Project Information Document (PID)

Concept Stage | Date Prepared/Updated: 01-Aug-2024 | Report No: PIDDC00814

BASIC INFORMATION

A. Basic Project Data

Project Beneficiary(ies)	Operation ID	Operation Name	
India	P506340	Maharashtra Resilience Development Project	
Region	Estimated Appraisal Date	Estimated Approval Date	Practice Area (Lead)
SOUTH ASIA	06-Feb-2025	29-May-2025	Urban, Resilience and Land
Financing Instrument	Borrower(s)	Implementing Agency	
Investment Project Financing (IPF)	Government of India	Sangli, Miraj and Kupwad Municipal Corporation, Kolhapur Municipal Corporation, Maharashtra Institution for Transformation (MITRA), Relief & Rehabilitation Department (R&R), Maharashtra Krishna Valley Development Corporation (MKVDC), Department of Finance, Ichalkaranji Municipal Corporation	

Proposed Development Objective(s)

To strengthen multi-hazard climate and disaster risk management and institutional capacity for Maharashtra's resilient development.

PROJECT FINANCING DATA (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)?	No
Is this project Private Capital Enabling (PCE)?	Yes

SUMMARY

Total Operation Cost	**400.00**
Total Financing	**400.00**

of which IBRD/IDA	**280.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	280.00

Non-World Bank Group Financing

Counterpart Funding	120.00
Borrower/Recipient	120.00

Environmental and Social Risk Classification	Concept Review Decision
Substantial	

Other Decision (as needed)

B. Introduction and Context

Country Context

1. **India's climate variability, increased frequency and severity of disasters, and temperature spikes[1] imperils millions.** More than 80 percent of India's population lives in areas highly susceptible to extreme seismic risk and hydrometeorological disasters, including floods, droughts, and cyclones. Out of the almost 3.3 million km^2 of landmass, 59 percent is prone to earthquakes of moderate to very high intensity, 15 percent is susceptible to landslides, 12 percent is prone to river floods, and 75 percent of the coastline faces cyclone risk[2], 33% of experiencing erosion[3]. India, ranking seventh in climate disaster impact[4], has an average annual loss of $87 billion[5] from extreme weather. Rising temperature, sea-level rise, and extreme precipitation due to climate change are expected to further retreat the country's glacier mass, and increase the frequency and magnitude of wildfires, landslides, coastal and river flooding. The trajectory of climatic changes, unplanned urbanization, and population growth could drive 50 million people[6] into poverty by 2040, intensifying health, economic, and food security risks. Studies show potential infrastructure losses from sea-level rise and inundation in cities like Chennai, Mumbai, and

[1] Climate Risk Country Profile: India (2021) The World Bank Group.
2 Government of India (2019) Annual Report 2018-19, National Disaster Management Authority of India, Government of India.
3 NCCR (2018) National Assessment of Shoreline Changes along the Indian Coast.
4 Eckstein et al. (2021) Global climate risk index 2021. Who Suffers Most from Extreme Weather Events, 2000-2019.
5 WMO (2021) State of the Climate in Asia 2020.
[6] Skoufias et al. (2012) The Poverty and Welfare Impacts of Climate Change: Quantifying the Effects, Identifying the Adaptation Strategies.

Kolkata whereas unplanned urban expansion worsens flooding and heat stress in major cities like Mumbai, Chennai, Kolkata, Bengaluru, and Hyderabad. Despite achievements[7] in reducing disaster-induced mortality, significant investments are needed to reduce annual economic losses and strengthen household, community, infrastructure and institutional resilience.

