MoEFCC 2009). This included compiling a state climate profile, conducting a vulnerability assessment, and proposing a list of intended actions based on the vulnerability assessment. The SAPCCs were also meant to indicate 'incremental or additional costs' for these activities (MoEFCC 2009; Kumar 2018).

States acted on this guideline at '**varying levels of speed and motivation**' (Gogoi, 2019). For example, Odisha released its first SAPCC in 2011 and has updated it every five years since, while Bihar released its first SAPCC in 2015 (Government of Bihar, 2015; Government of Odisha, 2021). **SAPCCs have focused on adaptation action with limited focus on mitigation** (Gogoi 2017; Pahuja et al. 2022). Additionally, most states have tried to stay close to the NAPCC, with only a few including additional topics (e.g., health, mining, and coastal development) (Jogesh and Paul 2020).

While SAPCCs offer an opportunity to integrate climate vulnerability in development planning, this process faced several challenges:

1. States lacked the technical skills to assess climate risks and vulnerability (Dubash and Jogesh 2014; Jogesh and Paul 2020; Pahuja et al. 2022).
2. Given the lack of a common vulnerability assessment framework, states used different vulnerability assessment methodologies (Dhanpal and Panda 2014; Jha 2014).
3. There was also a lack of climate data at the regional level (Jha 2014).

As a result, some SAPCCs were inadequately rooted in science (Pahuja et al. 2022). While they equated to 'good development plans', their recommendations were 'quite broad... amounting to a large sectoral wish list' (Jogesh and Paul 2020; p2).

To add to these challenges, there was also some ambiguity around SAPCC funding. While it had been assumed that the central government would fund activities outlined in SAPCCs, this did not materialize (Gogoi 2019).

⁶ The 7th Schedule of the Indian Constitution deals with the division of powers between the Union government and state governments; dividing the roles and responsibilities into three lists namely: - Union List, State List and Concurrent List. The State List comprises subjects over which state legislatures exercise exclusive jurisdiction.

3.1.3 POLICY DEVELOPMENTS FOLLOWING THE NAPCC AND SAPCCs

The NAPCC created opportunities for dialogue on climate risk and vulnerability. As a result, several sectoral policies recognized climate change as a potential risk and identified various adaptation measures (Patra 2016).

At the national level, in 2009, the Disaster Management Policy briefly touched on climate change and called for synergies between adaptation and disaster risk reduction. In 2012, the National Water Policy was updated to incorporate 'adaptation strategies in view of climate change for designing and management of water resources' (PIB 2014). In 2014, the National Agroforestry Policy was launched to encourage tree plantation in an integrated manner with crop and livestock cultivation, to promote 'resilient cropping and farming systems to minimize the risk during extreme climatic events...and improve productivity, income and livelihoods' (MoA 2014).

Several SAPCCs also highlighted the importance of updating policies and regulations to facilitate state-level climate action, setting a foundation for incorporating climate concerns in state policies (Dubash and Jogesh 2014). For example, Odisha's 2011 SAPCC initiated integration of climate concerns in the state's health policy.

3.1.4 RECENT ADAPTATION ACTION

In 2015, India submitted its INDC to the UNFCCC, based on the broad framework of the NAPCC (DEA 2017). The adaptation objective under India's INDC was to '...better adapt to climate change by enhancing investments in development programs in sectors vulnerable to climate change' (MoEFCC 2015; p 29).

In 2019, guidelines for the National Disaster Management Plan set the broader goal of developing synergies between the SDGs and the Paris Agreement by integrating disaster risk reduction and climate adaptation (NDMA 2019).⁷

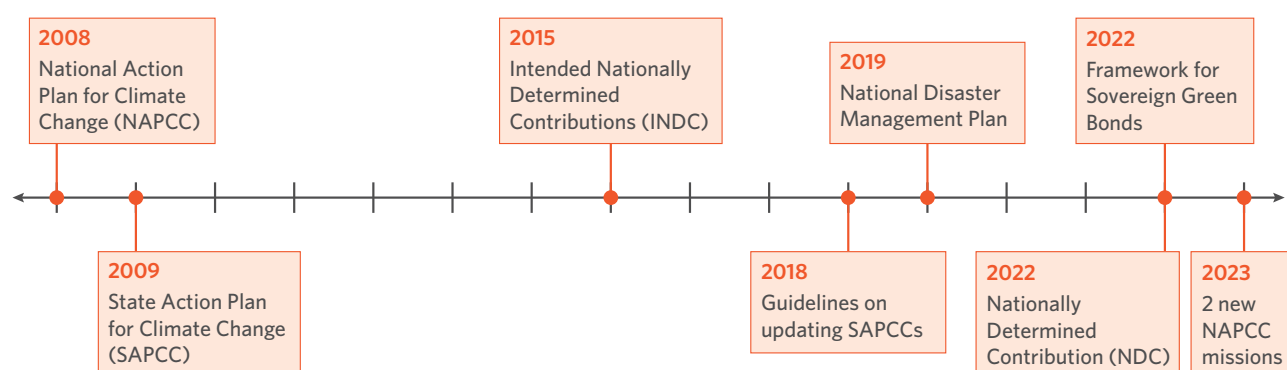
In 2022, India updated its international commitments under the Paris Agreement and released its Nationally Determined Contributions (NDC), which includes the objective of 'enhancing investments in development programs in vulnerable sectors' for adaptation (Gol 2022; p 3). In the same year, the Ministry of Finance (MoF) introduced a Framework for Sovereign Green Bonds, classifying projects promoting climate action, including resilience and adaptation, as 'green' (MoF 2022).

In 2023, the MoEFCC announced that it was adding two additional missions - focused on coastal management and human health - to the NAPCC.

Subnational ecosystems evolved simultaneously. In 2018, based on developments in climate science, the central government issued guidelines for states to update their SAPCCs (MoEFCC 2019), recommending they build synergies with the NDC, the SDGs, and current national policies, and align the periods of SAPCCs to that of the NDC (2021-30). These guidelines equally emphasize adaptation and mitigation and note that states need to finance SAPCCs largely through their own budgets. Nine states had updated their SAPCCs as of September 2023.⁸

⁷ The 2019 Disaster Management Plan builds on the Disaster Management Act (2005) and National Policy on Disaster Management (2009), particularly emphasizing synergies between the Sendai Framework, SDGs, and Paris Agreement. It highlights the necessity for sustainable development to be resilient and adaptive to climate change impacts.

⁸ Madhya Pradesh has also updated its SAPCC but has prohibited its citation. It is therefore not included in this report.

Figure 2: Timeline for India's adaptation-related plans and frameworks

Source: CPI

3.2 INSTITUTIONS

Increasing domestic focus on adaptation (and mitigation) has spurred the establishment of new climate-focused institutions at the national and state levels and added adaptation to several ministry and department agendas (Dubash and Ghosh 2019).

Relevant national institutions are shown in Table 3.

Table 3: India's national adaptation-related institutions

Name	Description
Ministry of Environment, Forest and Climate Change (MoEFCC)	The authority for climate change policy and planning, including adaptation, and the coordinating ministry for the NAPCC, with different ministries in charge of specific missions (see Annex 2).
Expert Committee on Climate Change	Supervises technical and financial assessment of SAPCCs and provides recommendations to states.
National Steering Committee on Climate Change	Has the final authority to endorse SAPCCs.
Climate Change Finance Unit	Represents the Ministry of Finance (MoF) in domestic and international climate finance matters, largely focuses on international climate finance negotiations and provides guidance to the MoEFCC on the same. It also provides inputs to the Economic Survey of India, shaping climate finance discourse and informing policy (Jha 2014; PIB 2018).
National Disaster Management Authority	Coordinates the efforts on disaster risk reduction and mitigation of disasters.
NITI Ayog	The government think tank that advises central and state governments on policy and strategies on management of forest and protection of biodiversity and natural habitats, as well as implementation of SDGs, including climate action (NITI Ayog 2023).
National Bank for Agriculture and Rural Development (NABARD)	National Implementing Agency for the Adaptation Fund and the National Adaptation Fund for Climate Change (NABARD 2015). It is also the accredited Direct Access Entity for the Green Climate Fund (GCF), along with other organizations including the Small Industries Development Bank of India (GCF 2022).

In addition, at the international level, the Coalition for Disaster Resilient Infrastructure was established in 2019 to promote the resilience of infrastructure to climate and disaster risks.

At the state level, environment or climate change units⁹ are the nodal agencies for all SAPCC-related issues. However, this can vary from state to state. Gujarat, for example, has a dedicated department for climate change. Within states, different departments provide inputs to the climate change cell (or other nodal authority) for SAPCCs. States also have State-Level Steering Committees on Climate Change, which are responsible for approving SAPCCs (MoEFCC 2022). Other state-level bodies have emerged. For example, Tamil Nadu has registered the Tamil Nadu Green Climate Company to raise climate finance.

3.3 PROGRAMS AND SCHEMES

India has launched various programs and schemes to finance and implement adaptation action. Adaptation action (along with other climate and developmental actions) can be executed and financed through three types of schemes:

1. **Central Sector Schemes (CSs):** fully funded by the central government (PIB 2020).
2. **Centrally Sponsored Schemes (CSSs):** jointly funded and executed by the central and state governments.
3. **State Schemes:** designed, implemented, and funded by state governments.

Table 4 presents a few examples of the above-mentioned programs and schemes for adaptation in India.

Table 4: Examples of adaptation-related central programs and schemes

Type	Name	Description
Central Sector schemes	Climate Change Action Programme	Launched in 2014 as a Central Sector scheme to build capacity for assessing climate change impact as well as formulating relevant response measures (Lok Sabha Secretariat 2015).
	National Adaptation Fund for Climate Change (NAFCC)	Set up in 2015 to finance and scale up adaptation action (over and above other initiatives under the NAPCC and SAPCCs) in vulnerable states (MoEFCC 2015).
Centrally Sponsored Schemes	Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	Established in 2015 to improve water and sanitation services, and create open spaces in cities.
	Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI)	Set up in 2023 to conserve and restore the mangrove ecosystem for preventing coastal erosion and sustaining local livelihoods (MoEFCC 2023).
	Amrit Dharohar	Introduced in 2023 to promote the conservation of Ramsar Sites and encourage optimal use of wetlands to enhance biodiversity, eco-tourism, and local livelihoods (PIB 2023; MoEFCC 2023).

