



URBAN
RESILIENCE
FUND

Asian Development Bank

Climate Finance Training Urban and Water Sector

September 2018

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Presentation Outline



- **Overview of Urban sector**
- **MDB approach and principles**
- **ADB Urban and Water Climate Finance Guidance Note**
- **Mitigation and Adaptation finance tracking**
- **Kolkata Environmental Improvement Program case study**
- **Coastal Towns Environmental Infrastructure Project case study**
- **Secondary Cities Development Program (Green Cities) case study**
- **New Clark City case study**

Urban Sector



- ADB's Urban Sector Strategy (1999) and Urban Operational Plan 2012-2020.
- Integrated 3E approach: Livable Cities Vision (green growth) - balancing Environmental Sustainability, Economic competitiveness and equity.
- ADB 2030 - Livable Cities OP (one of 7 OPs).
- Integrated solutions.
- Sources of funding diversified.
- Inclusive and participatory urban planning.
- Climate resilient approaches and disaster management systems implemented.

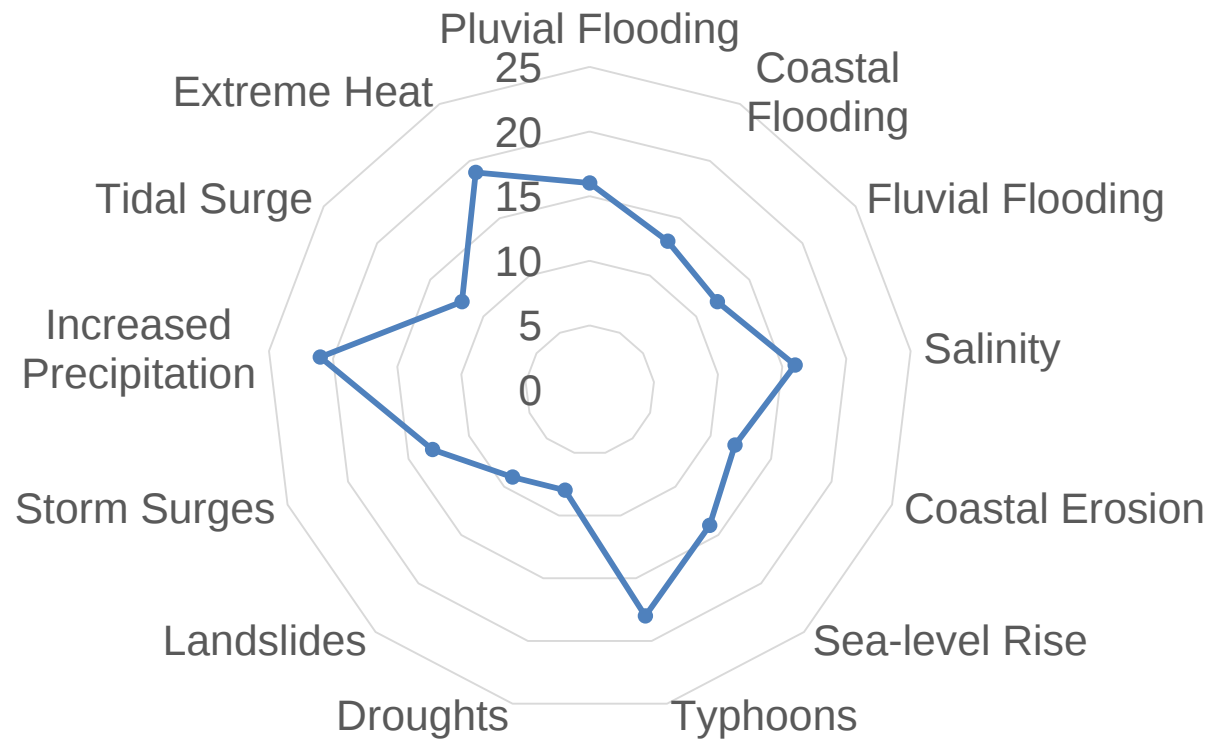
Water-related Disasters & Climate Change Risks: Floods and Droughts



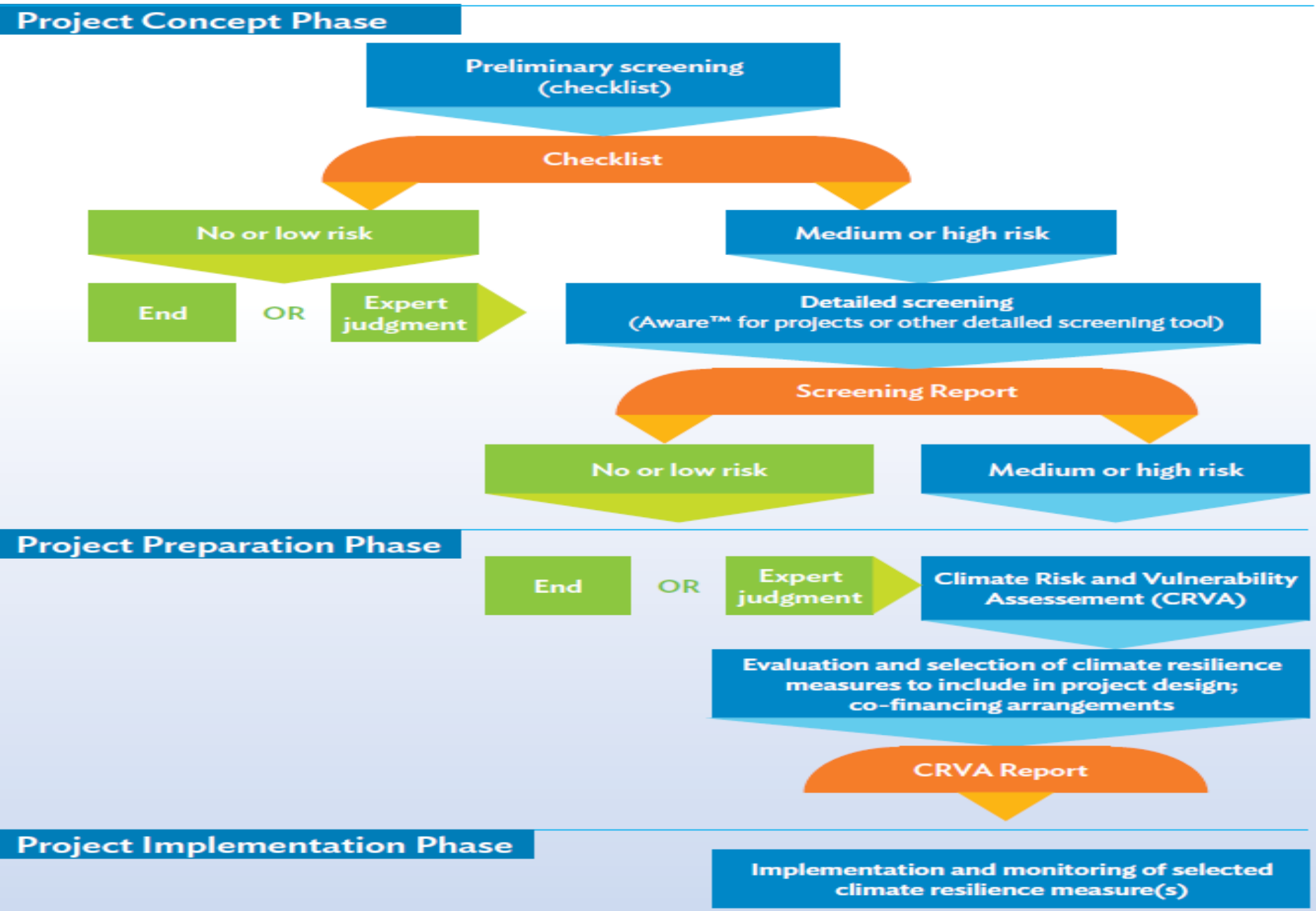
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Diverse climate risks faced by cities



Flow Chart for Climate Risk Management of Investment Projects



Joint MDB Approach



- Application of the joint MDB approach in the urban sector, and relate this approach to ADB's internal approach and guidelines.
- Focus on Adaptation Finance tracking.
- Greater complexity and challenges.
- Overall Urban and water contribute about 1 Billion to Climate Adaptation Finance target of 2 B/year.
- Targets will increase over the 2030 strategy.



Key Principles

Scope - Climate activities can be stand alone projects or components of project.

Conservativeness-where data is unavailable, take conservative approach where under reporting rather than over reporting is preferable

Granularity-Only climate activities that are to be disaggregated from non-climate activities are covered:

- If disaggregation is not possible using project-specific data, more qualitative/experience/expert based assessment
- to identify the proportion of the project that covers climate activities, consistent with the conservativeness principles.

Principles for Tracking Climate Finance



Granularity Principle

Identify mitigation and/or adaptation finance through mitigation and/or adaptation activities at the lowest level of project disaggregation e.g. project component, output or activity, supported by budgetary and technical reports.

Conservative Principle

Estimate mitigation and/or adaptation finance on basis of expert judgement, preferable under-report climate finance.



Mitigation and Adaptation Activities

Mitigation Activities

Promotes efforts to reduce or limit greenhouse gas (GHG) emissions or enhance GHG sequestration.

- Wind or solar-driven pumping systems or similar applications
- Waste water treatment or waste-to-energy projects reducing methane emissions or net emissions
- Waste recycling projects reducing net emissions

Adaptation Activities

- **Type 1:** adaptation activities are those associated with the need to manage climate risks to projects (climate proofing)
- **Type 2:** adaptation activities are those predicated solely on the need to address climate change risks (the need for adaptation to climate change).

ADB Mitigation Finance Estimating Methodology



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- **Identify ADB projects that fit the typology of eligible mitigation activities.**
- **Identify in those projects the mitigation sub-project or component funded by ADB assistance (loans, grants, equities, guarantees, ADB-administered climate funds).**
- **Estimate the cost of the mitigation component funded by ADB (base cost, financial charges, contingencies, etc.) this is ADB's mitigation finance.**
- **The financing for an activity included in the list above can be counted towards climate finance as the activity (and not the whole project) supports reduced GHG emissions.**

Mitigation Finance Estimating

Provide List of Eligible Urban Mitigation Activities:

- Wind or solar-driven pumping systems;
- Treatment of wastewater if not a compliance requirement (e.g. performance standard or safeguard) to reduce methane emissions **(if net emission reductions can be demonstrated)**;
- Waste management and waste-to-energy projects that demonstrably reduce methane emissions and/or generate energy (waste incineration, landfill gas capture/combustion);
- Demand-side energy efficiency projects;
- Waste-recycling projects that recover/reuse materials and waste as inputs into new products- **if net emission reductions can be demonstrated**;
- Retrofit of existing industrial & residential infrastructure to switch to cooling agent with lower GW potential.

Adaptation Finance Tracking

Joint MDB Approach: 3 Criteria to Qualify as “Adaptation”



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- **Climate vulnerability context: statement of project’s risks from and vulnerability to climate change.**
- **Statement of purpose: Report and Recommendation of the President (RRP) addresses vulnerability to climate change impacts.**
- **Clear and direct link: between climate vulnerability context and project activities.**

Adaptation Finance Tracking

Guiding Principles

- Context and location specific (wrt MIT)
- Ex-ante classification
- Conservative approach
- Granular approach
- Additionality - “subproject” or “project element” level
- Beyond the Business-As-Usual (BAU)





1. Identify ADB projects with eligible adaptation activities or components (using the 3 criteria-context, intent, linkage) funded by ADB assistance (loans, grants, equities, guarantees, ADB-administered climate funds).
2. Provide/develop specifications of the adaptation components (e.g. description, sizes or capacities, materials) detailed enough to enable cost estimation.
3. Estimate the cost of the adaptation components - **this is ADB's adaptation finance.**



3 Step Criteria	Climate-Resilient Municipal Infrastructure
1. Climate vulnerability Context	Project is located in a low-lying coastal area. Roads, bridges, water supply and sanitation systems are at risk of being damaged or rendered ineffective by more frequent and intense cyclones and storm surges
2. Statement of Intent	Increase climate and disaster resilience in coastal towns through climate resilient infrastructure and capacity building support
3. Link between identified climate vulnerability and project activities	(i) “Climate-proofed” designs for infrastructure e.g. raising road level), raising base level of cyclone shelters, and water supply and sanitation, bigger drainage capacity, flood control systems (ii) Non-structural interventions, such as urban planning, community awareness raising, flood monitoring and mapping (iii) Capacity-building support on preparing and responding to climate risks

Estimating Adaptation Finance - 2 types of projects



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Type 1: Climate Proofing of Development Projects - Incremental	Type 2: Project Activities predicated on CC Adaptation - Proportional
Did not explicitly intend to address climate change impacts	Directly predicated on addressing climate change impacts
CRVA conducted during project development stage	CRVA conducted prior to selection of activity/output
Derive incremental cost of adaptation	Count 100% of activity or output costs
	Include DMF outcome and output indicators for adaptation

2 Types Adaptation Activities - Tracking Climate Finance



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Type 1 Climate Proofing

Adaptation activities are those associated with the need to manage climate risks to projects (climate proofing)

Projects that include a sub activity that is predicated on climate change, the cost for climate adaptation is the total of the incremental cost of climate proofing may be attributed to climate finance.

Type 2 Climate Change Adaptation

Adaptation activities are those predicated solely on the need to address climate change risks (the need for adaptation to climate change).

Projects that require adaptation to climate change, 100% of the activity or output costs may be attributed to climate finance.

In order to justify the allocation of the complete costs the project DMF could include indicators at measuring progress towards adaptation at outcome and output level.

Estimating Adaptation Finance

Incremental cost approach: Adaptation finance is the difference in cost of the project with and without the adaptation component.

Proportional approach:

- (i) Adaptation finance is proportional to the ratio of adaptation-related outputs/indicators to the total outputs/indicators of a project
- (ii) Adaptation finance is taken percentage of adaptation finance in the total cost of similar projects or components implemented in similar situation.
- Strong justification or basis for choosing a specific percentage.

Incremental is the preferred approach

- Use proportional approach only when you are sure, based on the 3 criteria, that there is adaptation component in the project but there is no clear description of it to enable cost estimation by incremental approach.

Monitoring and Reporting of Climate Finance versus Climate outcomes



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- **ADB approach for monitoring and reporting climate finance (components) within eligible urban activities and investments.**
- **Monitoring and Reporting on CF - 3 levels:**
 - Project level (Project Officers)
 - Sector level (Secretariat of Sector Groups)
 - Corporate level (SDCC/SPD)
- **Need for climate outcomes reporting based on climate and climate adaptation indicators.**



Adaptation Indicators

Subsector	Adaptation Indicators
All/ cross-sectors	- Reduction of climate related damages reduced by at least xx%. - All newly built urban infrastructure integrate green and climate resilient design features. - At least xx no. community-led initiatives that improve climate resilience completed. - Maintenance and emergency plans that factor in climate risk considerations prepared.
Drainage	- Flood damages reduced by xx%/\$xx in coverage areas. - Drainage canals introduced over xx ha where previously there were no drainage facilities.
Irrigation	- All irrigation infrastructure includes climate resilient design features like additional freeboard. - Water productivity increased from xx m3/ha to xx m3/ha.
Flood management	- Storage capacity of xxm3 reservoir is increased by xx m3. - Flood embankments elevation increased from xx m to xx m. - Area of land protected from flood inundation increased from xx ha to xx ha. - xx km of porous paving constructed to reduce the volume of storm water runoff. - Diameters of pipes increased by xx% to better cope with increased precipitation and extreme weather events. - xx no of stand by pumps available for emergency situations increased from xx no pumps to xx no pumps.
Coastal flood management	- Measures to protect coastal dune complex from erosion are implemented. - xx km2 of mangrove forests have been restored.
Institutional development	- Knowledge and skills of at least xx staff are strengthened in integrating climate change resilience into urban planning (at least xx% of participants are women). - xx no of farmers (of which xx% are women) are trained in land and water management response to increased climate variability. - Knowledge and skills of at least xx water resources department staff are strengthened in climate resilient infrastructure design/ planning (at least xx% of participants are women). - Early warning system for flood risk management designed, installed and implemented.
Roads	xx km of road is elevated to create a flood evacuation route for xx no people
Solid waste management	- Monitoring equipment for potential flooding at landfill sites installed and made operational. - Planning of landfill sites considered future flooding areas due to climate change.
Water supply	Diversity of water supply sources are utilized.
Waste water	- Increased effluent treatment (including cooling) to address increasing surface water temperatures of receiving water bodies (whose long-term ecological health will be compromised under climate change) implemented. - Pump stations raised and levees built to avoid rising sea levels from rendering the plants inoperable.
Urban renewal	Newly developed area will contain green surface area of xx million sqm.

