



**Project Document  
of the Asian Infrastructure Investment Bank**

**The People's Republic of Bangladesh  
Bangladesh Municipal Water Supply and Sanitation Project**

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**Currency Equivalents**  
(Effective as of June. 19, 2019)

Currency Unit = Taka (TK)  
USD1.00 = TK84

**Abbreviations**

CFA	–	Cofinancing Framework Agreement
BMWSSP	–	Bangladesh Municipal Water Supply and Sanitation Project
DPHE	–	Department of Public Health Engineering
EIRR	–	Economic Internal Rate of Return
EMF	–	Environmental Management Framework
ESP	–	Environmental and Social Policy of AIIB
ESIA	–	Environmental and Social Impact Assessment
ESMP	–	Environmental and Social Management Plan
FSM	–	fecal sludge management
FSTP	–	Fecal Sludge Treatment Plant
GDP	–	Gross Domestic Product
GoB	–	Government of Bangladesh
GRM	–	Grievance Redress Mechanism
lpcd	–	liters per capita per day
LGD	–	Local Government Division
LGIs	–	Local Government Institutions
MDG	–	Millennium Development Goal
MIS	–	Management Information System
MoLGRD&C	–	Ministry of Local Government Rural Development and Cooperatives
NPV	–	Net Present Value
OPIR	–	Operational Policy on International Relations
O&M	–	operation and maintenance
PMU	–	Project Management Unit
RAP	–	Resettlement Action Plan
RSMF	–	Resettlement and Social Management Framework
SECP	–	Small Ethnic Community Plan
SECPF	–	Small Ethnic Community Planning Framework
TSU	–	Technical Support Unit
UNICEF	–	United Nations Childrens' Fund
WASAs	–	Water and Sewerage Authorities
WB	–	World Bank
WSS	–	Water Supply and Sanitation

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## 1. Project Summary Sheet

### The People's Republic of Bangladesh Bangladesh Municipal Water Supply and Sanitation Project

<b>Project No.</b>	<b>000068-BGD</b>
Borrower Implementation Agency	The People's Republic of Bangladesh Department of Public Health Engineering
Sector Subsector	Water Water Supply and Sanitation
Project Objectives/Brief Project Description	<p>The project objective is to increase access to improved water supply and sanitation services in selected <i>pourashavas</i> (municipalities) and strengthen the <i>pourashavas'</i> institutional capacities for delivering water and sanitation services.</p> <p>The project will support the Government of Bangladesh (GoB) with priority investments in water and sanitation infrastructure in selected <i>pourashavas</i> that do not have piped water systems. The project will comprise the following components:</p> <p>Component 1—Sector Support and Capacity Strengthening of Department of Public Health Engineering and <i>Pourashavas</i></p> <p>Component 2—Investment for Water Supply Infrastructure</p> <p>Component 3—Improving Sanitation and Drainage</p> <p>Component 4—Project Implementation and Management Support</p> <p>Component 5—Contingent Emergency Response</p>
Project Implementation Period	Start Date: August 2019 End Date: December 2024
Expected Loan Closing Date	December 2024
Project cost and Financing Plan	Total project cost: USD209.53 million Financing Plan: AIIB: USD100 million WB: USD100 million GoB: USD9.53 million
AIIB Loan (Size and Terms)	USD100 million. Final maturity of 25 years, including a grace period of five years, with level repayments at AIIB's standard interest rate for sovereign-backed loans.
Co-financier,	The World Bank

Size and Terms	USD100 million. Final maturity of 25 years, including a grace period of five years based on IDA terms.
Environmental and Social Category	B
Project Risk (Low/Medium/High)	Medium
Conditions for Effectiveness and Disbursement (If any)	<p>Establishment of Project Management Unit (PMU) before effectiveness of the AIIB Loan Agreement to be responsible for coordination and the overall management, implementation and supervision of the project.</p> <p>Effectiveness of WB Cofinancing Agreement.</p>
Key Covenants	<p>Before tendering of each <i>pourashava's</i> Water Supply Distribution package, the <i>pourashava</i> concerned shall enroll at least 50 percent of consumers (households and establishments) covered by the Water Supply Distribution Package.</p> <p>Before commissioning of the piped water services, the <i>pourashava</i> shall enroll at least 75 percent of the consumers (household and establishments) covered by the Water Supply Distribution Package.</p> <p><i>Pourashavas</i> shall set up a ring-fenced Water Supply and Sanitation department with a separate bank account within three months of project effectiveness.</p> <p><i>Pourashavas</i> must ensure tariff adjustment that fully cover increased cost of water operations, particularly as a result of increases in electricity tariffs or other legitimate cost items that increase the costs Water Service Providers.</p>
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that AIIB is in compliance with the policies applicable to the Project.

<b>President</b>	Jin Liqun
<b>Vice President</b>	D. J. Pandian
<b>Director General, Operations</b>	Supee Teravaninthorn
<b>Manager, Operations</b>	Gregory Liu

<b>Project Team Leader</b>	Zacharias Ziegelhöfer, Infrastructure Sector Economist
<b>Co-Project Team Leader</b>	Jan Høybye, Senior Investment Operations Specialist (Water)
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## 2. Strategic Context

### A. Country Context

1. With a population of about 163 million in 2016 covering an area of 144,415 square kilometers (km), Bangladesh is one of the most densely populated countries in the world (1,130 persons per square km). During 2011-2016, the economy achieved a gross domestic product (GDP) growth rate of an average 6.5 percent, and per capita income in 2017 was USD1,480. In view of this economic performance, the country was classified as a lower middle-income country by the World Bank (WB). According to the International Monetary Fund and International Development Association, Bangladesh has maintained a low risk of external public debt distress. Selected macroeconomic indicators from 2015-2019 are presented in Annex 5.

2. The country has achieved the Millennium Development Goals (MDG) with respect to reducing poverty and the poverty gap ratio, increasing access to improved water supply and sanitation (WSS), lowering the infant mortality rate, and reducing the incidence of communicable diseases. Between 2000 and 2010, Bangladesh saw steady decline in its national poverty rates, with an average of 1.7 percent reduction per year. Despite population growth, the number of people below the national poverty line decreased from 56.6 percent in 1991 to 31.5 percent in 2010, and the depth of poverty was halved from 23.8 percent in 1991 to 11.2 percent in 2010.<sup>1</sup> According to the latest data from 2016, Bangladesh has a national poverty rate of 24 percent (down from 48 percent in 2000) and an extreme poverty rate of 14 percent.<sup>2</sup>

3. Notwithstanding these achievements, the development challenges remain. Governance weaknesses, institutional shortcomings, infrastructure and investment deficits, and poor structures of public accountability, pose a drag on the potentially high rates of growth and human development. Furthermore, with two-thirds of its land mass less than five meters (m) above mean sea level, the country is very vulnerable to sea level rise, cyclones, increased precipitation and storm-induced flooding.<sup>3</sup>

4. In 2017, 54 percent of Bangladesh's population was residing in urban area<sup>4</sup>, corresponding to 88 million people. Urban areas in Bangladesh are administratively grouped according to their size in 11 city corporations for metropolitan cities, and 329 *pourashavas* for the secondary-to-small sized towns. Ten large cities account for about 24 million people, more than half of whom live in Dhaka alone. Over 200 secondary towns account for about 17 million people. There are 31 large *pourashavas* with population of over one million and the population of small to medium *pourashavas* ranges from 30,000 to one million.