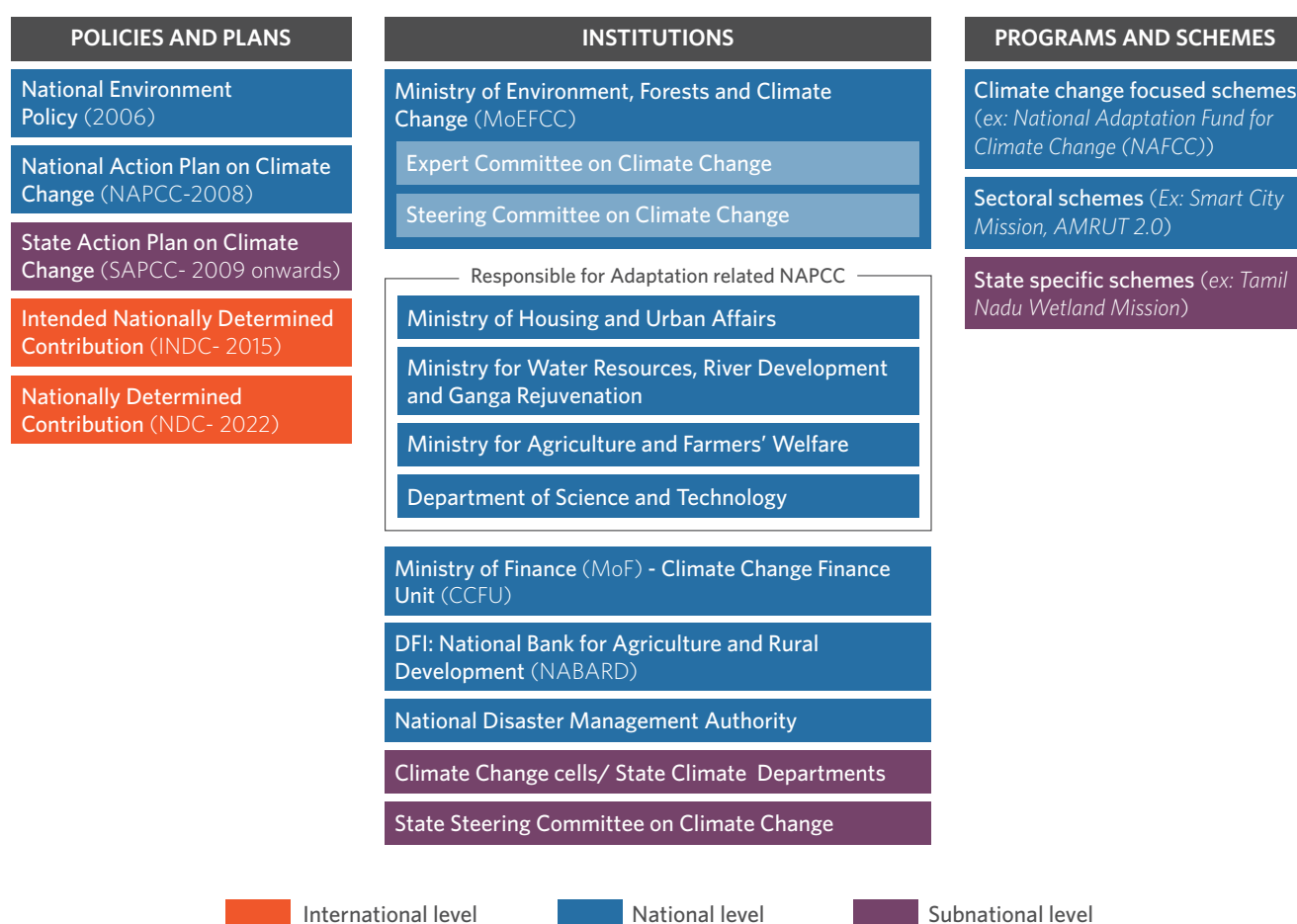
⁹ Also known as climate change cells

In addition to the schemes, the government has also set up funds such as the Compensatory Afforestation and Planning Authority (CAMPA) Fund. While India's INDC outlines CAMPA under the country's mitigation strategies, several states such as Odisha and Goa categorize the fund's conservation activities and their associated livelihood benefits as adaptation (MoEFCC 2015; Government of Odisha 2021; Government of Goa 2023).

State schemes include Odisha Bamboo Development Project, Tamil Nadu Wetland Mission (Government of Odisha 2021; TNGCC 2021). Some states, including Tamil Nadu and Gujarat, have also set up funds to finance climate action (Government of Gujarat 2018; Sivapriyan 2023). See Annex 2 for further details on recent schemes for financing adaptation.

Figure 3 summarizes the major policies, plans, institutions, and programs for adaptation in India.

Figure 3: Adaptation policies, institutions, and programs in India



Source: CPI analysis

4. INDIA'S ADAPTATION INVESTMENT NEEDS AND FUNDING GAPS

Despite action by India's central and state governments to create an enabling environment for climate adaptation, the lack of adequate funding is a stumbling block for implementation. This chapter explores estimated adaptation investment needs for India and for state governments for which updated SAPCCs are available. It also dives into the updated SAPCCs of three states to assess their funding gaps.

4.1 NATIONAL ADAPTATION INVESTMENT NEEDS

It is challenging to estimate the investment needs for adapting to climate change. It is a complex topic and limited literature is available on the issue (Micale, Tonkonogy and Mazza 2018). India's diverse geography and large climate variability compound this challenge (MoEFCC 2022). Understandably, the literature on adaptation investment needs in India is sparse.¹⁰

Because the Indian government sees adaptation as a co-benefit of development, many assessments of adaptation investment needs are based on investments required for adaptation-related development interventions in climate-vulnerable sectors.

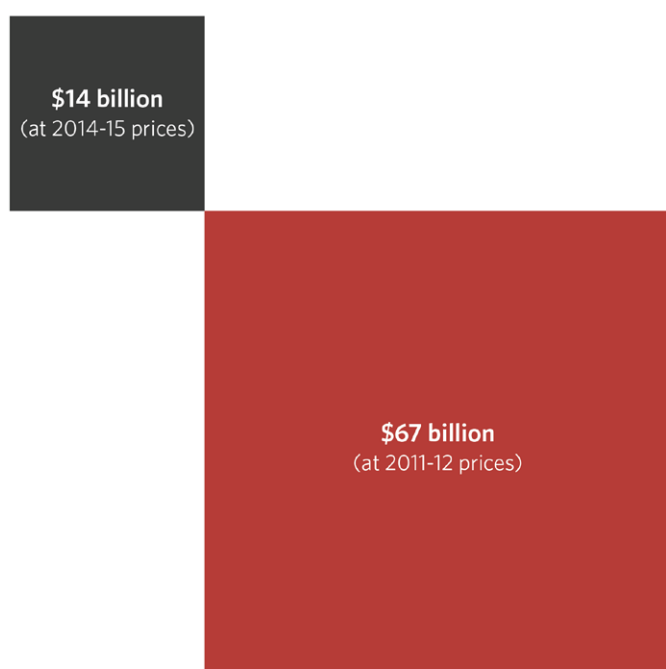
Available assessments indicate that investment needs for such interventions are substantial and will likely be higher in the future.

- For instance, India's INDC 2015 mentions a preliminary figure — **USD 206 billion** (at 2014-15 prices) — for investment needed to implement adaptation-related action in agriculture, forestry, fisheries, infrastructure, water resources and ecosystems, between 2015 and 2030 (MoEFCC 2015). It also points out that additional investment is needed to strengthen resilience, and for disaster management (MoEFCC 2015).
- Another estimate indicates that the cumulative investment needed for adapting to climate change in India by the year 2030, is INR 85.6 trillion at 2011-12 prices, or approximately **USD 1 trillion**¹¹ (DEA 2020; MoEFCC 2022).

In annual terms, estimates of India's investment needs for adaptation-related development interventions for 2015-2030, range from USD 14 billion to USD 67 billion (see Figure 4).

¹⁰ Some estimates of the investment needed for climate change actions are available, particularly in the context of the NAPCC. For instance, the Economic Survey 2012-13, provides an estimate of INR 2,300 billion required to fulfill the mission objectives under the NAPCC (MoF 2013; p.: 264). However, in most such estimates, climate change-related interventions include both adaptation and mitigation measures, making it difficult to delineate the investment needs for adaptation actions.

¹¹ Using 1 USD:74 INR, as the closest prevailing exchange rate at the time of DEA 2020 publication (See Singh, Ahuja and Malhotra 2021).

Figure 4: Estimates of India's annual adaptation investment needs (2015-30)

Source: Based on MoEFCC 2015 and SSEF (n.d.)

A more recent estimate suggests that India needs additional annual investment of 2.5% of GDP (at least USD 85 billion¹²) just to replenish the infrastructure gap caused by climate events by 2030, and notes that actual funding requirements are likely to be higher if the investment needed for adaptation (and mitigation) due to climate change are considered (RBI 2023b).

4.2 STATE ADAPTATION INVESTMENT NEEDS

In India's federal structure, **state governments play a central role in designing, funding, and implementing adaptation-related development programs**. One reason for this, as the previous chapter notes, is that several sectors crucial for adaptation-related actions are state subjects. SAPCCs are also important, as these incorporate state-specific climate vulnerabilities when identifying adaptation-related interventions (Jogesh 2020). For these reasons, **the budgets proposed in SAPCCs for adaptation (and mitigation) interventions are seen as an indicator of the investment needs at the state level** (Garg, Mishra and Dholakia 2015; Kaur and Chakraborty 2020).

4.2.1 FIRST ROUND OF SAPCCS

As noted, in 2009, the central government directed states to develop SAPCCs, consistent with the strategy outlined in the NAPCC. By the mid-2010s, all states had created SAPCCs, reflecting their climate adaptation approach (Kumar 2018), while also accounting for developmental agendas. Proposed budgets and investment needs outlined in SAPCCs depend on states' economies and the sectors that contribute to local livelihoods (Kumar 2018).

¹² Based on India's GDP of USD 3.39 trillion in 2022 as per IMF's World Economic Outlook data

However, **getting a clear idea of investment needs from the first round of SAPCCs is difficult**, as required investment amounts are rough estimates at best, often without technical grounding, and there are marked inconsistencies in cost estimates put forth by different states (Dubash and Jogesh 2014a; Dubash and Jogesh 2014b; Kumar 2018). Time periods for budget estimates also vary widely state by state (Mandal et al. 2013; Dholakia et al. 2015; Kumar 2018). In addition, **some estimates are inflated** because states were under the impression at the time of drafting that substantial funds would be provided by the central government (Gogoi 2017; Kumar 2018; Gogoi 2019).

Estimated investment needs for adaptation interventions, combining interventions mentioned in both the NAPCC and SAPCCs amount to around USD 185 billion from 2012-17, or USD 37 billion annually (Govindarajulu 2015).

