Climate Change Adaptation Investment Project for Barisal City Corporation

Climate Change Adaptation for Urban Areas (CCAUA) Programme

Nandita Basu
Wednesday, 04 March 2016
1. City Introduction

**Barisal City** stands
- 118 Km south of capital city Dhaka and
- 106 Km north of the sea Bay of Bengal.
- 2.5 meter high from sea level.

- **Latitude:** 22° 30″ to 22° 45″ North and **Longitude:** 90° 18″ of 90° 23″ east.
- **Project Area:** 58 Sq. Km and **Population:** 0.5 million
- **Challenges:**
  - Water level Rise and Heavy monsoon rainfall creates water logging
  - Unplanned and haphazard development
  - Lack of proper solid waste management
  - Lack of manpower in Barisal City Corporation

- **Opportunities:**
  - 46 Nos. (about 140 Km) of Canals as natural Drainage
  - Approved Master Plan
2. Infrastructure Project Overview

Project Objective

- To make the city climate resilient and environmentally sustainable and to improve the living condition of city dwellers by providing proper infrastructure, developing capacity of the staffs and building awareness among the people.

Beneficiaries: City Dwellers

Policy frameworks, City plans and strategies:

- Barisal Divisional Master Plan
- National Climate Change Strategies
- Climate Change Strategies for Barisal
### 3. Technical Description

<table>
<thead>
<tr>
<th>Project components and supporting measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Drainage Improvement and Roads (M1)</td>
</tr>
<tr>
<td>2. Canal Dredging and Improvement Work (M2)</td>
</tr>
<tr>
<td>3. Improvement Solid Waste Management (SWM) (M3)</td>
</tr>
<tr>
<td>4. Plot Raising &amp; Flood Resilient Housing for horizons &amp; pro-poor community (M5 &amp; M10)</td>
</tr>
<tr>
<td>5. Water Supply and Sanitation (M 7b)</td>
</tr>
<tr>
<td>6. Flood &amp; Tidal Surge Emergency Response Infrastructure (M 4)</td>
</tr>
<tr>
<td>7. Embankment Works (M 13a, 13b)</td>
</tr>
<tr>
<td>8. Accompanying Measures (Training, Equipments for Q&amp;M etc) (M6, M7a, M8, M9, M11, M12)</td>
</tr>
</tbody>
</table>

**Key challenges**

- Land acquisition for embankment works.
- Resettlement for canal dredging and improvement works and
- Temporary resettlement for house raising.
4. Anticipated Socio-Economic Impacts (Positive & Negative)

Social & Poverty Impacts:
• Embankment works
  – moving and resettling people
  – effect on the river fishing community living in the area.
• Canal dredging - deepening and widening
  – affect people live in or on the canal embankments legally and illegally
  – creates fishing contraptions
• Flood protection works in slum areas
  – improve living conditions and livelihoods
• The positive social impacts after implementation include:
  – Less damage to assets
  – More time available for productive work

Economic Impact:
Infrastructure works
  – creates employment for manual labour and thousands of people.
5. Anticipated Environmental and Climate [Resilience] Impact (Positive & Negative)

**Environment Impacts:**
Infrastructure works and supervision
- consumes materials and energy and thus generate greenhouse gases.

**Climate [resilience]:**
Increase Adaptive capacity in extreme events like flood, cyclone
Location of the Project Area
Water Level Near Ntun Bazar Area

2.63 ft. Rise Due to Extreme Climate Change

1.4 ft. Rise Under Moderate Climate Change Scenario

Water Level in the Recent Heavy Rain (25th June, 2015)

Water Level 7-8 ft. during high tide

3 – 4 ft. depth at low tide

General Monsoon 2015
The case for change
Barisal City and Challenges

Amanatganj Canal: Land Grabbed & Silted-up: Re-excavation Issue
Barisal City and Challenges

Out Fall of Jail Canal: Drainage & Re-excavation Issue
Barisal City and Challenges

River Side Low Land Flooding by Monsoon Rain & Tidal
Barisal City and Threats

River Erosion: Town Protection & Re-settlement Issues
Barisal City and Challenges

Palashpur Slum: Road, Water Logging & Drainage Issue
A suite of measures is proposed for implementation