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<sup>1</sup> Poverty gap ratio at USD1.25 a day (PPP), United Nations MDG monitoring, [www.mdgs.un.org](http://www.mdgs.un.org)

<sup>2</sup> World Bank. Household Income and Expenditure Survey 2016.

<sup>3</sup> World Bank. Climate and Disaster Risk Screening Report for WB Bangladesh Municipal Water Supply and Sanitation Project.

<sup>4</sup> United Nations Population Division. World Urbanization Prospects: 2018 Revision.

5. The Government of Bangladesh has legally devolved responsibilities to the local governments to carrying out local planning and implementation of development schemes. While implementation of the Decentralization Act (2010) is underway, many government investments and donor-supported initiatives have supported local bodies with greater roles in infrastructure planning and services delivery, over the last two decades.

## **B. Sectoral and Institutional Context**

6. **Water Supply:** Bangladesh has met the water MDG to halve the proportion of those without improved water sources ahead of time. In 2015, 87 percent of the population had access to an improved water supply source.<sup>5</sup> About 68 percent of urban households and 94 percent of rural households rely on tube wells for water. Privately installed tube wells are typically shallow wells equipped with hand pumps. In addition, about one million public tube wells have been provided by the Government to *pourashavas* in urban areas and Union Parishads in rural areas.

7. Only 10 percent of the population has access to piped water, mostly from groundwater-based schemes. Coverage of piped water supply is concentrated in the cities where Water Supply and Sewerage Authorities (WASAs) exist (e.g. Dhaka, Chittagong, Rajshahi and Khulna). Of the 329 *pourashavas* of Bangladesh, 151 have piped water systems covering only the core areas of towns. The supply hours vary from two to 12 hours per day, and the average quantity of water supplied is estimated at 75 liters per capita per day (lpcd). Generally, service quality is poor, and the water supply systems face various challenges, including partial utilization of production capacities due to limited coverage of distribution networks, inefficient operation and maintenance (O&M) management due to lack of skilled staff, and low revenues due to inefficient billing and collection of tariffs. In the remaining 178 *pourashavas*, there are no piped water supply systems and water supply is from public standpoints and shallow tube-wells, which are typically shared by nearby households.

8. **Water Quality:** Despite high access to improved water sources, poor water quality poses a major challenge. About 20 million people continue to consume water with arsenic and are exposed to severe health issues. Arsenic is reported from concentrated geographies while the incidence of E. coli is widespread—and more so in piped water systems. Urban populations report E. coli (55 percent) and arsenic (20 percent) contamination, whereas rural populations have relatively lower exposure to E. coli (38 percent), but higher arsenic contamination (27 percent) than in rural areas. An estimated 75 million people (47 percent) are drinking water that is either contaminated with arsenic, E. coli, or both. Thus, access to clean and safe drinking water is limited to only 53 percent of Bangladesh's households. Waterborne diseases are widespread, which fuel rapid transmission of gastrointestinal pathogens that can have disastrous impact on health and nutrition status for children.

9. **Sanitation:** Sanitation in urban areas comprises mainly on-site systems. Only 20 percent of Dhaka is covered by a sewer network. In a typical *pourashava*, a small proportion of households have septic or holding tanks, 25 to 50 percent of households use water-seal latrines emptying into

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<sup>5</sup> United Nations (2015): The Millennium Development Goals Report 2015.



pits, while the remaining households use unhygienic latrines or practice open defecation. Manual desludging of tanks and pits is common, and the fecal sludge is emptied into open fields, drains and nearby water bodies, leading to considerable public health and environmental hazards. Fecal sludge management is new to Bangladesh, and few *pourashavas* have started improving the collection practices and identifying and implementing adequate solutions for fecal sludge treatment.

10. In the *pourashavas*, which are targeted under this project, households rely on public standpoints and shallow tube-wells for water supply. Twenty-nine of the 30 *pourashavas* exceeded the allowable limits of the Bangladesh Drinking Water Quality Standards for iron and arsenic, exposing users to health-related contaminants. Fecal sludge and gray wastewater is generally handled in an unsanitary way.

## **Institutional Context**

11. **Water Supply and Sanitation Institutional Framework:** At the national level, the authority for regulating and overseeing the *pourashavas* is with the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MoLGRD&C). Since there is no separate regulatory body for the water and sanitation sector, the LGD is also responsible for the water and sanitation sector. Within MoLGRD&C, the Department of Public Health Engineering (DPHE) is tasked with the technical planning and execution of the construction of new water supply infrastructure—with exception for the four largest cities Dhaka, Chittagong, Rajshahi and Khulna for which dedicated bodies for water supply, sewerage and drainage services (WASAs) have been created. DPHE is hence responsible for the planning and execution of any public water schemes in 7 City Corporations and 329 *pourashavas*, as well as in rural areas. After the completion of construction works, DPHE hands over the schemes to the respective *pourashavas* for operation and maintenance (O&M).

12. Over the last four decades, several policies, approach papers and strategies were adopted for the WSS sector.<sup>6</sup> A unified National Strategy for Water Supply and Sanitation 2014 was developed to streamline the various policies and approach paper into one comprehensive document. The strategy provides a vision to addressing key WSS issues, including guidelines for public institutions, private sector and NGOs participation. Sector institutions, i.e., DPHE, WASAs and Local Government Institutions (LGIs), are expected to implement their respective components related to the National Strategy. The strategy also addresses emerging challenges of integrated water resources management, fecal sludge management, responding to demands

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<sup>6</sup> (1) Bangladesh Water Act, 2013, to coordinate, develop, manage, extract, distribute, use, protect and preserve water resource; (2) Local Government (Amendment) Act, 2010 for *pourashavas* and City Corporations, which describe the functions and responsibilities of the Local Government Institutions in WSS, amongst others; (3) National Policy for Arsenic Mitigation and Implementation Plan, 2004, specifically formulated to address the arsenic problem; (4) National Policy for Safe Water Supply and Sanitation, 1998, which aims to bring about changes in the traditional service delivery arrangement, to increase the capacity of the sector and participation of communities; (5) Environmental Conservation Act 1995 and Environmental Conservation Rules 1997, which set the standards of water quality and (6) Water Supply and Sewerage Act 1996, which describes the roles and responsibilities of WASAs.

of rapid urbanization, and managing disasters and climate risks. Following the Local Government (Amendment) Act, 2010, LGIs including *pourashavas* in urban areas are expected to take on greater responsibilities for WSS.

### 3. The Project

#### A. Rationale

13. **Strategic fit – Promoting sustainable infrastructure.** The investments under this project will increase access to safe drinking water and support the GoB in addressing water supply and sanitation in an integrated approach. In addition to water supply, the project includes septage management, critical drainage and locally-adapted solutions for graywater management and treatment; the latter may provide a basis for GoB to developing locally-adapted solutions and discharge standards for graywater, which currently do not exist in Bangladesh. The overall infrastructure developed is expected to be technically sustainable, environmentally safe, and financially viable by developing the capacity of the *pourashavas* in the effective provision of water supply services and by involving end users to pay for the improved services, which overall aligns well with the key thematic priority of AIIB.