4.2.2 UPDATED SAPCCS (2021-30)

The first round of SAPCCs was formulated in the context of the NAPCC and before the Paris Agreement. In view of the evolving knowledge of climate science and international and national policies, in 2019 the MoEFCC issued a common framework for the revision of SAPCCs for 2021-30. According to this framework, updated SAPCCs should provide a prioritized sector-specific list of adaptation (and mitigation) actions, backed by the latest vulnerability assessments and climate change projections (see chapters 2 and 3).

The 2019 guidelines also make it clear that state budgets are the primary source of funding for adaptation (and mitigation) interventions outlined in the updated SAPCCs (MoEFCC 2019).¹³

As of September 2023, updated SAPCCs of nine states - Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Odisha, Rajasthan, and Tamil Nadu - are publicly available.¹⁴ However, the SAPCCs for Gujarat and Rajasthan do not provide estimated investment needs or proposed budgets for climate change actions. For Karnataka, it is difficult to assess adaptation-related investment needs because there is no clear demarcation between adaptation and mitigation interventions.

SAPCCs in which it is possible to delineate proposed budget for adaptation-related interventions¹⁵ show that:

- Adaptation-related interventions constitute a large proportion of total investment needs, except for Haryana and Kerala (see Annex 3).

¹³ While during the drafting of the first set of SAPCCs, states were under the impression that substantial funds would be provided by the central government, by 2015 it was clear that states were expected to fund their respective SAPCCs (Dubash and Jogesh 2014a; Dubash and Jogesh 2014b; Gogoi 2019), with some additional funding coming from the central government (Allan, Bahadur, Venkatramani, and Soundarajan 2019). The 2019 MoEFCC guidelines confirm that the onus of funding SAPCCs falls on states/subnational governments.

¹⁴ Although the Madhya Pradesh SAPCC is publicly available, the document is not for citation; hence it is not included in this report. Some of these SAPCCs are draft versions.

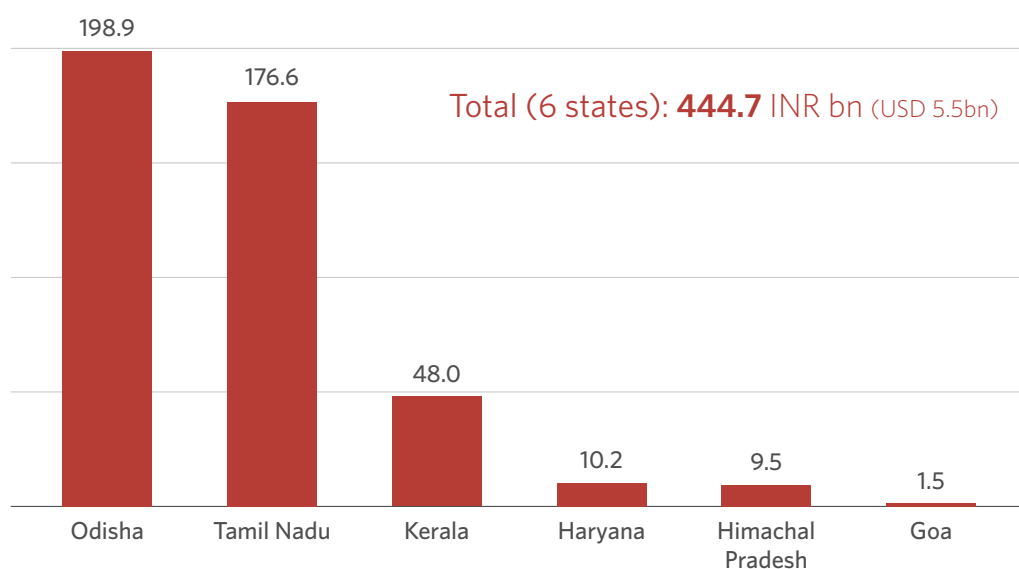
¹⁵ Due to the reasons explained above, Karnataka SAPCC has not been included for assessing adaptation investment needs.

- State programs and schemes constitute a significant proportion of proposed budgets for adaptation-related interventions (in addition to centrally sponsored schemes and/or central sector schemes).
- Sectors considered important for adaptation action are similar across SAPCCs. These include agriculture and related sectors, water resources, forestry, and urban development.
- All SAPCCs also include sectors for adaptation interventions important to states' economy and livelihood generation. For instance, Goa and Odisha SAPCCs include adaptation interventions for the mining sector.¹⁶ While both Goa's and Kerala's SAPCCs include adaptation interventions related to tourism.

In terms of investment needs, these six states alone require at least INR 444.7 billion (USD 5.5 billion)¹⁷ annually for adaptation-related interventions from 2021-30 (see Figure 5).

The aggregate cumulative adaptation investment needs for these six states amount to INR 4,351 billion (USD 54.4 billion) from 2021 to 2030, and are likely to be higher in reality. For instance, Goa's SAPCC notes that proposed budget estimates for climate-related activities are 'humble' and could be much higher (Government of Goa 2023).

Figure 5: Estimated annual adaptation investment needs of six states (2021-30; INR bn)



Notes: i) Adaptation-related activities were compiled from detailed sectoral budget breakdowns provided in the respective SAPCCs; ii) For activities that encompass both adaptation and mitigation measures, 50% of the proposed budget has been taken as adaptation investment needs; iii) The period for Kerala's SAPCC is 2023-30, and for Goa it is 2023-33.

Source: CPI calculation based on featured SAPCCs

¹⁶ Such as for creating and maintaining green zones or exploration and provisioning of treated water for mines

¹⁷ Using 1 USD:80 INR, as the prevailing exchange rate in 2023.

4.3 STATE ADAPTATION FUNDING GAPS

As mentioned, the lack of adequate funding is often a stumbling block to implementing the actions outlined in SAPCCs. Indeed, several updated SAPCCs provide details on the **funding gap - i.e., the difference between the adaptation investment needed and the amount that can be met through state budgets.**

Even SAPCCs that do not detail funding gaps allude to a lack of finance.

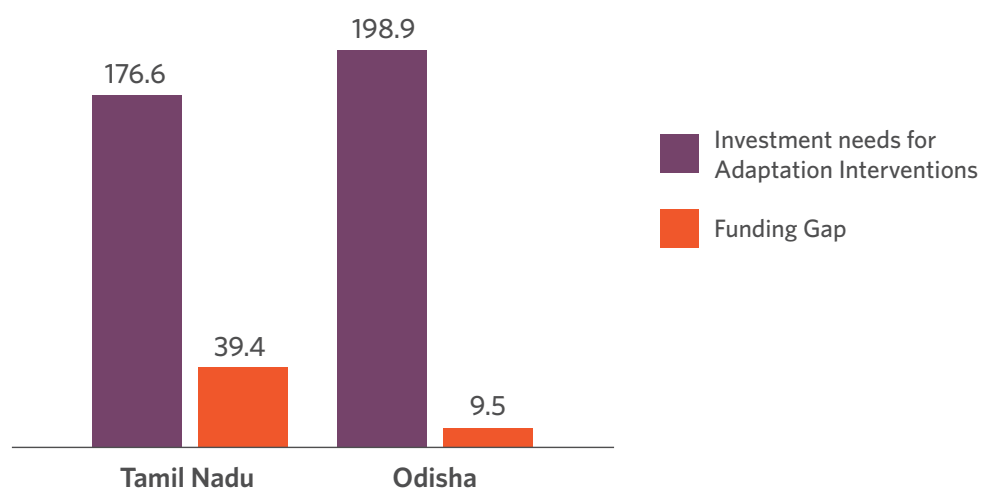
- For instance, Karnataka's SAPCC notes that climate financing in the state is highly scattered and based on central and state level schemes and programs, with no fixed percentage of assured finance allocated or earmarked in the state budget for adaptation (and mitigation) programs (Government of Karnataka 2021; p: 217).
- Similarly, Kerala's SAPCC (2022) points out that limited resources are a barrier to the implementation of sectoral adaptation actions.
- Goa's SAPCC (2023) lists several activities in the tourism sector but notes that these require funding from state/central schemes.

4.3.1 HIMACHAL PRADESH, ODISHA, AND TAMIL NADU

Of the six states that provide estimated investment needs for adaptation in their SAPCCs, three — Himachal Pradesh, Odisha, and Tamil Nadu — also provide estimates of the funding gap. The SAPCC for Himachal Pradesh shows a total funding gap of INR 70 billion (USD 0.8 billion) from 2021-30, for both mitigation and adaptation, but does not specify the gap for adaptation interventions.

The funding gaps calculated based on the SAPCCs for Odisha and Tamil Nadu are shown in Figure 6. Even though Odisha and Tamil Nadu have similar adaptation investment needs, the funding gap described is much lower for Odisha. This seems to arise from assumptions on future investment, and the gap may increase if these do not hold.

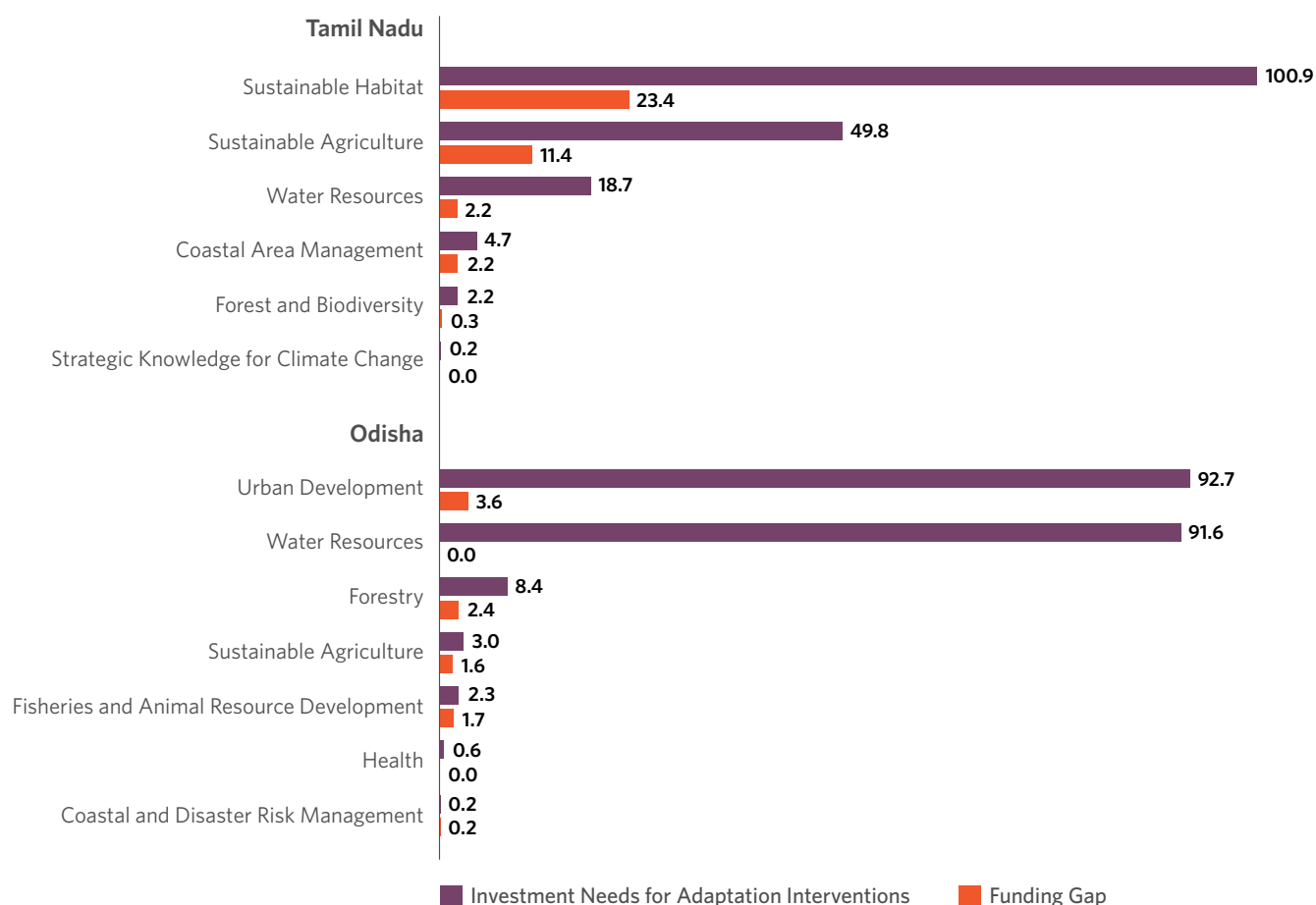
Figure 6: Estimated annual adaptation investment needs and funding gaps of Odisha and Tamil Nadu (2021-30; INR bn)



