



Additional Financing Report

PUBLIC

Project Number: 49107-012
June 2022

Administration of Grant India: Integrated Urban Flood Management for the Chennai–Kosasthalaiyar Basin Project - Additional Financing

This document is being disclosed to the public in accordance with ADB's Access to Information Policy.

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 16 May 2022)

Currency unit	–	Indian Rupee/s (₹)
₹1.00	=	\$0.013
\$1.00	=	₹77.44

ABBREVIATIONS

ADB	–	Asian Development Bank
EWCD	–	elderly, women, children, and persons with disabilities
GCC	–	Greater Chennai Corporation
GEF	–	Global Environment Facility

NOTES

- (i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2022 ends on 31 March 2022.
- (ii) In this report, “\$” refers to United States dollars.

Vice-President	Shixin Chen, Operations 1
Director General	Kenichi Yokoyama, South Asia Department (SARD)
Deputy Director General	Manmohan Parkash, SARD
Director	Norio Saito, Urban Development and Water Division (SAUW), SARD
Team leaders	Sourav Majumder, Senior Project Officer (Urban), India Resident Mission (INRM), SARD Akira Matsunaga, Principal Urban Development Specialist, SAUW, SARD
Team members	Deepa Ahluwalia, Senior Social Development (Officer), INRM, SARD Achyutha Rao Aleti, Environment Specialist, SAUW, SARD Mikael Andersson; Financial Management Specialist; Portfolio, Results and Quality Control Unit, Office of the Director General; SARD Saswati Belliappa, Senior Safeguards Specialist, SAUW, SARD Liming Chen, Urban Economist, SAUW, SARD Dharmesh Dawda; Senior Procurement Specialist; Procurement Division 1; Procurement, Portfolio and Financial Management Department Donna Marie R. Melo, Operations Assistant, SAUW, SARD Roshan Ouseph, Senior Counsel, Office of the General Counsel Santosh Pokharel, Urban Economist, SAUW, SARD Arghya Sinha Roy, Principal Climate Change Specialist (Climate Change Adaptation), Climate Change and Disaster Risk Management Division, Sustainable Development and Climate Change Department Hikaru Shoji, Senior Urban Development Specialist, SAUW, SARD
Peer reviewer	Stephen Blaik, Principal Urban Development Specialist, Urban Development and Water Division, Pacific Department

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

CONTENTS

	Page
PROJECT AT A GLANCE	
I. BACKGROUND	1
II. ADDITIONAL FINANCING	1
A. Rationale	1
B. Project Description	2
C. Value Added by ADB	3
D. Summary Cost Estimates and Financing Plan	3
E. Implementation Arrangements	4
F. Due Diligence	4
III. THE PRESIDENT'S DECISION	5
APPENDIXES	
1. Revised Design and Monitoring Framework	6
2. List of Linked Documents	10

PROJECT AT A GLANCE

1. Basic Data		Project Number: 49107-012	
Project Name	Integrated Urban Flood Management for the Chennai-Kosasthalaiyar Basin Project - Additional Financing	Department/Division	SARD/SAUW
Country Recipient	India	Executing Agency	Municipal Administration and Water Supply Dept
Country Economic Indicators	https://www.adb.org/Documents/LinkedDocs/?id=49107-012-CEI		
Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=49107-012-PortAtaGlance		
2. Sector	Subsector(s)	ADB Financing (\$ million)	
		Total	0.000
3. Operational Priorities		Climate Change Information	
✓ OP1: Addressing remaining poverty and reducing inequalities		GHG reductions (tons per annum)	0
✓ OP2: Accelerating progress in gender equality		Climate Change impact on the Project	High
✓ OP3: Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability			
✓ OP4: Making cities more livable		ADB Financing	
✓ OP6: Strengthening governance and institutional capacity		Adaptation (\$ million)	0.000
		Mitigation (\$ million)	0.000
		Cofinancing	
		Adaptation (\$ million)	6.880
		Mitigation (\$ million)	0.000
Sustainable Development Goals		Gender Equity and Mainstreaming	
SDG 1.5		Effective gender mainstreaming (EGM)	✓
SDG 5.5			
SDG 11.5		Poverty Targeting	
SDG 13.a		General Intervention on Poverty	✓
4. Risk Categorization:	Low		
5. Safeguard Categorization	Environment: B	Involuntary Resettlement: C	Indigenous Peoples: C
6. Financing			
Modality and Sources		Amount (\$ million)	
ADB		0.000	
None		0.000	
Cofinancing		6.880	
Global Environment Facility Grant - Grant projects (Full ADB Administration)		6.880	
Counterpart		2.610	
Government		2.610	
Total		9.490	
Currency of Financing: US Dollar			