1. Heightening key roads
2. Drainage improvement
3. Canal Re-excavation
4. Town Protection Work from river erosion
5. Plot by plot land raising and resilient houses for Horizons and Pro-poor City Dwellers
6. Water supply and sanitation
7. Waste Management
8. Accompanying measures
1. Heightening of key roads

Raised/elevated roads connecting the Slums with Core Urban Area and Barisal-Dhaka highway
2. Drainage improvements

Drainage system improvement Urban Area (Ward 16, 17, 21)
2. Drainage improvements

Drainage and road improvement slums

- Palashpur
- Shishu Park
- Kala Potty
- Rosulpur
- Bhatar Khal
- Barafkal Bosti
- Balur Math
- Stadium
2. Drainage improvements

Other Drainage improvements Urban Areas
3. Canal Re-excavation (dark blue lines)

- Amanatgonj
- Jail
- Lakutia
- Bhatar
- Chandmari
- Sagardi
3. Khal demonstration project

- Sagardi khal
The Sagardi demonstration Project for beautification and learning
4. Town Protection
Work from river erosion - Palashpur
5. Flood resilient houses in lowest lying slums

- South-east Palashpur
- Shishu Park
- Kala Potty
- Bhatar Khal
- Barafkal Bosti
- Balur Math stadium
Solid waste management

• The system today: main streets sweepers, house to house or neighbourhood collection, transport by rickshaw vans to truck collection points, truck transport to landfill; effectiveness: 70-80% collected; remainder ends up in drains and khals

• The system tomorrow: 100% collected, waste separation, reuse of organic waste; secondary transport collection sites, sanitary landfill sites, composting, treatment plant, modern incineration facility
No-Regret & accompanying measures

No regret measures
1. Enforcement of pond preservation regulations
2. Putting in place and testing Early Warning System procedures and emergency response readiness for evacuation of the most vulnerable people and of key emergency services
3. Clearing physical obstacles (tree cutting) for cyclone proof power lines
4. Spatial zoning to help growing population build outside or above flooding levels
5. Create a promotion programme for the adoption of flood resilient crops

Accompanying measures
6. EISA studies, Resettlement Plan, Audit and Performance Monitoring
7. Development capacity and skills PEA – training programme
8. Establishment of a BCC O&M department with adequate funding levels
9. Finalization and necessary approvals of the Barisal Climate Resilience Strategy and create Information point
## Investment and implementation costs:

Full programme and scaled down version

<table>
<thead>
<tr>
<th>Comprehensive concept CCAUA for Barisal</th>
<th>Full programme</th>
<th></th>
<th></th>
<th></th>
<th>Slimmed down programme</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tk. Crore</td>
<td>EUR mln.</td>
<td>%</td>
<td>Δ</td>
<td>Tk. Crore</td>
<td>EUR mln.</td>
<td>%</td>
</tr>
<tr>
<td>1. Drainage improvement and roads (M1)</td>
<td>94.12</td>
<td>11.07</td>
<td>23%</td>
<td>73%</td>
<td>68.87</td>
<td>8.10</td>
<td>22%</td>
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<tr>
<td>2. Canal Re-excavation and demonstration project (M2)</td>
<td>61.30</td>
<td>7.21</td>
<td>15%</td>
<td>87%</td>
<td>53.42</td>
<td>6.28</td>
<td>17%</td>
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<tr>
<td>3. Improvement solid waste management (M3)</td>
<td>17.02</td>
<td>2.00</td>
<td>4%</td>
<td>100%</td>
<td>17.02</td>
<td>2.00</td>
<td>6%</td>
</tr>
<tr>
<td>4. Plot raising and flood resilient housing (M5 and M10)</td>
<td>17.95</td>
<td>2.11</td>
<td>4%</td>
<td>67%</td>
<td>12.08</td>
<td>1.42</td>
<td>4%</td>
</tr>
<tr>
<td>5. Water supply and sanitation (M7b)</td>
<td>4.99</td>
<td>0.59</td>
<td>1%</td>
<td>100%</td>
<td>4.99</td>
<td>0.59</td>
<td>2%</td>
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<tr>
<td>6. Cyclone &amp; Flood Emergency response: heightened roads (M4)</td>
<td>41.45</td>
<td>4.88</td>
<td>10%</td>
<td>100%</td>
<td>41.45</td>
<td>4.88</td>
<td>13%</td>
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<tr>
<td>7. Town Protection Works from river erosion (M13a and M13b)</td>
<td>74.56</td>
<td>8.77</td>
<td>18%</td>
<td>48%</td>
<td>36.04</td>
<td>4.24</td>
<td>12%</td>
</tr>
<tr>
<td>8. Accompanying measures (M6, M7a, M8, M9, M11, M12)</td>
<td>23.61</td>
<td>2.78</td>
<td>6%</td>
<td>69%</td>
<td>16.32</td>
<td>1.92</td>
<td>5%</td>
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<tr>
<td>Sub-total 1</td>
<td>335.00</td>
<td>39.41</td>
<td>75%</td>
<td>250.19</td>
<td>29.43</td>
<td>81%</td>
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<tr>
<td>9. Implementation Consultant (5 yrs. contract)</td>
<td>33.00</td>
<td>3.88</td>
<td>8%</td>
<td>93%</td>
<td>30.70</td>
<td>3.61</td>
<td>10%</td>
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<tr>
<td>Price and volume contingencies</td>
<td>36.80</td>
<td>4.33</td>
<td>9%</td>
<td>76%</td>
<td>28.09</td>
<td>3.30</td>
<td>9%</td>
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<tr>
<td>Sub-total 2</td>
<td>404.80</td>
<td>47.62</td>
<td>100%</td>
<td>76%</td>
<td>308.98</td>
<td>36.35</td>
<td>100%</td>
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<tr>
<td>10. Project Management Unit</td>
<td>14.96</td>
<td>1.76</td>
<td>4%</td>
<td>91%</td>
<td>13.63</td>
<td>1.60</td>
<td>4%</td>
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<tr>
<td>11. Operations &amp; Maintenance costs during project period</td>
<td>32.43</td>
<td>3.82</td>
<td>8%</td>
<td>82%</td>
<td>26.53</td>
<td>3.12</td>
<td>9%</td>
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<tr>
<td>Total Investment proposed for appraisal</td>
<td>452.19</td>
<td>53.20</td>
<td>112%</td>
<td>77%</td>
<td>349.13</td>
<td>41.07</td>
<td>113%</td>
</tr>
</tbody>
</table>
To implement an investment of ~Tk. 450 Crore is required. The FSR also presents a downscaled version which requires ~Tk. 350 Crore.

### Suite of proposed measures

<table>
<thead>
<tr>
<th>Project Investment level (Tk. Crore)</th>
<th>Full VAFS</th>
<th>Downscaled VAFS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implementation cost</strong></td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>452</td>
<td>349</td>
</tr>
<tr>
<td><strong>Main contribution</strong></td>
<td></td>
<td>Delta</td>
</tr>
</tbody>
</table>

1. Heightening key roads
2. Drainage improvement
3. Canal Re-excavation
4. Town Protection Work from river erosion
5. Plot by plot land raising and resilient houses
6. Water supply and sanitation
7. Waste Management
8. Accompanying measures

Some downscaling possible without large effects on damage reduction.
# Annual O&M costs of the Full Programme

<table>
<thead>
<tr>
<th>Project component</th>
<th>Investment with O&amp;M costs</th>
<th>O&amp;M costs in %</th>
<th>O&amp;M per fiscal year in Tk. Crore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canal Re-excavation</td>
<td>28.99</td>
<td>20.0%</td>
<td>-</td>
</tr>
<tr>
<td>Sagardi demonstration project</td>
<td>25.40</td>
<td>4.0%</td>
<td>-</td>
</tr>
<tr>
<td>Town Protection Works from river erosion</td>
<td>63.38</td>
<td>5.0%</td>
<td>-</td>
</tr>
<tr>
<td>Embankment/heightened road Palashpur</td>
<td>6.35</td>
<td>7.5%</td>
<td>0</td>
</tr>
<tr>
<td>Drains</td>
<td>92.42</td>
<td>4.0%</td>
<td>-</td>
</tr>
<tr>
<td>Roads</td>
<td>41.45</td>
<td>10.0%</td>
<td>-</td>
</tr>
<tr>
<td>Plot raising and flood resilient housing</td>
<td>12.89</td>
<td>1.0%</td>
<td>-</td>
</tr>
<tr>
<td>Solid waste collection general</td>
<td>15.70</td>
<td>10.0%</td>
<td>0.09</td>
</tr>
<tr>
<td>Piped water connection for slums</td>
<td>1.30</td>
<td>10.0%</td>
<td>0.00</td>
</tr>
<tr>
<td>Public toilets for slum areas</td>
<td>3.69</td>
<td>10.0%</td>
<td>0.02</td>
</tr>
<tr>
<td>Pond cleaning &amp; restoration</td>
<td>1.70</td>
<td>3.0%</td>
<td>0.01</td>
</tr>
<tr>
<td>Equipment O&amp;M department</td>
<td>20.85</td>
<td>10.0%</td>
<td>0.52</td>
</tr>
<tr>
<td>Total O&amp;M costs planning</td>
<td>314.13</td>
<td></td>
<td>1.07</td>
</tr>
</tbody>
</table>

