

MAHARASHTRA STATE CLIMATE FINANCE FRAMEWORK

FROM RISK TO RESILIENCE



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EXECUTIVE SUMMARY

Maharashtra stands at a critical juncture. On the one hand, its economic growth is accelerating, while on the other, climate risks are escalating, impacting livelihoods, public health, critical infrastructure and economic output. And both are becoming increasingly intertwined. As one of India's most economically dynamic states, Maharashtra is simultaneously among the most exposed to climate-related hazards, including floods, droughts, heat stress, cyclones, and coastal erosion.

These risks threaten infrastructure, livelihoods, fiscal stability, and long-term development outcomes, particularly in climate-sensitive sectors such as agriculture, manufacturing, and urban infrastructure. Addressing these challenges requires stronger policies, coupled with a decisive, forward-looking approach on how financial resources are mobilised and utilised.

Through the *Viksit Maharashtra 2047 vision* and the updated *Maharashtra State Action Plan on Climate Change: Pathways for 2030* (MH SAPCC), the Government of Maharashtra has articulated a clear commitment to climate-resilient and low-carbon development. Translating these ambitions into measurable outcomes depends on the state's ability to systematically align public expenditure and private investment with targeted climate action. Mobilising domestic and international capital alongside streamlining public finance has emerged as a strategic priority for the Government of Maharashtra, as embedded in the MH SAPCC. However, the absence of a clear and credible framework to define what constitutes a climate-aligned activity limits investors and financial institutions from identifying eligible projects, assessing climate impact, and aligning investments with state priorities. Existing

budget allocation for climate-focussed activities remains fragmented across departments, as they are often without a consistent methodology to assess their contribution to climate mitigation and adaptation or resilience.

The **Maharashtra State Climate Finance Framework (MSCFF) responds to these challenges by presenting a state-level climate finance taxonomy that is aligned with Maharashtra's sustainable developmental goals and climate risks.** The framework serves as a decision-making tool to categorise climate change mitigation, adaptation, and cross-cutting activities, and links them with the sectoral strategies embedded under the *MH SAPCC*. Furthermore, it establishes a structured, science-based 'common language' to identify, classify, and screen climate-focussed interventions. The framework ensures that it is interoperable with Indian and global climate taxonomies, and enables decision-makers to move from reactive spending towards a more strategic, outcome-oriented deployment of capital. The framework will enable planners to move from fragmented spending to a structured, pipeline-driven approach, which signals investor-ready opportunities, and strengthens access to domestic and international climate finance.

By operationalising the priorities of the *MH SAPCC* and aligning them with the *Viksit Maharashtra 2047 vision*, the MSCFF strengthens the link between risk-informed planning and channelling investment towards sustainability. Ultimately, the framework supports Maharashtra's transition towards a low-carbon, climate-resilient development pathway; one that safeguards economic growth, protects vulnerable communities, and ensures long-term sustainability in the face of escalating climatic uncertainties.

KEY DEFINITIONS

Climate adaptation, as defined by the United Nations Framework Convention on Climate Change, is the process of adjusting ecological, social, and economic systems to respond to actual or expected climate impacts, aiming to moderate potential damage or capitalise on new opportunities. It is a context-specific approach that focuses on building resilience through infrastructure, policy changes, and community-led solutions, to protect lives and livelihoods (UNFCCC n.d.).

Climate mitigation involves reducing greenhouse gas emissions and enhancing natural carbon sinks, to address the root causes of global warming and preserve a stable biosphere. This goal is achieved through transitioning to renewable energy, restoring ecosystems like forests and wetlands, and implementing supportive policies such as carbon pricing and emission limits (IPCC 2022b).

Climate finance as defined by the UNFCCC Standing Committee on Finance aims at reducing emissions and enhancing sinks of greenhouse gases, reducing vulnerability, increasing adaptive capacity, and mainstreaming and increasing resilience of human and ecological systems to negative climate impacts. It includes financing for actions identified in a country's nationally determined contribution, adaptation

communication, national adaptation plan, long-term low-emission development strategy or other national plan for implementing and achieving the goals of the Paris Agreement and the objective of the Convention (UNFCCC 2024).

Sustainable finance refers to finance flows, policies and institutional frameworks that support long-term sustainable development. It incorporates environmental, social, and governance (ESG) frameworks into decision-making to ensure economic growth, social inclusion and stewardship. (OECD 2024)

Adaptation finance refers to funding directed at building resilience to climate change impacts, from flood-resistant infrastructure to drought-resilient agriculture, early warning systems, and risk-transfer mechanisms like insurance. (UNEP FI 2025)

Mitigation finance is financial support provided for activities and interventions that contribute to the reduction, limitation, or avoidance of greenhouse gas emissions, or the enhancement of sinks (MDBs and IDFC 2023)

Maladaptation is the risk of an unintended measurable increase in vulnerability (or exposure) in the investment context, and/or in the wider system, within which the investment is situated (Climate Bonds Initiative 2024).

1. INTRODUCTION

Maharashtra has articulated an ambitious development agenda through the *Viksit Maharashtra 2047 vision*, which seeks to position the state as a USD 1 trillion economy by 2030 and USD 5 trillion economy by 2047, while advancing inclusive, sustainable, and resilient growth (Government of Maharashtra, n.d.). The vision emphasises structural economic transformation, building industrial competitiveness and job creation, while recognising the need to manage environmental risks associated with rapid growth. Complementing this long-term economic vision, the *Maharashtra State Action Plan on Climate Change* (MH SAPCC) provides policymakers with a strategic framework for addressing climate change by formulating sector-specific strategies for mitigation and adaptation. The *MH SAPCC* identifies climate risks, priority sectors, and

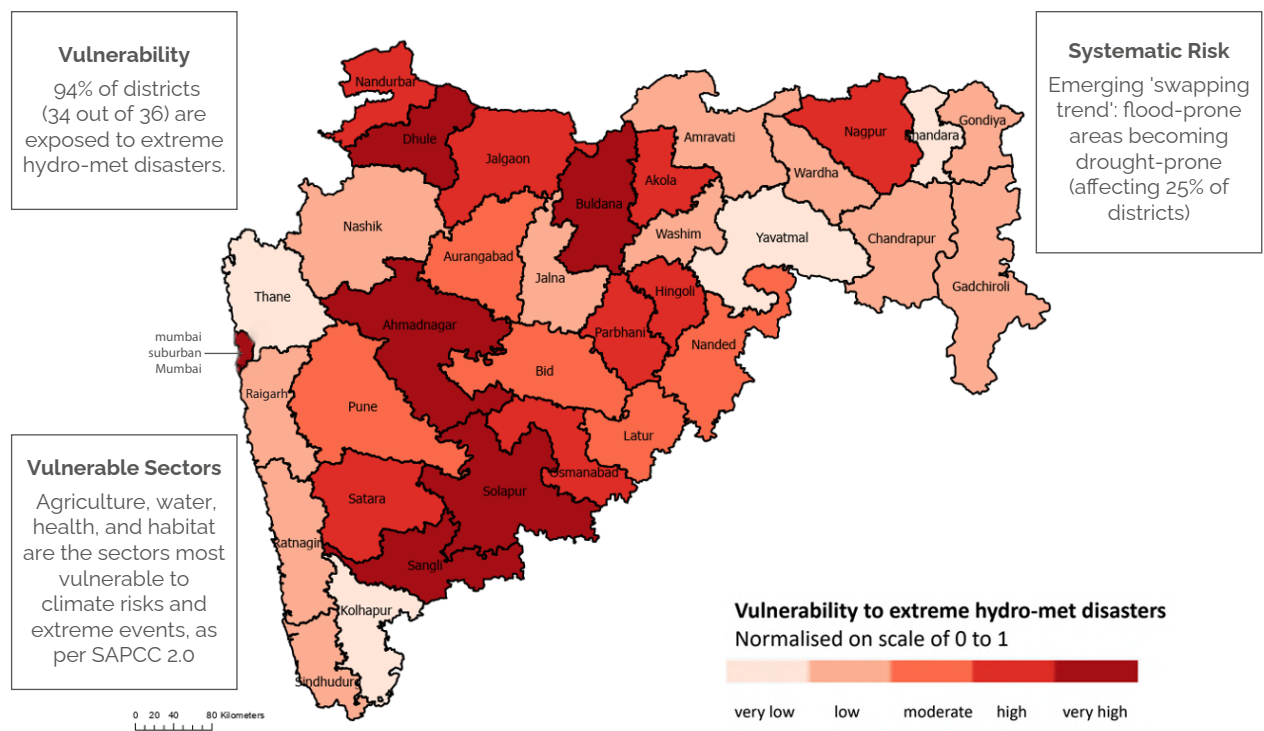
response strategies, thereby building a connection between development planning and climate action. Together, these policy instruments reflect the Government of Maharashtra's commitment towards integrating climate considerations into economic decision-making and ensuring that pathways for growth and development remain compatible with environmental sustainability and long-term resilience.

Maharashtra is highly vulnerable to the impacts of climate change, owing to a long coastline, socio-economic diversity, diverse agro-climatic zones, and an economy that is reliant on agriculture, manufacturing, and other industries. An analysis by the Council on Energy, Environment and Water (CEEW) shows that nearly **94% of the districts (34) in**

Maharashtra are exposed to extreme climate events such as floods, droughts, and cyclones. CEEW research further finds that over 85% of the state's districts (30) are currently exposed to extreme drought and drought-like conditions. The state has witnessed a threefold increase in the frequency and intensity of extreme droughts and cyclonic events, and a fourfold increase in the frequency and intensity of extreme flood events since 2010 (Mohanty and Wadhawan 2021). Importantly, 25% of districts (9) in the state are

showing a swapping trend in rainfall patterns—flood-prone areas are becoming drought-prone, and vice versa. These trends indicate that climate risks in Maharashtra are no longer only episodic events, but have become systemic, and hence, require risk-informed interventions with robust finance flows for their implementation. The approach should move beyond reactive disaster-response to creating long-term resilience across sectors.