I. BACKGROUND

1. The Asian Development Bank (ADB) approved on 23 September 2021 a loan of \$251 million to the Government of India for the Integrated Urban Flood Management for the Chennai–Kosasthalaiyar Basin Project, from ADB’s ordinary capital resources.¹ Loan and project agreements were signed on 26 October 2021. The loan became effective on 7 January 2022 and will be closed on 31 December 2027. The executing agency is Municipal Administration and Water Supply Department of the Government of Tamil Nadu. The implementing agency is the Greater Chennai Corporation (GCC).

2. The ongoing project will strengthen climate and disaster resilience in the Chennai–Kosasthalaiyar River basin. It will reduce the exposure of 1.9 million people to seasonal flooding by (i) improving climate-resilient urban flood protection infrastructure (output 1), (ii) enhancing urban flood preparedness of the GCC (output 2), and (iii) establishing measures for sustaining the operation and maintenance of the stormwater drainage system in the GCC (output 3).

3. The GCC awarded all civil works packages and one consulting service contract amounting to \$241.6 million, or 96.3% of the loan amount. Physical progress is 21.3% and the disbursements amount to \$35.3 million, or 14.1% of the loan amount. The ongoing project complies with the safeguard requirements and covenants of the loan agreement. The project is performing well and it is on track to deliver the expected outputs with appropriate project risk management.

II. ADDITIONAL FINANCING

A. Rationale

4. The additional financing will be used to expand the scope of the project, particularly to help the GCC enhance flood retention in the Kadapakkam Lake through ecosystem restoration. It will demonstrate nature-based solutions for climate change adaptation through rejuvenation of the water body, promoting integrated flood risk management to strengthen disaster resilience, mitigate environmental degradation, and enhance biodiversity. The additional financing will strengthen capacity in the GCC and other stakeholders and increase awareness of the advantages of nature-based solutions for urban flood risk management. It will promote knowledge dissemination and replication through national and global platforms created in partnership with the National Institute of Urban Affairs of India and UrbanShift.² These components meet the eligibility criteria for additional financing as they are technically feasible, economically viable, and financially sound (paras. 14 and 15) and accorded high priority by the government and consistent with the overall project objective and ADB’s country partnership strategy for India, 2018–2022.³

5. Kadapakkam Lake is in a newly developing peri-urban part of the Chennai–Kosasthalaiyar basin. Land use change limits the ability of surface water storage to mitigate flooding. Located

¹ ADB. 2021. [Report and Recommendation of the President to the Board of Directors: Proposed Integrated Urban Flood Management for the Chennai–Kosasthalaiyar Basin Project](#). Manila.

² [UrbanShift](#) is a global platform funded by the Global Environment Facility (GEF) and implemented by a consortium that includes the World Resource Institute, Local Governments for Sustainability, and the C40 Cities Climate Leadership Group. The platform will provide a suite of technical and knowledge support services to improve stakeholder capacity in sustainable, integrated, and inclusive approaches to urban development. It will be administered by the United Nations Environment Programme and includes as partners ADB, the World Bank, United Nations Industrial Development Organization, and United Nations Development Programme.

³ The additional financing also aligns with the recently launched Atal Mission for Rejuvenation and Urban Transformation 2.0, a national flagship urban water mission, which defines rejuvenation of water bodies for improved water security as one of the key reform areas. ADB supported its policy formulation through the policy-based loan.

near the Manali industrial hub in north Chennai, the lake is under worsening risk of water pollution, encroachment, and biodiversity loss.⁴ Further, climate risk and adaptation assessment foresee more damaging floods as climate change will likely increase rainfall intensity by an average of 11%–16% by 2050. Recognizing the complex causes of urban flooding and the pressing need to strengthen climate and disaster resilience and environmental conservation, the additional financing will provide adaptive nature-based solutions to maximize environmental services over time and provide long-lasting benefits.