Sectoral and Institutional Context

2. **Maharashtra is one of India's economic growth engines aiming for a US$1 trillion economy by 2027–28[8], while also facing increased frequency of extreme weather events and climate change impact.** It is the second most populous state, third largest in area, and the third most urbanized in India[9] and contributes 14 percent of the national nominal GDP.[10] Climate risks are an increasing threat to Maharashtra's development due to the growing exposure, rising disruptions and losses across economic sectors. Climate projections indicate an increasing frequency of high intensity events such as the 2019 floods where the districts of Kolhapur and Sangli received 1,918 mm of rainfall during a fortnight in August (6–18 times the normal).[11] There have been flooding events in the state almost every year since 2019 with 1,246 lives lost during 2019–2022[12] and increasing instances of annual flooding in cities. This period has also witnessed landslides, unseasonal rainfall, dry spells, droughts, heatwaves, lightning strikes, and rising frequency of Arabian Sea cyclones impacting the state.
3. **These disasters demonstrate that the past is not a reliable guide for future management of climate and disaster risks[13].** In addition to the rising frequency and intensity of extreme weather events, hazard characteristics are also evolving and demand more sophisticated monitoring, management, and mitigation investments. For example, continuous rainfall events increasingly trigger mudflows and landslides which are not covered by existing early warning systems. Similarly, the recent catastrophic floods emerge from the interaction of multiple systems. Floods in the upper-Krishna basin is characterized by concurrent high flows both at mainstream and tributaries, causing uncontrollably high backflow near confluences. Given that most flood water is attributable to the runoff from free catchments, the operation of upstream reservoirs is insufficient to regulate excess flood flows. The impact of flood releases from reservoirs also plays a crucial role. Dams like Koyana, Warna and Radhanagari need effective management to balance flood control and water storage. Many of the reservoirs in Maharashtra are over 30 years old, with the operational rules not updated since construction. Further, frequent disasters place an unprecedented burden on the state's otherwise stable fiscal position, calling for a diversification of financing, including private capital mobilization, and reforms that better prepare the public finance management systems for shocks. Advanced catastrophe modeling and quantification of risks for undertaking such reforms do not currently exist.
4. **Urban flooding is emerging as a frequent and damaging climate change-related hazard in Maharashtra, disrupting lives and economic activity in cities.** Many cities in Maharashtra increasingly face flood events due to unplanned and unregulated urban development, inadequate river management, insufficient or lacking storm water drainage, and encroachments on water bodies and flood zones. Mumbai and Pune experienced disruptive flooding as recently as the 2024 monsoon. Smaller cities like Kolhapur, Sangli, and Ichalkaranji -located in the

7 Ray et al. (2021) An assessment of long-term changes in mortalities due to extreme weather events in India: A study of 50 years' data, 1970–2019
8 Maharashtra Economic Advisory Council (2023) Implementation framework for becoming a $1 Trillion economy.
9 Government of India (2011) Census of India.
10 GoM (2023) Economic Survey of Maharashtra 2022–23.
11 GoM (2023) A Report on Floods 2019 Krishna Sub Basin. https://wrd.maharashtra.gov.in/Upload/PDF/Vol%201%20Main%20Report.pdf
12 Maharashtra State Disaster Management Plan (2023).
13 According to the frequency analysis conducted by the flood modeling task force of MKVDC, the devastating 2019 flood is equated to a 25-year return period. Given the higher frequency of flood events in recent years, this may become an even more common disaster in the near future.

upper Krishna sub-basin- are also increasingly impacted but lack adequate risk management capacities compared to bigger cities. These cities are located along rivers and experience significant population growth. For example, Sangli experienced a 400 percent increase in the size of its settlement areas in flood-prone zones between 1985 and 2015[14]. These cities are densely populated and need flood mitigation solutions that cater to their specific characteristics, address the needs of the urban poor, and mitigate other climate impacts, such as urban heat, and precipitation-triggered landslides. Newly formed urban local bodies such as in the city of Ichalkaranji offer opportunities to plan trunk infrastructure based on climate-informed risk assessments, for example through the development of drainage master plans. Addressing the challenges of these riverine cities requires an integrated approach to fluvial and pluvial flood risk management.