Source: CPI calculation based on Government of Odisha 2021 and Government of Tamil Nadu (n.d.)

The variation in overall funding gaps of Odisha and Tamil Nadu arises from the variation in the sectoral funding gaps. For instance, in Tamil Nadu, sectors with relatively large investment needs (e.g., sustainable habitats and agriculture), also have larger funding gaps. However, in Odisha, funding gaps are relatively large for adaptation interventions in agriculture, fisheries, and animal resource development, even though estimated investment needs for these sectors are relatively small. In contrast, the funding gaps are small in sectors with the largest estimated investment needs (e.g., urban development and water resources) (see Figure 7). The smaller gaps in the sectors of urban development and water resources seem to arise from the assumption that 'heavy climate investments are expected in urban development, water resources ... in next 10 years' (Government of Odisha 2021; p: 159). Any failure to meet these assumptions would result in larger funding gaps.

Figure 7: Estimated annual sectoral investment needs and funding gaps for adaptation interventions in Odisha and Tamil Nadu (2021-30; INR bn)



Notes: i) The gap for coastal area management does not match the overall gap mentioned for the sector in Table 7.7 of Tamil Nadu's SAPCC; ii) Adaptation-related activities have been compiled from the detailed sectoral breakdown of the proposed budget provided in the respective SAPCCs; iii) For activities that encompass both adaptation and mitigation measures, 50% of the proposed budgets have been taken as adaptation investment needs.

Source: CPI calculation based on the featured SAPCCs

A stylized fact¹⁸ that emerges from the above is that several states are likely to face adaptation funding gaps, and therefore need more financial resources to meet their adaptation investment needs.

¹⁸ Stylized fact, a term used in economics, is a simplified presentation of an empirical finding. Stylized facts are broad tendencies that aim to summarize the data, offering essential truths while ignoring individual details.

5. BRIDGING ADAPTATION FUNDING GAPS

This chapter assesses whether states' current sources of adaptation finance present opportunities to bridge their adaptation funding gaps. It first examines the current status of the fiscal health of state governments and its implications going forward before exploring the potential for private finance to increase adaptation investment.

5.1 MAIN ADAPTATION FINANCE SOURCES IN INDIA

Finance for adaptation-related interventions in India flows from **various domestic and international sources**¹⁹, as shown in Figure 8.

Figure 8: Sources of adaptation finance in India



Domestic sources of adaptation-related finance comprise central and state government budgets and climate-dedicated funds of the central and state governments. International finance for adaptation flows through a) multilateral climate funds such as the Global Environment Facility (GEF), Green Climate Fund (GCF), Adaptation Fund (AF), etc.; b) Multilateral Development Banks (MDBs); c) bilateral and regional channels; and d) Foundations such as Gates Foundation and IKEA Foundation.

The government and domestic institutions are the main providers of climate finance in India (DEA 2020), with government programs and schemes being the most important source (DEA 2020; Khanna, Purkayastha, and Jain 2022). Further, state governments are the main contributors of adaptation-related expenditure.

¹⁹ There may exist other flows of finance to adaptation but these are hard to track and report.

For instance, an assessment by a sub-committee of India's MoF (DEA 2020) shows that in 2017-18 alone, central government expenditure on Centrally Sponsored Schemes related to SDGs that contribute to improving resilience²⁰ stood at INR 3,260 billion (USD 43.8 billion²¹), with state governments contributing a multiple of this amount.²²

Compared to this, domestic climate-dedicated funds constitute a small proportion of finance for adaptation-related interventions. For instance, total cumulative funds disbursed under NAFCC since 2015 amount to around INR 8.47 billion (approximately USD 100 million) (NABARD 2020).

Similarly, even though international finance for adaptation in India has increased in recent years, data from India's Third Biennial Report to the UNFCCC shows that these constitute a small proportion of the total finance for adaptation-related interventions (see Annex 4).

5.2 IMPORTANCE OF STATE BUDGETS FOR ADAPTATION

Adaptation is largely a subnational issue in India, and states are the main contributors to public expenditure for adaptation-related interventions.²³ This is because state governments account for more than 60% of general government expenditure, against the global average of about 30% (RBI 2023a). Moreover, they are responsible for expenditures in several core adaptation-relevant sectors including agriculture, water, health, and urban development (Shrivastava and Santhosh 2022; MoEFCC 2022).

The role of state governments in financing adaptation interventions assumes further importance as SAPCCs are now expected to be financed entirely from state budgets.

This also means that state spending for adaptation-related development interventions is critical for bridging funding gaps. It is therefore important to understand how India's fiscal federal structure makes finance available to state governments, and the rules related to borrowing by states to finance their expenditure.

5.2.1 SOURCES OF STATE ADAPTATION-RELATED FINANCE

As in other federal systems, state governments in India depend on transfers from the central government (and borrowing) to finance adaptation-related expenditures. As is common in federal systems, there is an asymmetry in the assignment of revenue-raising powers and expenditure functions between the central and state governments (Rao 2019; Gupta and Sarma 2022). Most broad-based taxes are assigned to the central government, and states are given the predominant responsibility of providing social services such as

²⁰ 'Investment needs and current spending', as defined in this analysis, focus on the linkages between adaptation, SDGs, and basic needs, and may therefore differ from definitions typically used for adaptation finance (MoEFFC 2022).

²¹ Using 1 USD:74 INR, as the closest prevailing exchange rate at the time of DEA 2020 publication (See Singh, Ahuja and Malhotra 2021).

²² The report also notes that the estimate of state spending on adaptation-related components is an overestimate, as state-level information is not available at disaggregated levels to enable differentiation between developmental expenditure and expenditure for climate resiliency.

²³ Given that India's INDC looks at climate action for adaptation in consonance with development, hence, other than funds meant to specifically address climate change related issues, the sources of finance for climate change adaptation are similar to that for development expenditure.

water supply and sanitation, urban development, healthcare, and co-equal responsibility of providing economic services (Rao 2019). While states collect around 37% of total revenues, they account for more than 60% of total expenditure (Jha, Jaluka and Chakraborty 2021).

The mismatch between revenue raising capacity of state governments and their expenditure needs leads to both vertical and horizontal imbalances²⁴.

The Constitution of India provides for the Finance Commission (FC) to correct such fiscal imbalances (see Box 1).

Box 1: The role of Finance Commission (FC)

The FC, a constitutional body that is set up at intervals of five years, recommends the division of taxes between central and state governments, as well as their distribution among states. Transfers from the FC comprise tax devolution²⁰ and other grants. Tax devolution by the FC is the main source of unconditional fiscal transfers for states (Chakraborty 2021).

FC transfers to states are a crucial node in states' climate adaptation response. The unconditional FC transfers provide states — including those with weaker fiscal positions²⁶ — with the financial resources to design adaptation-related development programs and schemes in accordance with state-specific climate vulnerability.

Additionally, the FC has increasingly taken climate-related issues into account when deciding criteria for tax devolution and other grants (see Box 2).

Box 2: Climate change considerations in recent FC transfers to states

The 14th FC (2015-16 to 2019-20) and the 15th FC (2020-21 to 2025-26) have integrated climate change (by promoting forest conservation) as one of the criteria to determine the tax devolution to states (Chakraborty L 2021; Pillai, Dubash and Bhatia 2021).

Further, to increase support for disaster preparedness in vulnerable areas, the 15th FC recommended the creation of two funds (as part of FC grants) for disaster mitigation — the National Disaster Risk Management Fund (NDRMF) and State Disaster Risk Management Fund (SDRMF) — to supplement the existing Disaster Response Fund.²² Fiscal transfers to state governments under the SDRMF are based on, among others, the risk profile of individual states. Risk profiles of states are calculated based on the Disaster Risk Index, which assigns scores to the possibility of events like cyclones, droughts and floods, and the degree of states' vulnerability (Kapur et al 2020).

24 Horizontal imbalances between states arise as institutional capacities, income levels and tax base, etc., that impact a state's fiscal position, differ between states (Jha Jaluka Chakraborty 2021).