Figure 1. Maharashtra's vulnerability to extreme climate events

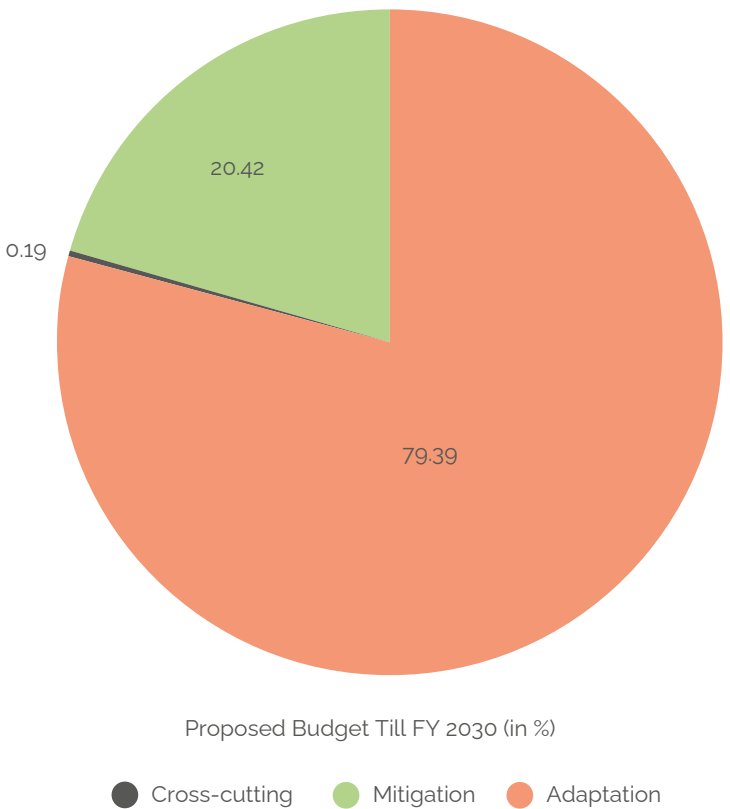


Source: CEEW analysis based on Department of Environment and Climate Change, Government of Maharashtra and Council on Energy, Environment and Water. Maharashtra State Action Plan on Climate Change (2020 - 2030). Mumbai: Department of Environment and Climate Change, Government of Maharashtra.

The *MH SAPCC* serves as a roadmap to identify and integrate climatic risks for priority sectors, and implement adaptation and mitigation strategies at the state and local levels. Recognising climate finance as a critical enabler, the Government of Maharashtra has committed to significantly scaling up climate-related expenditure, with the aim of increasing budgetary allocations for climate-focused interventions from **12% in 2024 to 50% till 2030**, which translates to **INR 2,97,558.74 crore** (Department of Environment and

Climate Change, Government of Maharashtra and Council on Energy, Environment and Water). Figure 2 and Table 1 provide an overview of the proposed climate budget, highlighting a strong emphasis on adaptation (79.39%), alongside mitigation (20.42%), and cross-cutting activities (0.19%). This distribution underscores the need to identify innovative pathways for channelling finance towards adaptation, which remains one of the most persistent challenges in climate finance.

Figure 2. Proposed climate budget based on MHSAPCC recommendations (2024–30)



Source: Department of Environment and Climate Change, Government of Maharashtra and Council on Energy, Environment and Water.

Table 1. Maharashtra's proposed climate budget and activity-wise categorisation

Category	Climate budget (INR crore)	Share of total climate budget (%)
Mitigation	60,787.51	20.42 %
Adaptation	2,36,198.33	79.39%
Cross-cutting	572.9	0.19%
Total	2,97,558.74	100%

Source: Department of Environment and Climate Change, Government of Maharashtra and Council on Energy, Environment and Water.

Achieving this target will require sustained public investment coupled with private domestic and international finance mobilisation. Strengthening climate finance frameworks at the sub-national level is recognised as a potential instrument to scale investments, improving transparency while ensuring that capital is deployed effectively to support long-term climate-focused outcomes (UNEP FI 2025).

1.1. NEED FOR A STATE-LEVEL FRAMEWORK

While Maharashtra has articulated strong climate and development ambitions, the effectiveness of climate action increasingly depends on how investment decisions are made, prioritised, and coordinated across institutions. Climate-relevant investments in the state are currently dispersed across multiple departments, schemes, and budget lines, often without a unified method to assess their measured effects, and contribution to long-term mitigation and adaptation outcomes. This fragmentation limits the state's ability to aggregate impact, track progress, and strategically steer investments toward transformational outcomes (OECD 2024).

Moreover, without the formalisation of a thorough needs and gaps assessment, based on local climate

risk identification, budgetary allocations follow historical spending patterns, rather than adopting forward-looking strategies. These institutional limitations have spillover effects on private investment decisions. The private sector faces limitations in screening climate-aligned investment opportunities due to the absence of clear signals on state priorities, eligible activities, and credible impact metrics. This challenge is particularly stark for climate adaptation, as such projects struggle to attract private capital due to difficulties in quantifying benefits, long and uncertain gestation periods, and the lack of stable and predictable revenue streams (OECD 2024).

As observed globally, climate finance frameworks have emerged as effective instruments to address structural and informational gaps by providing a common decision-making tool for public and private actors. By establishing clear classification criteria, risk-informed screening processes, and impact indicators, such frameworks enable institutions to shift from fragmented, ad hoc investments towards a more strategic and outcome-oriented deployment of capital. Maharashtra needs a dedicated, state-level climate finance framework that translates global and domestic best practices into an instrument tailored to its institutional structure, sectoral priorities, and development objectives.

1.2. TOWARDS THE MAHARASHTRA STATE CLIMATE FINANCE FRAMEWORK (MSCFF)

What is the MSCFF?

A structured, science-based decision tool to identify, classify and screen climate-aligned activities, to inform public and private investment in Maharashtra. It is a 'living document' designed to evolve with India's national taxonomy.

Bridging the state's climate investment gap will depend not only on the scale of available finance, but also on the capacity to systematically identify and prioritise climate activities across sectors. (OECD 2024). The MSCFF is envisaged as a reference guide to strengthen decision-making, enhance transparency, and standardise the classification of mitigation, adaptation, and cross-cutting activities within the state. By providing clear science-based criteria and screening approaches, the framework supports integration of climate considerations into development expenditure planning, while improving the quality and consistency of climate-related investments.

By aligning public and private financial flows with the objectives of the *MH SAPCC* and the vision of *Viksit Maharashtra 2047*, the MSCFF seeks to improve the effectiveness, credibility, and scalability of climate finance in the state. In doing so, it facilitates mobilisation of public, private, and international capital towards a coherent pipeline of investments that support Maharashtra's long-term transition to a low-carbon, climate-resilient development pathway. (OECD 2024).

The MSCFF is explicitly designed to align with and complement **India's emerging Climate Finance Taxonomy** (Ministry of Finance 2025), serving as an early sub-national application of a taxonomy-based approach to climate finance. While the national taxonomy establishes overarching principles, definitions, and screening logic, the MSCFF operationalises these at the state level by translating them into sector-specific classifications, activity-level screening criteria, and investment pathways that reflect Maharashtra's distinct climate risks, development priorities, and institutional arrangements. In essence, the framework represents a practical exercise in adopting and contextualising a climate finance taxonomy at the sub-national level, demonstrating



Climate-resilient urban infrastructure: The tetrapod seawall along Marine Drive, Mumbai

Image: iStock

how national standards can be embedded within state planning, budgeting, and investment-decision-making processes. The MSCFF is conceived as a **living document**, and will be periodically reviewed and updated following the formal launch of **India's Climate Finance Taxonomy** (Ministry of Finance 2025). This iterative approach will ensure continued alignment with national frameworks and incorporation of emerging best practices, as Maharashtra scales up climate finance in the following years.

The framework was conceptualised under the guidance of the Department of Environment and Climate Change, Government of Maharashtra, the Maharashtra State Climate Action Cell (MahaSCAC), and the Maharashtra Institution for Transformation (MITRA). The CEEW, as knowledge partner to MITRA and MahaSCAC, led the technical drafting of the framework, and helmed the overall consultation process, supported by the Foreign, Commonwealth and Development Office (FCDO), British High Commission.

A multi-institutional 'Working Group on Climate Finance', under the leadership of MITRA, brought together representatives from the state government, knowledge partners, bilateral cooperation agencies, and subject-matter experts. Through structured technical consultations and a focussed drafting session, the working group provided strategic guidance on the framework's scope, design, screening

criteria, usability, and applications for potential users. Inputs and feedback received during these engagements were systematically incorporated into the final draft, ensuring that the framework reflects expert perspectives, and is both technically robust and practically applicable.

The following organisations contributed to the consultation process, and as members of the Working Group on Climate Finance:

- Asian Venture Philanthropic Network
- C40 Cities
- Climate Bonds Initiative
- Climate Policy Initiative
- Environmental Defense Fund
- Foreign Commonwealth and Development Office, British High Commission
- World Resources Institute, India

The MSCFF is proposed to be operationalised through a multi-tier governance structure that ensures strategic oversight, technical backstop, and effective coordination across state departments and stakeholders. The governance arrangement will be further determined in consultation with various departments of Government of Maharashtra, MITRA, and technical partners.

2. OBJECTIVES AND GUIDING PRINCIPLES OF THE CLIMATE FINANCE FRAMEWORK

A climate finance taxonomy is a practical guide that helps determine whether an activity or investment supports climate goals. It sets out clear categories and rules to identify projects that reduce emissions, build resilience to climate risks, or enable climate action.

By clearly defining what qualifies as climate-aligned, a taxonomy helps governments, businesses, and financial institutions make informed decisions, compare investments consistently, and direct funding toward credible climate solutions. It also strengthens accountability by reducing ambiguity around what determines as a climate-aligned activity, thus minimising 'greenwashing'.