14. **Alignment with Country priorities.** The GoB has adopted the Sustainable Development Goals 2030 (SDG 2030)<sup>7</sup> as charted out by the members of the United Nations, and the project is expected to directly contribute to the achievement of SDG 6 to “ensure access to water and sanitation for all,” in particular targets 6.1 “achieve universal and equitable access to safe and affordable drinking water for all” and 6.2 “achieve access to adequate and equitable sanitation and hygiene for all and end open defecation.” The Sector Development Plan (2011-2025) targets to extend piped water supply to 90 percent of the population in large *pourashavas* (from 40 percent in 2011) and 85 percent of the population in small *pourashavas* (from 30 percent in 2011) by 2025. The GoB has made substantial investments in the areas of water supply and sanitation, with the support of IFIs and bilateral donors. Despite the Government’s increased focus on inter-agency coordination at the national and local levels for achievement of its overall goals, continued urbanization has been causing stress on the already insufficient existing infrastructure and consequently, the percentage of piped service coverage in urban areas remains low. The proposed project builds on the GoB’s efforts and fills a gap not covered by other programs.

15. By providing sustainable access to piped water supply and by improving sanitation in selected small to medium *pourashavas*, the project will contribute to the Government’s key objectives of improved urban environment and health in Bangladesh. The project will also help to reduce water-related diseases in selected *pourashavas*, thus reducing morbidity and mortality rates among children and other vulnerable populations. Improvement in access to piped water

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<sup>7</sup> On Sep. 25, 2015, countries adopted a set of goals to end poverty, protect the planet and ensure prosperity for all as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years. More information at <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

supply at the household will also have direct effects in reducing time costs, particularly for women and girls, who typically bear the burden on water collection in Bangladesh.

### **Value addition by AIIB**

16. **Enhancing quality of environmental management.** The Bank team has provided inputs to the preparation of project design and components, identifying gaps and recommending mitigation measures. The Bank has proposed the inclusion of low-cost and locally adapted treatment solutions for increased gray waste water, documentation of the selection of water sources and ensuring that sound and internationally tested standards for public toilet and latrine design will be employed.

17. **Economic and financial due diligence:** The Bank team has conducted its own analysis to assess the economic viability of the project in close coordination and dialogue with the lead co-financier. The Bank team has also conducted additional robustness tests and sensitivity analysis to assess financial sustainability. The results and identified risks were discussed and adequate mitigation actions are in place.

18. **Filling the financing gap.** In alignment with the AIIB strategy, providing additional finance where such finance is not offered by other banks, or the private sector, has made it possible to finalize project preparation and ensure that the project can be implemented according to the project plan.

### **Value addition for AIIB**

19. This is AIIB's first co-financing partnership with WB in developing infrastructure for safe drinking water and sanitation services in Bangladesh. The project is a good opportunity for AIIB to gain experience in the water and sanitation sector in Bangladesh, learning by doing, address new challenges and find solutions which can then be replicated in other countries having similar conditions. This will also position AIIB to independently process similar future projects in this sector.

### **B. Objective**

20. The project objective is to increase access to improved water supply and sanitation services in selected *pourashavas* and strengthen the *pourashavas'* institutional capacity for delivering water and sanitation services.

21. **The project beneficiaries.** About 600,000 people, corresponding to 136,800 households, will be connected to the new piped waters supply systems and benefit from improved water services. Sanitation improvements will benefit at least 150,000 people in the selected *pourashavas*. Other beneficiaries include staff from implementing agencies, e.g., *pourashavas*, DPHE, other public and private sector agencies, women's groups, poor households, and informal

sector cleaning workers who will benefit from capacity building and market development activities supported by the project.

22. **Results indicators.** The proposed project objective indicators for the project are:

- (i) People provided with access to improved water sources.
- (ii) People provide with access to improved sanitation services.
- (iii) Number of *pourashavas* scoring 50 percent and above in Performance Assessment Scorecard.
- (iv) Number of *pourashavas* with operational water supply systems.

23. A set of intermediate indicators will be used to track component level outputs and results. The Results Framework including monitoring indicators is presented in Annex 1.

### C. Project Description and Components

24. The project supports the Government of Bangladesh with priority investments in WSS system improvements in selected *pourashavas* that do not have piped water systems and suffer from water quality issues. Water supply infrastructure will comprise construction of intakes at raw water sources, water treatment plants, treated water storages, and distribution networks. Sanitation improvement will be achieved through procuring equipment for safe management of fecal sludge, sewage disposal and critical drainage system improvements. The construction of pilot Septage Treatment Plants is planned in three selected *pourashavas*. Infrastructure provision will be combined with targeted institutional development for the *pourashavas* and DPHE to build their capacity for effective and sustainable WSS service delivery.

25. External donors have been active in the water sector for decades in Bangladesh. To achieve successful results, the project design builds on the lessons learned from previous investments and international good practices. A few key lessons are: (i) institutional and policy reforms are key to success; (ii) emerging private sector in water supply operations in Bangladesh can yield sustainable operations; (iii) demand-led approaches are critical for success and sustainability of WSS projects; and (iv) local governments will achieve improvements with incentive recognizing actions.

26. Most importantly, past projects have shown that provision of WSS infrastructure that is not commensurate with the demand for customer services and revenue collection potential, can result in systems becoming unviable for *pourashavas* to manage. Therefore, the key feature in the project is the demand-responsive design of WSS infrastructure focusing on the use of simple, technically sound, cost-effective technology with relatively low O&M requirements. Equally important, *pourashavas* have committed to ensure participation and collect connection fees from 50 percent and 75 percent of the households respectively prior to the tendering and commencement of water supply delivery to ensure a critical mass of client base for financial viability.

27. The project will comprise the following five components.

28. **Component 1—Sector Support and Capacity Strengthening of DPHE and *Pourashavas*.** This component will include (i) technical assistance for the *pourashavas* to build their capacity for the effective management and delivery of water supply and sanitation services (e.g., procurement and monitoring of private operators, water quality monitoring, billing and collection, complaint redressal); (ii) incentive grants for *pourashavas* to finance municipal civil works to improve service delivery; the grants would be awarded on the basis of a performance scorecard approach, verified by a third-party agency; and initial operations support for the *pourashavas* to ensure operational sustainability during the built up of services and (iii) capacity building for DPHE to effectively support the delivery of water supply and sanitation services at the municipal level, including establishing and adapting technical standards, standard operating procedures, establishing a Management Information System, training and capacity building, guidelines for private sector participation, and creating a Municipal Support Unit within DPHE.

29. **Component 2—Investment in Water Supply Infrastructure.** Investments in 30 selected *pourashavas* will include construction of intake at raw water source, water treatment plants, treated water storages, and distribution networks, including house service connections with meters. The 30 *pourashavas* were selected based on their willingness to provide water and sanitation services in a ring-fenced manner, levy user charges and other eligibility criteria, such as availability of land. The participating *pourashavas* have agreed to enroll households early in project preparation and collect advance connection deposits<sup>8</sup> to ensure a critical mass of client base prior to the start of construction. The component will also include an immediate response facility for disasters and climate-induced emergencies. DPHE does currently not possess the required equipment and goods to respond promptly and effectively in case of natural disasters and address the WSS needs of affected *pourashavas* across the country. DPHE will be supported to develop its emergency response system and purchase equipment that will enable DPHE to respond promptly in providing support for repairing WSS systems of the project *pourashavas*.

30. **Component 3—Improving Sanitation and Drainage.** This component focuses on environmental improvement and public health in the selected *pourashavas* by establishing safe management of fecal sludge, sewage disposal, and implementing critical drainage system improvements. *Pourashavas* will be supported in the preparation and implementation of City Sanitation Action Plans focusing on the entire chain of sanitation activities. The component is divided into two subcomponents, septage management and critical drainage system improvements. The septage management will be monitored by the *pourashavas* and conducted with private sector engagement. Adequate equipment for the safe emptying and management of septage sludge will be procured and leased to private operators. The private operators will also be responsible for the safe disposal and basic treatment (trenching) on land provided by the *pourashavas*. Critical drainage system improvements according to existing drainage master plans will be financed with a focus to prevent flooding. Locally adapted low-cost solutions for gray wastewater treatment to protect downstream water bodies will be identified and implemented.