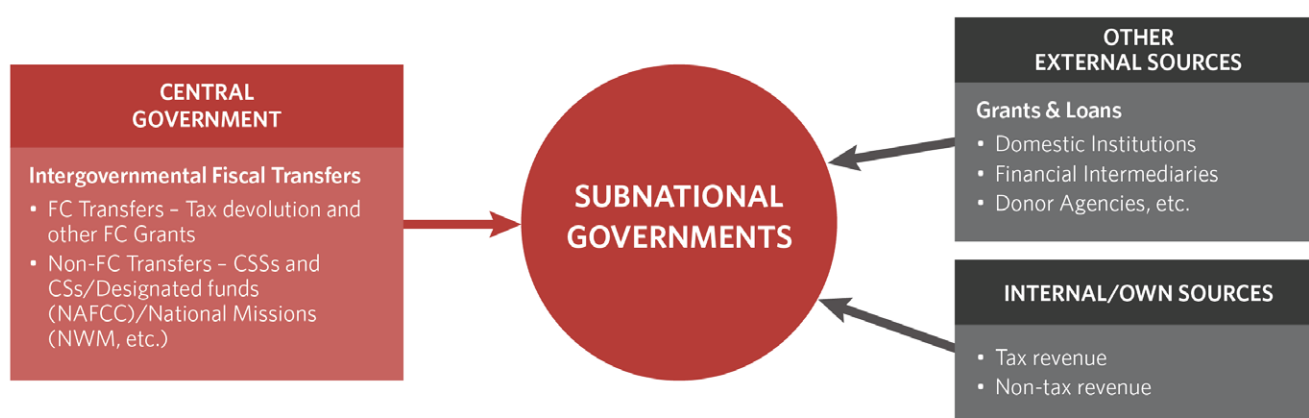
25 According to the 15th FC recommendations, states receive 41% of the divisible pool of taxes collected by the central government. This pool comprises tax receipts mobilized by the central government, except for the portion mobilized through cesses, surcharges, and cost of tax collection.

26 FC transfers, which are based on formula and criteria adopted, attempt to provide more transfers to states with weaker fiscal positions to make up for horizontal imbalances across states (Jha, Jaluka and Chakraborty 2021).

27 The existing State Disaster Response Fund (SDRF) is the principal source of funding for state governments to redress notified disasters and offer immediate relief to victims. The central government contributes 75% for general category states, and 90% for North-eastern and hilly states. The National Disaster Response Fund (NDRF) supplements the SDRF of a state in case of severe disasters, and when SDRF funds are inadequate (Kapur et al 2020).

Centrally Sponsored Schemes (CSSs) and Central Sector Schemes (CSs) are other important sources of state adaptation finance. FC transfers and non-FC transfers (under CSSs and CSs) are together called intergovernmental fiscal transfers (see Figure 9). As Chapter 3 notes, the central government provides grants for CSs, whereas the funding of CSSs is shared between the central and state governments.²⁸ CSS grants are often tied to specific expenditure priorities, with guidelines and conditions for fund use set by the central government. Therefore, the release of funds from the central government is based on state governments meeting these conditionalities.

Figure 9: Sources of state adaptation-related development finance



The FC is the primary institution for intergovernmental fiscal transfers. Fiscal transfers from this body, along with those under CSSs and CSs, comprise the intergovernmental fiscal transfers in India.

Other sources of adaptation finance include states' own revenues and borrowing.²⁹

However, there are strict limits on the borrowing that states can resort to for financing such expenditures.

The central government specifies the annual borrowing limit (the fiscal deficit) for states as per the Fiscal Responsibility and Budget Management Act (FRBM). Other than in exceptional circumstances, such as the COVID-19 pandemic, the annual borrowing limit is set at 3% of Gross State Domestic Product (GSDP) (Forum for State Studies 2023a). Further, states need to ensure that their outstanding debt (debt to GSDP ratio) does not exceed the prescribed limits³⁰ (Chakraborty, Jha and Jaluka 2021; RBI 2022), except under exceptional circumstances.

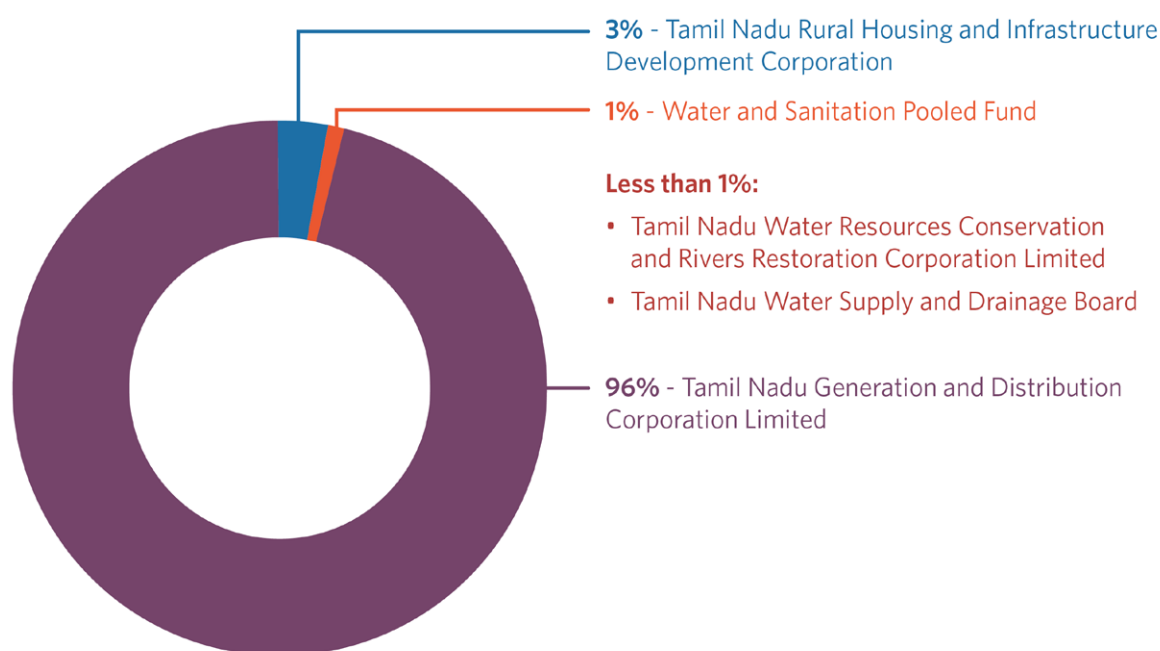
²⁸ In general, states (other than North-eastern states and two Himalayan states — Himachal Pradesh and Uttarakhand) are expected to contribute anywhere between 10% to 50% of total allocations from their own resources (Kapur et al 2020). In the case of North-eastern and the two Himalayan states, the central government provides 90% of funds.

²⁹ States borrow from several sources to finance their fiscal deficits, including the national government and institutions like the Life Insurance Corporation of India, State Bank of India, and National Bank for Agriculture and Rural Development (NABARD), as well as market borrowing, and provident funds, among others (Forum for State Studies 2023; Gupta and James 2023).

³⁰ The panel to review FRBM rules (2017) — also known as the N.K. Singh Review Panel — recommended a debt-to-GDP ratio of 40% for the central government and 20% for subnational governments by the financial year 2025.

Off-budget borrowing³¹ is another source used by states to fund adaptation-related interventions. Owing to the twin pressures of the need to increase developmental expenditure while also maintaining fiscal deficits within permitted limits, several state governments resort to off-budget borrowing (Rao 2022). In many cases, off-budget-borrowing, which includes borrowing by state Public Sector Units (PSUs), is used to finance adaptation-related development programs such as infrastructure for irrigation and water supply (see Figure 10).

Figure 10: Spending on climate-vulnerable sectors using off-budget resources by PSUs in Tamil Nadu (as of March 2021)



Source: Gupta and James 2023

5.3 CONSTRAINED STATE FINANCES AND IMPLICATIONS FOR ADAPTATION FUNDING

States' ability to finance the adaptation investment needs outlined in their SAPCCs will depend on their fiscal health and capacity for additional spending.

The subsection below outlines developments that have led to a deterioration in state fiscal health, and traces how adaptation spending has fared at different points in time. We then look at the constraints that state governments are likely to face in increasing adaptation spending, going forward.

³¹ Off-budget borrowing refers to borrowing by state Public Sector Units (PSUs) and Special Purpose Vehicles (SPVs), for which the state governments are to service the principal and interest amounts, either out of their budget or by special assistance to these institutions.

5.3.1 STATES' FISCAL HEALTH AND ADAPTATION-RELATED EXPENDITURE: THE SITUATION SO FAR

Over the years, several factors have adversely affected the fiscal health of states. For instance, from 2015-19, state finances have been strained due to the stagnation of their own tax receipts, and rising need for expenditure for, among other things, infrastructure development (Surya and Chakrabarty 2022; RBI 2022). States' need for intergovernmental transfers has increased significantly since 2015-16 (RBI 2022), but these have often not kept pace with their rising expenditure needs (Gupta and James 2023). As a result, **state governments have increasingly relied on borrowing to finance their growing expenditure needs** (Tiwari and Surya 2021).

However, India's economic slowdown in 2019-20 forced states to reduce their borrowing³², as well as cut expenditure on certain adaptation-related interventions, such as crop husbandry, water supply, irrigation, and flood control (RBI 2022).

The relaxation of borrowing limits and front-loading of intergovernmental fiscal transfers during the COVID-19 pandemic helped maintain spending in certain climate-vulnerable sectors from 2020-22 (see Box 3).

Box 3: Relaxation in borrowing limits during the COVID-19 pandemic

Considering the extraordinary fiscal stress from the pandemic on state finances and the need for stimulus for recovery, the 15th FC proposed relaxations in the borrowing limits for state governments. The net borrowing limit was set at 4% of GSDP for 2021-22, and 3.5% for 2022-23. However, from 2023-24, state governments need to bring down their fiscal deficits to 3% of GSDP.

Source: RBI 2022 and 2023a

At the same time, the increase in borrowing during the COVID-19 pandemic aggravated the fiscal management challenges for state governments. Owing to the revenue shortfalls and the need for higher spending during the pandemic, state governments borrowed to help sustain expenditures, raising deficit levels (Surya and Chakraborty 2022). Aggregate borrowing by state governments surged to a historic high of 4.7% of GSDP in 2020-21 (RBI 2022). While in 2022-23, the aggregate borrowing by state governments at 3.4% of GSDP remains within the permitted limit, borrowing by several individual states is estimated to be well above the limit (RBI 2023a). Similarly, the outstanding debt levels of several state governments are above the prescribed limits (RBI 2022).

³² Given that states need to keep their borrowing within 3% of GSDP as per the FRBM Act, slowdown in GDP/GSDP means that the amount states can borrow (in absolute terms) also reduces.

³³ States are allowed an additional conditional borrowing of 0.5% of GSDP for the years 2021-22 to 2024-25, but only if they undertake certain power sector reforms (RBI 2022; RBI 2023a).