6. The proposed rejuvenation will restore natural, hydraulic, and ecological functions and processes of the lake catchment and allow the water body to retain floodwaters and reduce and delay peak runoff. Enhanced flood retention in the catchment will complement a stormwater drainage system implemented under the ongoing project and enhance integrated flood resilience in the basin. The nature-based solutions will have multiple co-benefits as improved infiltration into depleted aquifers restores groundwater availability, the water body is protected from direct wastewater discharge and encroachment, habitat restoration for flora and fauna revives biodiversity, and waterfront development facilitates recreation. Significant potential exists for replication in other cities that face similar urban flood challenges and loss of natural environment in India and around the world.

7. Chennai is, among large Indian cities, the most exposed to climate change risks.⁵ The proposed nature-based solutions are predicated to address climate change risk by enhancing water retention in the catchment, which will reduce current and future flood risk in monsoon season and increase groundwater availability in the dry season. Associated capacity building and knowledge dissemination will promote other cities to replicate and scale-up climate-adaptive nature-based solutions.

B. Project Description

8. The overall project impact and outcome remain unchanged.⁶ The additional financing will enhance flood retention in the 55-hectare Kadapakkam Lake under output 1, thereby contributing to climate adaptation. Desilting will restore water holding capacity in the lake and double its volume from 1.1 million to 2.2 million cubic meters.⁷ The project proposes a bund 20 meters wide with a cycle track on the upper tier and a walking path on the lower tier. A bird island is proposed with a 2-hectare forest of various native trees planted using the Miyawaki method.⁸ Recreation will be enhanced by a children's play area, an open-air theater, a library, and hobby fishing and boating facilities, all with features friendly to the elderly, women, children, and persons with disabilities (EWCD).⁹ The proposed works will maximize the use of environmentally friendly

ADB. 2021. [Report and Recommendation of the President to the Board of Directors: Proposed Sustainable Urban Development and Service Delivery Program](#). Manila.

⁴ A biodiversity study found 124 floral species in the lake area, as well as 12 fish, 2 amphibians, 8 reptiles, 30 butterflies, 14 dragonflies and other odonates, and 46 birds, including the Spot-Billed Pelican (*Pelecanus philippensis*), listed as near threatened on the International Union for Conservation of Nature Red List. The lake bund is a feeding area for terrestrial birds, its flowers attracting insects that attract in turn insectivorous birds, its fruit attracting frugivorous birds, and its bush providing ideal habitat for reptiles, which attract omnivorous birds.

⁵ Verisk Maplecroft. 2021. [Environmental Risk Outlook 2021](#). Bath.

⁶ The project impact is Chennai City made a safe place to live in, with reduced vulnerability to disaster. The project outcome is strengthened climate and disaster resilience in the Chennai–Kosasthalaiyar River basin.

⁷ The proposed improvements will not have any adverse flood impacts both upstream and downstream of the lake.

⁸ The Miyawaki method places various native plants close to one another so that they grow upward toward the sun. This speeds growth by a factor of 10 and makes plantation 30 times denser, requiring no maintenance for 3 years.

⁹ EWCD-friendly features include safety rails, signages, child, elderly and persons with disability compatible toilet facilities, separate toilet facilities for women and men, accessible pathways, side benches, drinking water facilities, rain shelters, illumination along pathways, display of emergency contact numbers, etc.

materials and approaches, reusing dredged soil with geotextile underlay to shore up the bund, paving with fly ash brick, and fencing with shrubbery and trees.

9. Under output 2, the additional financing will (i) enhance capacity in the GCC and other government entities and awareness in local communities of urban water body rejuvenation using nature-based solutions, (ii) promote the replication of nature-based solutions by other cities in Tamil Nadu through the development of an investment readiness road map, (iii) disseminate to other Indian cities knowledge and practices from this demonstration investment as a model for nature-based urban flood risk management, and (iv) strengthen understanding in the GCC and other cities in Tamil Nadu of integrated sustainable urban development through participation in national and global dialogues organized by UrbanShift.