Summary and where do we go from here!

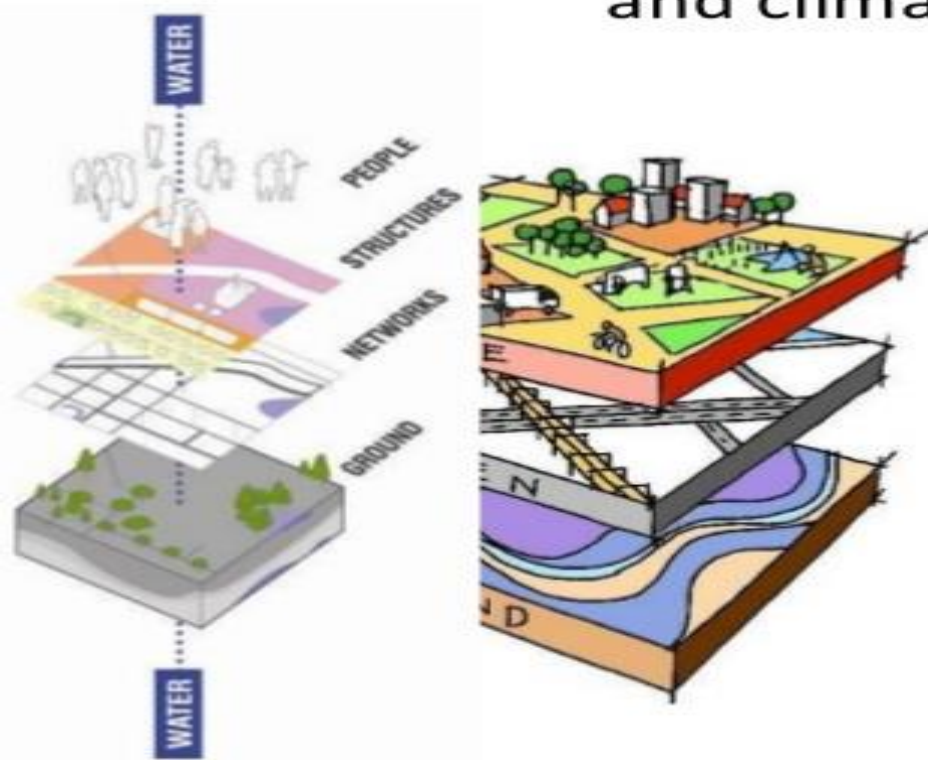


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- **Challenges in the Climate Adaptation Finance tracking and reporting**
- **Evidence based decision making**
- **Robust CRM processes upstream at CPS/COBP and concept level**
- **CRVA as basis to set the vulnerability context**
- **Need for Climate outcomes reporting based on climate and climate adaptation indicators**

Basic Approach - Adaptation

Multi-layer approach to flood risk prevention and climate adaptation





URBAN RESILIENCE FUND

Asian Development Bank

India

Kolkata Environmental
Improvement Program (KEIIP)
Tranche 3

September 2018



3 Steps Tracking Climate Adaptation Finance

Step 1
Establish
Vulnerability

Step 2
Provide clear
statement of
intent to address
vulnerability

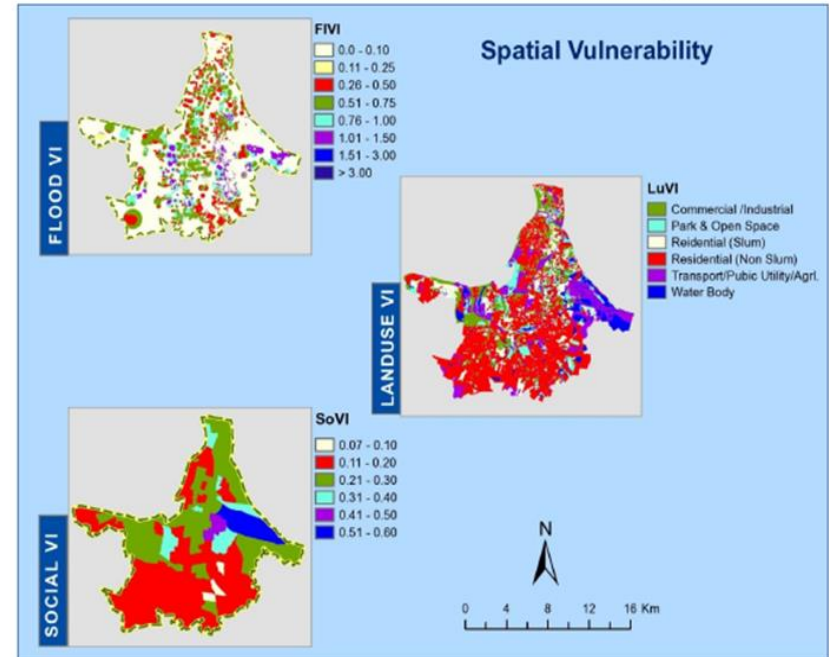
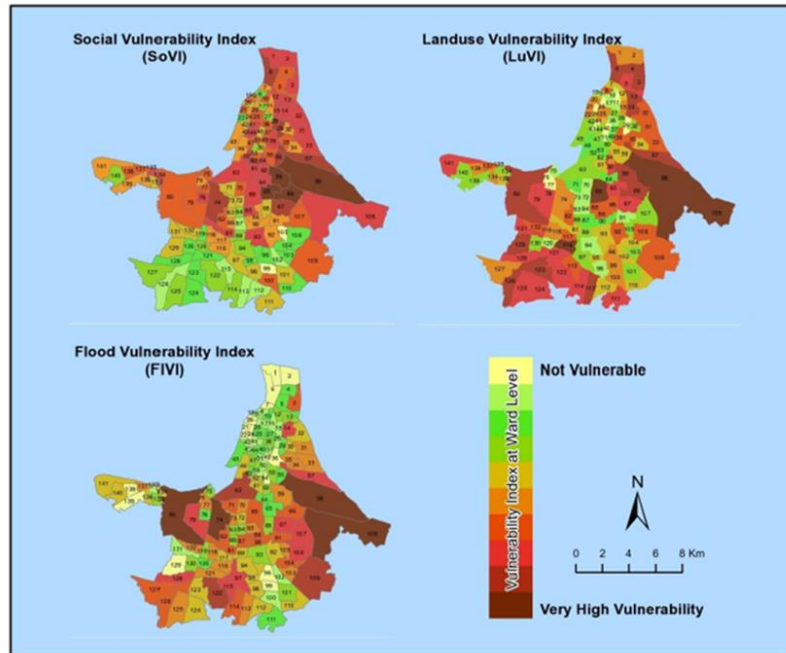
Step 3
Articulate clear
and logical
connection between
vulnerabilities and
project activities

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Step 1 Establish Vulnerability



Source: Vulnerability of Kolkata Metropolitan Area to Increased Precipitation in a Changing Climate, World Bank, 2011.

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Step 1 Establish Vulnerability

2. Kolkata is the capital of the Indian state of West Bengal, and one of the densest megacities in the world, with 24,000 people per square kilometer. Kolkata faces multiple challenges. In 2017, Kolkata had an estimated 5.2 million people; while the total population of the city and its suburbs was 14.7 million, making it the third-most populous metropolitan area in India.² KMC is mandated to provide urban services—including water supply and S&D—to its citizens, but services are not uniform across the city.³ In 2007, Kolkata was identified as a hotspot for climate change and among the top 10 cities with high exposure to flooding under climate change forecasts by the Organization for Economic Cooperation and Development. In 2011, a detailed study by the World Bank assessed Kolkata's vulnerability to climate change and recommended investments in S&D systems.⁴ In 2011, KMC prepared an investment plan to improve the urban sector, which estimated the needed physical investment at \$4 billion.⁵ KMC designed KEIP to increase its climate resilience and urban services by adopting the recommendations from the 2011 World Bank study, and following the investment plan and KMC's relevant master plans and policies.⁶ The program's associated policy framework aims to create an enabling environment for improved services.⁷ Adoption of a water loss roadmap in 2016, property tax reforms in 2017, and increases in urban services through Projects 1 and 2 of KEIP are helping KMC address some of the challenges identified by the policy framework.

3. KEIP incorporates a phased sequencing of investment to increase its climate resilience by systematically achieving expansions in the S&D network in peripheral areas of Kolkata, including flood prone areas; increasing sewage treatment capacity; improving water supply through reductions in nonrevenue water (NRW); and increasing operational efficiency of services. Through KEIP, KMC is also implementing information technology-based solutions for smart management of urban services, such as a geographic information system, upgrading of supervisory control and data acquisition, setting the water supply services into district metering areas, digitizing maintenance systems, and establishing an interactive e-platform for citizen interface. The program consolidates and builds on KMC's Kolkata Environmental Improvement

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Step 2 Provide clear statement of intent to address vulnerability

A. Impact and Outcome

12. Project 3 is aligned with the following impact: access to water supply and sanitation in the service areas of Kolkata Municipal Corporation improved (program-defined). The outcome will be sanitation service quality, operational sustainability, and climate resilience in selected areas of KMC improved.¹⁴

B. Outputs

13. **Output 1: Sewerage and drainage network extension to peripheral areas continued.** Project 3 will continue expanding S&D services in selected peripheral areas of KMC to at least 3,000 additional households and provide sewage treatment for at least 100,000 households covered under KEIP. It will construct (i) at least 43 km of additional sewer drain pipes; (ii) four pumping stations and at least 13 km of pumping mains and one existing pumping station upgraded; and (iii) three sewage treatment plants (STPs), with at least 115 million liters per day combined capacity.¹⁵

14. **Output 2: Operational capacity for urban services strengthened.** Project 3 will support KMC in enhancing its operational capacity and resilience of urban services. It will provide planning, preparatory and transaction advisory services for a comprehensive sanitation improvement in Kolkata, improve inclusiveness of public places, and provide training and capacity building of KMC staff in resilient urban services operations.¹⁶

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DESIGN AND MONITORING FRAMEWORK FOR PROJECT 3

Impact of the Project is aligned with: Access to water supply and sanitation in the service areas of Kolkata Municipal Corporation Improved*			
Results Chain	Performance Indicators with Targets and Baselines*	Data Sources and Reporting	Risks
Outcome Sanitation service quality, operational sustainability, and climate resilience in selected areas of KMC Improved	By 2024: a. 100% of collected sewage from 100,000 households in project areas treated (2017 baseline: 25%) b. Project areas prone to flooding reduced to 5% or less (2017 baseline: Around 60% or approximately 600 hectares of project areas experience flooding) c. S&M cost recovery by KMC's S&D Department exceeds 100% (2017 baseline: 0%)	a and b. Annual reports of KMC's S&D Department, and PMU's project quarterly reports c. KMC's audited financial statements	The lack of an approved water and sewerage tariff structure may constrain KMC from achieving financial sustainability
Outputs 1. Sewerage and drainage network extension to peripheral areas continued	By 2023: 1a. At least 43 km sewer drain pipeline commissioned (2017 baseline: 0) 1b. Four additional stations and a pumping main and one existing station upgraded (2017 baseline: 0) 1c. Three additional STPs with at least 115 MLD capacity commissioned (2017 baseline: two with 102 MLD capacity) 1d. At least 3,000 additional households (including 100% of vulnerable households, and households headed by female) in the project areas connected to S&D network* (2017 baseline: 0)		
2. Operational capacity for urban services strengthened	By 2023: 2a. At least 20% staff employed at the three additional STPs constructed under the project are female (2017 baseline: 0)	2a. KMC's annual reports	

Step 3
Articulate clear and logical connection between vulnerabilities and project activities

b. Project areas prone to flooding reduced to 5% or less (2017 baseline: Around 60% or approximately 600 hectares of project areas experience flooding)

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DESIGN AND MONITORING FRAMEWORK FOR PROJECT 3

Impact of the Project is aligned with: Access to water supply and sanitation in the service areas of Kolkata Municipal Corporation Improved*			
Results Chain	Performance Indicators with Targets and Baseline ^a	Data Sources and Reporting	Risks
Outcome	By 2024:		
Sanitation service quality, operational sustainability, and climate resilience in selected areas of KMC Improved	a. 100% of collected sewage from 100,000 households in project areas treated (2017 baseline: 25%) b. Project areas prone to flooding reduced to 5% or less (2017 baseline: Around 60% or approximately 600 hectares of project areas experience flooding) c. O&M cost recovered by S&D Department 100% (2017 baseline: 0%)	a and b. Annual reports of KMC's S&D Department, and PMU's project quarterly reports	The lack of an approved water and sewerage tariff structure may constrain KMC from achieving financial sustainability
Outputs	By 2023:		
1. Sewerage and drainage network extension to peripheral areas continued	1a. At least 43 km of sewer drain pipe commissioned (2017 baseline: 0) 1b. Four additional STPs and one pumping main constructed and one existing station upgraded (2017 baseline: 0) 1c. Three additional STPs with at least 115 MLD of capacity commissioned (2017 baseline: two STPs with 102 MLD of combined capacity) 1d. At least 3,000 additional households (including 100% of vulnerable households, and households headed by female) in the project areas connected to S&D network* (2017 baseline: 0)		
2. Operational capacity for urban services strengthened	By 2023:	2a. At least 20% staff employed at the three additional STPs constructed under the project are female (2017 baseline: 0)	2a. KMC's annual reports

Step 3
Articulate clear and logical connection between vulnerabilities and project

1d. At least 3,000 additional households (including 100% of vulnerable households, and households headed by female) in the project areas connected to S&D network* (2017 baseline: 0)

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DESIGN AND MONITORING FRAMEWORK FOR PROJECT 3

Impact of the Project is aligned with: Access to water supply and sanitation in the service areas of Kolkata Municipal Corporation Improved*			
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Outcome	By 2024:		
Sanitation service quality, operational sustainability, and climate resilience in selected areas of KMC improved	a. 100% of collected sewage from 100,000 households in project areas treated (2017 baseline: 25%) b. Project areas prone to flooding reduced to 5% or less (2017 baseline: Around 60% or approximately 600 hectares of project areas experience flooding) c. O&M cost recovery by KMC's S&D Department exceeds 100% (2017 baseline: 100%)	a and b. Annual reports of KMC's S&D Department, and PMU's project quarterly reports c. KMC's financial reports	The lack of an approved water and sewerage tariff structure may constrain KMC from achieving financial sustainability
Outputs	By 2023:		
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2. Operational capacity for urban services strengthened	By 2023:		
	2a. At least 20% staff employed at the three additional STPs constructed under the project are female (2017 baseline: 0)	2a. KMC's annual reports	

Step 3
Articulate clear and logical connection between vulnerabilities and project

1c. Three additional STPs with at least 115 MLD of combined capacity commissioned (2017 baseline: two existing STPs with 102 MLD of combined capacity)

Mitigation

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Step 3
Articulate clear and logical connection between vulnerabilities and project activities