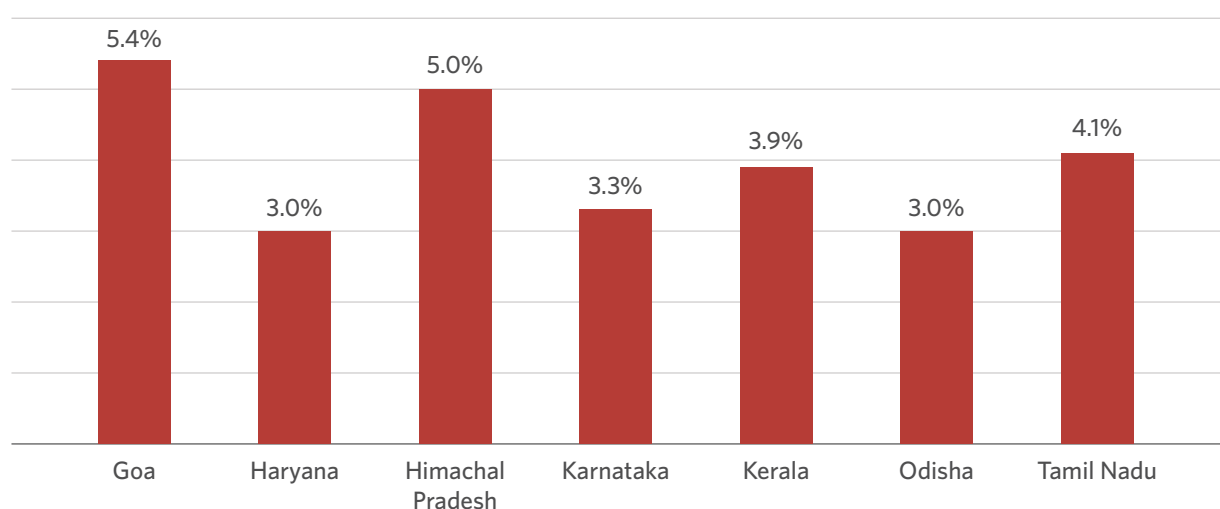
5.3.2 CHALLENGES TO BRIDGING ADAPTATION FUNDING GAPS GOING FORWARD

Worsening state fiscal health could be detrimental to increased adaptation-related expenditure going forward.

The need to reduce fiscal deficits and outstanding debt in the coming years presents a challenge for state governments to bridge the adaptation funding gap. Presumably, the updated SAPCCs account for all possible sources of finance such as intergovernmental transfers, and state revenue, to calculate their adaptation funding gap. This implies that if states are to bridge the funding gap, they can only do so by borrowing more.

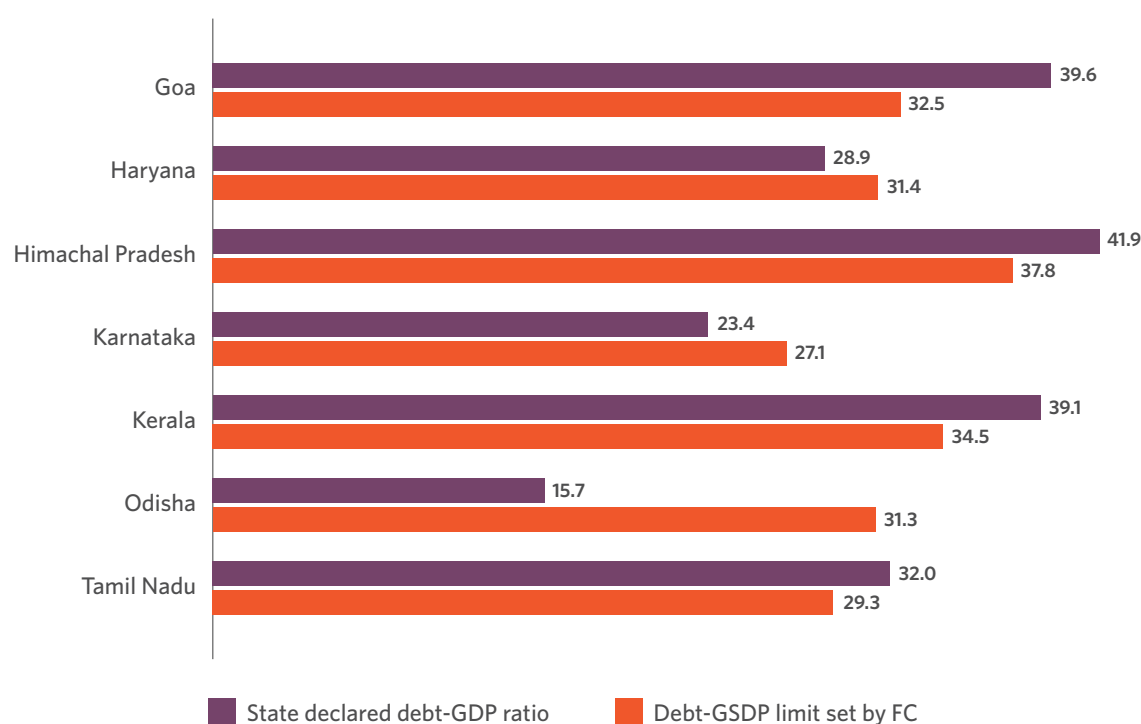
However, states have little scope to increase borrowing. The fiscal roadmap outlined by the 15th FC permitted states to borrow up to 3.5% of their GSDP in 2022-23, but limits them to 3% of GSDP in 2023-24. States also need to reduce their outstanding debt.³⁴ As Figures 11 and 12 show, both these indicators are far above permitted limits for Goa, Himachal Pradesh, Kerala, and Tamil Nadu in 2022-23. The need for a sharp reduction in this indicator from 2023-24 onwards means that these states will have significantly lower borrowing space going forward, hence their capacity to bridge the adaptation funding gap will remain restricted.

Figure 11: Fiscal deficit in 2022-23 of states with updated SAPCCs (% of GSDP)



Source: RBI 2023a

³⁴ Unlike borrowing limits which are uniform across states, permitted debt limits differ from state to state.

Figure 12: Outstanding debts declared by states vs. FC recommended limit for 2022-23

Source: 15th FC Report 2021 and RBI 2023a

New rules regarding off-budget borrowing will further impair states' ability to increase spending on adaptation-related expenditure in the future. In March 2022, the central government stipulated that off-budget borrowing by state PSUs and Special Purpose Vehicles (SPVs) would be included as part of states' liabilities while deciding their annual borrowing limits and their debt positions (RBI 2023a) (Box 4),³⁵ in effect reducing their fiscal space (Chakraborty L 2023). Information on off-budget borrowing by states is sparse, but data available for Tamil Nadu shows that it has depended on off-budget borrowing to finance adaptation-related interventions in the past (see Figure 10). With the new rule in place, the gap between Tamil Nadu's declared debt-to-GDP ratio and the recommended limit for 2022-23 widens. Unless buttressed by an increase in state revenue or FC transfers, the possibility of closing the state's adaptation funding gap is low.

Box 4: New rule regarding off-budget borrowing by state governments

As per new rules, the borrowing by state PSUs and SPVs, for which the state governments are to service the principal and interest amounts, either out of their budget or by special assistance to these institutions, are now part of states' liabilities.

Source: Gupta and James 2023

35 In March 2022 the national government asked state governments to adjust their off-budget borrowing for 2020-21 and 2021-22 against the borrowing limits for 2022-23. These were relaxed to an extent in July 2022, allowing subnational governments to adjust their off-budget borrowing of 2021-22 against the borrowing limits of the next four years till March 2026. In effect, subnational governments will have significantly lesser borrowing space (RBI 2023a).

5.4 PRIVATE FINANCING FOR ADAPTATION

Given that public finance will not be sufficient to bridge the adaptation funding gap in India, it will be critical to attract private financing. The private sector has already recognized climate change-related physical risks, which make adaptation investments a requirement for business continuity. Managing physical climate risks is becoming part of private sector strategies to safeguard supply chains and production facilities (Fayolle, et al. 2019). However, it is important to increase private financiers' participation in climate adaptation beyond protecting direct business operations in order to create spillover benefits for other parts of the economy. Possible private participation in adaptation may be categorized as shown in Table 5.

Table 5: Means of participation of private sector in climate adaptation

Private participation in climate adaptation	Property rights	Examples
Private investment in climate adaptation to protect own assets and supply chains.	Private goods	Enlarged or retrofitted cooling systems; new facilities outside high-risk zones; desalination plants; cold storage; rainwater harvesting.
Private engagement in developing and selling products and services that are owned and financed by the public sector.	Public goods	Weather forecasting products and services; public infrastructure (all-weather roads, seawalls, storm water drains); cyclone shelters; forest conservation.
Private engagement in developing products and services that are owned by the private sector and fully or partly financed by the public sector.	Private goods with positive externality	Affordable climate-resilient buildings; climate-resilient agriculture (drought resistant seeds, extension services, insurance); water recycling/reuse.
Private full or partial ownership and financing (including PPPs or deferred public expenditure/annuity models).	Public goods	Climate-related public infrastructure (buildings, seawater retainers, coastal roads, flood embankments, urban heat reduction, nature-based solutions).

Source: CPI analysis

The first engagement mechanism in the table relates to the private sector's need to manage physical risks. The others need to be created, enabled, or incentivized by policy and institutional mechanisms in cases where commercial and private investments are expected to be limited. Although there are opportunities for the private sector to generate profits by selling climate-adaptive products or services, such as seeds for drought-resistant crops or private-weather forecasting, its role in climate adaptation is limited (World Bank Group). This report focuses on private finance for climate adaptation, which largely relates to public or private goods with clear positive externalities.

5.4.1 BARRIERS TO PRIVATE FINANCE IN CLIMATE ADAPTATION

In order to create incentives and mechanisms that use scarce public capital to scale up private finance, it is important to identify barriers to private investment in adaptation projects. These include:

- Lack of data and information, including on exposure to climate change risk and vulnerability mapping of locations (Observer Research Foundation 2023)
- Uncertain investment returns (World Bank Group)

- Limited knowledge of investment opportunities (World Bank Group)
- Lack of capacity to develop commercially feasible projects (World Bank Group)
- Unavailability of bankable projects and business models (Biagini, Bierbaum, Stults, Dobardzic, & McNeeley 2014)
- Long-investment horizons (Prasad, Loukoianova, Feng, & Oman 2022)

The impacts of climate change are uncertain as they are based on multiple factors. There is a limit to which predictive models can provide data, information, and analytics that can support the private sector in making investment/financing decisions (Clark, Reed, & Sunderland 2018). Uncertainty over the intensity and frequency of climate-related hazards makes it challenging to quantify the benefits of climate adaptation. In addition, state authorities lack the capacity to originate, structure, and develop climate-resilient projects that can attract private capital.

Climate change adaptation projects present a classic market failure problem. Such projects are sometimes not profitable enough to attract private investment, and even if new business models are created, lenders perceive risk in financing them. For example, protecting coastal mangroves offers numerous benefits, including protection from storms and floods. However, attracting private investment is difficult as these projects do not generate adequate returns to service debt. For public infrastructure projects, revenue is mostly derived from user fees, which are not available in many adaptation projects. It is also difficult to monetize the full benefits of climate adaptation projects realized by the general public and to reward the private sector in those specific locations. For example, stormwater drains help public and private corporations, but there are limited business models to create bankable projects. Many investors see a mismatch between the long-term anticipated impacts of climate change and their short-to-mid-term investment horizons.