5. **Climate change projections affirm the need for integrated water and disaster risk management approaches that enable economic growth and resilience.** The existing temporal and spatial variation of water-related climate risks in Maharashtra is likely to get amplified due to climate change, both because of the projected rainfall and temperature trends as well as the cascading impact on groundwater recharge (due to increased runoff during high intensity rainfalls). The only available climate projection[15] for the state is ten years old and indicates an increase in mean temperature from 1.2 to 1.6°C by the 2030s. The expected amplification of variability requires robust plans for different climate scenarios and investments in data, digital infrastructure, and decision support systems.
6. **The proposed project will build upon GoM's efforts to enhance capacity for climate-informed planning, decision making and investments for Maharashtra, including by advancing integrated approaches to risk management and financing.** GoM constituted a high-level committee[16] after the 2019 floods to understand its causes and make recommendations for future resilience-building. The proposed project will support GoM in implementing the recommendations of this committee together with the resilience-building measures envisioned in the State's Disaster Management Plan (2023)[17] and the State Action Plan on Climate Change.[18]

Relationship to CPF

7. **The proposed project builds on the Climate Change Action Plan 2021–2025 (CCAP), the South Asia Roadmap, and the Global Crisis Response Framework (GCRF) and operationalizes key objectives outlined in the CPF.** The project aligns with Focus Area 1 of the CPF on Resource Efficient Growth by improving resilience to climate change and will improve DRM through resilient infrastructure, supporting state DRM institutions, and emergency preparedness (Objective 1.5); enhance connectivity and make infrastructure climate-resilient (Objective 2.3). It will also directly contribute to core objectives of the GCP and the corporate results indicator of people with enhanced resilience to climate risks.
8. **The proposed project is consistent with India's NDCs**, significantly contributing to current and future climate change resilience in a highly exposed area and minimizing greenhouse gas emissions.

C. Proposed Development Objective(s)

[14] GFDRR (2021) India Urban Climate Risk Analysis (Unpublished).
[15] TERI (2014) Assessing Climate Change Vulnerability and Adaptation Strategies for Maharashtra.
[16] GoM (2020) A Report on Floods 2019 (Krishna Sub Basin) by Experts Study Committee.
[17] GoM (2023) State Disaster Management Plan.
[18] GoM (2023) Draft Maharashtra State Action Plan on Climate Change (2020–2030).

To strengthen multi-hazard climate and disaster risk management, and institutional capacity for Maharashtra's resilient development.

Key Results (From PCN)

9. The project will measure progress toward the PDO via the following proposed indicators:
    a. People with enhanced resilience to climate risks (Corporate Results Indicator) (Number of people, disaggregated by gender and youth)
    b. Area with reduced flood and landslide risk (ha) (Number)
    c. Expanded communication of early warnings to target population (Number)
    d. People served by emergency management centers with enhanced operational capacities (Number)
    e. A comprehensive strategy to mobilize private capital to finance and transfer disaster risk is adopted and prioritized instruments implemented by the state of Maharashtra (Y/N)

D. Concept Description

10. **The project seeks to enhance resilient development in Maharashtra by demonstrating an integrated climate and disaster risk management approach.** This will be undertaken in the upper Krishna sub-basin, including the cities of Kolhapur, Sangli, and Ichalkaranji, which faced unprecedented flooding in 2019 and is also likely to experience increased frequency and intensity of extreme hydro-meteorological events. The integration is envisioned at the following scales:
    a. **Spatial:** design and implement climate and disaster risk-informed mitigation actions upstream and in the downstream urban areas of the Krishna River and its tributaries.
    b. **Levels of governance:** a strategic mix of state, district, and city-level actions.
    c. **Multi-sectoral:** investments anchored at the sectoral entities for water resource management, disaster risk management, disaster risk financing and urban resilient development.
11. **MRDP will benefit the state beyond the investments directly financed under the project.** The project will support the design and establishment of learning platforms in partnership with local organizations to institutionalize and share knowledge and data. Feasibility studies in innovative and complex risk reduction measures will enable large-scale future investments in climate and disaster risk reduction.
12. **The project builds on the World Bank's past and current operations in Maharashtra as well as the GoM and other development partners' initiatives and will draw lessons from global good practices.** This includes over three decades of investments in rural water supply and sanitation by the World Bank, the National Hydrology Project (NHP), the National Cyclone Risk Mitigation Project (NCRMP-II), and the ongoing Maharashtra Project on Climate Resilient Agriculture (POCRA). MRDP integrates learned lessons by i) ensuring a multi-sectoral and long-term approach to climate and disaster risk management across state, river basin, and local scales, ii) applying climate-informed and integrated models for prioritizing project interventions in a complex systems, iii) enhancing state capacity and emergency operations through institutional strengthening and data-enabled approaches, iv) involving communities and vulnerable groups, and v) building financial resilience to ensure long-term sustainability of project activities. The project will also leverage complementarities with Maha STRIDE currently in preparation with the same implementing agency in GoM as well as the state's experience with other development partners like ADB, JICA, and AIIB.