Results Chain	Performance Indicators with Targets and Baselines ^a	Data Sources and Reporting	Risks
	2b. At least 80% of eligible KMC and PMU staff, including 100% of eligible female staff, reported increased knowledge on climate resilience, NRW reduction and smart water management (2017 baseline: 0%)^a 2c. 80% of female who participated in IEC activities reported increased awareness on water hygiene and safe sanitation practices (2017 baseline: 0%) 2d. Vulnerability map of public places completed and its use for climate resilience and inclusiveness pilot tested (2017 baseline: 0) 2e. Detailed feasibility assessment, due diligence, and transaction advisory for climate-resilient management infrastructure completed (None)	2b-2e. Annual reports of KMC's Water and S&D departments, PPMS, and quarterly progress reports from the PMU approved by KMC	
Key Activities with Milestones Output 1. Sewerage and drainage extension 1.1 Commission S&D network and one pump station 1.2 Commission S&D network and one pump station 1.3 Commission S&D network and one pump station 1.4 Construct and commission STP near J... 1.5 Construct and commission STP near K... 1.6 Construct and commission STP at Raj... 1.7 Construct and commission one pump station Park (Q4 2018–Q2 2021) 1.8 Install house connections (Q4 2018–Q2 2021) Output 2. Operational capacity for urban water management 2.1 Develop capacity of KMC staff on climate resilience (2018–Q2 2023) 2.2 Complete feasibility study and transaction advisory for climate-resilient management infrastructure 2.3 Complete mapping and piloting to improve water management 2.4 Conduct regular monitoring, reporting and evaluation (Q2 2023) 2.5 Disclose project information to public (Q1 2018–Q2 2023)			
Inputs ADB: \$100 million (regular ordinary capital resources loan) UCCRTF under UFPF: \$2 million (technical assistance) Government and KMC: \$43 million			
Assumptions for Partner Financing Not Applicable			

2b. At least 80% of eligible KMC and PMU staff, including 100% of eligible female staff, reported increased knowledge on climate resilience, NRW reduction and smart water management (2017 baseline: 0%)^a

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Step 3
Articulate clear and logical connection between vulnerabilities and project activities

Results Chain	Performance Indicators with Targets and Baselines ^a	Data Sources and Reporting	Risks
	2b. At least 80% of eligible KMC and PMU staff, including 100% of eligible female staff, reported increased knowledge on climate resilience, NRW reduction and smart water management (2017 baseline: 0%)^a 2c. 80% of female who participated in IEC activities reported increased awareness on water hygiene and safe sanitation practices (2017 baseline: 0%) 2d. Vulnerability map of public places completed and its use for climate resilience and Inclusiveness pilot tested (2017 baseline: 0) 2e. Detailed feasibility assessment, due diligence, and transaction advisory for climate-resilient management infrastructure completed (None)	2b-2e. Annual reports of KMC's Water and S&D departments, PPMS, and quarterly progress reports from the PMU approved by KMC	
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2d. Vulnerability map of public places completed and its use for climate resilience and Inclusiveness pilot tested (2017 baseline: 0)

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Results Chain	Performance Indicators with Targets and Baselines ^a	Data Sources and Reporting	Risks
	2b. At least 80% of eligible KMC and PMU staff, including 100% of eligible female staff, reported increased knowledge on climate resilience, NRW reduction and smart water management (2017 baseline: 0%)^a 2c. 80% of female who participated in IEC activities reported increased awareness on water hygiene and safe sanitation practices (2017 baseline: 0%) 2d. Vulnerability map of public places completed and its use for climate resilience and inclusiveness pilot tested (2017 baseline: 0) 2e. Detailed feasibility assessment, due diligence, and transaction advisory for climate-resilient solid waste management and drainage infrastructure of KMC completed (2017 baseline: None)	2b-2e. Annual reports of KMC's Water and S&D departments, PPMS, and quarterly progress reports from the PMU approved by KMC	

Step 3
 Articulate clear and logical connection between vulnerabilities and project activities

Key Activities with Milestones

Output 1. Sewerage and drainage extension

- 1.1 Commission S&D network and one pump station
- 1.2 Commission S&D network and one pump station
- 1.3 Commission S&D network and one pump station
- 1.4 Construct and commission STP near J. K. Park
- 1.5 Construct and commission STP near K. K. Park
- 1.6 Construct and commission STP at Rajendra Park
- 1.7 Construct and commission one pump station

(Q4 2018–Q2 2021)

Output 2. Operational capacity for urban

- 2.1 Develop capacity of KMC staff on climate resilience (2018–Q2 2023)
- 2.2 Complete feasibility study and transaction advisory
- 2.3 Complete mapping and piloting to improve water management
- 2.4 Conduct regular monitoring, reporting and evaluation (Q2 2023)
- 2.5 Disclose project information to public (Q2 2023)

Inputs

ADB: \$100 million (regular ordinary capital)

UCCRTF under UFPF: \$2 million (technical assistance)

Government and KMC: \$43 million

Assumptions for Partner Financing

Not Applicable

2e. Detailed feasibility assessment, due diligence, and transaction advisory for climate-resilient solid waste management and drainage infrastructure of KMC completed (2017 baseline: None)

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TRANCHE AT A GLANCE

1. Basic Data		Project Number: 42266-026	
Project Name	Kolkata Environmental Improvement Investment Program-Tranche 3	Department/Division	SARD/SAUW
Country Borrower	India Government of India	Executing Agency	Kolkata Municipal Corporation
2. Sector	Subsector(s)	ADB Financing (\$ million)	
✓ Water and other urban infrastructure and services	Urban sewerage		100.00
		Total	100.00
3. Strategic Agenda	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	CO ₂ reduction (tons per annum)	48,550
Environmentally sustainable growth (ESG)	Global and regional transboundary environmental concerns	Climate Change impact on the Project	Medium
		ADB Financing	
		Adaptation (\$ million)	40.00
		Mitigation (\$ million)	15.00
4. Drivers of Change	Components	Gender Equity and mainstreaming	
Governance and capacity development (GCD)	Civil society participation	Effective gender mainstreaming (EGM)	✓
Knowledge solutions (KNS)	Organizational development		
Partnerships (PAR)	Public financial governance		
	Knowledge sharing activities		
	Pilot-testing innovation and learning		
	Civil society organizations		
	Implementation		
	Private Sector		
Private sector development (PSD)	Public sector goods and services essential for private sector development		
5. Poverty and SDG Targeting		Location Imp	
Geographic Targeting	No	Urban	
Household Targeting	No		
SDG Targeting	Yes		
SDG Goals	SDG6, SDG13		
6. Risk Categorization:	Low		
7. Safeguard Categorization	Environment: B Involuntary Resettlement: B Indigenous		
8. Financing			
Modality and Sources			
ADB			
Sovereign MFF-Tranche (Regular Loan): Ordinary capital resources			100.00
Cofinancing			
None			0.00
Counterpart			43.00
Government			43.00
		Total	143.00
Note: An attached technical assistance will be financed on a grant basis by the Urban Climate Change Resilience Trust Fund under the Urban Financing Partnership Facility in the amount of \$2,000,000.			

Climate Change Information

CO₂ reduction (tons per annum) 48,550

Climate Change impact on the Project Medium

ADB Financing

Adaptation (\$ million) 40.00

Mitigation (\$ million) 15.00

INDIA - Kolkata Environmental Improvement Program (KEIP) Tranche 3 \$100m TA \$2m



APPENDIX 1: CLIMATE FINANCING RATIONALE AND CALCULATIONS

This appendix proposes and explains the rationale to justify an estimate of the climate change adaptation component of the proposed Tranche 3, \$100 million, of the \$400 million ADB loan India: Kolkata Environmental Improvement Investment Program (KEIP). The **estimated climate change adaptation finance is \$40 million, equivalent to 40% of the proposed tranche 3.**

The 3 new sewage treatment plants (STPs), proposed to be constructed under Project 3, of cumulative capacity of 115 MLD, will reduce carbon dioxide emissions estimated around 48550 tons per year. The three STPs are fully centralized, aerobic and will be well managed. Therefore, the **climate change mitigation finance is estimated at \$15 million**, which is ADB's share in the total cost of the three STPs (\$26.57 million) minus the proportionate climate change adaptation cost estimated for the STPs (\$11.6 million).



URBAN
RESILIENCE
FUND

Asian Development Bank

Bangladesh

Coastal Towns Environmental
Infrastructure Project

September 2018

3 Steps Tracking Climate Adaptation Finance

Step 1
Establish
Vulnerability

Step 2
Provide clear
statement of
intent to address
vulnerability

Step 3
Articulate clear
and logical
connection between
vulnerabilities and
project activities

BANGLADESH - Coastal Towns Environmental Infrastructure Project (CTEIP) \$52m and Additional Financing (AF) \$6m



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Step 1 Establish Vulnerability



**ADB
Project**

**36
towns**

Climate
Change
Screening

**3
towns**

Climate
Assessments

- Project Preparatory Technical Assistance (PPTA)
- Detailed Engineering Design (DED) of critical Infrastructure projects

**UCCRTF
Support**

**2
towns**

UCCRTF Grant
\$1.6m
Urban Resilience
Planning (URP)

**2
towns**

UCCRTF Grant
\$6m Climate
Resilient
Infrastructure

- Integrated Drainage Plan (IDP) and Solid Waste Management (SWM) Plan
- Climate Assessments on community (ward) level
- Design of Infrastructure projects critical for strengthening Urban Resilience

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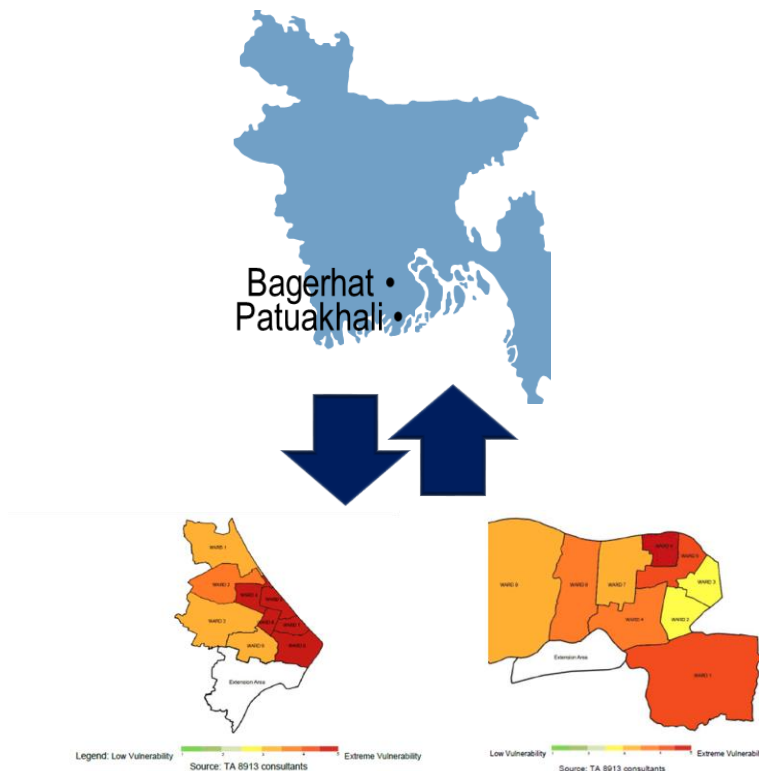
Step 1 Establish Vulnerability

Top-down

Assessments on regional level based on Climate Modelling (future scenarios) / Historical Data (past events): Flood and Rainfall

Bottom-up

Assessments on city and community level based on Focus Discussion Groups (FDGs)



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Step 1 Establish Vulnerability



**ADB
Project**



**Climate
Change
Screening**



**Climate
Assessments**

Criteria for Screening

- Distance from coast and/or major river estuary
- Salinity intrusion and river water quality
- Availability of protective embankment, canals and roads



Step 1. Climate Scenarios based on regional modelling e.g. general observed trends on in creased temperature and rainfall, sea level rise and changes cyclone occurrences.



Step 2. Hydraulic Modelling e.g. storm surges and tidal impacts for sizing of roads, drains, sewers.



Step 3. Climate Proofing of Infrastructure and additional cost of climate change adaptation measures.



Step 4. Climate Change Options in dimension of pipes and roads to address current and future rainfall scenarios.

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Step 1 Establish Vulnerability



**UCCRTF
Support**

Rapid Urban
Climate Change
Assessments
(RUCCAs)

Climate Resilient
Integrated Urban
Plans (CRIUPs)

Actionable
Priorities for
Implementation
of the CRIUPs
(5 years)

Implementation of
Infrastructure
projects critical for
strengthening
Urban Resilience

Step 1. Vulnerability Assessments visualizing how towns and communities respond and cope to/with climate shocks and stresses, how the livelihoods of communities are affected.

Step 2. Sensitivity Assessments overlay critical infrastructure on the vulnerability maps to assess deficiencies and climate impacts.

Step 3. Identification of Infrastructure projects critical for strengthening Urban Resilience.

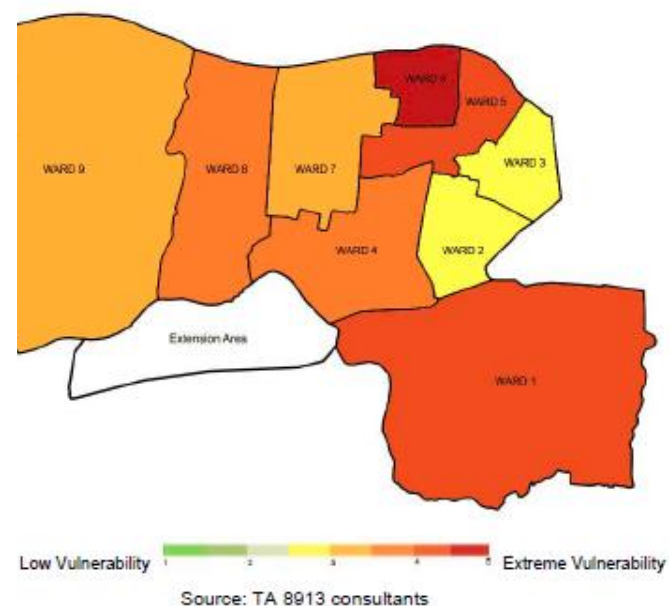
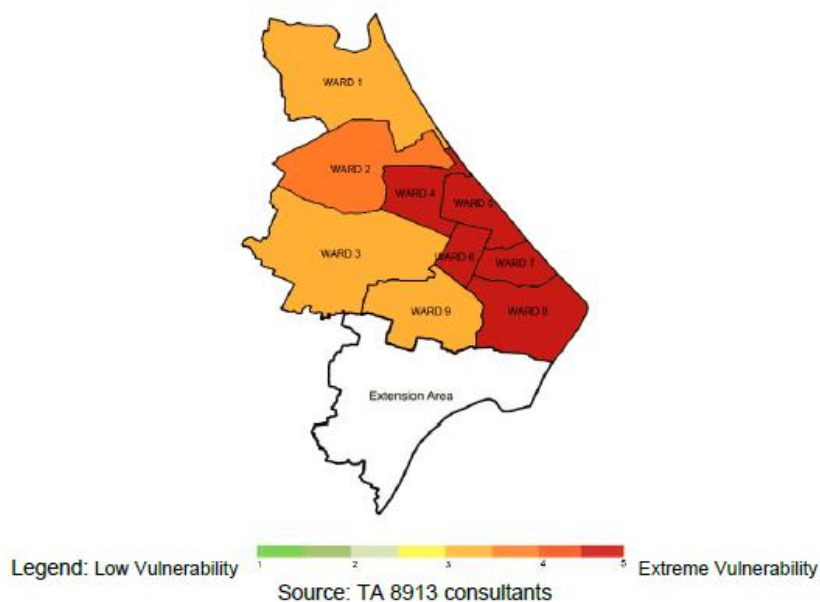
Step 4. Implementation of Infrastructure projects critical for strengthening Urban Resilience.