Accessing capital through domestic and global markets along with the private sector offers a substantial opportunity to bridge the gap between current finance flows and the estimated needs to enhance climate resilience. For instance, in India, the cumulative expenditure needed for adaptation by 2030 in the business-as-usual scenario stands at an estimated INR 56.68 lakh crore. Whereas, India's National Communication to the UNFCCC points out that the total expenditure allocated for adaptation in 2021–22 was INR 13.35 lakh crore (UNFCCC 2023). These figures signify a major gap in allocation versus the total need for financing adaptation-focussed projects in India, and highlight the limitations of public financing. On the other hand, financial institutions and investors continue to face challenges in identifying climate-aligned investments due to the absence of consistent definitions, comparable classification systems, and credible criteria for determining impact. This is particularly evident for climate adaptation projects, which lack clear bankability standards (OECD 2025).

To address the challenges of bridging the finance gap, recent global developments indicate a growing shift towards the use of standardised taxonomies and climate finance frameworks, to attract private capital and improve the classification and transparency of climate-aligned activities. The European Union Sustainable Finance Taxonomy pioneered the use of a common language and eligibility criteria to define environmentally sustainable activities, by formalising a set of guiding principles to avoid greenwashing and enhance investor clarity (Climate Policy Initiative 2025). To add to that, the Climate

Bonds Resilience Taxonomy (CBRT) appends further nuance by incorporating resilience and adaptation criteria, and broadens the focus beyond mitigation to include systemic risk reduction and intentional adaptation outcomes (Climate Bonds Initiative 2025). Taking inspiration from these developments, various countries and regional bodies have developed and refined their respective taxonomies. Notable examples come from China, the UK, Brazil, Singapore, and regional bodies like Association of Southeast Asian Nations (ASEAN).

Comparative analysis of international taxonomies points towards a set of common foundational principles that underpin effective climate finance frameworks: alignment with science-based targets and climate objectives, consistent definitions and metrics, and strong governance and transparency mechanisms (OECD 2020). These principles ensure that taxonomies are both credible and usable for investors, policymakers, and regulators. At the national level, India's Draft Climate Finance Taxonomy represents a significant step towards creating a unified framework for defining climate-aligned economic activities and aligning financial flows with India's development and climate objectives. The taxonomy adopts a principles-based approach, emphasising science-based assessment, substantial contribution to climate objectives, avoidance of significant harm, and recognition of transition and adaptation activities. Importantly, it acknowledges the differentiated nature of climate risks and development pathways across regions, implicitly creating space for contextualised application at the sub-national level.

Within this evolving landscape, the Maharashtra State Climate Finance Framework (MSCFF) is positioned as a complementary and enabling instrument that builds on **India's Climate Finance Taxonomy** (Ministry of Finance 2025) and other global taxonomies, while introducing state-specific granularity. As India's national taxonomy is finalised, the MSCFF will be systematically reviewed and refined to ensure continued alignment with national definitions, thresholds, and classification approaches. This iterative approach positions the MSCFF as a living framework that can adapt to emerging policy guidance, scientific evidence, and market practices, while remaining responsive to Maharashtra's evolving climate and development priorities.

2.1. OBJECTIVES OF THE MSCFF

The core objective of the framework is to ensure that future investments in Maharashtra are climate-aligned and environmentally sustainable. To achieve this, the framework will offer a structured decision-making tool for policymakers, private-sector actors, and financial institutions to identify, assess, and prioritise investments that contribute meaningfully to the state's climate mitigation, adaptation, and resilience strategies.



Figure 3. Objectives of the framework



Source: Authors' analysis.

2.2. WHO CAN USE IT?

This section highlights the applicability of the MSCFF for potential users. The framework features a wide array of potential applications

to support decision-making at the state and local levels, combined with usability for private sector and financial institutions.

Figure 4. Who can use the framework?



Source: Authors' analysis.

2.3. GUIDING PRINCIPLES OF THE MSCFF

The MSCFF is guided by principles that anchor climate finance decisions in Maharashtra's policy priorities, scientific assessments, and development goals, while ensuring consistency with India's emerging climate finance taxonomy. These principles also enable alignment with international standards, strengthening the credibility, transparency, and scalability of climate-aligned investments.

Figure 5. The five guiding principles of the MSCFF



Source: Authors' Analysis.

Operationalises the MH SAPCC: The Maharashtra State Climate Finance Framework benchmarks the activities against the mitigation and adaptation strategies formulated in the MH SAPCC.

Aligns with state-level priorities: The framework aligns with the broader state development priorities, including the *Viksit Maharashtra 2047* vision, and ensures coherence between climate action and long-term economic and social development objectives. This enables sustainable growth while addressing Maharashtra's specific development needs through climate finance.

Builds on India's Draft Climate Taxonomy: The MSCFF expands on the principles and provisions of India's *Draft Climate Finance Taxonomy* (Ministry of Finance 2025) by adopting a consistent approach to defining, classifying, and assessing climate-aligned activities. This forward-looking approach supports

coherence with national climate objectives while improving robustness to integrate state-specific risks, sectors, and investment priorities.

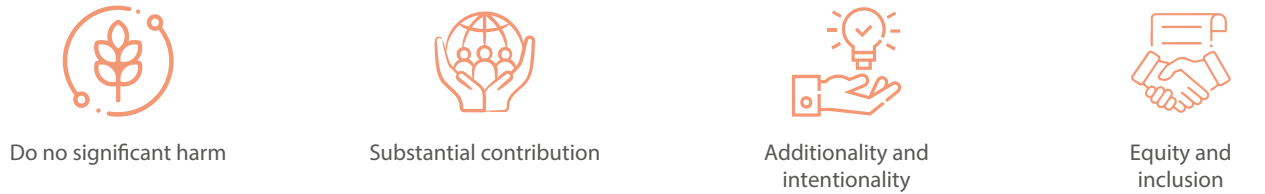
Science-based: The MSCFF is grounded in robust climate science and risk assessments, drawing on authoritative sources such as the Intergovernmental Panel on Climate Change (IPCC 2022a, 2022b). Scientific thresholds and risk-based assessments underpin the classification of activities, thereby ensuring environmental integrity and credibility of climate-related outcomes.

Interoperability with international taxonomies: The MSCFF is designed to be interoperable with leading international climate finance taxonomies and standards, including the EU Sustainable Finance Taxonomy, the Climate Bonds Initiative (CBI), Taxonomy, and the Climate Bonds Resilience Taxonomy (CBRT)(Climate Bonds Initiative 2024).

2.4. TECHNICAL SCREENING CRITERIA

The technical screening criteria help assess if an activity contributes to mitigation or adaptation, while avoiding unintended environmental or social harm. They ensure that only activities with clear climate intent and measurable impact are classified as climate-aligned under the framework.

Figure 6. The four technical screening criteria



Source: Authors' analysis.

Do No Significant Harm (DNSH): The DNSH principle ensures that activities classified under the MSCFF do not undermine environmental integrity, exacerbate climate vulnerability, or result in any spillover maladaptive outcomes in other sectors, locations, or communities. This process involves screening for potential negative externalities such as increased emissions, ecosystem degradation, or displacement risk of vulnerable communities and so on. The DNSH safeguards are particularly critical for adaptation measures, as poorly designed interventions for climate adaptation may lead to exacerbation of long-term vulnerabilities, or shift of climate-associated risks elsewhere, even if they reduce the risks in the short-term.

Substantial Contribution (SC): To qualify under the MSCFF, activities must demonstrate a *Substantial Contribution (SC)* to climate mitigation or adaptation objectives, rather than resulting in marginal or incidental co-benefits. Drawing on other global taxonomies, SC is assessed by establishing a clear causal link between the activity and climate outcomes such as measurable emissions reductions, avoided emissions, and demonstrable reductions in climate risk, exposure, or sensitivity. This criterion ensures that classified activities meaningfully advance Maharashtra's climate priorities, and avoid dilution of climate finance through weak or tangential interventions.

Intentionality and Additionality: The MSCFF applies a combined lens of *intentionality* and *additionality* to distinguish a genuine climate-relevant activity from business-as-usual development. *Intentionality* requires that climate mitigation and adaptation outcomes are explicit objectives of the activity, reflected in its design, rationale, and the expected results, rather than a secondary benefit. *Additionality* assesses whether the activity delivers climate benefits beyond what would have occurred in the absence of the intervention, policy support, or climate finance, and emphasises on a re-labelling of the existing development spending as climate finance.

Equity and Inclusion: *Equity and inclusion* are central to the MSCFF, reflecting the recognition that climate resilience must be socially just and locally appropriate. Activities are assessed for their distributional impacts, including benefits accrued to vulnerable populations, marginalised communities, and high-risk regions. It is equally important to consider whether proposed interventions exacerbate existing social or economic inequalities. This criterion ensures that climate finance supports inclusive resilience, protects livelihoods, and aligns with Maharashtra's broader development and social equity objectives, particularly in rural, coastal, and urban contexts.

3. CONCEPTUAL STRUCTURE OF THE MAHARASHTRA STATE CLIMATE FINANCE FRAMEWORK

The MSCFF is designed as a structured and science-based mechanism to identify, classify, and benchmark climate-relevant public and private investments in the state. It operationalises Maharashtra State Action Plan on Climate Change (MH SAPCC) by systematically aligning activities as potential mitigation and adaptation strategies underscored within the plan. It ensures consistency and interoperability with the state's climate risks and response strategies, by positioning the MH SAPCC as its operational backbone. At its core, the MSCFF adopts a step-wise screening and classification approach, consistent with the emerging global best practices in climate finance taxonomies, to determine whether an activity qualifies as climate mitigation, climate adaptation, or is cross-cutting in nature.

The *MH SAPCC* underscores the diverse nature of climate risks in Maharashtra, ranging from coastal flooding and cyclones to heat stress, drought, and livelihood vulnerability. It proposes activity-wise climate budget categorisation and sector-wise financial requirements for the period 2024–2030. Mitigation screening focuses on reduction of GHG emissions and low-carbon transitions. Adaptation screening emphasises upon contextualising climate risk, reducing vulnerability, and enhancing adaptive capacity.