C. Value Added by ADB

10. With ADB support, this additional financing incorporates innovative nature-based solutions in the overall project. It will enhance integrated urban flood risk management by (i) addressing climate change risk through improving flood retention capacity and groundwater availability, (ii) catalyzing a nature-positive investment to maximize ecosystem services and biodiversity in the long run, and (iii) providing multiple co-benefits for a more livable city. Through an ongoing ADB multitranche financing facility, ADB will facilitate replicating and scaling up the proposed approach in other cities in Tamil Nadu.¹⁰

D. Summary Cost Estimates and Financing Plan

11. The overall project is estimated to cost \$480.01 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual.¹¹

Table 1: Summary Cost Estimates
(\$ million)

Item	Current Amount ^a	Additional Financing ^b	Total
A. Base Cost^c			
1. Climate-resilient urban flood protection infrastructure improved in the Chennai–Kosasthalaiyar River basin	396.22	7.20	403.42
2. Urban flood preparedness of the Greater Chennai Corporation and project communities enhanced	8.67	1.39	10.07
3. Measures for sustaining operation and maintenance of stormwater drainage system established in the Greater Chennai Corporation	7.13	-	7.13
Subtotal (A)	412.02	8.60	420.62
B. Contingencies^d	47.85	0.89	48.74
C. Financing Charges during Implementation^e	10.66		10.66
Total Cost (A+B+C)	470.53	9.49	480.01

Note: Numbers may not sum precisely because of rounding.

^a Refers to the original amount.

^b Includes taxes and duties of \$0.98 million to be financed by the government. Such amount does not represent an excessive share of the project cost.

^c Loan component in April 2021 prices at an exchange rate of \$1.00 = ₹74.80; Global Environment Facility grant component in November 2021 prices at an exchange rate of \$1.0 = ₹74.00.

¹⁰ ADB. 2018. [Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility, Technical Assistance Grant, and Administration of Grant to India for the Tamil Nadu Urban Flagship Investment Program](#). Manila.

¹¹ The project administration manual is accessible from the list of linked documents in Appendix 2.

- ^d Physical contingencies are computed at 5.0% for civil works and equipment. Price contingencies are computed at 1.6%–1.8% on foreign exchange costs and 4.0% on local currency costs and include provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
- ^e Includes interest and commitment charges. Interest during construction for the Asian Development Bank loan has been computed at the 5-year United States dollar fixed-swap rate plus a spread of 0.5% and a maturity premium of 0.1%. Commitment charges for the Asian Development Bank loan are 0.15% per year, to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

12. The summary financing plan is in Table 2. The Global Environment Facility (GEF) will provide the additional grant cofinancing of \$6.88 million to be administered by ADB.¹² GEF will finance expenditures for enhancing flood retention in Kadapakkam Lake and associated capacity building and knowledge dissemination, or part of (i) civil works and equipment, (ii) consulting services, and (iii) incremental administrative cost. Climate adaptation under the additional financing is estimated to cost \$9.49 million. Proposed activities are classified as Type 2 adaptation activities, as they are predicated solely on the need to address climate change risks (para. 7).

Table 2: Summary Financing Plan

Source	Current ^a		Additional Financing		Total	
	Amount (\$ million)	Share of Total (%)	Amount (\$ million)	Share of Total (%)	Amount (\$ million)	Share of Total (%)
Asian Development Bank						
Ordinary capital resources (regular)	251.00	53.34			251.00	52.29
GEF (grant) ^b			6.88	72.53	6.88	1.43
Government	219.53	46.66	2.61	27.47	222.13	46.28
Total	470.53	100.00	9.49	100.00	480.01	100.00

GEF = Global Environment Facility.

^a Refers to the original amount.

^b Administered by the Asian Development Bank.

Source: Asian Development Bank estimates.

E. Implementation Arrangements

13. The Municipal Administration and Water Supply Department remains the executing agency, and GCC will remain the implementing agency. Project management and implementation units in GCC will retain their responsibilities. One deputy project manager will be the nodal officer for implementing the GEF component. The implementation period is from July 2022 to December 2025. The grant closing date is 30 June 2026. Advance contracting of civil works, equipment, and consulting services will be done in accordance with ADB's Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). Retroactive financing will not apply. Disbursement of grant proceeds will follow ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).