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<sup>8</sup> Free metered water connections will be provided for schools in the selected *pourashavas*.

31. **Component 4—Project Implementation and Management Support.** This component will include project management and implementation support to assist DPHE in ensuring seamless coordination, efficient implementation and compliance with the relevant policies. The component entails the following elements: (i) project management consultant; (ii) project annual audits and (iii) project communications, citizens' satisfaction surveys and report cards. This component will also ensure that gender aspects and social inclusion are covered in all stages of the project cycle.

32. **Component 5—Contingent Emergency Response.** Bangladesh is prone to natural disasters, which will further increase with climate change. A provisional zero amount component is included under this project to allow for reallocation of funds in case of an emergency. In addition to reallocation of funds from other project activities, contingencies, which are included in other components, may also serve as a source for additional funds to be reallocated in the event of an emergency.

#### **D. Cost and Financing**

33. Total cost of the project is estimated to approximately USD210 million. The indicative cost and financing plan is shown in Table 1.

34. The Government of Bangladesh would be the borrower of the sovereign backed loan. AIIB and WB would provide financing of USD100 million each with an equal split of financing for all project components. Government of Bangladesh will provide counterpart funding of USD9.53 million.

35. **Co-financing arrangements.** AIIB and WB are proposing to jointly co-finance the project, with WB taking the lead. The co-financing arrangements for the project between AIIB and WB will follow the Co-financing Framework Agreement (CFA) signed by the respective Presidents of the two institutions in April 2016. WB's policies and procedures on safeguards, procurement, financial management, project monitoring, and reporting will be used for the project activities to be financed in whole or in part out of the loan proceeds (including activities to be financed by AIIB).

**Table 1: Project Cost and Financing (USD million)**

Project Components	Project Cost	Financing					
		IDA	Share	AIIB	Share	GOB	Share
1. Sector Support and Capacity Strengthening	<b>21.42</b>	10.69	49.9%	10.69	49.9%	0.04	0.2%
2. Investment for Water Supply Infrastructure	<b>116.83</b>	54.68	46.8%	54.68	46.8%	7.46	6.4%
3. Improving Sanitation and Drainage	<b>61.33</b>	30.67	50.0%	30.67	50.0%	0	0.0%
4. Project Implementation and Management Support	<b>9.95</b>	3.96	39.8%	3.96	39.8%	2.03	20.4%
5. Contingent Emergency Response	<b>0</b>	0	0.0%	0	0.0%	0	0.0%
<b>Total Project Cost and Financing</b>	<b>209.53</b>	100.0	47.7%	100.0	47.7%	9.53	4.6%

36. **Financing Terms.** The financing will be a sovereign-backed loan with a final maturity of 25 years, including a grace period of 5 years, and will be made on standard terms for sovereign-backed loans, with the corresponding average maturity.

#### **E. Implementation Arrangements**

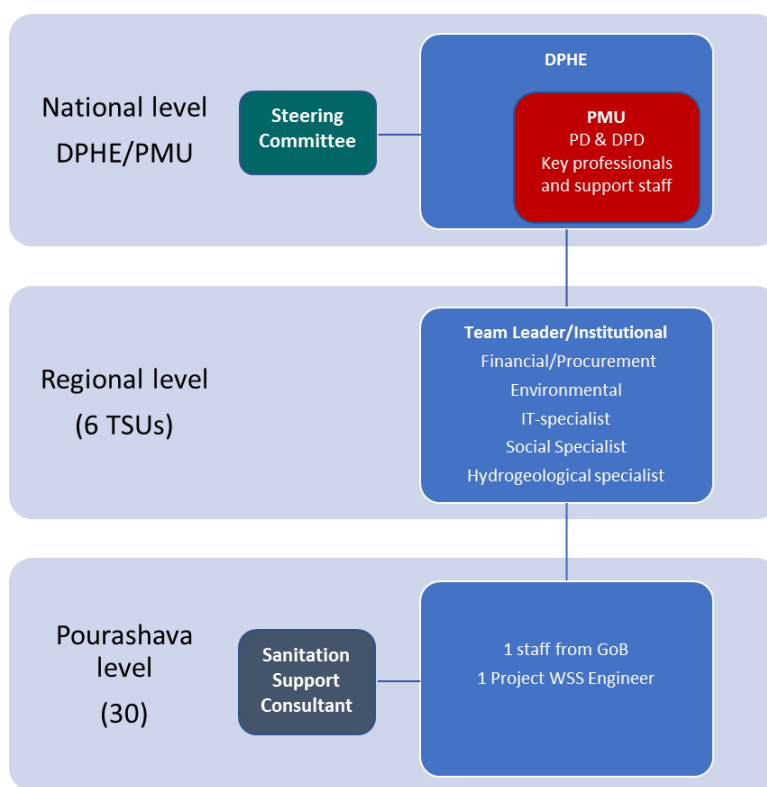
37. **Implementation period.** The project implementation is expected to start in August 2019. Completion of the project is planned for December 2024. A phased approach is being adopted in implementation: during project preparations, the first group of 15 *pourashavas*' bulk water systems have been planned, and institutional arrangements made so that implementation can immediately commence after effectiveness of the Loan Agreement. Technical designs for the second group of *pourashavas* will be finalized in parallel. Similarly, sanitation plans, and their implementation will be carried out in phases.

38. **Project Implementing Agency.** The DPHE will be the agency responsible for the technical project implementation (Implementing Agency, IA). At the national level, a Project Steering Committee (PSC) will be established in the Local Government Division (LGD), chaired by the Secretary of LGD, to provide overall guidance and policy direction. The PSC will meet at least twice a year in the first two years and subsequently as frequent as necessary to take stock of project progress and make course corrections. Apart from overall project management, DPHE will be responsible for design and construction of bulk water supply production and treatment, sanitation infrastructure planning and design, including FSM services, and institutional capacity strengthening.

39. A **Project Management Unit (PMU)** will be set up in DPHE with key professionals and staff to lead the project implementation. The PMU will comprise a full-time Project Director and

Deputy Project Director, and other personnel with specialization in requisite disciplines<sup>9</sup> at DPHE headquarters, posted from within DPHE and recruited from the open market. DPHE will also be responsible for procuring, coordinating and monitoring the project management and implementation support, under Component 4, particularly (i) the Technical Support Unit (TSU) to provide support to *pourashavas* and (ii) third-party institutional performance audits and sample citizens' surveys in each of the participating *pourashavas*. The TSU consultancy will allocate multi-disciplinary teams to support *pourashavas* in the implementation of project activities and building their capacities. This includes communication to build awareness and target messages to households and other stakeholders.

**Figure 1: Implementation Structure**



40. At the municipal level, *pourashavas* will procure private contractors for the construction of the water supply distribution systems. Considering the limited experience of the *pourashavas* in the full chain of sanitation, the project will finance a Sanitation Support Consultant that will assist the *pourashavas* in preparing and implementing *pourashava* sanitation action plans. *Pourashavas* will be responsible for design, procurement, implementation of critical drainage improvements based on the existing drainage masterplans.