Sectors in MH SAPCC

The following sectors are outlined in the *Maharashtra State Action Plan on Climate Change: Pathways for 2030* for targeted climate action

Table 2. List of sectors in mitigation and adaptation

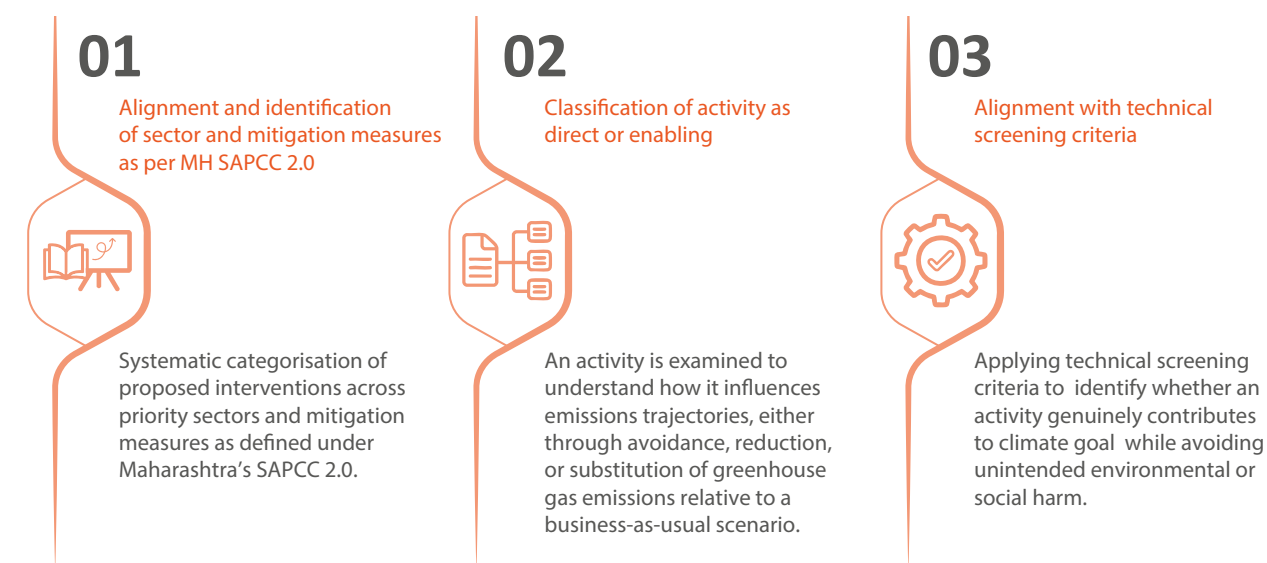
Mitigation	Adaptation
Energy	Agriculture and allied sectors
	Water Resources, water supply and sanitation
Industry	Forest and biodiversity
	Energy
Transport	Habitat (urban, rural and tribal)
	Public health

Mitigation	Adaptation
Buildings	Disaster management
	Waste management
Agriculture, Forestry, and Other Land Use (AFOLU)	Wastewater collection and treatment
	Flood management

Source: Authors' analysis.

3.1. SCREENING FRAMEWORK FOR CLIMATE MITIGATION ACTIONS

Figure 7. Three-step screening framework for climate mitigation actions



STEP 1: ALIGNMENT WITH MH SAPCC; IDENTIFICATION OF SECTOR AS PER MH SAPCC

Each activity is positioned within the relevant thematic area outlined in Maharashtra's climate action plan, establishing its strategic relevance to the state's long-term mitigation priorities. The activity demonstrates consistency with the mitigation objectives and priority

action areas outlined in the MH SAPCC, reinforcing the state's pathway towards a low-emissions trajectory while supporting the achievement of sector-specific climate targets. There are five mitigation focussed sectors outlined in the MH SAPCC 2.0, namely, energy, industry, transport, buildings, and agriculture, forestry, and other land use (AFOLU), which serve as an entry point for categorising potential activities.

STEP 2: CLIMATE MITIGATION POTENTIAL AT ACTIVITY LEVEL

An activity is examined to understand how it influences emissions trajectories, either through avoidance, reduction, or substitution of GHG emissions. The activity is then determined whether it delivers emissions reductions through direct action, or indirectly by strengthening systems, policies, or market conditions that enable mitigation.

STEP 3: ALIGNMENT WITH TECHNICAL SCREENING CRITERIA

The activity is screened to identify potential environmental risks and unintended impacts, while also recognising positive externalities such as resource efficiency or ecosystem benefits. This step supports early risk mitigation and enhances the robustness of investment decision-making. The key indicators of the technical screening criteria include: Do No Significant Harm, Substantial Contribution, Additionality and Intentionality, and Equity and Inclusion.

Table 3. Categorisation of mitigation-focused activities

Category	Colour code	Definition	Strategic goal for Maharashtra
Green activity	Green (Direct)	Activities operating at near-zero emissions or directly leading to the reduction of GHG emissions, in line with India's net-zero target of 2070.	Sustainable economic growth: attract capital for EVs, renewables, and green hydrogen to drive the new economy.
Transition activity	Amber (Enabling)	Activities that are not yet low-carbon, but are making progress toward decarbonisation determined by sector transition pathways.	Transition: decarbonise traditional industries (steel, cement, textiles) without causing economic disruptions.
Excluded activity	Red (Excluded)	Activities that are emissions-intensive, with no viable transition pathway (e.g., new coal-fired power), or that lock-in carbon assets.	Risk management: Signal to investors which assets may become 'stranded'.

Source: Authors' analysis.

Table 4. further elucidates samples of sector-wise activities and classification methods.

Table 4. Classification criteria for sector-wise mitigation activities

Sector	Activity	Role	Screening metric/criteria
Energy	Renewable energy generation (solar, wind, ocean)	Direct	Automatic eligibility: No threshold required; the activity is low-carbon by nature.
	Transmission and distribution (T&D) infrastructure (grid & storage)	Enabling	System integration: Infrastructure dedicated to connecting renewable energy or improving grid flexibility (e.g., battery storage).
	Green hydrogen production	Direct	Carbon intensity: Production intensity must be declining over time

Sector	Activity	Role	Screening metric/criteria
Transport	Zero-emission vehicles (EVs, hydrogen fuel cell)	Direct	Zero tailpipe emissions: Vehicles emitting 0 gCO ₂ /km.
	Charging infrastructure	Enabling	Dedicated use: Construction of EV charging stations or hydrogen refuelling points.
	Railway electrification	Direct	Electrified track: Electrification of existing fossil-fuel lines.
Buildings	Green buildings (new construction)	Direct	Net-zero ready: Building is designed to have very low energy demand and is powered 100% by on-site or off-site renewable energy.
	Building components	Enabling	Manufacture: Production of energy-efficient equipment (e.g., high-performance glass, insulation, LED lighting).
Industry	Low-carbon manufacturing	Direct	Emissions intensity: Manufacturing processes operating at or near zero emissions (e.g., green steel using hydrogen).
	Efficiency technology	Enabling	Tech Deployment: Manufacture/installation of sensors, Leak detection systems, or smart meters that measurably reduce energy use in other sectors.
Agriculture, forestry, and other land use (AFOLU)	Afforestation and increasing tree cover outside forests (TOF)	Direct	Net carbon sequestration: Native-species plantation on degraded or non-forest land, with measurable gain in carbon stock.
	Soil and biomass carbon monitoring systems	Enabling	Baseline and tracking: Sampling networks and digital records that measure carbon-stock change over time.

Source: Authors' analysis.

Note: This table utilises the methodology of the *Climate Bonds Initiative Mitigation Taxonomy*; for sample tables of mitigation activities, refer to the annexure.

Direct activities deliver measurable climate outcomes on their own, such as reducing GHG emissions. Examples: installing solar power plants deploying zero-emission public transport.

Enabling activities do not generate direct GHG reductions, but create the conditions that support climate mitigation. These include policy reforms, strengthening data systems, capacity building, and financial instruments that support or unlock direct climate investments. Examples: development of EV charging infrastructure, grid modernisation and energy storage systems, adoption of industrial decarbonisation policies, emissions monitoring and reporting systems, and carbon market infrastructure.

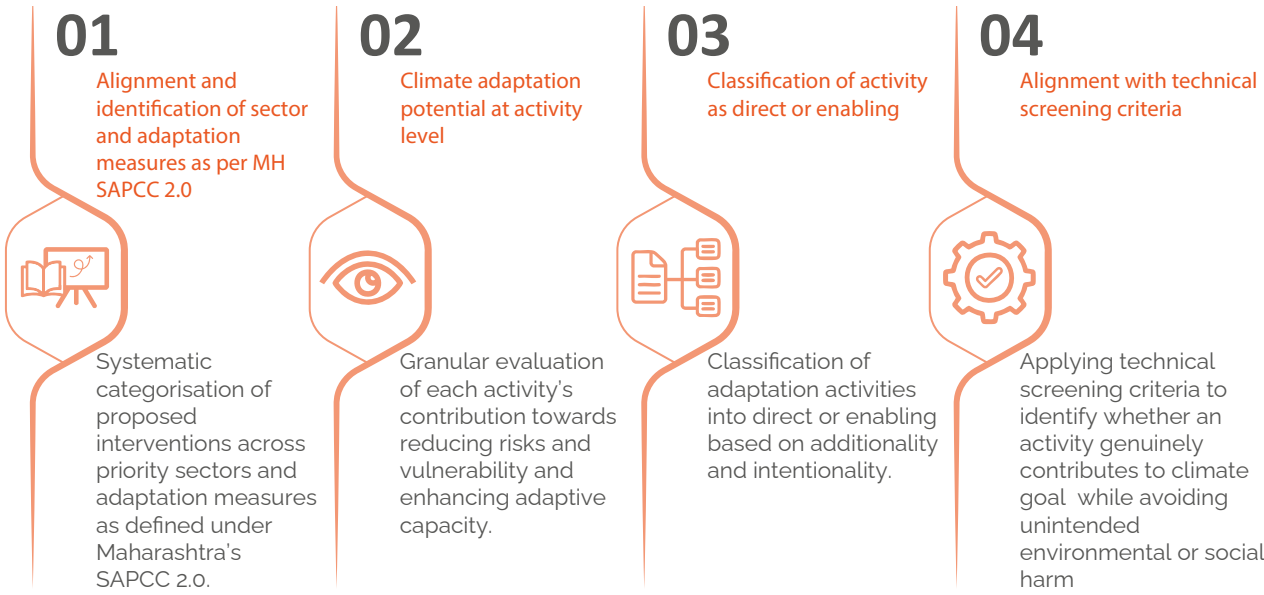
Figure 8. Sample mitigation activities categorisation using MSCFF



Source: Authors' analysis.