F. Due Diligence

14. The proposed interventions are technically viable. Inflow to Kadapakkam Lake will pass through a shallow forebay to improve water quality before entering the main lake. The forebay will be periodically cleaned during low-flow periods, which will reduce the necessary frequency and cost of desilting the main lake. Locally available and environmentally friendly materials will be used for developing the lake bund, furnishings, and bird island. A lake management committee comprising various stakeholders including representatives from civil society organization(s) will

¹² On 18 December 2021, the GEF chief executive officer endorsed a grant not exceeding \$7,506,024 from the GEF Trust Fund, which will be allocated to ADB for the project financing and agency fee. ADB will administer \$6,880,000 of the grant as the proposed additional financing.

be constituted to review maintenance, oversee water and environmental quality monitoring, and initiate coordinated works to resolve any operational issues. Community awareness will be raised to deter solid waste dumping and protect water bodies.

15. The overall project remains economically viable with unquantifiable benefits added by the proposed interventions such as increased groundwater availability, environmental protection, enhanced biodiversity, and recreational value.¹³ Financial sustainability risk remains *moderate* and financial management risk *substantial*, and both can be properly managed with measures and actions proposed in the ongoing project.¹⁴ All procurement of goods and works and consultant recruitment will adhere to the ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).

16. The additional financing is classified as *effective gender mainstreaming*. It will incorporate EWCD-friendly features in the design of the lake complex, and women's participation in workshops, representing at least 40% of participants, to disseminate the application of nature-based solutions for integrated flood risk management to stakeholders in other Indian cities.

17. The additional financing is *environmental safeguard category B*. Proposed activities will improve the environment around the lake and are unlikely to have significant adverse environmental impacts that are unprecedented or irreversible. Predicted impacts can be mitigated or minimized to an acceptable level with good construction procedures and the mitigation measures defined in the environmental management plan. There are no eco-sensitive areas within 10 kilometers of the lake areas. Feedback from the public consultation were considered in the project design. An initial environmental report for the additional financing included a biodiversity assessment and was disclosed on the ADB and GCC websites and updated before contract award.

18. Safeguard categorizations for the additional financing are *involuntary resettlement C* and *indigenous peoples C*. No land acquisition or physical or economic displacement is envisaged in the components supported by the additional financing. Lake rejuvenation will have neither adverse impact on the livelihoods of existing water users nor temporary impacts from approach roads, disposal of dredged material from the lake, and other associated works. Continuous consultation will be undertaken in project implementation. A land acquisition and resettlement due diligence report for the additional financing was disclosed on the ADB and GCC websites and will be updated before contract award.

III. THE PRESIDENT'S DECISION

19. The President, acting under the authority delegated by the Board, has approved the administration by the Asian Development Bank of a grant not exceeding the equivalent of \$6,880,000 to India for the additional financing of the Integrated Urban Flood Management for the Chennai–Kosasthalaiyar Basin Project, to be provided by the Global Environment Facility.

¹³ The additional financing will support a valuation study of Kadapakkam Lake to quantify economic, social, and environmental benefits from investment over the project life cycle. The accurate quantification of multiple benefits will enable a more holistic comparison to traditional engineering approaches, rectify any underestimation of the value of investment in nature-based solutions, and promote their adoption more widely.

¹⁴ GCC will ensure sustainable operation and maintenance of the Kadapakkam Lake complex by exploring private sector engagement and its revenue from recreational facilities. GCC will provide the budgets from their own resources if there is any fund required to ensure quality operation and maintenance. Financial management arrangements for the ongoing project regarding accounting, financial reporting, and auditing will apply to the additional financing.

REVISED DESIGN AND MONITORING FRAMEWORK

The revised design and monitoring framework strikes out content for deletion and underlines content to be added.