13. **The multi-sectoral project activities toward enhanced institutional capacity for climate informed and integrated risk management aims at reducing the loss of lives and economic damages from disasters in Maharashtra**. It will improve climate resilience through feeding downscaled state-of-the-art climate models into decision making systems for risk management. The proposed components are:
    a. **Component 1 – Climate-Informed Flood Risk Management:** Reduce fluvial flood risk in the upper-Krishna sub-basin through a mix of mitigation solutions, including: i) Climate-informed reservoir operations, enhancement of data acquisition, data analysis and utilization for reservoir operations towards better flood risk management, ii) Flood risk mitigation works in the Krishna River system identified and prioritized through a modeling to determine their relative and collective effectiveness for flood mitigation, and iii) Feasibility studies for proposals to moderate extremely high flood intensities and reduce drought risk.
    b. **Component 2 – Multi-Hazard Resilience Building in Districts and Cities:** Enhance resilience of selected vulnerable areas through: i) *Landslide risk mitigation* in hotspots of selected districts using gray infrastructure where needed and nature-based solutions where possible, as well as landslide risk monitoring systems. ii) *Urban flood risk mitigation*, e.g., creating detailed risk assessments, high resolution maps, and resulting program of measures, including storm water drainage and nature-based solutions. The focus will be on institutional capacity development and innovative measures that create co-benefits for residents, through e.g., green spaces and corridors, urban wetlands and floodable parks, rain gardens, and permeable pavements. Activities shall feed state-level initiatives, incl. institutional reforms, to establish a long-term planning ecosystem for urban flood resilience, including, e.g., capacity development, multi-level and sectoral cooperation, private capital mobilization, and data-enabled and informed management, operation and maintenance.
    c. **Component 3 – Upgrading Emergency Management Capacities:** Strengthen multi-level emergency preparedness and response capabilities through the following: i) Upgrade state, district, and city emergency operation centers with state-of-the-art command and control facilities for improved situational awareness and decision-making, ii) Strengthen early warning systems, development of modules for lightning, landslides and flood early warning; designing effective and inclusive dissemination mechanisms through cell broadcasting; and community-based disaster risk management and early action capacities, iii) Climate-informed multi-hazard risk assessments for districts using innovative approaches such as remote sensing and earth observation, feeding into an integrated digital platform for resilience, iv) institutional reforms to enable and strengthen open access and sharing of risk data, and iv) Establishment of knowledge and learning platform for resilient development planning.
    d. **Component 4 – Private Capital Mobilization for Risk Financing:** Enhance the financing capabilities and fiscal resilience of GoM across administrative scales through: i) developing diversified public and private disaster and climate-risk financing mechanisms for investments in climate mitigation and adaptation, ii) linking existing disaster risk reduction mechanisms with risk financing strategies, and iii) transferring disaster risks to private capital markets. This entails developing a comprehensive strategy that proposes resilience building investments for financial protection and developing risk models to inform disaster risk financing decision making and potential disaster risk transfer. Possible financial tools will be explored, e.g., credit enhancement for tapping into private capital, resilience and catastrophe bonds, and creating a blended financing facility to mobilize private sector investments.
    e. **Component 5 – Implementation Support and Knowledge Management:** Project and knowledge management activities include i) capacity building, ii) coordination, financial management, procurement,

environmental and social risk management, communication, monitoring and evaluation, and stakeholder engagement, and the iii) development of a 'knowledge lighthouse' for knowledge dissemination at state and country level.