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Step 1 Establish Vulnerability



Bottom-up

City/Community level URAs are assessments on city and community level based on Focus Discussion Groups (FDGs)

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Step 2 Provide clear statement of intent to address vulnerability

II. THE PROJECT

A. Rationale

3. The project is prioritized in the government's Strategic Program for Climate Resilience (2010) under the Pilot Program for Climate Resilience, and will demonstrate new approaches for integrating climate resilience into urban development in coastal *pourashavas*.⁵ The government's Sixth Five-Year Plan, 2011–2015 targets assistance to vulnerable coastal populations requiring investments in climate-resilient infrastructure and urban planning.⁶ The project is consistent with the Bangladesh country partnership strategy, which targets assistance to vulnerable coastal areas in adapting to the risks of climate change,⁷ and is consistent with the ADB Urban Operational Plan to promote climate-change-resilient cities.⁸

4. Climate change is a critical development issue for Bangladesh. The country's low-lying coastal zone (consisting of 19 districts with an estimated population of 38.1 million, of which 8.6 million is urban) is highly vulnerable to cyclones, storm surges, sea level rise, and salinity intrusion. A 1.5°C increase in temperature and 4% increase in precipitation (the median projections for Bangladesh from general circulation models) would potentially result in sea levels in the Bay of Bengal rising by 27 centimeters or more by 2050.⁹ Warmer temperatures would result in more frequent and intense cyclones and storm surges, damaging roads and bridges and rendering existing drainage, water supply, and sanitation systems ineffective, as well as threatening public health and safety. The central and southwestern regions of the country are particularly vulnerable. Cyclone Sidr in 2007 (a Category 5 storm with wind speed of 260 kilometers per hour) resulted in economic losses of \$1.7 billion (2.6% of gross domestic product). The poor and women are disproportionately affected and have the lowest capacity to cope with losses. There is a high demand for climate-resilient infrastructure and disaster preparedness to improve the wellbeing of residents and reduce migration to larger cities.

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Step 2 Provide clear statement of intent to address vulnerability

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed loan, (ii) proposed administration of a loan to be provided by the Asian Development Bank (ADB) Strategic Climate Fund, (iii) proposed administration of a grant to be provided by the ADB Strategic Climate Fund, and (iv) proposed administration of a grant to be provided by the Sanitation Financing Partnership Trust Fund under the Water Financing Partnership Facility, all to the People's Republic of Bangladesh for the Coastal Towns Environmental Infrastructure Project.¹

2. The project will strengthen climate resilience and disaster preparedness in eight vulnerable coastal *pourashavas* (secondary towns with a population of 15,000 to 60,000) of Bangladesh.² The project takes a holistic and integrated approach to urban development and will (i) provide climate-resilient municipal infrastructure; and (ii) strengthen institutional capacity, local governance, and public awareness for improved urban planning and service delivery considering climate change and disaster risks. Key infrastructure investments include (i) drainage; (ii) water supply; (iii) sanitation; (iv) cyclone shelters; and (v) other municipal infrastructure including emergency access roads and bridges, solid waste management, bus terminals, slum improvements, boat landings, and markets.³ Investments will benefit the poor and women. The Ministry of Local Government, Rural Development and Cooperatives (MLGRDC), acting through its Local Government Engineering Department (LGED) and the Department of Public Health Engineering (DPHE), will be the executing agencies of the project.⁴ Project management and administration support will be provided under the project.

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Step 2 Provide clear statement of intent to address vulnerability

5. Coastal towns suffer from large infrastructure deficits and natural resource constraints that exacerbate sensitivity to climate change. A shortage of drains and severe siltation and solid waste build up result in severe flooding and extended water logging (lasting up to 7 days during monsoon rains). Water supply suffers from (i) low access to piped water, (ii) salinity contamination of shallow and middle aquifers, and (iii) unsustainable groundwater extraction. Feasibility study surveys found that residents without piped water supplies who rely on community pond sand filter systems pay as much as 2–4 times more for water of inferior quality compared to similar towns with piped supplies. There is a high willingness to pay (up to 50% more) for improved services. While there is generally high coverage of household sanitation (up to 94% of households have toilets), there is no septage management or treatment systems, resulting in polluted waterways and a high incidence of waterborne diseases, with large outbreaks occurring after disasters.¹⁰ Emergency access roads are in poor condition, and most cyclone shelters are structurally unsafe as a result of extensive exposure to cyclones and poor maintenance. There is an acute need for new, higher-capacity multi-use cyclone shelters located in core urban areas accessible to poorer populations. It is critical that new investments are designed that consider climate change to manage the long-term costs of natural disasters and ensure investments deliver intended benefits.

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Step 2 Provide clear statement of intent to address vulnerability

6. The high vulnerability of coastal towns is also linked to poor governance and low adaptive capacity.¹¹ Urban planning is in its infancy and development controls are only now emerging. Many *pourashavas* lack established mechanisms for public participation, particularly in the allocation of municipal budgets. Low tax collection efficiency (on average 57% in coastal towns) reflects outdated financial management practices, including limited computerization of accounts and billing systems, and irregular tax assessments. There is an urgent need to strengthen institutional capacity, public awareness, and knowledge management to complement physical investments as part of an integrated approach for building climate change resilience.

7. **Performance-based approach.** The project aims to incentivize governance improvement and build resilience by linking each stage of investment to demonstrated reforms, as proven highly effective in previous ADB urban projects in Bangladesh. The eight project towns are divided into two batches of four, with each town entitled to two stages of investment (stages 1 and 2).¹² Towns will receive funding under each stage if they fulfill agreed performance criteria.¹³ Performance will be evaluated in the following areas: (i) strengthening climate-disaster planning; (ii) strengthening citizen participation; (iii) improving municipal planning, service delivery, and O&M; and (iv) strengthening municipal financial management. A performance evaluation committee will evaluate each *pourashava*.

8. **Lessons.** The project reflects the successful experience in governance-led investment through performance-based allocation from the first and second Urban Governance and Infrastructure Improvement (Sector) Projects.¹⁴ The project also reflects findings of downscaled climate modeling from the technical assistance on Strengthening the Resilience of the Urban Water Supply, Drainage, and Sanitation to Climate Change in Coastal Towns.¹⁵

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Step 2 Provide clear statement of intent to address vulnerability

C. Outputs

10. The project will have the following outputs.

1. Output 1: Improved climate-resilient municipal infrastructure

11. **Stage 1: Climate and disaster risk-reducing infrastructure.** Priority infrastructure will fill critical deficits to strengthen climate and disaster resilience and include the design, rehabilitation, and construction of (i) drainage systems; (ii) cyclone shelters; (iii) water supply systems; (iv) sanitation systems; (v) emergency access roads, bridges, and culverts; and (vi) solid waste management systems.¹⁶ Infrastructure will be designed considering climate projections for the year 2040. The project will develop climate-resilient community infrastructure in poor, vulnerable areas as part of larger infrastructure contracts.¹⁷ Climate-resilient measures will include, but are not limited to, increasing drainage capacity; raising infrastructure levels for roads, cyclone shelters, water and sanitation facilities; and identifying non-saline water sources. Groundwater sources will be prioritized as a least-cost option where salinity levels are within government standards. A design consulting firm will screen all subprojects for climate resilience, and prepare all engineering designs, bidding, and safeguard documents.

12. **Stage 2: Local economic infrastructure.** This component will support local economic development activities and will include the design, rehabilitation, and construction of (i) markets, (ii) bus terminals, (iii) boat landings, and (iv) commercially important roads. These investments will also consider climate resilience in the planning and design stage.

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Step 2 Provide clear statement of intent to address vulnerability

2. Output 2: Strengthened institutional capacity, governance, and awareness

13. Municipal governance and service delivery improvements. Capacity building activities under this subcomponent will focus on (i) strengthening municipal finance systems to improve local revenues, (ii) enhancing citizen participation in *pourashava* planning and decision making process,¹⁸ (iii) strengthening technical capacity and institutional arrangements for improved service delivery and O&M at the *pourashava* level, and (iv) promoting private sector participation in fecal sludge management.

14. Non-structural measures to reduce climate and disaster risk. Capacity building support will strengthen the ability of *pourashavas* to prepare and respond to climate-related risks and disasters by (i) reviewing and updating the urban master plans, local building codes, and engineering design standards of LGED and DPHE to incorporate climate change and disaster resilient measures; (ii) improving water safety planning and groundwater monitoring through the development of water safety plans and guidelines; and (iii) establishing disaster management standing committees in each *pourashava*, and delivering appropriate technical training for the members of such committees.

15. Public awareness, behavior change, and community mobilization. Knowledge-based awareness-raising activities will focus on (i) education and communication campaigns to raise public awareness of climate change and disaster-related risks and preparedness; waste reduction, reuse and recycling; and the links between water, sanitation and hygiene; (ii) livelihood training programs for poor households targeting women; and (iii) community mobilization to enable poor communities to access and use climate-resilient infrastructure (under output 1). The institutional capacity-building consultants will support these activities.

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REVISED DESIGN AND MONITORING FRAMEWORK

Impact the Project is aligned with:
Current project
Improved well-being in coastal towns.*
Overall project
unchanged

Results Chain Outcomes	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Current Project	Current Project	Current Project	Current Project
Increased climate and disaster resilience in coastal towns benefiting the poor and women	By 2020 in project towns: 1. Percentage of household reporting inundation for more than 3 days reduced to about 21% (2013 baseline 43%). 2. Operating water supply systems compliant with government water standards throughout the year increased to 70% (2013 baseline 40%, 13.2% among households headed by women). 3. Additional 12,800 households with access to climate-proofed public sanitation facilities (2013 baseline 0). 4. Additional 7900 (households with access to improved cyclone facilities with separate areas and toilets for women). Overall project 1, 2, and 3 unchanged 4. Additional 8,600 (7900+700) households with access to improved cyclone facilities with separate areas and toilets for women.	For all indicators: Project-specific monitoring and evaluation surveys in a consolidated report from pourashavas and LGED and DPHE Evaluation of climate resilience	BWDB flood control systems not improved. Losing momentum for governance improvement due to change in pourashava leadership.
Overall project		Overall project	
Unchanged		Unchanged	
Outputs			
Output 1	By 2020 in project towns:	For all	
Current Project	Current Project	Current	
Improved climate-resilient municipal infrastructure	1a. Drainage: At least 79 km of new and improved drains constructed.	Project-specific monitoring and evaluation surveys in a consolidated report from pourashavas	Untimely acquisition of required lands Weak compliance with

Step 3
Articulate clear and logical connection between vulnerabilities and project activities

1. Percentage of household reporting inundation for more than 3 days reduced to about 21% (2013 baseline 43%).

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REVISED DESIGN AND MONITORING FRAMEWORK

Impact the Project is aligned with:
Current project
Improved well-being in coastal towns.*
Overall project
unchanged

Results Chain Outcomes	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Current Project	Current Project	Current Project	Current Project
Increased climate and disaster resilience in coastal towns benefiting the poor and women	By 2020 in project towns: 1. Percentage of household reporting inundation for more than 3 days reduced to about 21% (2013 baseline 43%). 2. Drinking water supply systems compliant with government water standards throughout the year increased to 70% (2013 baseline 40%, 13.2% among households headed by women). 3. Additional 12,800 households with access to climate-proofed public sanitation facilities (2013 baseline 0). 4. Additional 7,900 households with access to improved cyclone facilities with separate areas and toilets for women. Overall project 1, 2, and 3 unchanged 4. Additional 8,600 (7900+700) households with access to improved cyclone facilities with separate areas and toilets for women.	For all indicators: Project-specific monitoring and evaluation surveys in a consolidated report from pourashavas and LGED and DPHE consisting of evaluation of climate resilience.	BWDB flood control systems not improved. Losing momentum for governance improvement due to change in pourashava leadership.
Overall project Unchanged		Overall project Unchanged	
Outputs			
Output 1	By 2020 in project towns:	For all indicators:	
Current Project	Current Project	Current Project	
Improved climate-resilient municipal infrastructure	1a. Drainage: At least 79 km of new and improved drains constructed.	Project-specific monitoring and evaluation surveys in a consolidated report from pourashavas	Untimely acquisition of required lands Weak compliance with

Step 3
Articulate clear and logical connection between vulnerabilities and project activities

3. Additional 12,800 households with access to climate-proofed public sanitation facilities (2013 baseline 0).

BANGLADESH - Coastal Towns Environmental Infrastructure Project (CTEIP) \$52m and Additional Financing (AF) \$6m



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REVISED DESIGN AND MONITORING FRAMEWORK

Impact the Project is aligned with:
Current project
Improved well-being in coastal towns.*
Overall project
unchanged

Results Chain Outcomes	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Current Project	Current Project	Current Project	Current Project
Increased climate and disaster resilience in coastal towns benefiting the poor and women	By 2020 in project towns: 1. Percentage of household reporting inundation for more than 3 days reduced to about 21% (2013 baseline 43%). 2. Drinking water supply systems compliant with government water standards throughout the year increased to 70% (2013 baseline 40%, 13.2% among households headed by women). 3. Additional 12,800 households with access to climate-proofed public sanitation facilities (2013 baseline 0). 4. Additional 7900 (households with access to improved cyclone facilities with separate areas and toilets for women). Overall project 1, 2, and 3 unchanged	For all indicators: Project-specific monitoring and evaluation surveys in a consolidated report from pourashavas and LGED and DPHE consisting of evaluation of climate resilience	BWDB flood control systems not improved. Losing momentum for governance improvement due to change in pourashava leadership.
Overall project Unchanged	4. Additional 8,600 (7900+700) households with access to improved cyclone facilities with separate areas and toilets for women.	Overall project Unchanged	
Outputs			
Output 1	By 2020 in project towns:	For all indicators:	
Current Project	Current Project	Current Project	
Improved climate-resilient municipal infrastructure	1a. Drainage: At least 79 km of new and improved drains constructed.	Project-specific monitoring and evaluation surveys in a consolidated report from pourashavas	Untimely acquisition of required lands Weak compliance with

Step 3
Articulate clear and logical connection between vulnerabilities and project activities

4. Additional 8,600 (7900+700) households with access to improved cyclone facilities with separate areas

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Step 3
Articulate clear and logical connection between vulnerabilities and project activities

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Overall project Unchanged	2b. Climate-proofed building code guidelines adopted (include design features that cater to women in public facilities).	Adopted water safety plans. Adopted O&M plan with tariff plan.	
	2c. Climate-proofed LGED and DPHE design standard guidelines published.	Resolutions adopting GAP and PRAPs with budget support for each town.	
	2d. Water safety plans with groundwater monitoring (that define a leadership role for women) approved.	Consolidated annual monitoring report of pourashavas and LGED and DPHE.	
	2e. O&M plans approved including tariff plan for cost recovery (33% of participants during consultations were women).		
	2f. GAP and PRAPs approved for towns.		
	2g. Computerized financial accounting and billing systems functional.		
	2h. At least 4,800 (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.		
	Overall project 2a, 2b, 2c, 2d, 2e, 2f and 2g - unchanged		
	2h. At least 6000 (4800+1200) (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.		
	2i. Integrated Drainage Plan (IDP) developed for 2 towns.		
Overall project Unchanged	2j. Solid Waste Management (SWM) and Faecal Sludge Management (FSM) Plan with business model involving PPP approach developed for 2 towns.		
	2k. Knowledge product and		

2b. Climate-proofed building code guidelines adopted (include design features that cater to women in public facilities).

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Step 3
Articulate clear and logical connection between vulnerabilities and project activities

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Overall project Unchanged	2b. Climate-proofed building code guidelines adopted (include design features that cater to women in public facilities).	Adopted water safety plans. Adopted O&M plan with tariff plan.	
	2c. Climate-proofed LGED and DPHE design standard guidelines published.	Resolution adopting GAP and PRAPs with budget support for each town.	
	2d. Water safety plans with groundwater monitoring (that define a leadership role for women) approved.	Consolidated annual monitoring report of pourashavas and LGED and DPHE.	
	2e. O&M plans approved including tariff plan for cost recovery (33% of participants during consultations are women).		
	2f. GAP and PRAPs approved for towns.		
	2g. Computerized financial accounting and billing systems functional.		
	2h. At least 4,800 (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.		
	Overall project 2a, 2b, 2c, 2d, 2e, 2f and 2g - unchanged	Overall project Unchanged	
	2h. At least 6000 (4800+1200) (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.		
	2i. Integrated Drainage Plan (IDP) developed for 2 towns.		
	2j. Solid Waste Management (SWM) and Faecal Sludge Management (FSM) Plan with business model involving PPP approach developed for 2 towns.		
	2k. Knowledge product and		

2c. Climate-proofed LGED and DPHE design standard guidelines published.