Impacts the Project is Aligned with Chennai City made a safe place to live in, with reduced vulnerability to disaster (City Disaster Management Plan) ^a			
Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
Outcome Climate and disaster resilience in the Chennai–Kosasthalaiyar River basin strengthened	By 2028: 1.9 million people living in the flood-prone areas of the Chennai–Kosasthalaiyar River basin protected from flood risk from a 1:2-year return period rainfall (2021 baseline: 0) (OPs 3.2 and 4.1) ^b	GCC reports, including rainfall data, flood area records, and flood-affected people records	A: The precipitation level and sea level rise will be within climate change projections under the RCP 8.5 scenario. R: Delay in the completion of other planned water body restoration and channel rehabilitation projects under the Public Works Department may limit full realization of expected benefits. ^c
Outputs 1. Climate-resilient urban flood protection infrastructure improved in the Chennai–Kosasthalaiyar River basin	By 2027: 1a. 588 km of new stormwater drains constructed (2021 baseline: 0) (OPs 1.3.1; 3.2.5; and 4.1.2) 1b. 175 km of stormwater drains upgraded (2021 baseline: 0) (OPs 1.3.1; 3.2.5; and 4.1.2) 1c. 11 km stretches in four primary channels (Ambattur, Korattur, Kadappakkam, and Ariyallur) rehabilitated (2021 baseline: 0) (OPs 1.3.1; 3.2.5; and 4.1.2) 1d. One stormwater pumping station of 200 kW upgraded, and one new stormwater pumping station of 200 kW commissioned (2021 baseline: 0) (OPs 1.3.1; 3.2.5; and 4.1.2) 1e. 23,000 catchpits with rainwater harvesting structures constructed (2021 baseline: 0) (OPs 1.3.1; 3.2.5; and 4.3.1) 1f. Four GCC disaster relief camps (one per project zone) rehabilitated, with gender-responsive and socially inclusive features (2021 baseline: 0) (OPs 1.3.1; 2.5.2; and 4.1.2) ^d <u>1g. By 2025, water retention capacity of Kadapakkam Lake (55 hectares) augmented to 2.2 million cubic meters with nature-based solutions and EWCD-friendly recreational facilities^e (GEF-funded). (2022 baseline: 1.1 million cubic meters) (OP 1.3.1; 2.5.2; 3.3.3; and 4.3.1)</u>	1a.–1g. Project quarterly progress report, GCC annual reports	R: Heavy monsoons exceeding projections may delay construction. R: Surge in prices of materials and prolonged impact of COVID-19 on movement of goods and services may result in cost overrun and delay in project completion.

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
<p>2. Urban flood preparedness of the GCC and project communities enhanced</p>	<p>Integrated urban planning</p> <p>2a. By 2024, guidelines for integrating flood hazard zoning with spatial plans and land use, building and development regulations endorsed by the GCC (2021 baseline: no guideline) (OPs 3.2.4 and 4.3.1)</p> <p>2b. By 2025, baseline FRI and FRI framework for four river basins and the entire Chennai City established (2021 baseline: not applicable) (OP 4.2.1)</p> <p>2c. By 2024, manual for green infrastructure design, including rainwater harvesting, endorsed by the GCC (2021 baseline: not applicable)</p> <p><u>2d. By 2025, investment readiness road map to replicate nature-based solutions of Kadapakkam Lake adopted for at least one other city in Tamil Nadu (GEF-funded). (2022 baseline: not applicable) (OP 3.3.4)</u></p> <p>Citizen’s engagement and awareness</p> <p><u>2e.</u> By 2025, FCO for Chennai City operationalized (2021 baseline: not applicable) (OP 6.2.4)</p> <p><u>2f.</u> By 2025, at least 200 persons (including at least 50% women) in project community reported increased knowledge on green infrastructure schemes, including rainwater harvesting; flood risks and impacts; and the links between flooding, solid waste management, sewerage service house connections, and the protection of water bodies (2021 baseline: not applicable) (OPs 2.5 and 4.3.2)</p> <p>Institutional capacity building and knowledge dissemination</p> <p><u>2g.</u> By 2025, at least 50% of GCC technical staff (Storm Water Drain Department) in the project area, including 80% of women technical staff, reported increased knowledge on planning and design for stormwater drainage systems and management of solid waste and flood risks (2021 baseline: 0) (OPs 2.2; 4.3.2; and 6.1.1)</p> <p><u>2h.</u> By 2026, at least two knowledge products on good practices and lessons on integrated urban flood management published and presented to at least 100 key government officials and sector experts, of whom at least 80 participants reported increased knowledge (2021 baseline: 0)</p> <p><u>2i.</u> By 2025, at least 50 participants from Indian cities (including at least 40% women) reported increased knowledge on nature-based urban flood risk management through workshops and</p>	<p>2a. and 2c. GCC council resolutions</p> <p>2b. and 2d. Project quarterly progress report</p> <p>2e.–2j. Pre- and post-training survey and assessment</p>	<p>R: Competing priorities and turnover of key GCC staff disrupt business continuity and delay completion of target outputs.</p>