41. After completion and hand-over of the respective infrastructures, *pourashavas* will be

<sup>9</sup> This includes water and sanitary engineering, financial management, Information Technology, M&E, environment, social development, procurement, hydrogeologist/water quality.



responsible for the water and sanitation service delivery. *Pourashavas* will set up a ring-fenced water and sanitation department with dedicated personnel as per standard organogram and a separate designated bank account for water and sanitation related revenue and expenditures. *Pourashavas* shall engage private operators to manage the O&M of the water supply systems (bulk and distribution) and sanitation facilities, monitor private operators, and regularly disclose water and sanitation services performance.

#### 4. Project Assessment

##### A. Technical

42. *Pourashavas* for infrastructure investment under the project have been selected based on a set of criteria. Priority has been given to those *pourashavas* which: (a) demonstrate communities' demand and willingness to pay for improved services; (b) have a requisite staff and strong commitment for O&M of the WSS facilities; and (c) have a good revenue generation track record. Based on this process, 30 *pourashavas* were selected for the project. Feasibility studies have been undertaken by qualified consulting companies. The water sources for the water supply schemes were selected based on the availability of close-by surface water sources with a sufficient all-year flow and acceptable water quality. In some cases, these criteria were not met, and groundwater sources were chosen instead based on water quality tests, observing the treatment requirements defined by the Bangladesh water quality standard. During preparations, bid documents for bulk water supply for 20 *pourashavas* have been prepared and vetted. In addition, draft designs for the remaining water distribution systems have also been prepared. At least 15 *pourashavas* are expected to be implementation-ready for bulk water contracts at project effectiveness.

43. DPHE has prior experience in design and implementation of similar piped water supply systems. Project preparation support will ensure that the designs are technically sound and appropriate, simple and cost effective in capital investments and O&M. The water supply component will include the design of bulk intake, treatment, storage, and distribution. The project will provide an opportunity to the project *pourashavas* to build their capacity in design and implementation of the technically noncomplex water supply systems. The project will also support *pourashavas* in contracting private operators for water supply operations to mitigate operational and financial risks.

44. The basic approach of the sanitation improvement will be to increase appropriate knowledge, practices, and attitude of the beneficiary population toward increased demand for improved sanitation. The sanitation component will support *pourashavas* to improve fecal sludge management, including safe emptying and treatment/disposal of fecal matter, as well as carrying out critical sewerage and drainage infrastructure improvements. There is little experience of adequate fecal sludge management in Bangladesh. Therefore, the approach adopted will be demand-driven, initially with a few participating *pourashavas* and then expanding it to other *pourashavas* with demonstrated solutions and lessons learned.

45. Promoting fecal sludge treatment in *pourashavas* with a functional solid waste collection

system will provide opportunities for co-treatment that could be more economical and hence pose only small additional costs for the *pourashavas*. A city sanitation planning consultancy will help carry out situation analyses, and help prepare plans suitable for local conditions, and assist interested *pourashavas* in implementing business models for collection and management of fecal sludge. The project will support individual households by providing technical guidance for sanitary latrine construction, and for construction of community, school, and public toilets. Drainage investments will help *pourashavas* bridge a critical gap that is particularly relevant to Bangladesh's geographical location; water-logging and flooding are very common and contribute to poor environmental conditions and pose a public health hazard.

46. The project includes actions to mitigate discharge of gray waste water into downstream water bodies. The drainage component will include the identification and testing of locally adapted low-cost treatment solutions<sup>10</sup> to reduce the pollution load to downstream water bodies. Such primary treatment solutions range from coarse filtration/screens, gravel and sand filters, flotation/grease traps, sedimentation in tanks to ponds/reed-beds. These pilot solutions will also assist DPHE in formulating policy input to water quality standards for treatment of gray waste water, which currently do not exist in Bangladesh.

## **B. Economic and Financial Analysis**

47. A Cost-Benefit Analysis was carried out to assess the economic viability of the project comparing “with-” and “without-project” scenarios. The Economic Internal Rate of Return (EIRR) and the Net Present Value (NPV) of the project were estimated based on a discounted cash-flow analysis. The approach and detailed results are presented in Annex 4.

48. **Project costs.** The considered project costs include: (a) initial construction cost and (b) annual operation and maintenance cost over the life-time of the project, which was assumed to be 25 years. Financial costs were transformed to economic costs using a standard conversion factor. For the investment costs, the construction cost for the water supply schemes in the 30 *pourashavas*, sanitation improvement and septage management was considered.<sup>11</sup> Economic investment costs were estimated at USD138.1 million. Incremental economic operation and maintenance costs for water supply and septage management were estimated at an annual cost of USD3.69 million for all 30 *pourashavas* combined. All costs are in constant 2018 prices.

49. **Project benefits.** The quantifiable project benefits include: (a) cost savings from switching from shallow tube wells to piped water supply with household connections, (b) time savings for water hauling and handling, and (c) health benefits. A typical household is estimated to (a) save USD7.4 per month compared to operating and maintaining a shallow well, save time from water hauling valued at USD14.6 per month, and (c) reduce health costs by USD8.2 per month, resulting to a total benefit of USD30.2 per household per month. A phase in of service delivery and benefits

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<sup>10</sup> Locations and design to be identified by the TSUs and sanitation consultant.

<sup>11</sup> The costs of the critical drainage improvement, graywater treatment and technical assistance as well as project management was excluded because the benefits of those activities are not quantifiable given the available information.

was assumed in the analysis from year three onward with *pourashavas* achieving a 90 percent connection rate in year six in the areas targeted for the water supply systems.<sup>12</sup>

50. **Economic Project Evaluation.** The Economic Internal Rate of Return (EIRR) was estimated at 24.4 percent and Economic Net Present Value (ENPV) at USD142 million based on a 10 percent discount rate.<sup>13</sup> Given the strong socio-economic benefits of the project, the EIRR largely exceeds the social discount rate and the project demonstrates a strong economic viability. Sensitivity analysis of the EIRR and ENPV with respect to an increase in project costs by 20 percent, an increase in O&M costs by 20 percent and a 20-percent decrease in benefits as well as a combined worst-case scenario was carried out. The EIRR remains above 15 percent under all scenarios.

51. **Financial Analysis.** Conventional financial analysis was not performed because the *pourashavas* will not bear the capital investment costs for the planned water supply infrastructure. However, *pourashavas* are responsible for the provision of the water supply services within their respective geographic areas, including for adequate O&M costs of the water supply and sanitation systems.

52. The 30 *pourashavas* participating in the project do not have the enough tax revenues to cover full costs from the operations of their new water assets. *Pourashavas* achieved an average annual surplus of just TK0.3 million on TK18.4 million of revenues during fiscal year 2016. In the previous year, *pourashavas* incurred an average deficit of TK0.023 million on TK15.6 million in revenue. With such little financial headroom, the operation of the new water supply assets must generate enough revenue to fully recover at minimum, their operations and maintenance costs through user charges. A ring-fenced water department with a designated account will be created. A detailed cash-flow projection comparing the tariff revenue with O&M expenditures for a period of 10 years was carried out for each *pourashava*. The approach and analysis are presented in detail in Annex 4.

53. **O&M cost recovery:** Under the proposed tariff, all 30 *pourashavas* achieve full cost-recovery from year four onward after the initial phase of system buildup and operation with an increasing number of households being connected to the network. In year four, cost recovery is estimated at approximately 100 percent, and is expected to continuously increase thereafter to 106.7 percent-110.2 percent in years five to 10. During year one through three, the *pourashavas* experience a shortfall in revenue as compared to water-related expenditures with cost recovery ranging from 77.5 percent to 95.66 percent. To bridge the shortfall during the initial period of extending household connections and operation, the project foresees O&M subsidy support during this initial three-year period. With the O&M support, cost recovery is estimated at 110.7 percent to 134.6 percent during the initial three years in the base case scenario. Depending on their respective performance, this allows *pourashavas* to build financial headroom to carry out small network extensions or absorb negative shocks in subsequent years. Sensitivity analysis

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<sup>12</sup> The projects targets to provide piped water supply to the central parts of the *pourashavas*, corresponding to a coverage of approximately 55 percent of the population in the respective *pourashavas*.