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Step 3
Articulate clear and logical connection between vulnerabilities and project activities

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Overall project Unchanged	2b. Climate-proofed building code guidelines adopted (include design features that cater to women in public facilities).	Adopted water safety plans. Adopted O&M plan with tariff plan.	
	2c. Climate-proofed LGED and DPHE design standard guidelines published.	Resolution adopting GAP and PRAPs with budget support for each town.	
	2d. Water safety plans with groundwater monitoring (that define a leadership role for women) approved.	Consolidated annual monitoring report of pourashavas and LGED and DPHE.	
	2e. O&M plans approved including tariff plan for cost recovery (33% of participants during consultations are women).		
	2f. GAP and PRAPs approved for towns.		
Overall project Unchanged	2g. Computerized financial accounting and billing systems functional.		
	2h. At least 4,800 (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.		
	Overall project 2a, 2b, 2c, 2d, 2e, 2f and 2g - unchanged		
	2h. At least 6000 (4800+1200) (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.		
	2i. Integrated Drainage Plan (IDP) developed for 2 towns.		
Overall project Unchanged	2j. Solid Waste Management (SWM) and Faecal Sludge Management (FSM) Plan with business model involving PPP approach developed for 2 towns.		
	2k. Knowledge product and		

2h. At least 4,800 (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.

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Step 3
Articulate clear and logical connection between vulnerabilities and project activities

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
	2b. Climate-proofed building code guidelines adopted (include design features that cater to women in public facilities). 2c. Climate-proofed LGED and DPHE design standard guidelines published. 2d. Water safety plans with groundwater monitoring (that define a leadership role for women) approved.	Adopted water safety plans. Adopted O&M plan with tariff plan. Resolution adopting GAP and PRAPs with budget support for each town. Consolidated annual monitoring report of pourashavas and LGED and DPHE.	
Overall project	2e. O&M plans approved including tariff plan for cost recovery (33% of participants during consultations are women). 2f. GAP and PRAPs approved for towns. 2g. Computerized financial accounting and billing systems functional. 2h. At least 4,800 (at least 60% per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.	Overall project	
Unchanged	Overall project 2a, 2b, 2c, 2d, 2e, 2f and 2g - unchanged 2h. At least 6000 (4800+1200) (at least 600 per town including 60% women) undergo and complete livelihood training and knowledge based awareness programs that consider climate change.	Unchanged	
	2i. Integrated Drainage Plan (IDP) developed for 2 towns. 2j. Solid Waste Management (SWM) and Faecal Sludge Management (FSM) Plan with business model involving PPP approach developed for 2 towns.		
	2k. Knowledge product and		

2i. Integrated Drainage Plan (IDP) developed for 2 towns.

2j. Solid Waste Management (SWM) and Faecal Sludge Management (FSM) Plan with business model involving PPP approach developed for 2 towns.

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Step 3
Articulate clear and logical connection between vulnerabilities and project activities

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
	knowledge sharing event on improved inclusive access to Climate Resilient Infrastructure and support to the IDP and SWM and FSM Plan.		
Output 3		For all indicators:	
Current Project	Current Project	Current Project	
Project management and administration supported	3a. Quarterly progress reports and audit reports are submitted on time and of satisfactory quality (gender-disaggregated data collected). 3b. Project implemented on time and within budget.	Quarterly progress reports issued by PMU.	
Overall project	Overall project	Overall project	
Unchanged	Unchanged	Unchanged	
Key Activities with Milestones			
1. Output 1: Improved climate-resilient municipal Infrastructure			
1.1 Procure works, stage 1, batch 1 towns (Q3 2014) (unchanged)			
1.2 Procure works, stage 1, batch 2 towns (Q3 2015) (unchanged)			
1.3 Procure works, stage 1, batch 3 towns (two additional towns (Q4 2016) (added)			
1.4 Procure works, stage 2, batch 1 towns (Q4 2015) (unchanged)			
1.5 Procure works, stage 2, batch 2 towns (Q1 2017) (unchanged)			
1.6 Procure works, stage 2, batch 3 towns (Q2 2018) (unchanged)			
1.7 Implement all civil works (by Q2 2020) (unchanged)			
2. Output 2: Strengthened institutional capacity, governance, and			
2.1 Implement capacity building for batch 1 towns (Q2 2014); batch 2 and batch 3 towns (Q4 2016) (changed)			
2.2 Implement awareness and training for batch 1 towns (Q3 2014) (Q3 2015) and batch 3 towns (Q4 2016) (changed)			
2.3 Evaluate performance for stage 1, batch 2 towns (Q1 2015)			
2.4 Evaluate performance for stage 1, batch 3 towns (Q4 2016)			
2.5 Evaluate performance for stage 2, batch 1 towns (Q2 2015)			
2.6 Establish disaster management standing committees in (changed)			
2.7 Evaluate performance for stage 2, batch 2 towns (Q1 2017)			
2.8 Evaluate performance for stage 2, batch 3 towns (Q2 2018)			
3. Output 3: Project management and administration supported			
3.1 Establish PMU and PIUs (Q4 2013) (unchanged)			
3.2 Mobilize PMSC and ICCDC (Q3 2014) (unchanged)			
3.3 Mobilize PIAC (Q4 2014) (unchanged)			
3.4 Establish project performance management system (Q3 2014) (unchanged)			
3.5 Conduct monitoring and reporting (quarterly) (unchanged)			

2k. Knowledge product and knowledge sharing event on improved inclusive access to Climate Resilient Infrastructure and support to the IDP and SWM and FSM Plan.

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PROJECT AT A GLANCE

1. Basic Data		Project Number: 44212-013	
Project Name	Coastal Towns Environmental Infrastructure Project	Department /Division	SARD/SAUW
Country	Bangladesh	Executing Agency	Department of Public Health Engineering, Local Government Engineering Department, Ministry of Local Government, Rural Development, and Co-operatives
Borrower	People's Republic of Bangladesh		
2. Sector		ADB Financing (\$ million)	
✓ Water and other urban infrastructure and services	Other urban services		8.00
	Urban flood protection		13.50
	Urban policy, institutional and capacity development		2.20
	Urban sanitation		1.70
	Urban solid waste management		0.02
	Urban water supply		9.50
Transport	Urban roads and traffic management		17.08
	Total		52.00
3. Strategic Agenda		Climate Change Information	
Inclusive economic growth	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Adaptation (\$ million)	6.20
Environmentally sustainable growth	Disaster risk management	Climate Change impact on the Project	High
	Global and regional transboundary environmental concerns		
4. Drivers of Change		Gender Equity and Mainstreaming	
Governance and capacity development	Anticorruption	Gender equity (GEN)	✓
	Civil society participation		
	Institutional development		
	Organizational development		
	Public financial governance		
Knowledge solutions	Application and use of new knowledge solutions in key operational areas		
	Knowledge sharing activities		
Partnerships	Bilateral institutions (not client government)		
	Foundations		
	Official cofinancing		
5. Poverty Targeting		Location Impact	
Project directly targets poverty	Yes	Urban	
Geographic targeting (TI-G)	Yes		
6. Risk Categorization: Low			
7. Safeguard Categorization Environment: B Involuntary Resettlement: B Indigenous			
8. Financing			

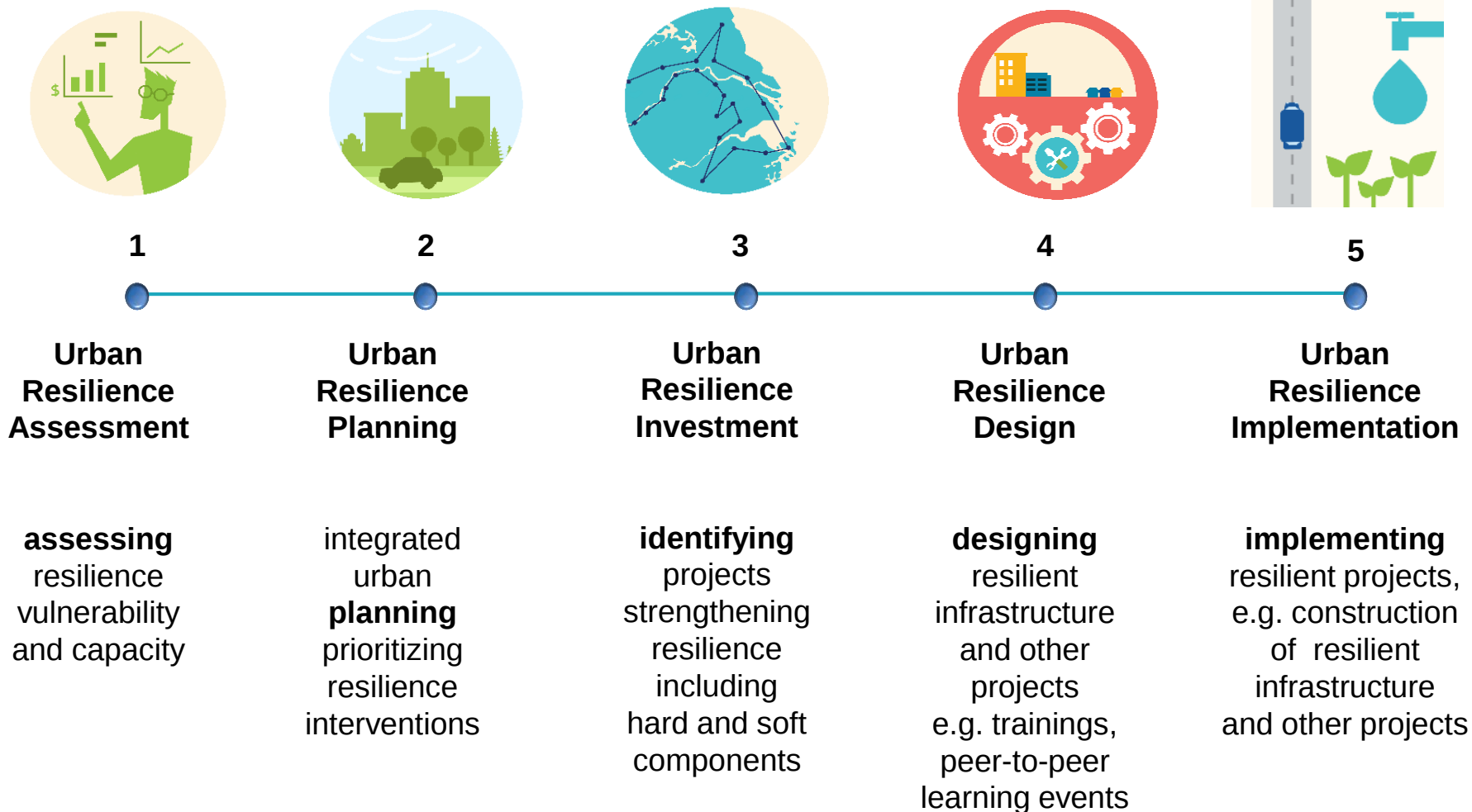
Climate Change Information
Adaptation (\$ million) 6.20
Climate Change impact on the Project High

BANGLADESH - Coastal Towns Environmental Infrastructure Project (CTEIP) \$52m and Additional Financing (AF) \$6m



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Strengthening Urban Resilience



Strengthening Urban Resilience Bangladesh: Bagerhat



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Strengthening Urban Resilience Bangladesh: Bagerhat