3.2. SCREENING FRAMEWORK FOR CLIMATE ADAPTATION ACTIONS

Figure 9: Four-step screening framework for climate adaptation actions



Source: Authors' analysis.

STEP 1: ALIGNMENT WITH MH SAPCC; IDENTIFICATION OF SECTOR AS PER MH SAPCC

Each activity should be mapped within the relevant sector as identified under the *MH SAPCC*, ensuring coherence with the state's recognised adaptation priorities and action areas. This step establishes the strategic context of the activity within the corresponding climate response mechanisms. There are 10 adaptation-specific sectors outlined in *MH SAPCC*, including agriculture, water resources, habitat, public health, disaster management and so on, which serve as the primary entry points for screening and classification.

STEP 2: CLIMATE ADAPTATION POTENTIAL AT ACTIVITY LEVEL

At this stage, the proposed activity is assessed for its direct and intentional contribution to climate adaptation outcomes. The screening examines whether the activity explicitly responds to identified climate hazards and vulnerabilities within the project context, and whether adaptation objectives

are embedded in its design, implementation, and expected outcomes. This includes evaluating the causal link between the intervention and its ability to reduce exposure or sensitivity to climate risks, strengthen adaptive capacity, or enhance the resilience of systems, communities, or ecosystems.

Each activity is examined to understand how it influences the vulnerability to identified climate hazards, and contributes to enhancing systemic adaptive capacity. The assessment evaluates the relevance of interventions to local climate risks, robustness of the risk-reduction mechanism, and the extent to which adaptation benefits are measurable and sustained over time. Overall, the activity should clearly demonstrate potential to:

- reduce vulnerability to climate risks
- enhance adaptive capacity of ecosystems and vulnerable communities.

Table 5 outlines the types of risks, indicators, and rationale for screening an adaptation-focussed activity.

Table 5: Rationale for screening an adaptation focussed activity

Category	Sub-Category	Criteria
Physical	Hazard & Risk Reduction	Does the activity/intervention reduce the impact of, or vulnerability towards, extreme weather events (heatwaves, floods, droughts, cyclones)? Does the activity lower the risk of physical asset damage, stranded assets, or reduced insurability due to climate change?
	Future Readiness	Does the activity use forward-looking climate projections to design interventions that remain effective as risks evolve?
Social	Inclusion & Equity	Does the activity reduce climate vulnerability among marginalised groups (women, gender minorities, persons with disabilities, indigenous peoples, those below the poverty line, among others)? Does the activity reduce the risk of worsening gender-based vulnerabilities, socio-economic inequality, or loss of access to social and informational resources?
	Local Knowledge & Fairness	Does the activity distribute risk-reduction benefits equitably, prioritising those most exposed, using local community knowledge?
Environment	Nature-Based Risk Buffers	Does the activity deploy nature-based solutions (e.g., mangrove restoration, watershed management) to reduce exposure to climate-induced hazards? Does the activity reduce the risk of biodiversity loss, species range shifts, or ecosystem fragmentation?
	Ecosystem Safeguards	Has the activity been assessed to confirm it does not increase ecological vulnerability or harm adjacent ecosystems or communities?

Economy	Asset & Revenue Protection	Does the activity reduce the risk of net revenue loss, asset devaluation, or stranded assets by maintaining economic continuity during climate-induced extreme events? Does the activity reduce income vulnerability for exposed groups (e.g., smallholder farmers) through diversification or financial protection mechanisms?
	Resource Efficiency	Does the activity promote resource-efficient practices (e.g., water recycling, waste reduction) to reduce economic vulnerability to climate-induced scarcity?
Infrastructure	Structural Resilience	Does the activity reduce the physical vulnerability of buildings or infrastructure to climate-induced hazards, with capacity to be upgraded as risks intensify? Does the activity reduce the risk of disruption to critical services (e.g., power, water, sanitation) during climate-induced extreme events?
	Decision Support & Coordination	Does the activity reduce governance vulnerability by providing forward-looking data or early warning systems to support risk-informed decision-making? Does the activity reduce fragmentation in climate risk management by strengthening coordination among relevant government bodies?
Governance	Accountability	Does the activity include a transparent, publicly accessible system to monitor and verify reductions in climate vulnerability and exposure over time?

Source: Authors' analysis.

Note: For sample tables of adaptation-screening activities, refer to the annexure

STEP 3: CLASSIFICATION OF ACTIVITY AS DIRECT OR ENABLING

The activity is classified based on whether it delivers direct adaptation outcomes, such as physical risk reduction or enhancing ecosystem-based resilience, or functions as an enabling intervention by strengthening institutional capacities, data systems,

or policies that support adaptation. This distinction clarifies the activity's impact, and ensures consistent classification, while recognising the role of enabling actions in scaling adaptation outcomes

Direct activities Actions that intentionally and additionally reduce climate risks or vulnerability, where adaptation outcomes are an explicit objective of the activity and deliver benefits beyond business-as-usual, or measures that directly protect communities and assets from climate hazards. For example, construction of flood-resilient urban drainage systems to reduce pluvial flooding; establishment of early warning systems for floods, cyclones, or heatwaves.
Enabling activities Actions that support adaptive capacities that enable effective implementation and long-term sustainability of direct adaptation interventions. For example, capacity building programmes for local governments on climate responsive planning and budgeting along with the development of city climate action plans

STEP 4: ALIGNMENT WITH TECHNICAL SCREENING CRITERIA

The activity is screened to identify potential environmental, social, or cross-sectoral risks, including the possibility of maladaptation or negative externalities. The assessment further focuses on the additionality and intentionality of adaptation

outcomes, ensuring that the planned outcomes are a deliberate objective of the intervention while remaining consistent with broader sustainability and equity considerations. Equity and inclusion are key cornerstones of a successful adaptation outcome. Thus, whether the activity impacts distributional vulnerabilities positively should be considered in the planning phase.

Figure 10: Sample categorisation of adaptation activities using the MSCFF

Holding ponds Sector: Water Resources, Supply & Sanitation, Flood Management Adaptation measure: Construction of detention ponds for urban flood resilience Risk: Environment Physical Technical screening criteria: Passes all Outcome: Crucial: Prevents flooding in low-lying, often poorer coastal areas.	Restoration of mangroves for coastal protection Sector: Forest and Biodiversity Adaptation measure: Restoration and conservation of wetlands and mangroves: Plantation of mangroves. Risk: Environment Physical Technical screening criteria: Passes all Outcome: Protects the homes and livelihoods of coastal fishing communities from extreme weather events.
	

Image: /Stock

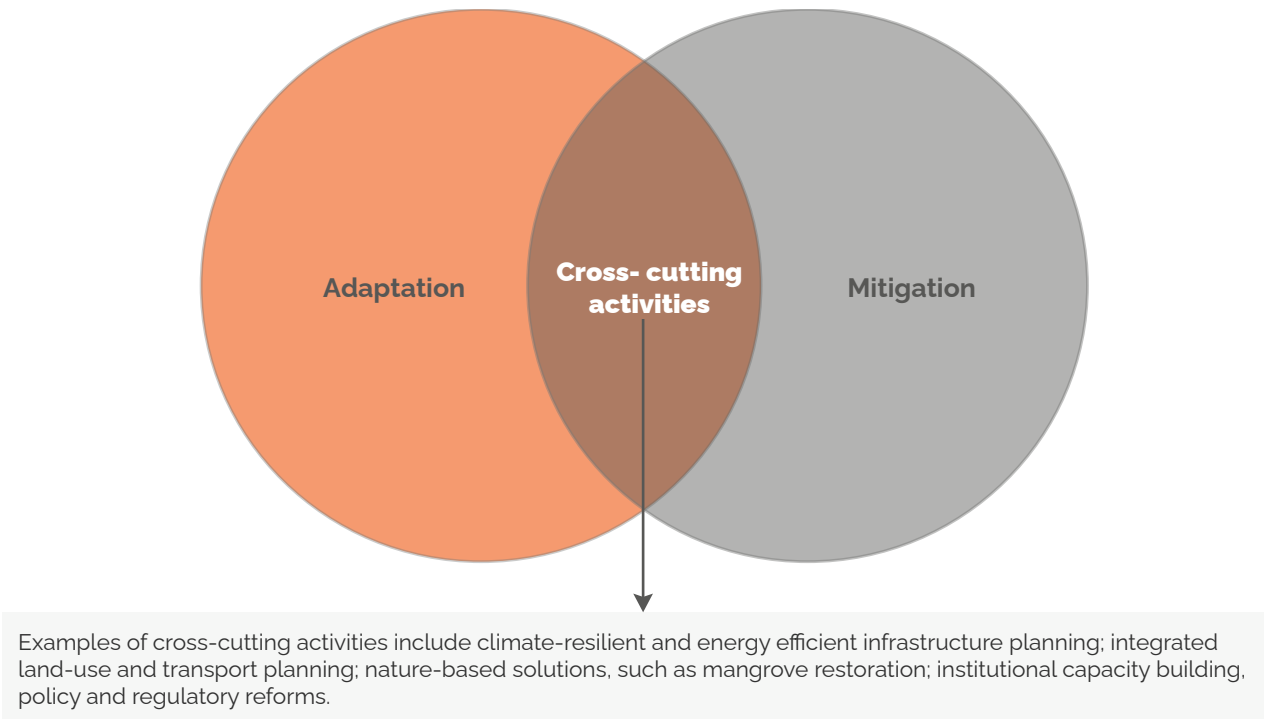
Source : Authors' analysis.

3.3. CROSS-CUTTING ACTIVITIES

Cross-cutting activities refer to interventions that simultaneously contribute to both climate mitigation and adaptation outcomes, or that create enabling conditions which strengthen the effectiveness of actions across multiple sectors. These include measures such as climate-resilient and energy efficient infrastructure planning, integrated land-use and transport planning, nature-based solutions such as mangrove restoration, institutional capacity building, policy and regulatory reforms. Within the

MSCFF, cross-cutting activities are recognised as critical to addressing systemic climate risks and avoiding siloed investments, particularly in a context where mitigation and adaptation objectives are deeply interconnected. The framework enables the identification and classification of such activities by assessing their multi-dimensional impacts, intentionality, and additionality, while applying screening criteria to ensure environmental integrity, social inclusion and co-benefits.