<sup>13</sup> As per Planning Commission and practice in other MDB-financed projects in Bangladesh.

was carried out with respect to three scenarios: i) a lower household connection rate, ii) increase in O&M costs, and iii) a combined worst-case scenario. The sensitivity analysis shows that the absorption capacity is limited. While under scenarios i) and ii) generally *pourashavas* can bridge temporary shortfalls in revenues through the initial financial headroom, a tariff revision by approximately 10 percent would be advisable to ensure O&M at adequate levels should the worst-case scenario be realized.

54. Lessons-learned from other projects in Bangladesh and the financial analysis demonstrate that a critical mass of households being connected to the piped waters supply system is critical for financial sustainability. For this reason, advance enrollment and advance payment by households to obtain household service connections was made a condition for *pourashavas* to participate in the project. The *pourashavas* will ensure 50 percent enrollment and advance payment of households prior to tendering and 75 percent enrollment prior to provision of water supply services.

### **C. Fiduciary and Governance**

55. **Financial management.** A financial management assessment was carried out and found the DPHE system adequate. Since the project will be implemented in a phased approach, the financial management assessments focused on DPHE and the first group of project *pourashavas*.

56. DPHE has a financial management system which includes adequate staff, planning and budgeting, accounting policies and procedures, internal control, financial reporting and monitoring, and external audits.

- **Staffing.** Most of the financial staff are certified accountants. An account office and two accountants will be appointed by DPHE from existing staff pool or to be in-sourced to the project. However, they have no experience in implementing multilateral development banks (MDBs) projects. A financial management specialist with experience in MDB's financial management and disbursement will be recruited and work together with the financial staff appointed by DPHE.

The financial management specialists of the technical support units (TSUs) will support the development of capacity and skills to cater to the *pourashavas*' financial management needs until their accounting units are fully functional.

- **Budgeting.** The annual project budget will be prepared by DPHE and project *pourashavas* based on project workplan and procurement plan and incorporated into their budgeting system for approval and monitoring. The approved annual budget of the project will be consolidated by DPHE and sent to the Bank for review. The implementation of annual budget will be reviewed quarterly and revised budget, if any, will be sent to the Bank.
- **Internal controls.** The internal control of DPHE and the project *pourashavas* are in place for the preparation and approval of transactions and for the duty segregation.

These internal controls will be applied to the project. In addition, to support the project *pourashavas* in managing the project proceeds, a financial management manual will be prepared alongside regular training by TSU financial management specialists.

- Accounting and reporting. A combination of IPSAS<sup>14</sup> and Bangladesh Government accounting standards are used by DPHE and the project *pourashavas*, which accommodate the ‘modified-cash’ basis of accounting. Automated accounting and reporting systems are used to capture financial information and produce reliable financial reports. Reports include the comparison of the budgeted and actual values.

The accounting policies and procedures of DPHE and the project *pourashavas* will be applied to the project. The project financial reports (PFRs) will be prepared by DPHE and the project *pourashavas*, respectively, in an agreed format and consolidated by DPHE. These quarterly PFRs will be submitted to the Bank within 45 days after the end of each quarter.

- Auditing. There are no internal audit units in DPHE and the project *pourashavas*. The government auditor will conduct the annual audit of financial statement of DPHE in accordance with INTOSAI<sup>15</sup> guidelines.

The project accounts will be also audited by the government auditor – Foreign Aided Project Audit Directorate under the Controller and Auditor General. The audit report will be submitted to the Bank within six months after the end of each financial year.

However, the municipal project accounts will be audited by a private audit firm which will be recruited by DPHE.

57. **Disbursement:** Advance payment will be made for the disbursement of Bank loan proceeds. A pooled Designated Account (DA) for advance payment will be opened, which will be used for both WB and AIB financing of the project. DPHE will prepare six-months’ forecast of expenses in each quarter for DA advance purpose. The withdrawal applications will be submitted by DPHE to the WB for review following the WB disbursement policies. Payment instructions will be given by the WB to AIB, based on an equal ratio between WB and AIB financing. Original supporting documents will be retained at the DPHE for the audit purposes. Further detailed requirements will be included in the WB’s Disbursement Letter.

**Table 2:** Forecast of Disbursements in USD million

<b>Fiscal Year</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
Annual	1.32	5.54	11.96	24.58	30.94	25.66
Cumulative	1.32	6.86	18.82	43.40	74.34	100.00

58. **Procurement.** The WB will play the lead co-financier role and coordinate with the Bank team for procurement preparation and implementation in accordance with the CFA between the

<sup>14</sup> International Public Sector Accounting Standards.

<sup>15</sup> International Organization of Supreme Audit Institutions.

WB and the Bank. All goods, works, non-consulting services, and consulting services required for this project and to be financed out of the proceeds of the IDA financing shall be procured in accordance with the WB Procurement Regulations for IPF Borrowers, dated July 1, 2016 and as revised in November 2017, which are consistent with the Bank's Core Procurement Principles and Procurement Standards under the AIIB Procurement Policy. The WB conducted the procurement capacity assessment of DPHE and project *pourashavas*. A few risks mainly relating to project *pourashavas*' management capacity have been identified and accordingly, the mitigation measures for bidding document preparation, evaluation and contract management have been proposed by the WB to minimize these risks during implementation of the project. Considering that the *pourashavas* have fewer trained/skilled personnel for bidding document preparation, evaluation and contract management, the procurement risk rates Substantial.

59. According to the requirement of the WB, a Project Procurement Strategy for Development (PPSD) based on the market analysis in line with the project's requirements has been prepared. Applicable procurement approaches have been proposed. A procurement plan for the project has been prepared covering the period of the project, the substantial portion covers civil works, including infrastructure for installation of piped water supply, drainage installation and construction of public toilets; the consulting services will be procured to strengthen DPHE and project *pourashavas* technical and management capacities for urban sanitation and drainage schemes; goods would be procured including office equipment for implementation support and equipment for fecal sludge collection. Most of the works packages of the proposed project will be procured using e-GP procedures. The PPSD including the procurement plan and the WB's supervision plan for procurement are acceptable to the Bank.

#### **D. Environmental and Social**

60. The Bank has agreed under the CFA with the World Bank to the application of the World Bank's Environmental and Social Safeguard Policies (WB Safeguard Policies)<sup>16</sup> to this co-financed Project in lieu of the Bank's Environmental and Social Policy (AIIB ESP). This is based on the Bank's determination that (i) the WB Safeguard Policies are consistent with the Bank's Articles of Agreement and materially consistent with the provisions of the AIIB ESP; and (ii) the monitoring procedures that the WB has in place to ascertain compliance with the WB Safeguard Policies are appropriate for the project. Under the WB Safeguard Policies, the project has been assigned Category B.