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Viet Nam

Secondary Green Cities
Development Project

September 2018

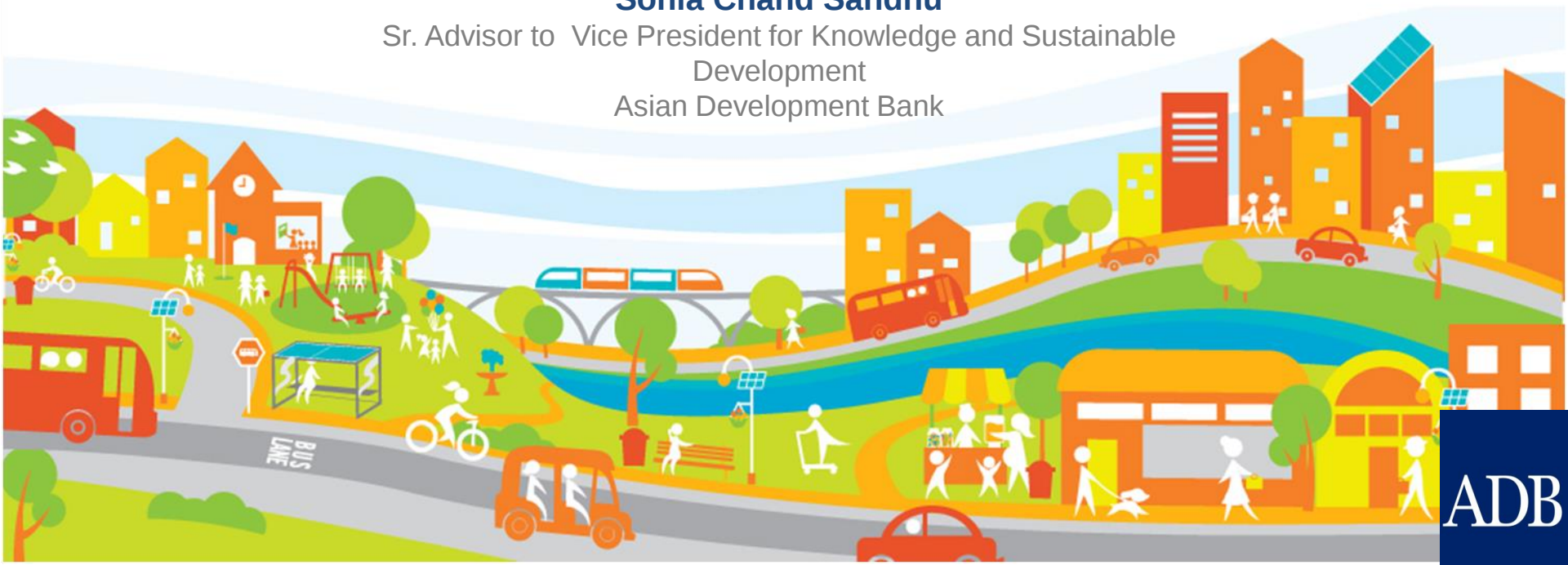
Economy + Environment + Equity

Counting Climate Finance
Staff Training, ADB HQ
20 September 2018

Green and Livable Cities

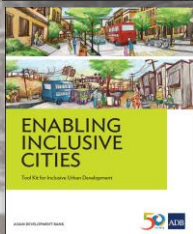
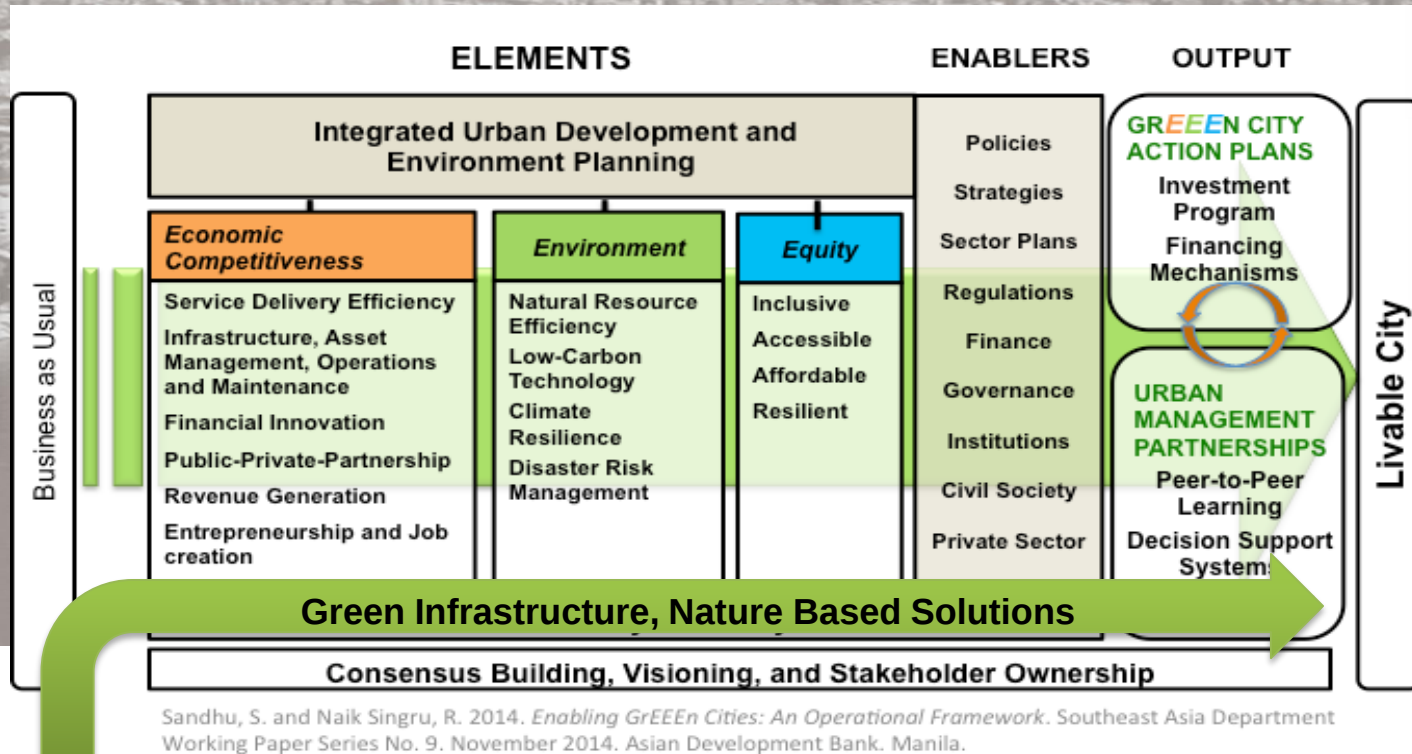
Sonia Chand Sandhu

Sr. Advisor to Vice President for Knowledge and Sustainable
Development
Asian Development Bank

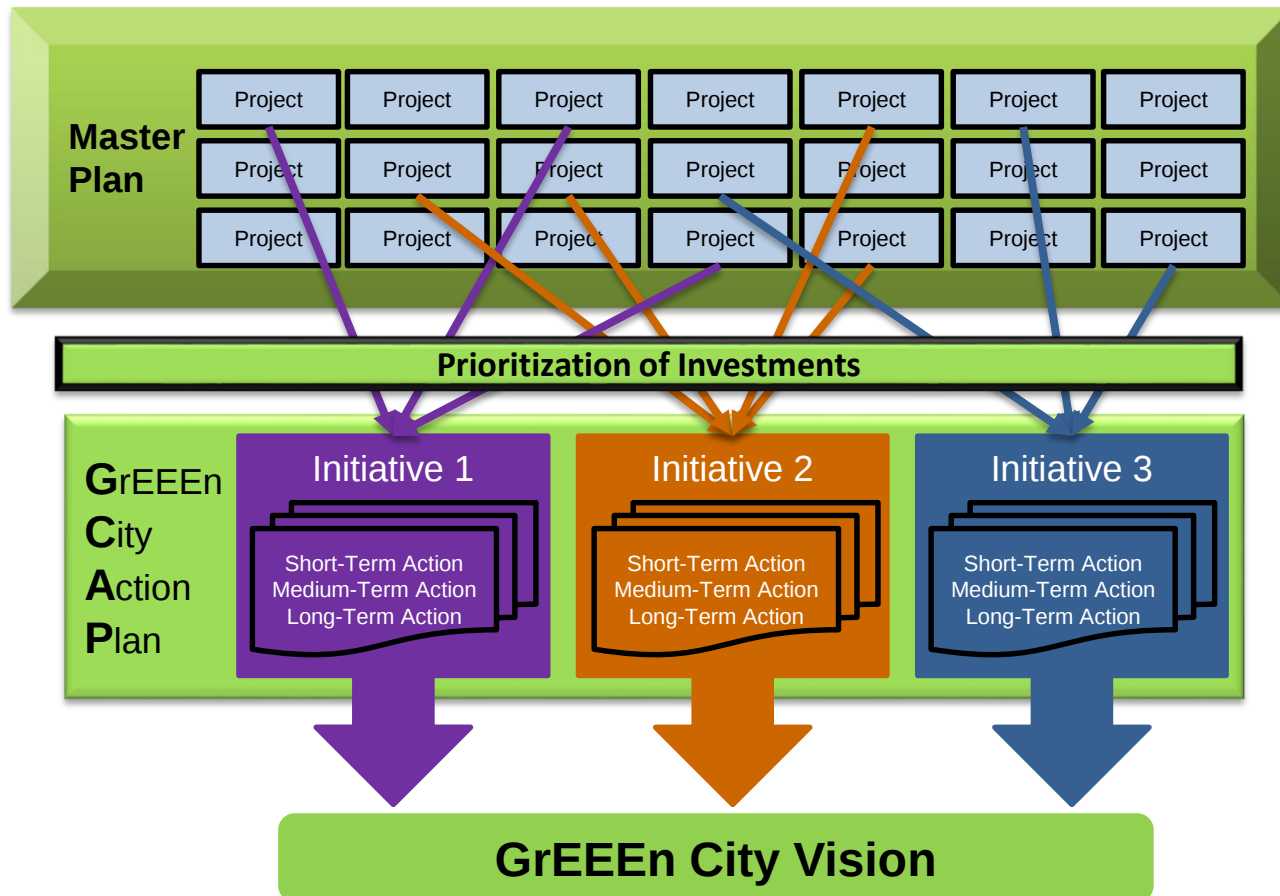


Convergence Platform for Integrated Planning and Design

GrEEEn Cities Operations Framework To Livable Cities Framework



From Master Plan to Action Planning



Source: S. Sandhu, et. al. 2016, *GrEEEn Solutions for Livable Cities*. Manila: Asian Development Bank

The development and green infrastructure interface

	Bridges	Buildings	Canals	Commercial area redevelopment	Culverts and drains	Dykes	Drainage	Flood gates	Industrial areas	Markets	Parking areas	Port redevelopment	Residential areas	River embankments	Road embankments	Roads and footpaths
Bioretention pond																
Bioswales																
Brush mattress																
Constructed wetlands																
Drainage corridors																
Greywater recycling																
Green roofs and walls																
Live crib wall																
Live fascines																
Live fencing																
Live staking																
Log terracing																
Palisades																
Permeable paving																
Rain gardens																
Solid waste management																
Stormwater tree pits																
Urban river terracing																
Urban tree canopy cover																
Vegetated gabions																
Vegetated eotextiles																
Vegetated revetment																
Vegetated riprap																
Vetiver grass																
GREEN INFRASTRUCTURE																

Source : ADB. 2015. *Nature Based Solutions for Sustainable and Resilient Mekong Towns*, Volume 1 of the Resource Kit for Building Resilience and Sustainability in Mekong Towns. Prepared by ICEM

Green Infrastructure : Low Impact Development (LID)

1. Stormwater filtering

Rain gardens: Storm water collection, treatment and reuse; Reduce erosion ; Storage of rain water for irrigation ; Bioretention, rain gardens



- Filtering sediments and oils
- Overflow to drainage



VIETNAM: Hue GrEEEn City Action Plan (GCAP)

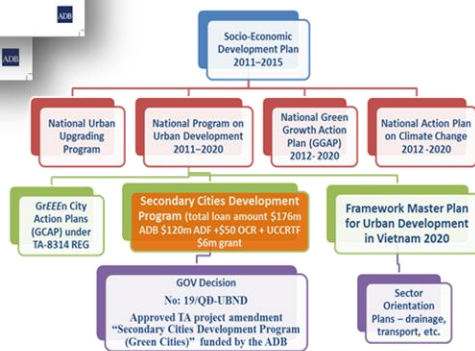
GCAP endorsement;
Strengthen de-centralization



- Initiative 1**
Improve the urban environment
1. WW treatment and collection system
 2. Drainage improvements for 4 wards
 3. Rehabilitate ponds and canals
 4. Landfill in Huong Binh.
 5. Energy efficient street lighting
 6. City wide water monitoring

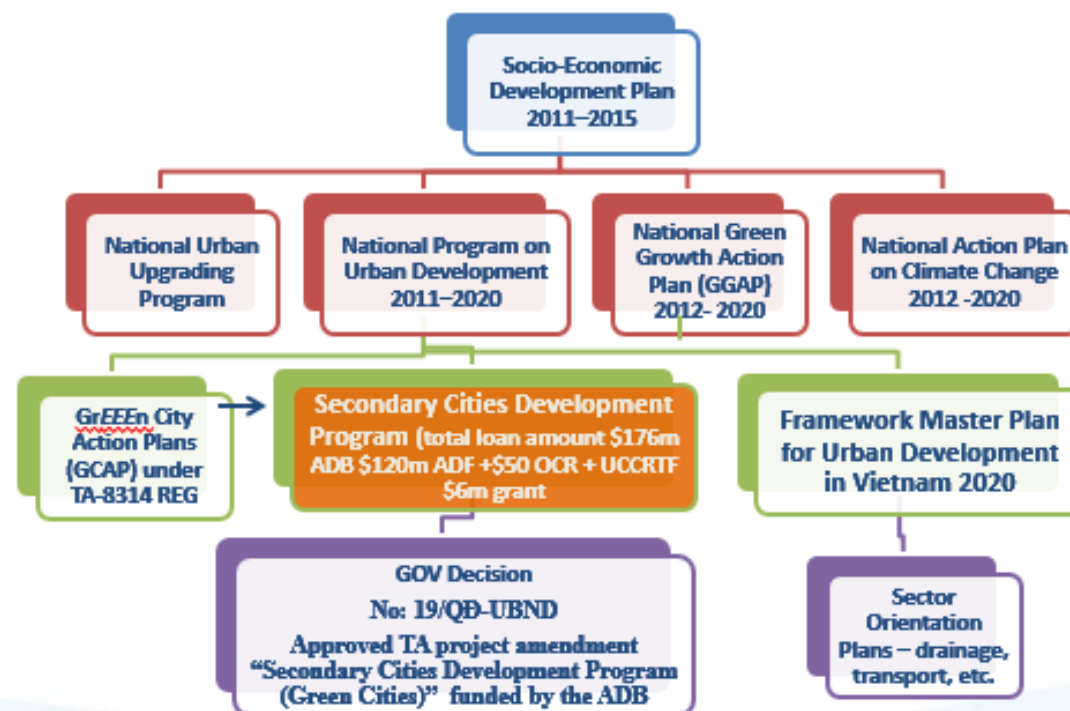
- Initiative 2**
Enhance the tourism experience
1. Expand tourism
 2. New crafts market in Thuy Xuan Ward
 3. Expand Hue by night
 4. Non-motorized transport

- Initiative 3**
Develop sustainable transport in expanded Hue city
1. Promote bicycle use
 2. Urban link roads for connectivity
 3. Peripheral parking facilities
 4. Tramline on existing railway alignment



VietNam Country Systems:

National Socio Economic Development, Environment and Urban Development Programs,
Green Growth, Climate Change, Resilience



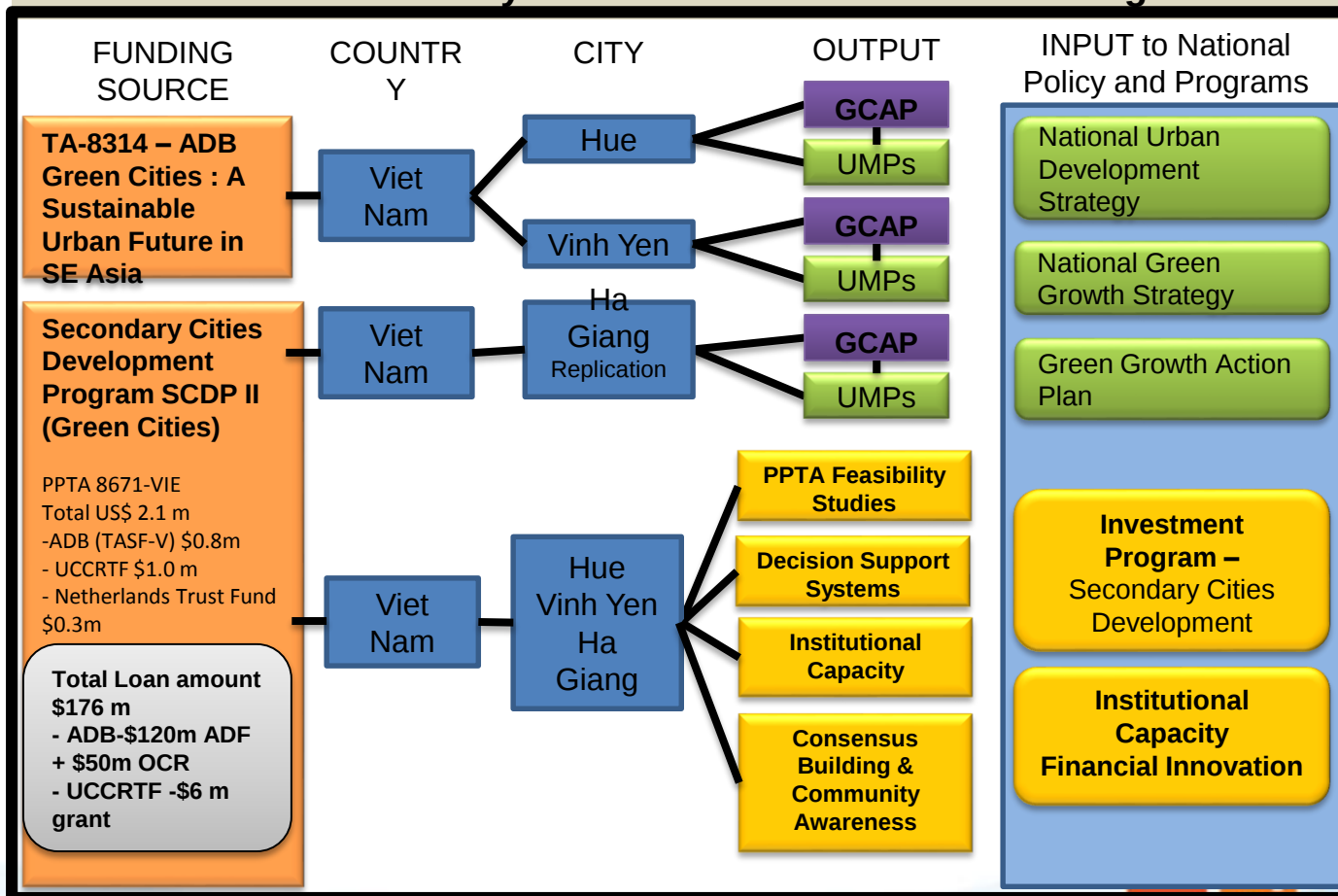
Supporting Decrees:

Government of Viet Nam, 2009, No. 783/QĐ-TTg: Decision on the Approval of the National Program on Urban Upgrading Hs Noi, 8 June.
 Government of Viet Nam, 2012, No. 1639/QĐ-TTg: Decision on the Approval of the National Program on Urban Development in 2011-2020 period
 Government of Viet Nam, 2012, No. 1393/QĐ-TTg: Decision on the Approval of the National Green Growth Strategy, 2012 – 2020 Hs Noi, 25 September.
 Government of Viet Nam, Ministry of Planning and Investment, 2014, draft National Action Plan on Green Growth in the period 2012-2020.
 Government of Viet Nam, 2012, No. 1474/QĐ-TTg: Decision on Promulgation of National Action Plan on Climate Change in the Period of 2012-2020, Hs Noi, 5 October.
 The Development Orientation of Urban and Industrial Parks Drainage in Viet Nam to 2025 and Vision to 2050 (approved in 2009 under Decision No. 19/QĐ-UBND) Hs Noi, 14 REG
 Government of Viet Nam, Decision 1327/QĐ-TTg: Planning of Road Transport Development in Viet Nam to 2020 and Vision 2050, Hs Noi.