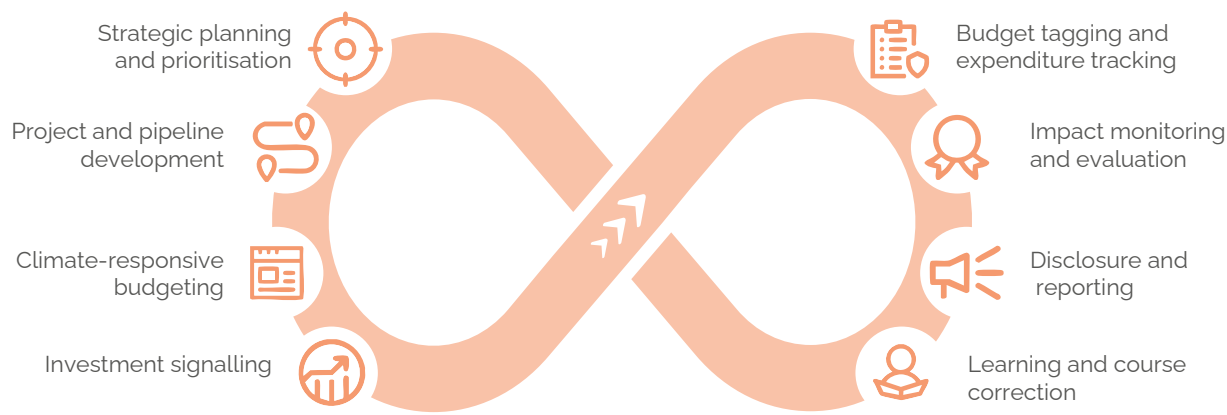
Figure 11: Cross-cutting activities



Source: Authors' analysis.

4. HOW TO USE THE FRAMEWORK

Figure 12: Framework operationalisation and strategic application



Source: Authors' Analysis.

Upstream applications

At the upstream stage, the MSCFF functions as a **decision-support tool** that shapes how climate priorities are translated into policies, programmes, and investment pipelines. By providing clear sectoral classifications, eligibility criteria, and impact pathways aligned with *MH SAPCC* and the *Viksit Maharashtra 2047* vision, the framework enables institutions to integrate climate considerations early in planning and project design processes. This upstream application supports a shift from incremental and scheme-driven planning towards more risk-informed, forward-looking, and outcome-oriented investment strategies.

Upstream uses include:

- **Strategic planning and prioritisation:** Supporting state departments, districts, and urban local bodies in identifying priority mitigation and adaptation interventions aligned with climate risks and sectoral strategies.
- **Project and pipeline development:** Guiding the design of projects and programmes by clarifying what qualifies as climate-aligned, including direct and enabling activities.
- **Climate-responsive budgeting:** Informing budget formulation and scheme design by embedding climate criteria into annual and medium-term planning processes.
- **Investment signalling:** Providing clarity to private investors and financial institutions on state priorities, eligible activities, and expected climate outcomes, thereby reducing uncertainty and facilitating early-stage investment decisions.

Operational downstream applications

Downstream, the MSCFF operates as a classification, tracking, and accountability mechanism, once investments are approved or expenditures are incurred. It provides a consistent basis for identifying and tagging climate-related spending across sectors and institutions, strengthening transparency and enabling aggregation of climate finance flows and impacts at the state level. By standardising screening criteria and indicators, the framework supports more robust monitoring, reporting, and evaluation of climate outcomes.

Key downstream uses include:

- **Budget-tagging and expenditure-tracking:** Enabling systematic identification and tracking of climate-aligned expenditures across departments, schemes, and levels of government.
- **Impact monitoring and evaluation:** Supporting assessment of mitigation and adaptation outcomes, using consistent, comparable indicators.
- **Disclosure and reporting:** Facilitating alignment with national reporting requirements and international investor and donor disclosure standards.
- **Learning and course correction:** Enabling evidence-based review of investments, to improve effectiveness, manage risks, and inform future policy and financing decisions.



CONCLUSION

The Maharashtra State Climate Finance Framework provides a practical foundation for integrating risk-informed planning into the state's investment landscape. By establishing a common classification system and screening approach for mitigation, adaptation, and cross-cutting activities, the framework strengthens Maharashtra's ability to systematically identify climate-aligned investments and improve the transparency of climate finance across sectors.

The framework is intended to support implementation rather than prescribe fixed outcomes. Its application across upstream planning and downstream tracking processes enables institutions to better align financial flows with the priorities set out in the MH SAPCC and the Viksit Maharashtra 2047 vision, while remaining

responsive to evolving climate risks, policy directions, and investment needs.

The MSCFF is designed as a living document. As India's national Climate Finance Taxonomy is finalised and notified, the framework will be reviewed and updated to ensure alignment with national definitions, thresholds, and reporting requirements. Periodic revisions will also incorporate emerging evidence, lessons from implementation, and international best practices, ensuring that the framework remains relevant, credible, and fit for purpose in supporting Maharashtra's long-term climate-resilient and low-carbon development pathway.

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ANNEXURE

Table A1: Sample table for screening mitigation activities

Activity	Alignment and identification of sector and mitigation measures as per MH SAPCC		Classification of activity as direct or enabling	Alignment with technical screening criteria			
	Sectors	Mitigation Measures		Substantial Contribution	Do No Significant Harm (DNSH)	Additionality and Intentionality	Equity and Inclusion
Installation of rooftop solar panels to generate zero-carbon electricity	Energy	Establish installed capacity target of 44 GW of renewable energy (RE)	Direct	Generates 100% renewable energy, directly displacing grid electricity primarily sourced from coal.	Panels must be recyclable; installation must not damage roof structural integrity. No toxic materials used in cleaning panels.	Intentionality: The city is proactively choosing solar energy over standard grid power to meet net-zero targets, and not only as a means to enhance affordability and accessibility to power.	Reduces electricity bills for public buildings, freeing up funds for social welfare. Can train local youth as solar technicians.
Retrofitting streetlights with smart LEDs to reduce energy consumption	Energy	Implement Unnat Jyoti by Affordable LEDs for All (UJALA) scheme (Central – Ministry of Power)	Direct	Reduces energy consumption compared to sodium vapour lights; smart controls reduce waste.	Old bulbs containing mercury/hazardous waste must be disposed of safely (e-waste rules). Light pollution must be managed.	Additionality: Moving to 'smart' controls goes beyond standard LED replacement, exhibiting an intent to maximise carbon efficiency.	Improved lighting in low-income areas and slums enhances safety for women and night-shift workers.
Upgrading grid infrastructure to support solar power integration	Energy	Establish green energy corridors in the state dedicated for evacuation and integration of RE through a dedicated Green Energy Fund	Direct	Enables the grid to handle intermittent renewable energy, reducing reliance on diesel backups during fluctuations.	Infrastructure upgrades must not disrupt local biodiversity, or require unsafe land acquisition.	Intentionality: This investment is specifically designed to unlock future solar capacity.	Ensures reliable power for hospitals and schools in peripheral areas, not just industrial zones.
Installation of real-time air quality sensors to monitor industrial emissions	Industry	Set up continuous Ambient Air Quality Monitoring Stations in districts/cities where they are currently operating (under health sector adaptation, but acts as monitoring for mitigation).	Enabling	Provides data necessary to enforce emission cuts; 'you cannot manage what you cannot measure'.	Equipment must be energy efficient. Data dissemination process must be authentic and transparent.	Intentionality: Investing in high-density monitoring reveals a commitment to tracking and fixing pollution hotspots.	Data is made public, empowering citizens to demand cleaner air and protecting vulnerable groups (children and elderly)
Installation of energy-efficient lighting in industrial zones	Industry	100% energy audit compliance for large industries. The Save Energy Programme should be revised to introduce mandatory compliance (ensures adoption of efficient lighting and equipment)	Enabling	Reduces peak energy load of the industrial zone, lowering reliance on thermal power.	Old bulbs must be recycled safely. Lighting levels must meet safety standards for workers.	Intentionality: Direct intervention in industrial zones targets high-consumption clusters for maximum climate impact.	Improves safety and visibility for factory workers working night shifts.
Route optimisation for industrial waste trucks to save diesel fuel	Industry	Encourage application of best available techniques (BATs) in different industrial subsectors for energy saving (optimising logistics falls under BAT for efficiency).	Enabling	Reduces diesel consumption through algorithm-based efficiency; fewer trips imply less carbon emissions.	Optimisation must not result in skipping slum areas or hard-to-reach narrow lanes to save fuel.	Intentionality: Using software/GPS specifically for 'fuel saving', rather than just 'tracking', shifts the intent to climate mitigation.	Ensures timely waste pickup in all zones, preventing health hazards in poorer neighbourhoods.
Purchase of electric vehicles (EVs) to replace diesel municipal cars	Transport	Aim for at least 30% EVs in new 2W registrations, 40% in 3W, and 15% in 4W by 2030, based on the modelling and the EV Policy, 2021.	Direct	Eliminates tailpipe emissions (CO2, NOx, PM) entirely from the municipal fleet.	Battery disposal plan must be in place. Electricity used for charging should ideally come from renewable sources.	Additionality: Replacing functional diesel cars before their end-of-life specifically to cut emissions is a proactive climate choice.	Reduces air pollution in dense areas, benefiting pedestrians and street vendors who are most exposed to exhaust.

Source : Authors' analysis.