61. Overall, the environmental and social impacts are expected to be positive as the works relate to provision of piped water supply in *pourashavas* with a population between 20,000 and 80,000, and one large town with more than 80,000 people. Since the Project involves 30 *pourashavas*, in which specific locations for the Project activities will only be identified during implementation, an Environmental Management Framework (EMF), was prepared in July 2018

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<sup>16</sup> The WB Safeguard Policies include Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Physical Cultural Resources (OP/BP 4.11), Indigenous Peoples (OP/BP 4.12), Involuntary Resettlement (OP/BP 4.12) and Projects on International Waterways (OP/BP 7.50).

and disclosed by DPHE<sup>17</sup> and WB<sup>18</sup> on their websites. Likewise, a Resettlement and Social Management Framework (RSMF) and Small Ethnic Community Planning Framework (SECPF) to address Ethnic Communities were completed (August 2018) and disclosed by DPHE and WB on their websites. *Pourashava*-specific Environmental and Social Impact Assessments (ESIAs) followed by preparation of Environmental and Social Management Plans (ESMPs), Resettlement Action Plans (RAPs) and Small Ethnic Community Plans (SECPs) will be prepared in accordance with the provisions of the EMF, RSMF and SECPF as each *pourashava* prepares the activities in its jurisdiction to be included in the Project.

## Environmental Issues

62. The project does not envisage any significant or irreversible environmental or social impacts. The key environmental issue will be the discharge of gray water/sludge mixed with untreated sewage. The Bank has identified increased graywater discharge in the *pourashavas* as a perceptible public health threat and following consultations with the WB, it has been decided that the borrower will implement mechanisms for appropriate disposal of sludge and sewage. This includes provisions for treatment of gray wastewater from drains and management of pits and empty canals that receive wastewater. The Bank has suggested to reduce the pollution load to downstream water bodies by primary treatment solutions such as coarse filtration/screens, gravel and sand filters, flotation/grease traps, and sedimentation in tanks and ponds/reed-beds. Critical drainage improvements according to existing Masterplans will be financed under this project to prevent spillage of wastewater. In addition, the *pourashavas* will meet the critical gaps in setting up a comprehensive drainage system through funds available from the national government. As part of the project design, the *pourashavas* will also involve the private sector in septage management. Adequate equipment for the safe emptying and management of septage sludge will be procured under the Project and leased to private operators. The private operators will also be responsible for the safe disposal and basic treatment (trenching) on land provided by the *pourashavas*. The project has provisions for installing FSTPs (Fecal Sludge Treatment Plants) in three *pourashavas*, with O&M support for three years as a pilot initiative. Depending on their success, installation of the FSTPs will be upscaled in the remaining *pourashavas*.

63. The Bank's due diligence on promotion of sanitation at the community level indicated that users were motivated to use the facilities, however, the technical design of toilets needs to follow international best practices (water seal, pour flush, and twin pit), such as the standard UNICEF model, to ensure that the toilets are sanitary and cost effective. Following the Bank's due diligence on justification of source selection, the DPHE provided detailed explanations on the selection of water sources in each of the 30 *pourashavas*, indicating the water quality of both surface and groundwater, and noting that five of the 30 *pourashavas* can access surface water, while the remaining 25 *pourashavas* will have to extract water from groundwater sources. Following consultations among AIIB, the WB and the GoB, it was decided that the borrower will be required

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<sup>17</sup> [http://dphe.gov.bd/index.php?option=com\\_content&view=article&id=98&Itemid=110](http://dphe.gov.bd/index.php?option=com_content&view=article&id=98&Itemid=110)

<sup>18</sup> <http://documents.worldbank.org/curated/en/393701536909036591/Environmental-Management-Framework-EMF>

to put in place a protocol for water quality monitoring in all *pourashavas* having the piped water supply schemes.

## **Social Issues**

64. Construction of water pipelines will result only in temporary disruptions since in most cases the alignment of the existing road network will be followed. Land, either government or private, will be required to construct Raw Water Treatment Plants and the FSTPs. The exact nature and amount of land required will be determined during project implementation. The process of land acquisition and management of the corresponding impacts on landowners (title holders or nontitle holders) will be implemented in accordance with RAPs prepared in accordance with the RSMF. At this stage, it is not known whether the project *pourashavas* are inhabited by ethnic communities, however, three project districts in the Chittagong Hill tracts are home to ethnic communities. The ESAs for the selected *pourashavas* located in Chittagong will verify the presence or absence of ethnic communities who may be affected by the project. If they are present in the *pourashava*, the *pourashava* concerned will address Ethnic Communities' issues through the preparation of a *pourashava*-level SECP in accordance with the SECPF and prior to implementation of project activities at the *pourashava* level. With regard to physical cultural resources, during implementation, "Chance Finds" may be encountered in the subprojects and special provisions have been made to avoid damaging cultural heritage sites and property.

## **Community Level Issues**

65. The WB has made extensive efforts to ensure that the elected representatives of the *pourashavas* can manage water supply and sanitation within their jurisdiction. A series of training workshops was conducted with the Chairmen of the *pourashavas* to enhance their knowledge of water and sanitation and of financial sustainability of the facilities. Community interactions revealed that users are willing to pay for improved facilities. The project has a robust Grievance Redress Mechanism (GRM) at the *pourashava* level that the WB has found to be satisfactory. Under the aegis of the WB, a Gender Action Plan will be prepared. The Gender Action Plan will ensure women's participation in decision making and provision of income from O&M, as and when such opportunities are feasible.

66. The project has a robust Citizen Engagement strategy, which includes: (i) consultations as the primary tool to promote stakeholder participation in the process of project design and implementation; (ii) a GRM to address and resolve beneficiaries' grievances; (iii) Citizen Report Cards to assess overall satisfaction among the population; (iv) Beneficiary Feedback (BF) using data-based indicators to measure the percentage of grievances resolved as well as level of citizen satisfaction with the services provided.



67. The EMF and its vernacular translation have been consulted upon and disclosed by DPHE on its website and on the World Bank's project website. Likewise, the RSMF and SECPF have been consulted upon and disclosed on DPHE's<sup>19</sup> and WB's<sup>20</sup> website.

### **Projects on International Waterways**

68. The Project involves international waterways. Consequently, the WB applied its Operational Policy 7.50 concerning projects on international waterways to the Project. In accordance with that policy, the WB has determined that notification to riparian states is not required on the basis of an expected *de minimus* impact of the Project on the other riparian states. This is because the surface water to be used is sourced from local rivers within Bangladesh which, while being tributaries of the transboundary Padma, Teesta, Brahmaputra and Meghna rivers, flow only in Bangladesh, the riparian furthest downstream; and the transboundary groundwater use constitutes an extremely minor increase of about 0.000005 percent of current use, which will not adversely change the quantity or quality of water flows to other riparians, or be adversely affected by the other riparians' possible water use. This decision not to require riparian notification is consistent with the Bank's Operational Policy on International Relations (OPIR), which provides an exception to the notification requirement if the Project is "expected to have minimal or no effect on any of the other riparians." Moreover, the Bank is satisfied with the WB's assessment capacity and process and with the assessment, itself and consequently, in accordance with the Bank's OPIR, the Bank may rely on such assessment.

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<sup>19</sup> [http://dphe.gov.bd/index.php?option=com\\_content&view=article&id=98&Itemid=110](http://dphe.gov.bd/index.php?option=com_content&view=article&id=98&Itemid=110).

<sup>20</sup> <http://documents.worldbank.org/curated/en/611771536930037106/Resettlement-and-social-management-framework>.

## E. Risks and Mitigation Measures

69. During project preparation, project teams of both the WB and AIIB have carried out a detailed assessment of the project, including assumptions and risks. The “Medium” risk rating has been confirmed due to the following key factors.