Enabling GrEEEn Cities

ADB

Vietnam : GrEEEn City Action Plan – A Platform for Integration



TASF – Technical Assistance Special Fund, GCAP – Green City Action Plan, UMPs – Urban Management Partnerships, PPTA – Project Preparatory Technical Assistance

Secondary Green Cities Development Project (SGCDP)



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- **Application of the GrEEEn city concept for the project design:** GrEEEn City Action Planning (GCAP) for Vinh Yen, Hue, and Ha Giang
- **Outcome:** Strengthened environmental sustainability, inclusiveness, and climate resilience of Vinh Yen, Hue, and Ha Giang
- **Outputs:** Green and resilient urban infrastructure services in Vinh Yen, Hue and Ha Giang improved
- **Financing:** \$223.87 million (ADB \$170 million; Co-financing \$ 6 million; government \$47.87) and the attached TA of \$14.1 million
- **Climate Finance:** \$29.16 million (adaptation)

Five common subproject components of two themes of SGCDP



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Component Theme/Type	Number of Subproject Components		
	Hue	Ha Giang	Vinh Yen
Green & Climate Resilient Urban Development			
Embankment Developments, Dredging	7	3	1
Parkland Development	2	-	2*
Stream-drain Rehabilitation		4	
New Wastewater Networks & Treatment, Water Supply	1	-	2
Integrated Urban Road Network Development			
New and Upgraded Roads, Drainage, Bridges	5	4	1*

* Two components allocated to “Economically Competitive City Development” theme

Estimated contribution to urban climate finance (adaptation): \$29.16 million



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	1	2	3	4	5	6	7
Project subcomponents in the 3 project cities	Total Costs of sub-components (USD)	Included in provincial government action plan as priority action for urban climate resilience	Included in Green City Action Plan as climate resilience initiative	Not in (2) or (3), but considered climate resilience activity by SGCDP	Climate Proofing of Infrastructure considered	Adaptation activity typology, ratio of adaptation finance (%)	Projects' contribution to Climate Resilience and Climate Proofing (USD)
	(Note 1)	(Note 2)	(Note 3)	(Note 4)	(Note 5)	(Note 6)	(Note 7)
Hue							
Drainage and pavement in 4 inner city wards of Citadel	9.50	✓	✓		✓	Type 2 (100%)	9.50
Dredging and embankments of Citadel lakes	2.06	✓	✓		✓	Type 2 (100%)	2.06
Dredging and embankments of Ke Van River	1.87	✓			✓	Type 2 (100%)	1.87
Dredging and embankments of An Hoa River	3.66	✓			✓	Type 2 (100%)	3.66
Dredging and embankments of An Dong Ba River	0.56	✓			✓	Type 2 (100%)	0.56
Dredging and embankments of Lap River	0.92	✓			✓	Type 2 (100%)	0.92
(Climate proofing of) Rehabilitation/ Embankment of An Cuu River	0.47				✓	Type 1 (5%)	0.02
(Climate proofing of) Rehabilitation/ Embankment of Nhu Y River (Vi Da Bridge on Han Mac Tu Road to Van Duong)	0.49				✓	Type 1 (5%)	0.02
Water supply system to Pho Son Waste Facility and villages	0.83			✓		Type 2 (25%)	0.21
(Climate proofing of) Park, path, drainage, and lighting in An Van Duong Development Area	5.60				✓	Type 1 (2%)	0.28
(Climate proofing of) Park and square in the administrative area	4.84				✓	Type 1 (2%)	0.24

How to make urban infrastructure and service green and resilient: Not only figures but also...



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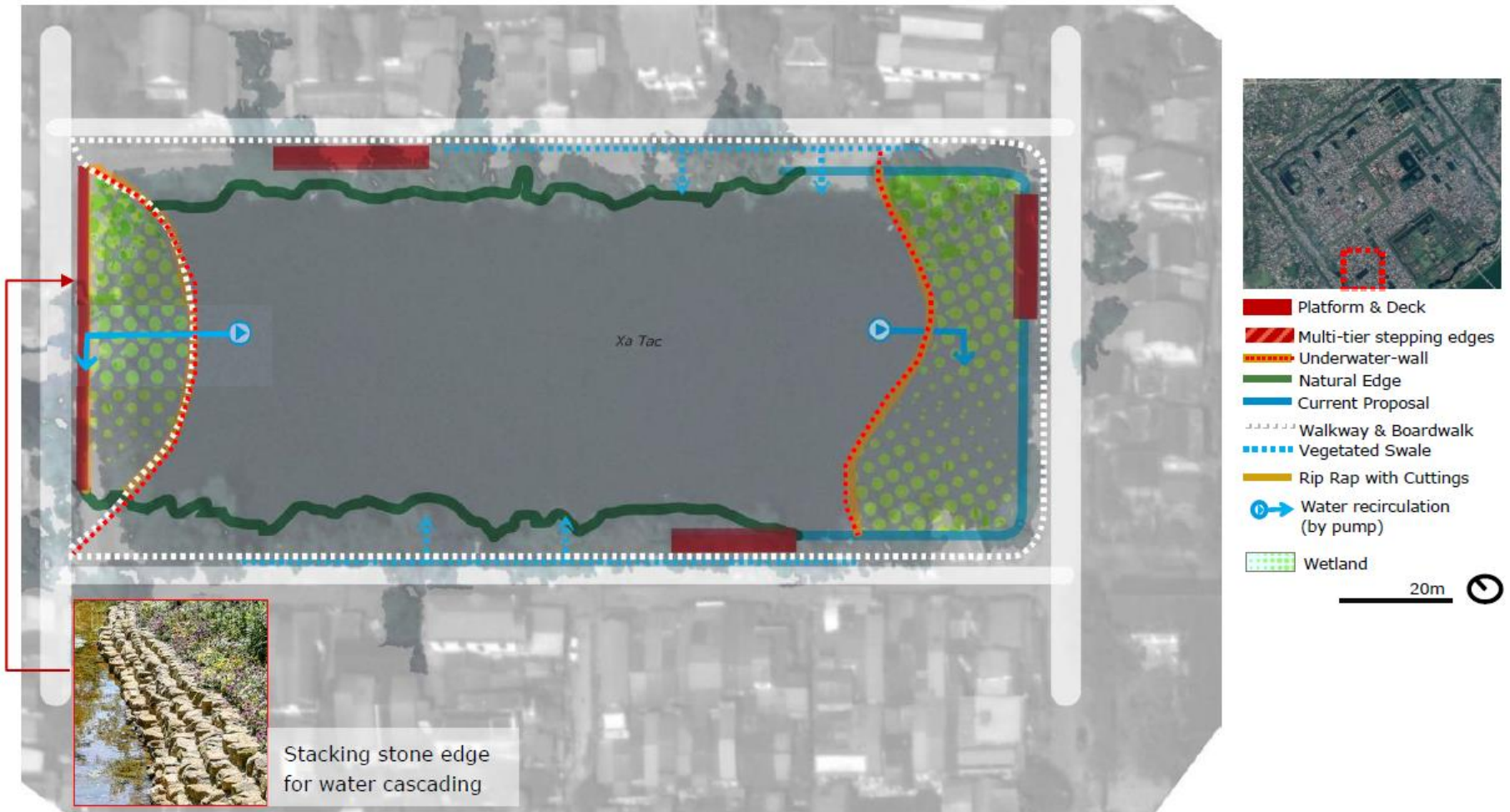
BAU Scenario

- High vertical embankment wall with no access to water
- No recirculation of water within the pond

Proposing alternative designs (soft edge treatment and water sensitive urban design) to DED consultants

“Planting a seed for enhancing the green design in our future projects”

Example: Design Alternative Proposed for Xa Tac Pond in Hue





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Philippines

New Clark City

September 2018

Review of the New Clark City Master Plan



Step 1

Review of the Master Plan on smart and green aspects

Step 2

River Study / River Zone Plan with open green spaces

Step 3

Resilience Framework and its Guidelines (high level)

Step 4

Integration of the Guidelines into sub plans and sector plans

New Clark City



- **redevelopment project** in a former US Military Base by the Bases Conversion Development Authority (BCDA) 120km north of Manila
- **9,450 hectares** within a special economic zone (SEZ)
- envisioned as an **environmentally sustainable, smart and disaster-resilient new world class city**
- **national government's backup facility**, with an operations and disaster risk and recovery center

New Clark City

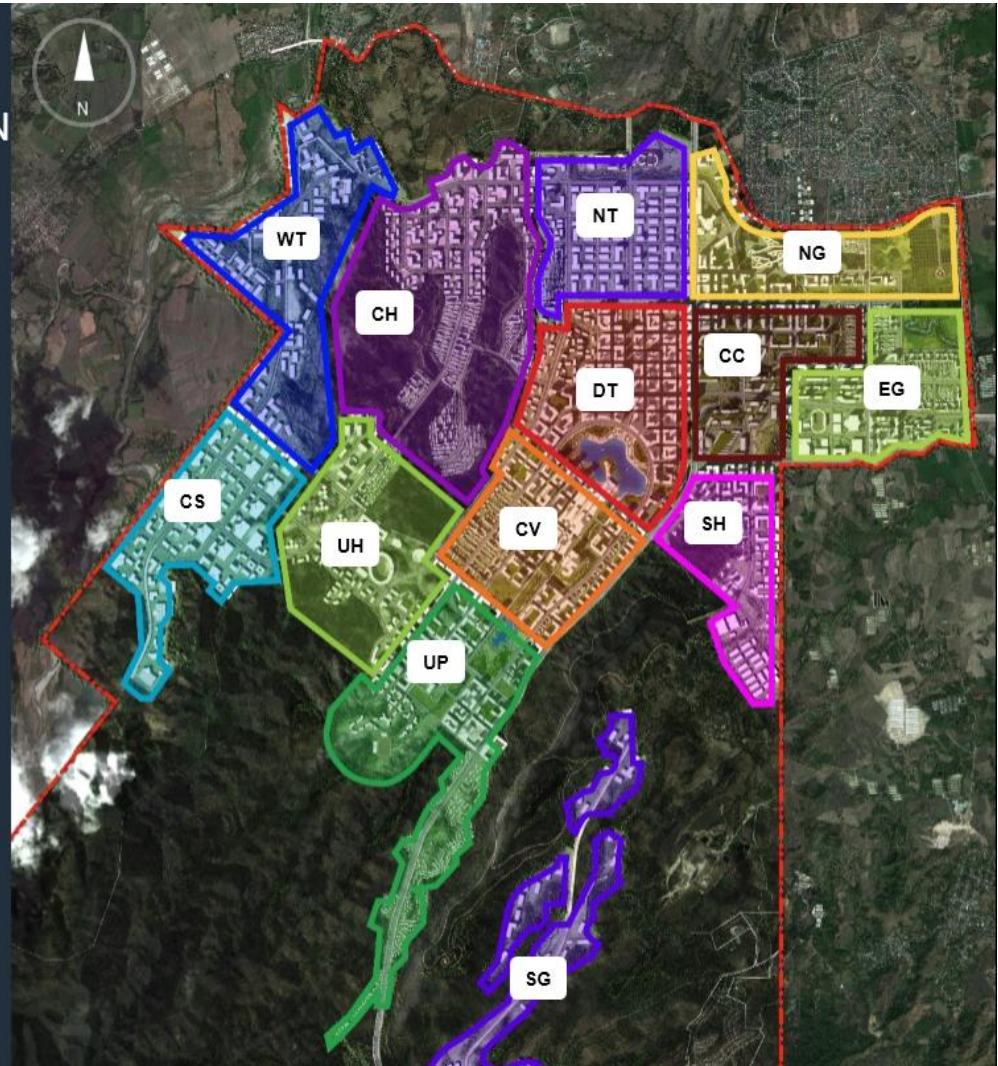


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NEW CLARK CITY COMPREHENSIVE DEVELOPMENT PLAN

KEY

- CC** Civic Center
- DT** Downtown
- CV** Clark Valley
- UP** University Place
- UH** University Heights
- NG** North Gate
- EG** East Gate
- SH** South Hill
- SG** South Gate
- SC** Clark Science City
- WT** West Tech Park
- CH** Clark Highlands
- NT** North Tech Park



Enhancing NCC's Resilience through Review of Master Plan



Implementation Strategy

NCC Master Plan

Review of the Master Plan Recommendations

Climate Risk and Adaptation

Possibly inconsistent with use of climate data

Design for 2050 climate change projections, and base projections on the high range emission scenario

The River

Heavily channelized

Integrate green/public space, flood management and functions to surrounding areas

Implementation of sub-plans

Comprehensive but less attention paid to scope, phasing and development strategy of sub-plans; issues on cost estimates

Re-think Phase 1 plans; Examine cost items; include provisions for raw water service, wastewater treatment, BRT, and civic elements such as schools, police and fire stations

Relationship to Surroundings

Relationship to surrounding localities sparsely addressed

Look into relationships with surrounding localities/communities, valuable landscape features, food systems and ecosystem services

Cost consequences

Have sound assumptions

Anticipate cost implications from alterations of Master Plan features; utilize nature-based solutions

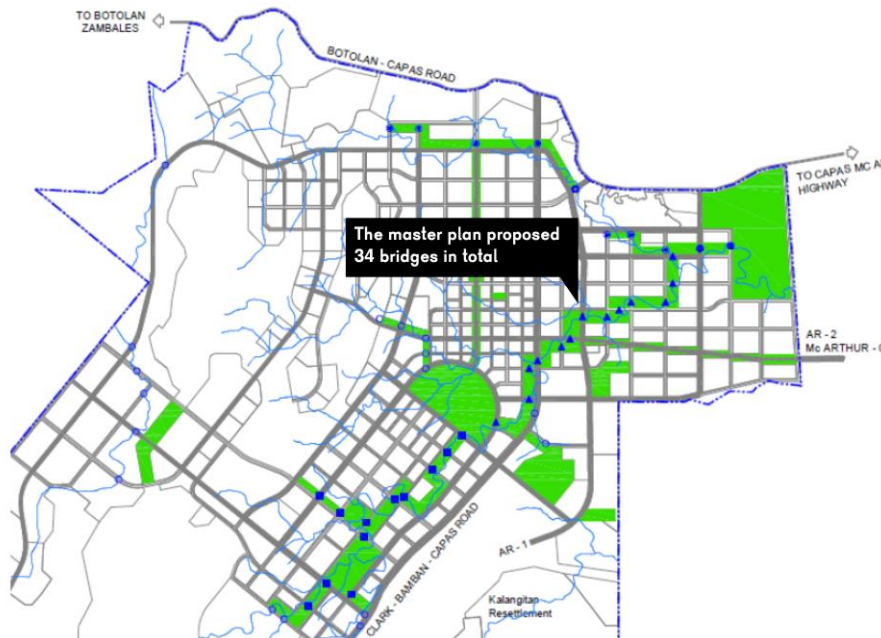
Review Master Plan River Channel / Crossings