**Source:** CCAUA VAfS Barisal_Ecorys_FSR Master file calculations: Final Appraisal version 3-1-2016

**Project starting date:** Q2 2017  Fiscal year 2016/17

**Project ending date:** Q2 2022  Fiscal year 2021/22

**O&M during project implementation period:** 32.43
# Annual O&M of the Slimmed Down Project

<table>
<thead>
<tr>
<th>Project component</th>
<th>Investment with O&amp;M costs in Tk. Crore</th>
<th>O&amp;M costs in %</th>
<th>O&amp;M per fiscal year in Tk. Crore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canal Re-excavation works</td>
<td>28.99</td>
<td>20.0%</td>
<td>-</td>
</tr>
<tr>
<td>Sagardi demonstration project</td>
<td>17.53</td>
<td>4.0%</td>
<td>-</td>
</tr>
<tr>
<td>Town Protection Works from river erosion</td>
<td>24.86</td>
<td>5.0%</td>
<td>-</td>
</tr>
<tr>
<td>Heightened road as embankment</td>
<td>6.35</td>
<td>7.5%</td>
<td>0.12</td>
</tr>
<tr>
<td>Drains</td>
<td>67.17</td>
<td>4.0%</td>
<td>0.15</td>
</tr>
<tr>
<td>Roads</td>
<td>41.45</td>
<td>10.0%</td>
<td>0.23</td>
</tr>
<tr>
<td>Plot raising and flood resilient housing</td>
<td>12.08</td>
<td>1.0%</td>
<td>-</td>
</tr>
<tr>
<td>Solid waste collection general</td>
<td>7.65</td>
<td>10.0%</td>
<td>0.04</td>
</tr>
<tr>
<td>Piped water connection for slums</td>
<td>1.30</td>
<td>10.0%</td>
<td>0.00</td>
</tr>
<tr>
<td>Community latrines</td>
<td>3.69</td>
<td>10.0%</td>
<td>0.02</td>
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<tr>
<td>Pond cleaning &amp; restoration</td>
<td>1.70</td>
<td>3.0%</td>
<td>0.01</td>
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<tr>
<td>Equipment O&amp;M department</td>
<td>13.55</td>
<td>10.0%</td>
<td>0.34</td>
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<tr>
<td>Total O&amp;M costs planning</td>
<td>226.33</td>
<td></td>
<td>0.79</td>
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<tr>
<td>Project starting date:</td>
<td>Q2 2017</td>
<td>Fiscal year 2016/17</td>
<td></td>
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<tr>
<td>Project ending date</td>
<td>Q2 2022</td>
<td>Fiscal year 2021/22</td>
<td></td>
</tr>
<tr>
<td>O&amp;M during project implementation period</td>
<td></td>
<td>25.06</td>
<td></td>
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</tbody>
</table>

*Note: not all project components have an O&M dimension*
Proposed implementation set up

Decision level

CCAUA Barisal Financing Agreement Committee

CCAUA Barisal Project Steering Committee (PSC)

Implementation and coordination

See next slide

BCC as Project Executing Agency

Barisal Development Coordination Committee (BDCC)

Implementation Consultant (IC)

Project Management Unit (PMU)

- Ministry of Planning; ERD
- Ministry of Local Government-Rural development and cooperatives; LGD
- Ministry of Finance
- KfW
- Local Government Division
- Planning Commission
- Ministry of Finance
- BCC (Mayor, CEO, PD)
- Ad hoc members

- BWDB, LGED, DOE, DPH
- NGO’s, Private sector
- Urban poor CDC clusters
- Women organisations
- Barisal District
- BCC (Mayor chairs)
The Implementation Consultant supports BCC and especially the PMU with a mix of international and national expertise.