Activity	Alignment and identification of sector and mitigation measures as per MH SAPCC		Classification of activity as direct or enabling	Alignment with technical screening criteria			
	Sectors	Mitigation Measures		Substantial Contribution	Do No Significant Harm (DNSH)	Additionality and Intentionality	Equity and Inclusion
Use of mechanical sweepers for road dust mitigation	Transport	Air quality improvement is proposed to be achieved by reducing the pollution levels by 20–30% by 2030, through improved monitoring and forecasting.	Direct	Reduces suspended particulate matter (PM10/PM2.5), improving air quality and reducing re-suspension of dust.	Must operate at safe speeds to avoid accidents. Dust collected must be disposed of safely, not dumped back.	Additionality: Moving from manual to mechanical is a tech upgrade specifically targeting air pollution, not just aesthetic cleanliness.	Protects sanitation workers from hazardous manual dust exposure and respiratory diseases.
Installation of electric crematoriums to stop wood burning and smoke	Buildings	Create village-specific non-timber forest product (NTFP) and fuelwood plantation. Identifying species to meet the fuelwood needs (indirectly supports reducing pressure on forests; crematoriums also fall under Air Quality improvement in MCAP (Mumbai Climate Action Plan))	Direct	Eliminates the burning of wood (preventing deforestation), and reduces smoke/PM emissions significantly.	Reliability of power supply must be ensured so bodies are not left half-cremated.	Additionality: Cultural shifts are hard; investing here shows strong intent to modernise traditional practices for climate goals.	Lowers the cost of funerals for low-income families (wood is expensive), and reduces smoke in residential areas.
Retrofitting municipal offices with 5-star rated fans and ACs to save power	Buildings	Mandate public procurement of only 5-star rated or super-efficient cooling appliances in upcoming government infrastructure.	Direct	Reduces electricity demand for cooling/ventilation by ~20–30%, lowering the city's carbon footprint.	Old, inefficient ACs must be disposed of carefully (refrigerant gases are potent GHGs).	Additionality: Replacing working equipment with efficient ones, purely for energy saving, demonstrates climate leadership.	Improves working conditions for municipal staff; sets a public example for private buildings to follow.
Installing biogas plant to convert wet waste into cooking gas	Buildings	100% segregation of waste at source; establish waste-to-energy plants, utilising combustion technologies, in all urban settlements.	Direct	Captures methane from rotting food (which is more potent than CO2), and offsets LPG usage.	The slurry (by-product) must be safe for use as fertiliser, and not contaminate soil/water.	Additionality: Processing waste locally rather than dumping it at a distant landfill is a specific decentralised climate strategy.	Provides low-cost clean cooking gas to community kitchens or canteens serving lower-income groups.
Planting urban forests (Miyawaki) to act as carbon sinks	Agriculture, forestry, and other land use (AFOLU)	Protect existing forests and increase the green cover of the state, including trees outside forest (TOF).	Direct	Creates dense carbon sinks, which absorb CO2 and lower local temperatures rapidly.	Must use native species only, avoiding invasive species that harm local biodiversity.	Additionality: Using the Miyawaki method is a specific, intensive investment for rapid climate results, unlike standard planting.	Creates cooling zones accessible to citizens who lack access to large parks in dense urban pockets.
Bioremediation of landfills to prevent methane gas leaks	Agriculture, forestry, and other land use (AFOLU)	100% segregation of waste at source to reduce waste disposal by 40% in landfills by 2030, and transition to cleaner energy sources in supply and treatment plants.	Direct	Stops the uncontrolled release of methane and leachate into groundwater, and restores land.	Process must control odours and prevent leachate from entering nearby water tables during treatment.	Intentionality: The primary goal is emissions control and ecosystem restoration, not just making space for more trash.	Improving health conditions for communities living near landfills (often the most marginalised).
Creation of green belts to absorb vehicle emissions	Agriculture, forestry, and other land use (AFOLU)	Protect existing forests and increase the green cover of the state, including trees outside forest (TOF).	Direct	Acts as a physical barrier to trap particulate matter and absorb CO2 from traffic corridors.	Trees selected must be resilient to pollution, and not require excessive watering (water stress).	Intentionality: Planting specifically along traffic corridors targets emission absorption, distinguishing it from general landscaping.	Reduces exposure to toxic fumes for pedestrians, cyclists, and residents living near highways.

Source : Authors' analysis.

Table A2: Sample table for screening adaptation activities

Activity	Alignment and identification of sector and adaptation measures as per MH SAPCC		Climate adaptation potential at activity level	Classification of activity as direct or enabling	Alignment with Technical Screening Criteria			
	Sectors	Adaptation Measures			Do No Significant Harm(DNSH)	Substantial Contribution	Additionality and Intentionality	Equity and Inclusion
Promoting natural farming (NF)	Agriculture & allied sectors	Promote natural farming with a focus on drought-resilient crops in 'highly vulnerable' drought-affected talukas.	Environment	Direct	Must ensure organic inputs do not introduce invasive species or pathogens. No yield penalty during transition.	Drastically reduces chemical fertiliser use, and improves soil water retention (drought resilience).	Intentionality: Shift from input-intensive farming specifically to build resilience against climate shocks, not just to save costs.	Empowers small and marginal farmers by breaking the debt cycle associated with expensive chemical inputs.
Adoption of heat-tolerant crop varieties	Agriculture & allied sectors	Spread the adoption of heat-tolerant and short-duration varieties of pulses and minor millets, alongside high-yielding varieties of millets.	Environment	Direct	New varieties must not be invasive or threaten local biodiversity. Must be nutritionally equivalent or better.	Ensures food security and stable yields despite rising temperatures and heatwaves.	Additionality: Proactively changing the crop mix before failure occurs demonstrates forward-looking climate adaptation.	Protects the livelihoods of subsistence farmers, who are most vulnerable to crop failure from heat stress.
Establishment of community seed banks	Agriculture & allied sectors	Develop a network of seed-saving communities through state and community participation, to maintain and proliferate resistant varieties.	Social	Enabling	Seed storage must not use harmful chemicals. Access rights must be equitable, not dominated by a few.	Preserves genetic diversity essential for future adaptation, ensures seeds are available locally after disasters.	Intentionality: Decentralising seed security is a specific strategy to reduce dependence on external markets during climate crises.	Direct benefit to women farmers, who traditionally manage seed selection and storage in many communities.
Construction of water harvesting structures	Water resources, supply & sanitation	Construct water harvesting structures (following watershed management ridge-to-valley approach) such as check dams.	Physical, Infra	Direct	Must not disrupt downstream water flow rights or local ecosystems. No unsafe displacement of people.	Captures heavy runoff for groundwater recharge, buffering against longer dry spells.	Additionality: Moving from 'drainage' to 'harvesting' is a specific shift to manage climate variability, not just water supply.	Enhances water security for remote villages often left out of large piped-water schemes.
Surface water-based drinking water schemes	Water resources, supply & sanitation	Increase surface water-based drinking water schemes, especially in rural areas.	Physical, Infra	Direct	Intake structures must not harm aquatic life. Treatment sludge must be disposed of safely.	Reduces stress on depleting groundwater aquifers, which are highly sensitive to drought.	Intentionality: Strategic shift away from groundwater dependency in specific drought-prone zones (Marathwada) is a climate adaptation choice.	Ensures reliable safe water for women and girls, reducing the drudgery of fetching water from distant sources.
Installation of water meters	Water resources, supply & sanitation	Target the installation and assessment of the potential of water meters in urban areas of Maharashtra, to be extended to rural areas after preliminary assessment.	Physical, Infra	Direct	Metering should not lead to unaffordable water tariffs for the poor.	Drastically reduces non-revenue water (NRW) loss, conserving energy used in pumping and treatment.	Additionality: Using meters for leak detection is a tech upgrade, specifically to conserve a climate-stressed resource.	Ensures fair water distribution, preventing upstream users from wasting water needed by downstream vulnerable communities.
Restoration of mangroves for coastal protection	Forest & biodiversity	Restore and conserve wetlands and mangroves: plantation of mangroves.	Environment	Direct	Restoration must not displace traditional fishing communities or block access to the sea.	Acts as a critical bio-shield against sea-level rise, storm surges, and cyclones; high carbon sequestration.	Intentionality: Focusing on coastal protection functions, rather than only 'forestry', highlights the adaptation intent.	Protects the homes and livelihoods of coastal fishing communities from extreme weather events.
Creation of NTFP and fuelwood plantations	Forest & biodiversity	Conserve biodiversity, forest ecosystem, and protect habitats.	Environment	Direct	Must use native species. Monocultures should be avoided to prevent biodiversity loss.	Reduces pressure on natural forests, preserving carbon sinks and biodiversity.	Additionality: Creating dedicated 'buffer' plantations specifically to save core forests is a strategic conservation measure.	Provides sustainable livelihood sources for tribal communities dependent on non-timber forest products.
Mainstreaming climate risks in biodiversity planning	Forest & biodiversity	Conserve biodiversity, forest ecosystem, and protect habitats.	Environment	Enabling	Planning must include indigenous knowledge, and not exclude local communities from conservation areas.	Ensures conservation strategies remain effective under future climate scenarios (e.g., species migration).	Intentional: Moving from static conservation to dynamic, climate-informed planning is a significant methodological shift.	Involves indigenous communities as key stakeholders in managing their local ecosystems.
Strengthening grid for re-newable integration	Energy	Establish green energy corridors in the state, dedicated to evacuation and integration of RE through a dedicated green energy fund.	Infrastructure	Direct	Transmission lines must avoid sensitive ecological zones and minimise land acquisition conflicts.	Enables the grid to absorb intermittent solar/wind power, essential for decarbonisation.	Additionality: Investment specifically to unlock RE capacity goes beyond standard grid maintenance.	Improves power quality in rural areas, supporting local enterprises and healthcare facilities.
Reducing distribution losses via smart metering	Energy	Reduce aggregate technical and commercial (AT&C) losses from 26.55% to 15% by 2030.	Infrastructure	Direct	Electronic waste from old meters must be managed. Data security protocols must be strictly followed.	Directly reduces generation requirements (and emissions) by plugging efficiency leaks.	Intentionality: Targeting technical losses is a direct energy efficiency measure with clear carbon reduction goals.	Reduces the cost of supply, potentially stabilising tariffs for low-income consumers.