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
	<p><u>trainings (GEF-funded) (2022 baseline: 0) (OP 2.5)</u></p> <p>2j. <u>By 2025 at least 10 officers of GCC and Government of Tamil Nadu (including at least 40% women) reported increased knowledge on integrated sustainable urban development through global and national dialogues (GEF-funded) (2022 baseline: 0) (OPs 2.5; 4.3.2; and 6.1.1)</u></p>		
<p>3. Measures for sustaining O&M of stormwater drainage system established in the GCC</p>	<p>3a. By 2023, a key performance indicator-based stormwater drainage operation performance improvement system established in 12 out of 15 zonal offices of the GCC (2021 baseline: not applicable) (OP 6.2.1)</p> <p>3b. By 2025, Sustainable Operation and Maintenance Improvement Plan of stormwater drainage system with gender-responsive and socially inclusive features approved by the GCC (2021 baseline: not applicable) (OPs <u>2.3.2</u>; 3.2.2 and 4.3.1)^f</p> <p>3c. By 2024, road map for municipal resource mobilization approved by the GCC (2021 baseline: 0) (OP 4.2.2)</p> <p>3d. By 2025, at least 50% of GCC technical staff (Storm Water Drain Department) in the project area, including 80% of women technical staff, reported increased knowledge on sustainable O&M of stormwater drainage systems and management of solid waste and flood risks (2021 baseline: 0) (OPs 2.2; 4.3.2; and 6.1.1)</p> <p>3e. By 2025, 100 drain desilting workers and conservancy workers (including at least 50 women workers) reported increased knowledge and skills of cleaning and maintaining stormwater drainage systems (2021 baseline: 0) (OP 2.2)</p>	<p>3a.–3c. GCC annual report, GCC budget</p> <p>3d.–3e. Pre- and post-training survey and assessment</p>	<p>R: Change in leadership may affect momentum on reform program.</p>
<p>Key Activities with Milestones</p> <p>1. Climate-resilient urban flood protection infrastructure improved in the Chennai–Kosasthalaiyar River basin</p> <p>1.1 Award all works contracts by June 2021</p> <p>1.2 Complete all civil works <u>funded by the loan</u> by June 2027</p> <p>1.3 <u>Complete augmentation of capacity of Kadapakkam Lake funded by the GEF grant by December 2024</u></p> <p>2. Urban flood preparedness of the GCC and project communities enhanced</p> <p>2.1 Draft guidelines for integrating flood hazard zoning with spatial plans and land use, building and development regulations by June 2023</p> <p>2.2 Develop FRI for four basins and Chennai City by December 2022</p> <p>2.3 Draft and adopt FRI framework for four basins and Chennai City by December 2024</p> <p>2.4 Draft green infrastructure design manual by December 2023</p> <p><u>2.5 Draft investment readiness road map to replicate nature-based solutions of Kadapakkam lake by December 2025.</u></p> <p><u>2.6</u> Draft concept paper and detailed feasibility report for FCO by December 2023</p> <p><u>2.7</u> Prepare and adopt FCO by December 2024</p> <p><u>2.8</u> Conduct knowledge-building workshops on green infrastructure, including rainwater harvesting, by June 2025</p>			

<p><u>2.9</u> Conduct six awareness workshops on flood risks and impacts and the links between flooding, solid waste management, sewerage house service connections, and the protection of water bodies by June 2024</p> <p><u>2.10</u> Conduct knowledge-building workshops on the planning and design of urban drainage systems by June 2025</p> <p><u>2.11</u> Prepare knowledge products on the good practices and lessons of the project, and conduct a dissemination workshop by July 2026</p> <p><u>2.12</u> Conduct knowledge dissemination workshops on nature-based solutions for urban water body rejuvenation by December 2025</p> <p><u>2.13</u> Participate in Global and National dialogues organized by UrbanShift by December 2025.</p> <p>3. Measures for sustaining O&M of stormwater drainage system established in the GCC</p> <p>3.1 Prepare and adopt baseline key performance indicators by December 2022</p> <p>3.2 Prepare an inclusive sustainable O&M improvement plan by December 2024</p> <p>3.3 Draft a road map for municipal resource mobilization by December 2023</p> <p>3.4 Conduct knowledge-building workshops on sustainable operation and management of urban drainage systems by June 2025</p> <p>3.5 Conduct training on cleaning and maintaining stormwater drainage systems for drain desilting workers and conservancy workers by June 2025</p> <p>Project Management Activities</p> <p>Mobilize project support consultant by July 2021</p> <p>Mobilize institutional strengthening and reforms consultant by November 2021</p> <p><u>Mobilize individual consultants supporting GEF-funded components by September 2022</u></p> <p>Implement gender equality and social inclusion action plan from July 2021 to June 2027</p> <p>Review missions, midterm review, and preparation of progress and annual reports</p> <p>Inputs</p> <p>Asian Development Bank: \$251.00 million (regular ordinary capital resources loan)</p> <p><u>Cofinancing from Global Environment Facility: \$6.88 million (grant)</u></p> <p>Government: \$219.53\$222.13 million</p>
--