5.4.2 INCREASING PRIVATE FINANCE IN CLIMATE ADAPTATION

Climate resilient infrastructure is often expected to be publicly financed and owned, though it may be developed and managed by the private sector under public-private partnerships (PPPs). Since adaptation requirements are localized and may also yield local benefits and public goods, it could be possible for capital and operating costs recovered through cost-based charges/fees, to be borne by households and corporations with assets in the locality. As the risk of losses due to climate-related events decreases due to climate adaptation projects, the tangible value of properties owned by households and corporations would increase accordingly. Local authorities can use their augmented tax revenues on land and property transactions to increase local area public finances/revenues. For example, cities can impose an additional tax (consequent to adaptation investments) to create additional revenue for the city to service debt.

However, it is important to recognize the vulnerability, ability, and/or willingness of households to pay taxes or user fees. For example, climate adaptation projects may help farmers increase their incomes, but it is unfeasible to tax or collect user fees from small and marginal farmers in India (see Box 5). Despite these barriers, there are certain ways to attract large-scale private financing for climate adaptation actions for the wider economy.

Box 5: Government support at the initial stages can accelerate private financing at later stages

Startups in India have developed drought- and heat-resilient seeds and are offering soil monitoring services to address climate-induced impacts on the nutritional value of foods. Sahaja Seeds, a start-up in India, sells seeds that are heat and drought-resistant; however, these seeds are expensive. Similarly, Krishitantra, another start-up in India, provides soil health monitoring services, but these services are not affordable to all farmers in India. Hence, the adoption of these climate-resilient goods and services or practices is limited to rich farmers for various reasons, including access to climate finance. Government subsidies can accelerate the adoption of such services with wide societal benefits. This can stimulate demand and accelerate private financing in climate-resilient agriculture practices.

The Global Innovation Lab for Climate Finance has incubated financial instruments that leveraged public finance to attract large-scale private finance (see Box 6). In Section 6.2 we have advanced recommendations that can be deployed to accelerate much-needed private finance for climate adaptations.

Box 6: Instruments to encourage private adaptation finance

The **Oasis Platform for Catastrophe and Climate Change Risk Assessment and Adaptation** instrument, endorsed by The Global Innovation Lab for Climate Finance, aims to improve understanding and management of climate risk, thereby facilitating investments in insurance and/or risk reduction. The instrument applies to Asian low and middle-income countries where information on climate risks is not available or adequately developed (The Global Innovation Lab for Climate Finance, 2015).

The **Restoration Insurance Service Company**, also endorsed by the Lab, invests in mangrove conservation and restoration. Investor returns will be generated through two primary income streams: 1) fees collected from insurance companies with interests in coastal assets, in recognition of the protective advantages offered by mangroves; and 2) by selling blue carbon credits on voluntary carbon markets (The Global Innovation Lab for Climate Finance, 2019).

The **Water Financing Facility**, endorsed by The Global Innovation Lab for Climate Finance, provides long-term loans to water utilities in Kenya for water infrastructure. Ring-fencing revenue from water infrastructure would reduce the risk associated with the Water Utility company's poor balance sheet. The facility also secured commitment from the Netherlands Government to provide a revenue pledge, which further reduces the credit risk of the facility (The Global Innovation Lab for Climate Finance, 2015).

6. CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

India recognizes that it is highly vulnerable to climate change, and the need to focus on adaptation measures/investments that have development co-benefits.

The country has displayed continuous commitment to enabling adaptation action, introducing plans, policies, programs, and schemes to facilitate activities at the national and state levels.

However, there are substantial adaptation investment needs at the national and subnational levels. The adaptation funding gaps for states are substantial, as some of the updated SAPCCs show.

Adaptation-related interventions in India are largely financed through domestic public finance, with states as the main contributors. However, at present, state finances are under severe stress. This constrains their ability to bridge the adaptation funding gap and meet their adaptation investment needs, which are likely to increase in the foreseeable future.

Globally, and in India, private adaptation finance tends to be limited due to information asymmetries, knowledge gaps, high upfront costs, long pay-back periods, unfavorable risk-return profiles, as well as a lack of bankable projects and business models.

Therefore, it is necessary to increase state fiscal space, as well as mobilize private finance to bridge adaptation funding gaps. The following section provides recommendations on ways to do so.

6.2 RECOMMENDATIONS

STRENGTHENING STATE PUBLIC FINANCE

- The Finance Commission's mandate to divide taxes between the central government and state governments, and its increasing focus on providing untied funds to states, make it a crucial node in India's adaptation response. Recent commissions have paid increasing attention to climate concerns by promoting forest conservation and increasing support for disaster preparedness in vulnerable areas. **The 16th Finance Commission, whose recommendations are expected to take effect from April 1, 2026, could consider adaptation as another crucial climate variable when setting its fund devolution criteria and formula.** To this end, it can use India's official climate vulnerability assessment, released in 2021. This can help states design and finance state-specific adaptation interventions.

- There is growing recognition of the need for climate change adaptation policies, programs, and schemes at the state level. Access to increased and directed public finance can help states implement these programs and schemes and meet their adaptation investment needs. **In this regard, an upward revision in states' fiscal deficit thresholds (from the current FRBM norms) may encourage them to introduce innovative financial instruments to finance adaptation-related projects.** This is important, particularly if the central government aims to promote budget transparency by incorporating off-budget borrowing into fiscal space computations.
- **Another mechanism that can help is the setting of time-bound, state-specific climate-incentivized borrowing ceilings.** The borrowing ceiling (as a share of GSDP) is uniform across states, but climate risk and vulnerability, and hence adaptation investment needs, vary. Climate-incentivized borrowing ceilings that account for state-specific climate risks and vulnerabilities can help relatively more vulnerable states have access to increased finance. Enhanced borrowing ceilings can be made conditional to states investing in adaptation-related interventions. This can also help reduce the adverse effects of climate change on the GSDP of vulnerable states and increase their fiscal capacity in the future. The borrowing ceiling, aggregated across states, can be kept as per the current FRBM norms, to ensure that only states with additional adaptation investment needs and capacity to implement get to borrow more. To curb fiscal profligacy, there is a need to provide adequate safeguards in terms of tax collections and increase revenues from other sources at the state and local body levels. Finally, an Adaptation and Resilience Tax (different from a Carbon Tax), also may be considered.
- A related issue that can help scale up adaptation finance flows is high-quality green finance data. Effective and comprehensive green finance data is crucial for understanding investment needs based on sectoral targets set under the national missions, schemes, and national/state action plans for climate change, building effective solutions, and measuring progress. Tracking helps in identifying gaps and barriers in financing adaptation and resilience solutions. This can also help improve transparency of the government's action plans on climate change. **It is therefore necessary to develop a template for tracking and tagging adaptation-related expenditure. This would help India move towards a credible adaptation finance plan, including at the state level.**

ATTRACTING PRIVATE PARTICIPATION AND INVESTMENT IN ADAPTATION

- **Climate adaptation public-private partnerships (PPP):** PPP models can be a key entry point for mobilizing large amounts of private finance, deferring fiscal burdens for governments. For example, annuity models or hybrid annuity models are used extensively in India for infrastructure and can be applied to climate adaptation projects, such as restoration of wetlands and protection of coastal zones. Under these models, private financiers source capital fully (annuity models) or partially (hybrid annuity models) and are paid on annuity or half-year annuity over specified years (ARE Ratings 2018). The other mechanism could be design-build-finance-operate (commonly known as DBFO) models whereby the private sector finances the project and gets assured revenue from the government agency or user fees. The government can also provide viability gap funding for such projects. Stable cash flows – annual or semi-annual annuity and

assured operating and maintenance payouts – mitigate financing risk, thereby attracting private financiers.

- **Developing a climate risk exposure and adaptation projects database of various locations:** Public institutions can create a database to connect climate adaptation projects with private financiers. A database containing information on physical risks posed by climate change to specific locations would help private investors identify and assess the commercial viability of locations for climate adaptation projects. Such information can help the private sector to design context-specific and climate-risk-informed adaptation projects and evaluate associated costs and benefits. The database can also have other information on climate adaptation investment opportunities in a given region (state or municipality), including a brief overview of the project, funding requirements, details of the stakeholders, creditworthiness, and government policies (financial support, fiscal support, etc.). Such information would help investors to select projects according to their risk and return objectives. The Matchmaker Service, endorsed by the Global Innovation Lab for Climate Finance, offers meaningful information and data points on city climate projects to potential investors, project developers, and other stakeholders through a matchmaking platform.
- **Assurance of minimum investment return or assured revenue:** Given the uncertainty over how climate change risks will manifest, climate adaptation projects need to be flexible, benefitting from their broader socioeconomic benefits to justify investment. In addition, adaptation projects should be considered as an investment to manage or minimize risk (UN Environment Program, 2019), not only to generate returns. For example, all-weather roads or cyclone shelters offer enormous value to local communities during climate-induced weather events, but it is difficult to monetize them. State or central governments can offer a minimum investment return assurance, or assured revenue to the private sector for climate adaptation projects that offer these benefits. However, public policies can be designed to enable state governments to charge beneficiaries³⁶ of climate resilience projects, and proceeds can be used to pay back to private investors. For example, land value capture is a mechanism to recover a portion of the investment cost of climate adaptation projects. As a result of adaptation efforts, government spending following natural disasters can be reduced if the impacts of the disasters are minimized.
- **Project preparation facilities and blended finance:** Climate adaptation projects need to be structured by state authorities to make them investment-ready. This involves feasibility analysis and transaction advisory services, which are typically not ‘financed’ in the same way as investments. State or local authorities can set up project preparation facilities to provide strategy, financing, legal, technical and procurement advice.

Such facilities can reduce transaction costs for private investors, especially in the complex areas of climate infrastructure projects. The facility can structure projects to align the interests of financiers, operators, and users, to improve financial prospects. It can also design innovative instruments for blended finance, government guarantees, risk-sharing mechanisms, and credit enhancement to help reduce real and perceived risks of

³⁶ Who have the ability to pay

investment, paving the way for private capital. Fiscal instruments such as tax benefits and subsidies can also help to make climate adaptation projects bankable.

Adaptation is a priority given India's climate vulnerability but adequate policy, as well as institutional and fiscal priority, is lacking. While India has taken some proactive measures through planning and programmatic actions like the NAPCC and SAPCCs they remain inadequately funded. To attract private investment in adaptation, there is a need for project development to create bankable projects that could then be developed under PPP models.