**PMU = Project Manager**
- Synchronises all Construction packages
- Leads preparation works
- Communicates with PEA and Financier

**Contract Manager**
- Drafts tender documents
- Tender and contract award

**Detailed Design Consultant**
- Organises surveys
- Details design of measures
- Bill of Quantities
- Cost estimates

**Supervisor**
- Assists Project Manager
- Supervises construction works
- Responsible for safety on site
# BCC PMU staffing concept

<table>
<thead>
<tr>
<th>PMU staff complement</th>
<th>№ of staff per category</th>
<th>Person months over five yrs.</th>
<th>BCC</th>
<th>BCC new recruitment</th>
<th>Deputation &amp; outsourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top &amp; middle level officers</td>
<td>3</td>
<td>132</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Project Director (PD)</td>
<td>1</td>
<td>24</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deputy Project Director (DPD)</td>
<td>2</td>
<td>108</td>
<td>2</td>
<td></td>
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<tr>
<td>Project managers</td>
<td>5</td>
<td>222</td>
<td>2</td>
<td>3</td>
<td></td>
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<tr>
<td>Specialist professionals</td>
<td>9</td>
<td>342</td>
<td>1</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Compliance and enforcement specialist</td>
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<td>1</td>
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<tr>
<td>Institutional expert</td>
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<tr>
<td>Community participation expert</td>
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<td></td>
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<tr>
<td>Land acquisition specialist</td>
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<td>Resettlement specialist</td>
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<td>Works inspection specialist</td>
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<td>Environment/CC specialist</td>
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<td>Procurement specialist</td>
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<td>30</td>
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<tr>
<td>Financial management specialist</td>
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<td>Support professionals</td>
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<td>540</td>
<td>5</td>
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<td>Office support staff</td>
<td>7</td>
<td>420</td>
<td>6</td>
<td></td>
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<tr>
<td><strong>Total PMU staff numbers</strong></td>
<td><strong>33</strong></td>
<td><strong>1656</strong></td>
<td><strong>17</strong></td>
<td><strong>5</strong></td>
<td><strong>11</strong></td>
</tr>
</tbody>
</table>
Criteria for success

Funding

- KfW is a long-term strategic partner for BCC
- BCC mobilizes additional development funds to implement the other Climate Change Resilience projects identified in the VAFS Barisal study and Delta Plan 2100 project
- BCC financial health increases over time and by 2018 BCC generates sufficient own funds to honor its DPP counterpart funding obligations
- Project partners (BCC, KfW, ERD and LGD) review project progress and funding needs on an annual basis. If triggered by external events, additional funds may be allocated as appropriate

Implementation

- Long term operations and maintenance of the new infrastructure is done adequately by BCC
- Involuntary resettlement and compensation will be implemented by experienced professionals and aligned with international development bank standards
- Transparent and adequate public tendering procedures followed: Contractors for public works, equipment and services deliver quality on time and within budget
- BCC adopts and enforces regulations for the protection and conservation of public and private ponds
- Climate change related risks fall within the expected levels (high economic growth, moderate climate change)

External/other

- Environmental clearance certificates will be obtained
Project partners & contracting

- Project executing agency: Barisal City Corporation
- Employer of the international consultant: BCC
- Financing partner: KfW, Development Bank, Frankfurt, Germany
- International consultant: Ecorys Netherlands BV
  - Dutch partners: Witteveen en Bos; and Twijnstra Gudde;
  - Swiss partner: SwissRe
  - Bangladesh partner: PMTC - Dhaka

Note: KfW issued an addendum to the Consultancy contract for support to the Employer during the appraisal mission.

Appraisal was signed by Secretary, MLGRD&C; Mayor, BCC and Program Manager, KfW.
Thanks All for your patience