14. The project design will operationalize WBG's corporate commitments on climate, citizen engagement and gender:
    a. **Paris Alignment:** The project is aligned with the goals of the Paris Climate Agreement and is consistent with the implementation of India's climate strategies including the updated First Nationally Determined Contributions and the Long-Term Low-Carbon Development Strategy. None of the project components are anticipated to result in a significant increase of greenhouse gas emissions. Where possible, energy saving measures will be integrated into the project design. The scope of the proposed project does not result in risks to climate change mitigation. Its activities will enhance the resilience to climate and disaster risks, thus actively contributing to climate adaptation. The choice of activities has been informed by the need to address multiple hazards and climate impacts and address differentiated impacts of on women and marginalized groups.
    b. **Citizen Engagement** will be crucial for designing and implementing locally responsive and community-based interventions that enhance the sustainability of project outcomes. Community-based approaches will be implemented in planning and implementation of disaster risk preparedness and management measures. Early warning systems will include information sharing and dissemination mechanisms that ensure all segments of the population, particularly the most vulnerable, receive timely warnings. MRDP will support learning and knowledge sharing for building capacity of local stakeholders, facilitating equal access to critical knowledge and data, and promoting broader community resilience-building.
    c. **Gender:** Recognizing the gendered impacts of disasters and extreme weather events, the project will focus on specific gender gaps and design interventions to close these gaps. MRDP will prioritize the inclusion and participation of women in disaster preparedness and their access to early warning systems. The labor force participation of women in Maharashtra is 38 percentage points lower than that of men. Consequently, the project i) will train and hire women to staff emergency operation centers and ii) identify opportunities to skill and employ women in nature-based solution interventions.
    d. **Climate Co-Benefits:** Maharashtra's vulnerability to disasters is exacerbated by the impacts of climate change. The project intends to address these vulnerabilities through strategic investments aimed at strengthening adaptive capacity though an integrated climate and disaster risk management approach. The project will generate adaptation co-benefits through its interventions under all components. Under component 1, the project will finance interventions to reduce fluvial flood risk such as climate-informed reservoir operations and flood risk mitigation works. Component 2 will focus on landslides and urban flood risk mitigation (pluvial and fluvial flood risk) through, e.g., gray infrastructure, storm water drainage, and NBS. Under component 3, the project will support upgrading emergency management capacities including early warning systems and community-based disaster risk management. Component 4 will focus on developing diversified public and private disaster and climate-risk financing mechanisms to ensure that investments in climate mitigation and adaptation are sustainable.

Legal Operational Policies

	Triggered?	
	Last approved	Current
Projects on International Waterways OP 7.50	No	
Projects in Disputed Area OP 7.60	No	