Public data and analytics on physical risk are important to be made available to policymakers at sub-sovereign levels so that there is a greater and better understanding of the implications of possible increases in the severity and frequency of climate events. Finally, there is a need for innovative financial instruments. These could be similar to social/development impact bonds where outcomes are partly paid for as results-based financing and may be structured as Adaptation and Resilience Bonds (A&R Bonds). Disaster management remains critical, and there will be increasing need to pay for climate disasters. This could take the form of disaster risk financing – where affected people would need to be compensated for Loss and Damage.

CPI remains committed to helping India accelerate its adaptation action. Going forward there are two critical areas of focus to advance adaptation finance in India: a) developing a pipeline of adaptation and resilience projects and b) advancing innovative financial instruments that create financial returns and pay for themselves as a result.

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Financing Adaptation in India

Annexes

February 2024



CLIMATE
POLICY
INITIATIVE

ANNEX 1. GLOBAL METHODOLOGIES AND PROCESSES FOR ADAPTATION ACTION

Following are some established criteria, methodologies and processes for planning, implementing, financing and tracking adaptation action, set by multilateral agencies and the private sector:

- **The Green Climate Fund's** detailed investment criteria are based on a four-pronged approach: (i) transformational planning or creating an enabling environment for adaptation investment through integrated strategies, influencing policy for systematic resilience assessment, and investment planning; (ii) catalyzing innovation in adaptation; (iii) de-risking high impact adaptation projects by establishing commercial viability of adaptation solutions; and (iv) aligning finance with sustainable development (GCF 2022).
- **The MDB-IDFC Common Principles for Climate Change Adaptation Finance Tracking** emphasize that adaptation activities must: (i) set out the context of climate risks, vulnerabilities, and impacts; (ii) state the project's intent to address the risks; and (iii) demonstrate a direct link between the identified risks and the financed activities (European Investment Bank 2022).
- **The World Bank's resilience rating system** assesses if projects are resilient to the risks posed by the impacts of climate change and if their outcomes aim to build resilience of systems to climate change, based upon the breadth and depth of climate data integration into project design, and its reflection in operations and risk analysis (World Bank 2021).
- **Lightsmith Group's Adaptation SME Accelerator Project (ASAP) Taxonomy**, a private sector initiative, creates a flexible framework for determining if an SME qualifies as an adaptation SME, based on the types of technologies, products and services it offers. These include climate information and data-based products, and technologies or services needed to address climate risk and enable adaptation (Trabacchi et al. 2020).

ANNEX 2. ADAPTATION PLANNING IN INDIA

NAPCC MISSIONS

The following graphic presents all eight missions of the NAPCC, the focus of each mission along with the corresponding nodal ministries.

Mission	Ministry	Focus of the mission
National Solar Mission	Ministry of New and Renewable Energy	The mission aims to increase the share of solar energy in the total energy mix and improve the affordability of solar power and energy storage systems.
National Mission on Energy Efficiency	Ministry of Power	The mission aims to create an enabling policy environment to improve the energy efficiency of domestic, commercial, and industrial sectors.
National Water Mission	Ministry of Water Resources, River Development and Ganga Rejuvenation	The mission aims to ensure “integrated water resource management to help conserve water, minimise waste and ensure equitable distribution of water resources among and within states”.
National Mission for Sustainable Agriculture	Ministry of Agriculture & Farmers' Welfare	The mission aims to make agriculture more productive, sustainable, remunerative and climate resilient.
National Mission for Sustaining the Himalayan Ecosystem	Department of Science and Technology	The mission aims to assess the vulnerability of the Himalayan region and build capacity at the state level to respond to the impacts of climate change.
National Mission for Green India or Green India Mission	Ministry of Environment, Forest and Climate Change	The mission aims to safeguard and enhance ecosystem services and associated livelihoods against the impact of climate change.
National Mission for Sustainable Habitat	Ministry of Housing and Urban Affairs	The mission aims to encourage sustainable urban planning with focus on 5 thematic areas: <ul style="list-style-type: none"> • Energy and Green Building • Green Cover and Biodiversity • Mobility and Air Quality • Water Management • Waste Management
National Mission for Strategic Knowledge on Climate Change	Department of Science and Technology	The mission aims to create a comprehensive knowledge system that informs and supports climate change action in India with the help of research and communication-based actions.

Mitigation	Adaptation	Both Mitigation and Adaptation
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Source: Prime Minister's Council on Climate Change 2008

NDC GOALS AND NAPCC MISSIONS

The table below shows the link between India's NDC goals and the NAPCC missions.

	NDC goal	Relevant NAPCC missions
1	To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.	All Missions
2	To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.	All Missions
3	To reduce the emissions intensity of its Gross Domestic Product by 33-35% by 2030, from 2005 level.	<ul style="list-style-type: none"> ▪ National Solar Mission ▪ National Mission for Enhanced Energy Efficiency ▪ National Mission on Sustainable Habitat ▪ Green India Mission
4	To achieve about 40% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 with the help of transfer of technology and low-cost international finance, including from the Green Climate Fund (GCF).	<ul style="list-style-type: none"> ▪ National Solar Mission
5	To create an additional carbon sink of 2.5 to 3 billion tons of CO ₂ equivalent through additional forest and tree cover by 2030.	<ul style="list-style-type: none"> ▪ Green India Mission ▪ National Mission for Sustainable Agriculture
6	To better adapt to climate change by enhancing investments in development programs in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.	<ul style="list-style-type: none"> ▪ National Mission for Sustainable Agriculture ▪ National Water Mission ▪ National Mission for Sustaining the Himalayan Ecosystem
7	To mobilize domestic and new and additional funds from developed countries to implement the above mitigation and adaptation actions, in view of the resource required and the resource gap.	

Quantitative Targets

Qualitative Targets

Source: Government of Tamil Nadu [date unknown]

ADAPTATION-RELATED DEVELOPMENT SCHEMES¹

The following table presents some of the recent adaptation related schemes in India.

Scheme		Description
Pradhan Mantri Fasal Bima Yojana (PMFBY)	Central Sector Scheme	The scheme provides affordable crop insurance to ensure comprehensive risk cover against all non-preventable natural risks from pre-sowing to the post-harvest stage (SCA 2021).
Namami Gange Programme	Central Sector Scheme	The scheme aims to ensure effective abatement of pollution, conservation and rejuvenation of River Ganga (PIB 2018).
Atal Mission for Rejuvenation and Urban Transformation 2.0 (AMRUT 2.0)	Centrally Sponsored Scheme	The Mission focuses on sustainable water management, comprising universal water supply coverage, reducing non-revenue water (universal water supply, water meters, and leakage detection technologies), double piping systems in group housing societies, and water conservation interventions (MoHUA 2021).
Pradhan Mantri Krishi Sinchai Yojana (Irrigation scheme)	Centrally Sponsored Scheme	The Scheme aims to develop irrigation sources to combat drought. This is done through rainwater conservation, the construction of farm ponds, water harvesting structures, small check dams, etc (PIB 2022).
National Afforestation Programme (NAP)	Centrally Sponsored Scheme	The Scheme aims to restore degraded forests and to develop forest resources with peoples' participation, with a focus on the improvement of livelihoods (PIB 2019).

Source: Compiled by CPI, based on multiple sources²

¹ The schemes highlighted could also include aspects of mitigation.

² Ministry of Housing and Urban Affairs, 2021; PIB 2017; PIB 2018; PIB 2019; PIB 2022; Standing Committee on Agriculture 2021

ANNEX 3. SHARE OF ADAPTATION INTERVENTIONS IN PROPOSED BUDGETS OF FEATURED SAPCCS

SHARE OF ADAPTATION-RELATED INTERVENTIONS IN THE TOTAL PROPOSED BUDGET IN UPDATED SAPCCS

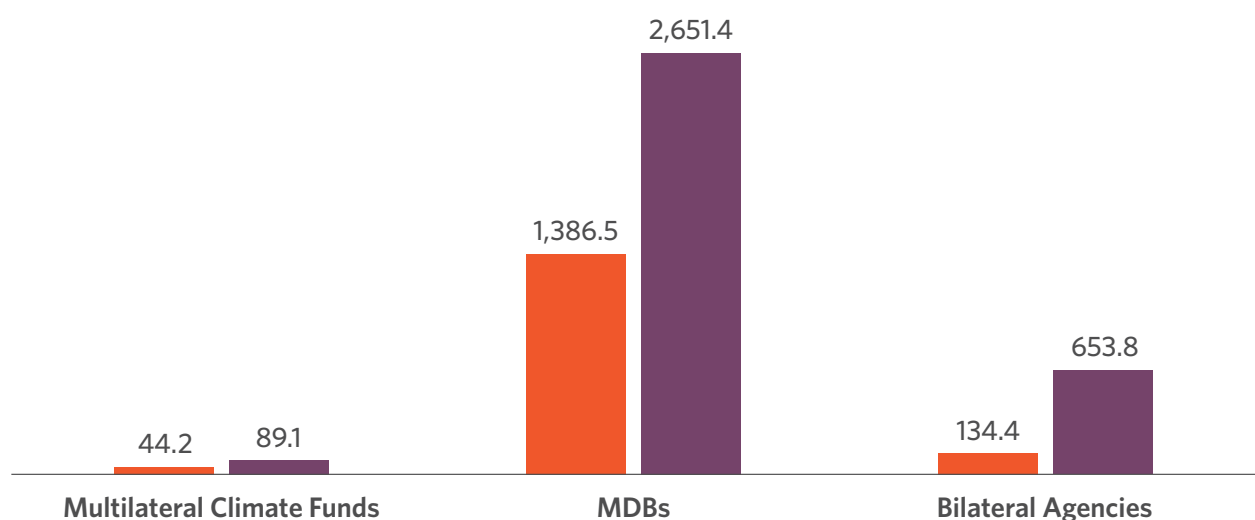
The table below shows that international finance for adaptation constitutes a small proportion of the total finance for adaptation-related interventions in India. Adaptation-related interventions constitute a large proportion of total investment needs in all the featured SAPCCs, except for those of Haryana and Kerala.

	State	Share of adaptation-related interventions (%)
1	Odisha	81.0
2	Himachal Pradesh	86.9
3	Goa	65.0
4	Tamil Nadu	54.5
5	Kerala	42.4
6	Haryana	26.0

Source: CPI calculation based on featured SAPCCs

ANNEX 4. ADAPTATION FINANCE RECEIVED FROM INTERNATIONAL SOURCES

ADAPTATION-RELEVANT CUMULATIVE FINANCE RECEIVED BY INDIA FROM INTERNATIONAL SOURCES - 2014-2020 (IN USD M)



Source: MoEFCC 2021

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