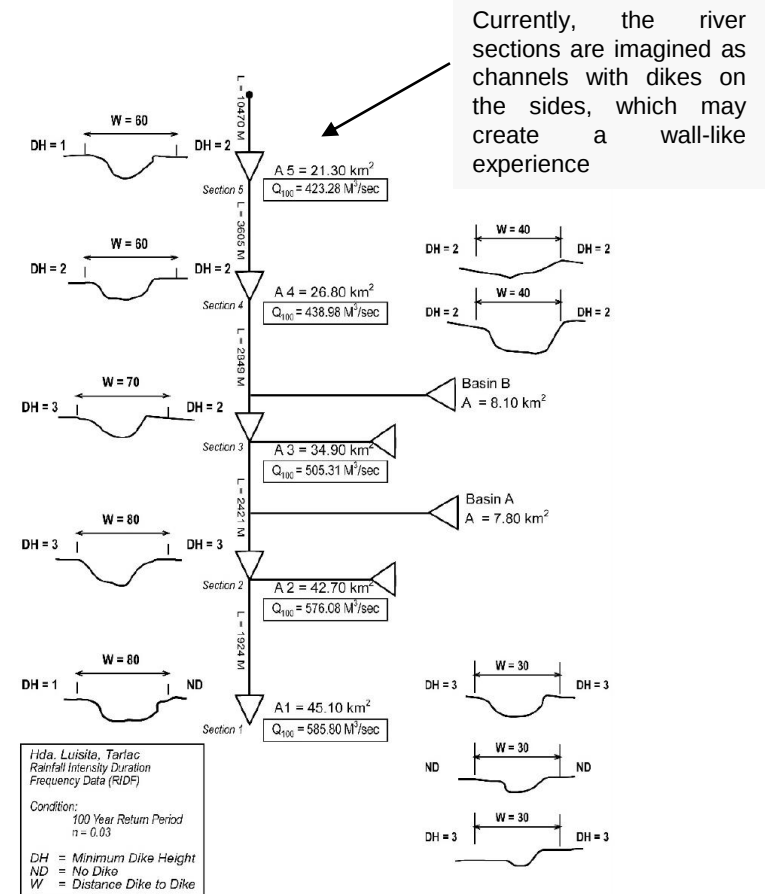
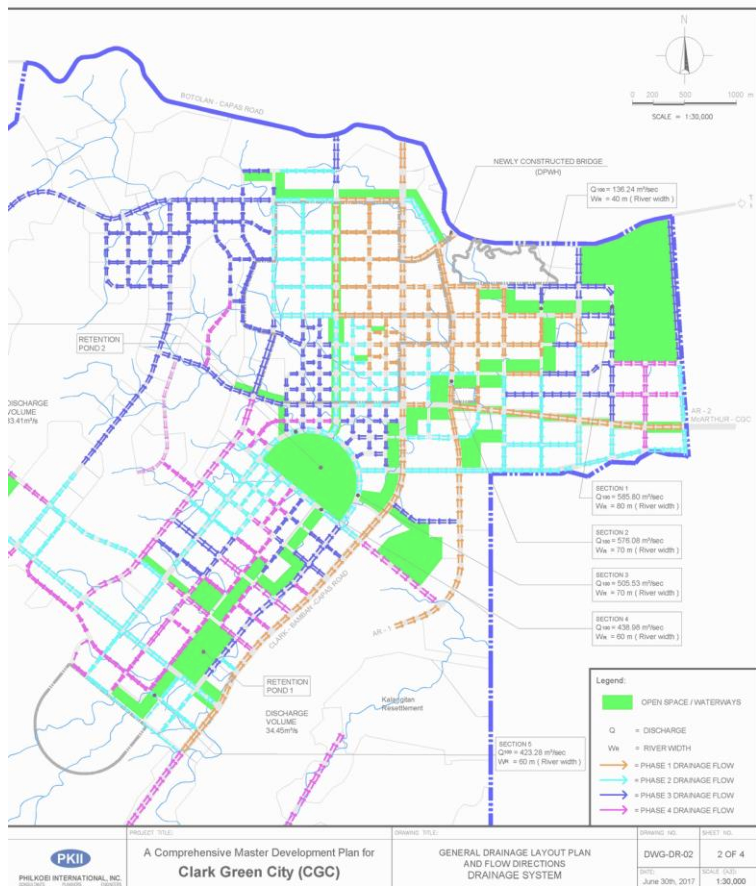
81

As set out in the master plan, most of the “green zone” area is utilized by the hardened river channel, which leaves minimal opportunity for multi-benefit open space throughout the city. An implication of this design and engineering approach, limits the use of the master plan’s “green zone” as open space during dry weather.

Given the master plan’s gridded road network, approximately 34 bridges are proposed across the main river stem. This amount of infrastructure is costly and requires detailed, dedicated maintenance schedules and strategies. Crossings should be designed such that smaller footprints are required and integration with open space produces better public space.



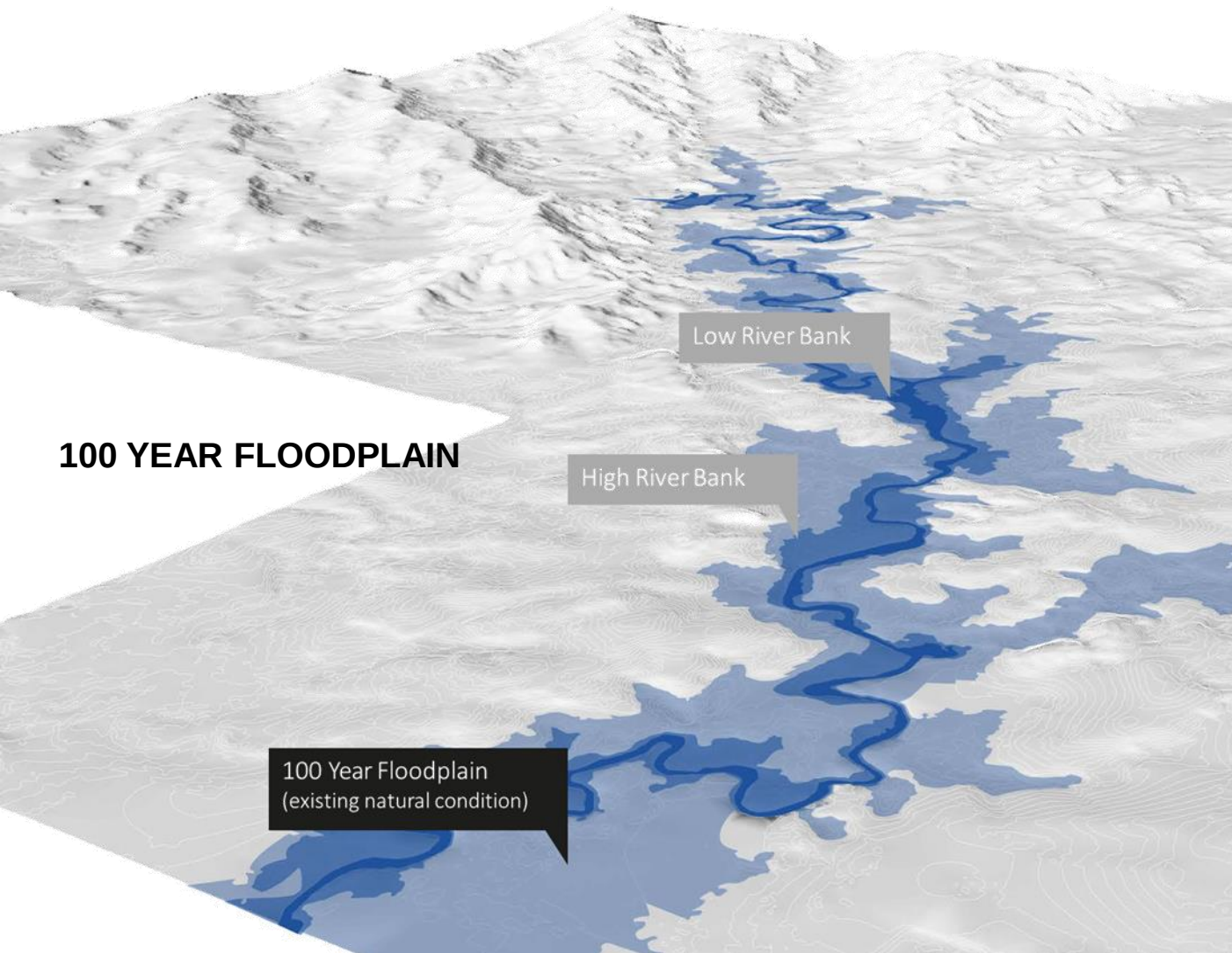
Proposed Engineering Solutions of the River in the Master Plan



New Clark City River Study



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The natural low river bank marks the river condition during base conditions.

The natural high river bank shows the frequently flooded zone during wet season.

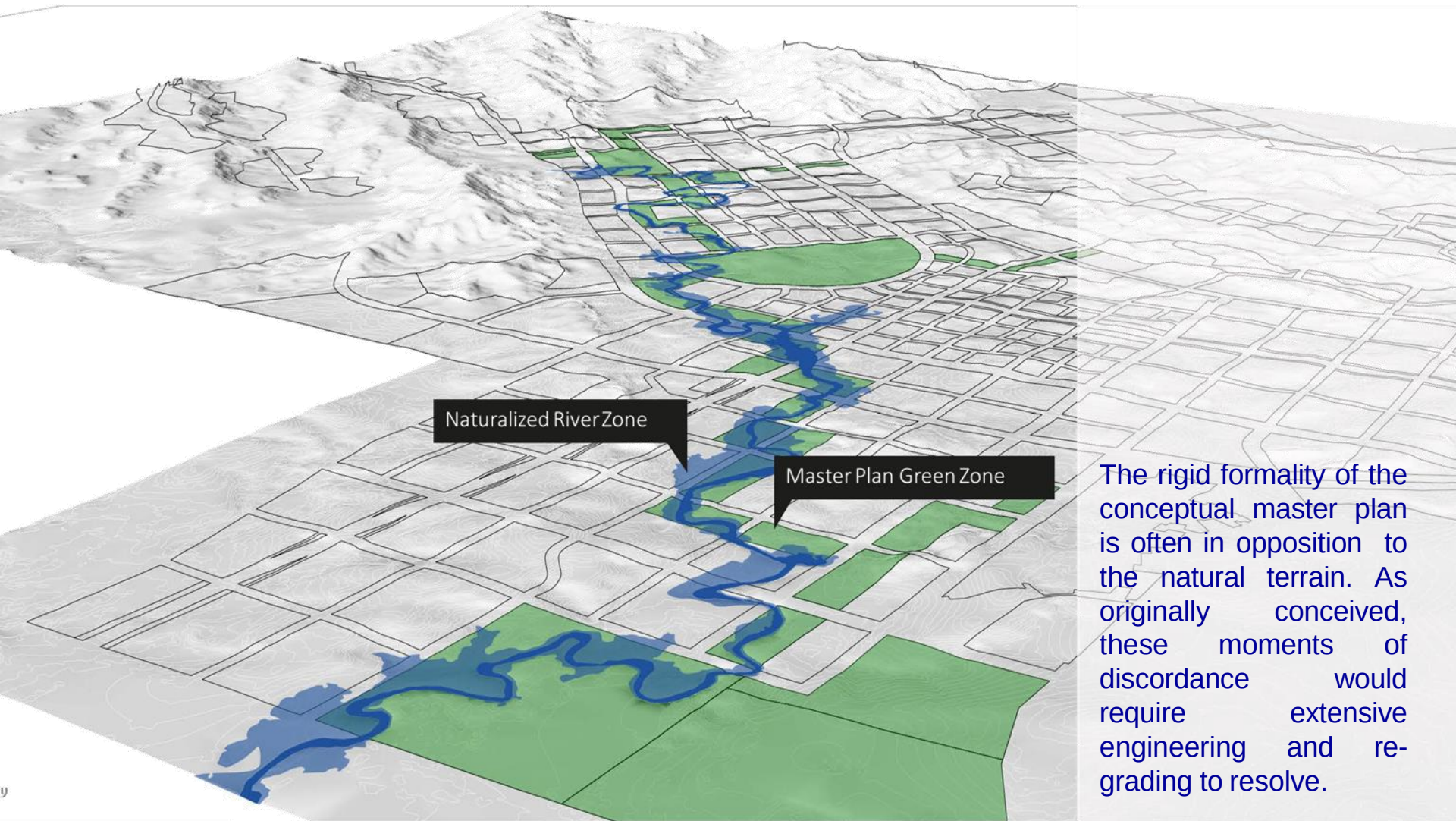
The natural 100 year floodplain is the area estimated to have a 1% chance of flooding in any given year.

It is critical that development is avoided as much as possible in this zone. If development does occur, proper protection must be offered.

New Clark City River Study



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Naturalized River Zone

Master Plan Green Zone

The rigid formality of the conceptual master plan is often in opposition to the natural terrain. As originally conceived, these moments of discordance would require extensive engineering and re-grading to resolve.

New Clark City River Plan



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Urban Edge

Photo: Chicago River Walk, Chicago



Landscape Edge

Photo: Mill River Park, Stamford



Natural Edge

Photo: Bishan Park, Singapore



New Clark City River Zone Plan - Costs



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Cost Increase 1: Additional roads to reduce block size

25m collector roads estimated at \$489/m
Increase road length of 1,600m
 $1,600\text{m} * \$489/\text{m} = \$782,000$

Estimated Cost Increase of ~\$1M

Cost Increase 2: Expanded river zone to build

Park development was not estimated in MP
Increase in park area 1,600m
Estimate of \$500,000/ha to design and build active urban park land
 $10\text{ha} * \$500,000/\text{ha} = \$5,000,000$

Estimated Cost Increase of ~\$5M

New Clark City River Zone Plan - Savings



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Action	Reduction / Increase	Oder of Magnitude	Value (USD)
Reduced Bridges	↓	\$\$\$\$\$	\$ 31,000,000
Reduced AR2 Bridge	↓	\$	\$ 2,000,000
Reduced Grading Cut/Fill	↓	\$	\$ 15,000,000
River to Remain in Channel	↓	\$	\$ 4,000,000
Expanded River Zone	↑	\$	\$ 2,000,000

Total Reduction	\$ 52,000,000
Total Increase	\$ 2,000,000
TOTAL REDUCTION	\$ 50,000,000

**Master Plan
Phase I:
\$ 330m**

**Reduction
Phase 1: \$50m
(15%)**



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Low Cost / Low Regrets Adaptation

September 2018

Not all adaptation investments are high-cost, they may simply require **different approaches and improved planning.**

e.g. more effective infrastructure siting, broadening beneficiary catchments, contingency planning, incorporating flexibility for future upgrade, local work-force capacity building.

**‘Low cost’
adaptation**

‘No-regrets/ low-regrets actions’⁸⁹ prioritize activities which address **existing climate change adaptation deficits** while also providing future benefits (IPCC iterative climate risk management).

These are best considered as part of an iterative adaptation approach alongside long-term risk and uncertainty.

**‘Low regrets’
adaptation**



Both approaches are best identified in early planning stages. Low-cost and no-cost climate adaptation and resilience benefits can be difficult to track quantitatively using an incremental approach.

Increasing value for money on climate adaptation investment



- ✓ Does the investment have a long lifespan, and is potentially exposed to uncertain future climate impacts?
- ✓ Are there low- or no-cost actions that could be adopted early that could enhance VFM both immediately and over the operating lifetime?
- ✓ Is there opportunity to increase proportion of tracked climate finance by enhancing resilience co-benefits for vulnerable communities within the project catchment area?
- ✓ Can any incremental costs associated with incorporating resilience be covered by external climate finance?

Use economic appraisal techniques that incorporate robustness and flexibility to ensure value for money under a range of climate scenarios.

Identify potential quick wins (e.g. less vulnerable siting, access options) that do not carry large incremental costs. Allow for future change (e.g. design for future upgrade).

Explore low cost opportunities for providing access for underserved and exposed communities to resilient infrastructure. Prioritize activities that enhance community climate change adaptation/ resilience.

Explore the opportunities for accessing climate finance for incremental costs by aligning investments and programming with wider resilience funds, such as GCF or ADB Trust Funds.



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Thank you!