Summary of Screening of Environmental and Social Risks and Impacts

Based on the assessment carried out at Concept Stage, environmental and social risks are rated 'substantial'. These emanate from interventions associated with (i) flood risk management, including reservoir operations, improvement of river cross-sections and nallah restoration (Component 1), (ii) landslide risk mitigation (Component 2.1), (iii) storm water drainage works (Component 2.2) and, (iii) upgrade of Emergency Operation Centers (EOCs) (Component 3). Environment: The likely adverse impacts due to works under Component 1 include: (i) impacts on ecology and habitats - both aquatic and riparian; (ii) impact on vegetation, plantations and forest areas; (iii) changes in water quality/flows during construction phase; (iv) pressure on natural resources (particularly large quantity of stone required for protection works); (v) delays in obtaining regulatory permits and slippages in compliance to conditions therein; (vi) disruption to services due to shifting of utilities; (vii) OHS issues, particularly those associated with work in/around water and construction vehicles/machinery movement, (viii) direct or indirect impacts on cultural heritage and, (x) issues with management of dredged materials. The potential risks/impacts associated with works under Component 2 include: (i) loss of trees/vegetation; (ii) OHS risks for workers; (iii) community health and safety risks (specifically around sensitive receptors); (iv) improper disposal of wastes/debris; (v) increase in air/dust, soil, water and noise pollution during construction; (vi) impact on cultural/common property resources and; (vii) disruption of services due to utility shifting. For construction and operation of EOCs, the primary issues are associated with e-waste management, energy footprint and, life & fire safety risks. Social: River widening and nallah restoration works in rural areas are likely to involve acquisition of small parcels of private agriculture lands along the riverbanks, including government and private structures and field crops. For the urban storm water drainage interventions, minor impacts are likely on private structures and livelihoods (like staircases, ramps, shops etc.) over the existing drains/roads. For pumping station, land acquisition will be required if the Municipal Corporations are not able to identify suitable government land. Collective impacts on tribal people are not expected to be significant, given their low presence in the project area (less than 1%). Given the scope of construction work in the rural areas and the towns and establishment of construction sites and labor camps will lead to risks associated with labor influx, labor camp management and OHS/CHS. Managing expectations and concerns of key project stakeholders, including project beneficiaries, adversely impacted groups, local governments, and community groups/leaders will be critical for effective stakeholder management. Institutional Risks: The lack of technical and operational expertise in the PMU and PIUs in assessing, mitigating and managing E&S risks and impacts consistent with applicable ESSs is an additional risk factor. While the exact nature of environment and social risks/impacts due to project interventions will only be known during the assessments, deployment of experts, establishment of systems and capacity development measures need to be streamlined early-on given the nature and complexity of proposed project interventions. The risk ratings will be revisited once more granular/specific information on the location and scale of interventions is available. E&S Instruments: At the project level, an Environment and Social Management Framework (ESMF), Stakeholder Engagement Plan (SEP) and Labour Management Procedures (LMP) will be prepared. Relevant

aspects of ESS 1, ESS 2, ESS 3, ESS 4, ESS 5, ESS 6, ESS 7, ESS 8 and ESS 10 along with national/state (Borrower) systems will be assessed and required mitigation measures will be reflected in the Environment and Social Commitment Plan (ESCP). For priority investments to meet the readiness criteria of Govt. of India, sub-project level ESIA, ESMP and RAP (and other instrument/s, as needed) will be prepared commensurate to the potential impacts envisaged from proposed interventions. All ES instruments prepared by project appraisal will be consulted upon, and disclosed on MRDP and World Bank websites.

CONTACT POINT

World Bank

Anup Karanth
Senior Disaster Risk Management Specialist

Satya Priya LNU
Senior Water Resources Management Specialist

Jolanta Kryspin-Watson
Lead Disaster Risk Management Specialist

Borrower/Client/Recipient

Government of India

Implementing Agencies

Sangli, Miraj and Kupwad Municipal Corporation
Shubham Gupta
Municipal Commissioner
smkcorporation@gmail.com

Kolhapur Municipal Corporation
K. Manjulekshmi -
Municipal Commissioner
commissionerkmc@rediffmail.com

Maharashtra Institution for Transformation (MITRA)
Praveen Pardeshi
Chief Executive Officer
ceo-mitra@mah.gov.in

Relief & Rehabilitation Department (R&R)
Sonia Sethi
Principal Secretary
psec.r&r@maharashtra.gov.in

Maharashtra Krishna Valley Development Corporation (MKVDC)
Atul Kapole
Executive Director
edmkvdcpune@gmail.com

Department of Finance
Om Prakash Gupta
Additional Chief Secretary
acs.finance@maharashtra.gov.in

Ichalkaranji Municipal Corporation
Omprakash Divate
Municipal Commissioner
mun.comm.imc@gmail.com

FOR MORE INFORMATION CONTACT

The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 473-1000
Web: http://www.worldbank.org/projects

APPROVAL

Task Team Leader(s):	Anup Karanth, Satya Priya LNU, Jolanta Kryspin-Watson

Approved By

Practice Manager/Manager:	Abhas Kumar Jha	18-Jul-2024
Country Director:	Hideki Mori	01-Aug-2024