A = assumption; COVID-19 = coronavirus disease; EWCD = elderly, women, children, and persons with disabilities; FCO = flood citizen observatory; FRI = flood resilience index; GCC = Greater Chennai Corporation; GEF = Global Environment Facility; km = kilometer; kW = kilowatt; O&M = operation and maintenance; OP = operational priority; R = risk; RCP = Representative Concentration Pathway.

- ^a Greater Chennai Corporation. 2017. [City Disaster Management Plan](#). Chennai.
- ^b A 1:2-year return period rainfall corresponds to rainfall intensity of 68 millimeters per hour. People protected from flood risk is the number of people not subjected to any kind of inundation on days when the rainfall intensity published by India Meteorological Department's Redhills rain gauging station is less than 68 millimeters per hour. It is calculated by deducting the population of reported inundation areas within the project area as per GCC records from the total population of the project area. The minimum number from such daily calculations in a year is reported as the project outcome.
- ^c Other planned projects include (i) water body restoration in Ambattur lake, Korattur lake, Retteri lake, Sadayankuppam lake, Ariyalur lake, Kadapakkam lake, Madhavaram Periyathoppu lake, and Kolathur lake; and (ii) channel rehabilitation in Ratteri South channel, Ratteri North channel, and Puzhal channel.
- ^d A gender-responsive and socially inclusive relief camp will have the following features: (i) at least one female worker or caretaker with supplies of sanitary napkins, soap, and a basic first aid kit with medicines; (ii) safe spaces (affording privacy and security) for women, especially nursing mothers and adolescent girls; (iii) separate, well-lit, and clean toilets for men and women, with barrier-free access for people with disabilities and older persons; water, hooks, ledges, and shelves in the toilet; (iv) provisions for washing and disposal of menstrual products; (v) regular (daily) visits by female student volunteers and awareness generation on mechanism to address women's vulnerability to violence and trafficking; (vi) regular interaction between volunteers and people with disabilities within the relief camp; and (vii) helpline numbers displayed on walls.
- ^e EWCD-friendly features include safety rails, signages, child, elderly and persons with disability compatible toilet facilities, separate toilet facilities for women and men, accessible pathways, side benches, drinking water facilities, rain shelters, illumination along pathways, display of emergency contact numbers, etc.
- ^f The Sustainable Operation and Maintenance Improvement Plan identifies the institutional, technical, financial, and social requirements to ensure the sustainable operation and maintenance of the stormwater drainage system. It will include community responsibility and participation, including women's participation.

Contribution to Strategy 2030 Operational Priorities

Expected values and methodological details for all OP indicators to which this operation will contribute results are detailed in Contribution to Strategy 2030 Operational Priorities (accessible from the list of linked documents in Appendix 2).

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=49107-012-2>

1. Grant Agreement
2. Project Agreement
3. GEF Fund Approval (GEF CEO endorsement)
4. Sector Assessment (Summary): Water and Other Urban Infrastructure and Services (Urban Flood Protection)
5. Project Administration Manual
6. Financial Analysis
7. Economic Analysis
8. Summary Poverty Reduction and Social Strategy
9. Risk Assessment and Risk Management Plan
10. Contribution to Strategy 2030 Operational Priorities
11. Climate Change Assessment
12. Gender Equality and Social Inclusion Action Plan
13. Initial Environmental Examination: Kadapakkam Lake
14. Land Acquisition and Resettlement Due Diligence Report: Kadapakkam Lake