Activity	Alignment and identification of sector and adaptation measures as per MH SAPCC		Climate adaptation potential at activity level	Classification of activity as direct or enabling	Alignment with Technical Screening Criteria			
	Sectors	Adaptation Measures			Do No Significant Harm(DNSH)	Substantial Contribution	Additionality and Intentionality	Equity and Inclusion
Deploying decentralised renewable energy (DRE)	Energy	Pilot phase: Focus on creating adequate infrastructure and enabling ecosystems at the state level, and creating 2,500 DRE livelihood deployments in the first two years.	Infrastructure	Direct	Batteries must be recycled responsibly. Systems must be durable and not become e-waste quickly.	Provides reliable, zero-carbon energy access, displacing diesel generators and kerosene.	Additionality: Focusing on livelihood applications (pumps, charkhas) links climate action directly to economic resilience.	Empowers rural artisans and farmers with independent, reliable energy for income generation.
Climate-proofing road infrastructure	Habitat (urban, rural & tribal)	Mainstream the components of climate change into the planning, design, and construction of the road infrastructure process.	Infrastructure, Social	Direct	Construction materials should be low-carbon where possible. Drainage must not be diverted to flood homes.	Ensures critical connectivity remains functional during floods/heatwaves for evacuation and relief.	Intentionality: Updating design codes for future climate extremes (heat/ rain) is a proactive adaptation investment.	Ensures safe access for pedestrians and public transport users, who rely most on road infrastructure.
Risk-informed tourism planning	Habitat (urban, rural & tribal)	Implement risk-informed tourism planning	Governance	Enabling	Development must not degrade natural assets or displace local residents.	Prevents economic loss and safety risks by siting infrastructure away from hazard zones.	Additionality: Integrating climate risk data into master planning changes the 'build anywhere' status quo.	Protects the livelihoods of local service providers (guides, taxi drivers) whose income depends on safe tourism.
Climate-resilient tribal cooperatives	Habitat (urban, rural & tribal)	Set up and strengthen 360 tribal cooperatives (in each taluka) for marketing, grading, and packing centre products, and sensitising agricultural cooperatives network on climate-proofing production and marketing, via Tribal Cooperative Marketing Development Federation (TRIFED), Krishi Vikas Kendras (KVKs).	Governance	Enabling	Must not impose external technologies without community consent. Fair profit-sharing is essential.	Builds economic resilience of vulnerable groups against climate shocks affecting their produce.	Intentionality: Specifically targeting tribal cooperatives acknowledges their unique vulnerability and role in conservation.	Directly boosts income and decision-making power for tribal populations.
Developing heat action plans (HAPs)	Public health	Climate proof public healthcare and implement adaptation strategies such as cool roofing, to respond to heat waves.	Social, Governance	Enabling	Early warnings must reach everyone, not just those with smartphones. Cooling centres must be safe spaces.	Reduces heat-related mortality and morbidity during extreme temperature events.	Additionality: Coordinating inter-agency response, specifically for heat, is a new, necessary adaptation mechanism.	Protecting the homeless, elderly, and outdoor workers who are most exposed to heat.
Surveillance of climate-sensitive diseases	Public health	Strengthen surveillance of climate-sensitive diseases and ensure health system is prepared for them.	Social, Governance	Enabling	Data privacy of patients must be protected. Surveillance shouldn't divert resources from primary care.	Enables early detection and containment of outbreaks (e.g., dengue) triggered by changing weather.	Intentionality: Linking disease-tracking to climate variables is a specific adaptation strategy for health security.	Protects slum dwellers and rural populations with limited access to healthcare from epidemic outbreaks.
Building flood-resilient health infrastructure	Public health	Build flood-resilient infrastructure for public health facilities in flood-prone districts.	Social, Governance	Direct	Retrofitting must not disrupt current services. Materials should be non-toxic and durable.	Ensures hospitals remain operational during disasters, when they are needed most.	Additionality: Designing beyond standard codes to withstand future flood levels is a clear resilience investment.	Ensures continuous care for patients in critical care as well as those from vulnerable groups during emergencies.
Real-time Flood Decision Support System (RTDSS)	Disaster management	Improve flood hazard mitigation.	Social, Governance, Physical	Enabling	Alerts must be accurate to avoid panic. System must be maintained to prevent failure during crisis.	Minimises loss of life and property by enabling precise, timely evacuation and dam management.	Intentionality: Moving from static maps to real-time decision support is a high-tech adaptation investment.	Protects low-lying communities who are often the first victims of the mismanagement of dams/ floods.
Impact-based forecasting services	Disaster management	Implementing multi-hazard impact-based forecast and warning services.	Social, Governance, Physical	Enabling	Forecasts must be in local languages, and understandable formats.	Shifts focus from 'what the weather will be' to 'what the weather will do', enabling better preparation.	Additionality: Customising forecasts for specific impacts (e.g., crop loss, power outage) adds immense actionable value.	Helps farmers and fisherfolk take specific actions to save their assets/lives.
Mainstreaming civil defence volunteers	Disaster management	Mainstream Civil Defence and Aapda Mitra volunteers into (District Emergency Operations Centre(s)) DEOCs	Social, Governance, Physical	Enabling	Volunteers must be properly trained and insured. Deployment should not put them at undue risk.	Enhances local response capacity, often the difference between life and death before state aid arrives.	Intentionality: Formalising community volunteers into the official response framework strengthens last-mile resilience.	Engages local youth and ensures immediate help for isolated or hard-to-reach households.

Activity	Alignment and identification of sector and adaptation measures as per MH SAPCC		Climate adaptation potential at activity level	Classification of activity as direct or enabling	Alignment with Technical Screening Criteria			
	Sectors	Adaptation Measures			Do No Significant Harm(DNSH)	Substantial Contribution	Additionality and Intentionality	Equity and Inclusion
Segregation of waste at source	Waste management	100% segregation of waste at source to reduce waste disposal by 40% in landfills by 2030, and transition to cleaner energy sources in supply and treatment plants.	Environment, Social, Physical	Enabling	Collection systems must ensure segregated waste isn't mixed again. Workers need protective gear.	Drastically reduces organic waste in landfills, cutting emissions of methane (a potent GHG).	Additionality: Enforcing source segregation is a behavioural and systemic shift necessary for low-carbon waste management.	Improves hygiene and working conditions for sanitation workers and ragpickers.
Establishment of waste-to-energy Plants	Waste management	Implement household-level waste segregation and efficient waste management systems. Establish waste-to-energy plants—utilising combustion technologies and highly efficient power plants that use municipal solid waste as fuel instead of coal, oil, or natural gas—in all urban settlements with a population of one million or more.	Environment, Social, Physical	Direct	Emissions (dioxins/furans) must be strictly controlled. Ash must be disposed of safely.	Recovers energy from waste while diverting volume from landfills, reducing methane.	Intentionality: Choosing WtE is a specific strategy to manage non-recyclable waste while generating power.	Reduces the health hazards of open dumps for nearby communities.
Scientific landfill management	Waste management	Improve landfill site management by extending the operational period to 50 years, including 20 years of active operations.	Environment, Social, Physical	Direct	Leachate treatment must be robust to protect groundwater. Gas capture systems must be safe.	Captures methane (mitigation) and prevents groundwater contamination (adaptation/ health).	Additionality: Moving from open dumping to scientific management is a major upgrade for environmental safety.	Significantly improves the quality of life and health for marginalised communities living near dump sites.
Reuse of treated wastewater	Wastewater collection & treatment	754 MCM of treated used water to be availed for reuse per year.	Environment, Social, Physical	Direct	Quality standards for reuse must be strict, to prevent health risks.	Reduces freshwater withdrawal for non-potable uses, preserving resources for drinking.	Intentionality: Creating a 'circular water economy' is a specific adaptation strategy for water-scarce regions.	Ensures freshwater priority for domestic users while supporting industry/ agriculture needs.
Transitioning treatment plants to renewables	Wastewater collection & treatment	. Transition secondary and tertiary water supply and sewage treatment plants from thermal energy sources to renewable energy sources.	Environment, Social, Physical	Direct	Solar/biogas installations must not compromise plant operations.	Decarbonises the water sector, which is typically a high energy consumer.	Additionality: Retrofitting existing plants with RE is a direct measure to cut operational carbon footprints.	Reduces operational costs, potentially lowering water/ sewerage charges for citizens.
Energy conservation in wastewater treatment	Wastewater collection & treatment	Transition secondary and tertiary water supply and sewage treatment plants from thermal energy sources to renewable energy sources.	Environment, Social, Physical	Direct	Efficiency upgrades must not reduce treatment quality.	Lowers energy intensity of sanitation services, contributing to mitigation goals.	Intentionality: Auditing and upgrading pumps specifically for energy saving goes beyond routine maintenance.	Frees up municipal budget for expanding sanitation access to unserved slum areas.
Construction of bio-dykes	Flood Management	Investing in ecosystem-based adaptation, to build resilience towards floods.	Environment, Physical	Direct	Must use non-invasive plant species. Design must withstand expected flood velocities.	Provides flexible, eco-friendly riverbank protection that adapts to changing water levels.	Additionality: Choosing bio-engineering over concrete walls shows intent for sustainable, nature-based adaptation.	Bio-dykes primarily provide cost-effective and sustainable flood control and riverbank stabilisation, by using local materials and vegetation that strengthen over time.
Creation of urban holding ponds	Water resources, supply & sanitation, flood management	Construction of detention ponds for urban flood resilience	Environment, Physical	Direct	Ponds must be maintained to prevent mosquito breeding. Safety fencing is needed.	Buffers peak stormwater flows, preventing flash floods in dense urban areas.	Intentionality: Creating dedicated holding spaces is a specific spatial planning intervention for flood-resilience.	Prevents flooding in low-lying slums and informal settlements that are often hardest hit.
Augmentation of stormwater drainage	Flood Management	Stormwater drainage capacity to be increased by 20% by 2030.	Environment, Physical	Direct	Construction must minimise disruption. Outfalls must not damage downstream ecosystems.	Increases capacity to handle the "new normal" of high-intensity rainfall events.	Additionality: Upgrading capacity by 20% specifically accounts for climate projections, not just current needs.	Reduces waterlogging risks for all citizens, protecting homes and small businesses from damage.

Source : Authors' analysis.

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