Description	Risk rating	Mitigation measures
<p><b>Political and Governance:</b> Political and governance risks are the key country risks. Government procedures for planning and executing projects, particularly the process for approving and amending Technical Project Proposals (TPP)/Development Project Proposals (DPP), are onerous. There is no independent regulator for the sector. Decentralization to <i>pourashavas</i> is poor, weakening their ownership and interest in operating water and sanitation systems.</p>	Medium	This will be partially addressed by unbundling bulk and distribution system, capacity building and providing greater planning and implementation roles to <i>pourashavas</i> .
<p><b>Sector Policies:</b> While there are a set of useful Acts, policies and strategies in the sector, there is a need to operationalize these and formulate coherent strategies to addressing sector deficits and shortcomings.</p>	Medium	Based on the Local Government Act of 2010, the local government institutions need further delegation of power and financial allocations. In this respect, the project aims at involving the <i>pourashavas</i> in the planning and implementation.
<p><b>Technical design:</b> Given the small size and rudimentary capacities of most of the project <i>pourashavas</i>, there may be risks that some of these <i>pourashavas</i> are unable to scale up for project implementation.</p>	Medium	A modular approach has been adopted for water supply scheme design that is based on demand. Similarly, an incremental approach has been suggested for sanitation.
<p><b>Implementation:</b> DPHE personnel who are largely civil engineers lack relevant experience in institutional reform, water governance including decentralization and service</p>	Medium	Apart from the national PMU, TSU personnel placed in regional clusters and <i>pourashavas</i> , are proposed to help deliver project outputs while building capacities of <i>pourashavas</i> .

<p>delivery options, and a customer-facing orientation to services delivery.</p>		<p>Also, a phased approach to implementation is being adopted so that the first group of 15 <i>pourashavas</i> can be supported by the PMU and TSUs to carry out timely implementation.</p>
<p><b>Environmental and Social:</b> <i>Pourashavas</i> and their contractors have weak implementation capacities and lack experience, especially relating to management of environmental and social risks and impacts at the local level.</p>	<p>Medium</p>	<p>EMF, RSMF, SECPF for the Project prepared.</p> <p>ESIA/ESMP/RAP/SECP as appropriate, will be prepared and implemented at the <i>pourashava</i> level.</p> <p>The IA to engage E&amp;S Consultants for supervision of preparation and implementation of ESIA's, EMPs, RAPs, and SECPs in accordance with the ESMF, RSMF, SECPF.</p> <p>Implementation support Missions periodically to ensure safeguard measures are addressed.</p>
<p><b>Procurement and FM:</b> <i>Pourashavas</i> have weak implementation capacities and lack contract management experience, especially relating to Bank procurement and financial management requirements.</p>	<p>Medium</p>	<p>Technical Assistance/Capacity Building (TA/CB) is provided to help local governments in better managing procurement, contracts and accounting for project funds. This follows the WB's experience in urban and local government strengthening projects.</p>
<p><b>Financial sustainability:</b> There is the risk of insufficient levying and collecting of tariffs by <i>pourashavas</i>, thus causing the schemes to becoming unsustainable.</p>	<p>High</p>	<p>To mitigate this risk the project: i) requires <i>pourashavas</i> to enroll a minimum number of households for connection to the system before approving construction, and before commissioning of schemes and paying an enrolment fee; ii) provides three years of subsidy support so that the systems can continue to operate while the <i>pourashavas</i> ramp up their revenue collections; and iii) may waive or reduce the connection cost for all households that enroll early. The</p>

		operational subsidies and the performance grant based on the institutional performance scorecard, are expected to provide the time and financial cushion to ramp up operations and set the <i>pourashavas</i> on a path to financial sustainability in the post-project period.
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### Annex 1: Results Framework

**Project Objective:** The project objective is to increase access to improved water supply and sanitation services in selected *pourashavas* and strengthen the *pourashavas'* institutional capacities for delivering water and sanitation services.

#### PROJECT OBJECTIVE INDICATORS

Indicator Name	Core	Unit of Measure	Baseline 2018	End target	Monitoring Frequency	Data Source/Metho-dology	Responsibility for Data Collection	Description (indicator definition)
People provided with access to improved water sources (gender disaggregated reporting)		Number	0	600'000	Annual	Progress Report	IA	
People provided with improved sanitation services (gender disaggregated reporting)		Number	600'000	750'000	Annual	Progress Report	IA	
Number of <i>pourashavas</i> scoring 50% and above in Performance		Number	0	30	Annual	Progress Report	IA	

Assessment Scorecard												
Number of <i>pourashavas</i> with operational water supply systems		Number	0	30					Annual	Progress Report	IA	
<b>Component 1: Sector Support and Capacity Strengthening.</b>												
Participating <i>Pourashavas</i> with at least 80% cost recovery on operations and maintenance	X	Number	0				24		Quarterly, year-3 onward	Official records, MIS reports/IBN ET. WSS accounts, HH connection database and billing collection system.	TSU, third-party national agency	Number of <i>Pourashavas</i> recovering at least 80 percent of costs incurred on operations and maintenance through revenues.
<b>Component 2: Investment for Water Supply Infrastructure</b>												

Number of <i>Pourashavas</i> supplying at least 11 hours of water to customers	X	Number	0				20		Quarterly, year-3 onward	Administrative data of <i>Pourashava</i> . Log books for recording hours of supply	TSU	Number of <i>Pourashavas</i> that provide water supply for at least 12 hours in a day at minimum pressure
Number of <i>Pourashavas</i> supply water of quality in compliance with Bangladesh standards	X	Number	0				30		Quarterly	Administrative data of <i>Pourashava</i> . Annual Audits, spot checks	TSU	Percentage of water samples meeting potable quality standards at the exit of storage reservoir
<b>Component 3: Improving Sanitation and Drainage</b>												
Number of <i>Pourashavas</i> with at least 60% improved toilets	X	Number	0				25		Annual	Administrative data of <i>Pourashavas</i> . <i>Pourashava</i> administrative accounts	TSU	Number of <i>Pourashavas</i> that have at least 80% of toilets that are classified as improved under JMP definition
Number of <i>Pourashavas</i> with	X	Number	0				15		Annual	Administrative data of	TSU	<i>Pourashavas</i> that have signed

operational service contracts for emptying septic tanks?										<i>Pourashava</i> s. Log books of <i>Pourashava</i> s		contracts with Operators for emptying of sludge from household toilets that are operational
Number of <i>Pourashavas</i> that implement drainage improvements to manage storm water and waste water	X	Number	0				30		Annual	Administrative data of <i>Pourashava</i> s. Log books of <i>Pourashava</i> s	TSU	<i>Pourashavas</i> that have identified priority drainage requirements and have started drainage construction
<b>Component 4: Project Implementation and Management Support</b>												
Percentage of beneficiaries expressing satisfaction over service provision (gender disaggregated)	X	%	0				55		Annual	Administrative data of <i>Pourashava</i> s. Sample household surveys.	Third-party national agency	Disaggregates customer response by gender on the level of satisfaction with service on various indicators



**Annex 2: List of Project *Pourashavas***

<b>Sl. No</b>	<b>Name of <i>pourashava</i></b>	<b>Category of <i>pourashava</i></b>	<b>Estimated Total Population *(Base: 2021)</b>	<b>Fiscal Revenue (2015-2016) in TK million</b>
1	Tarabo	A	162,117	68.40
2	Ullapara	A	80,805	38.09
3	Chandanaish	A	73,897	18.71
4	Madhupur	A	72,728	16.15
5	Akhaura	A	43,908	15.98
6	Banskhali	A	38,326	16.38
7	Bagha	A	35,078	16.54
8	Akkelpur	A	31,932	11.98
9	Panchbibi	A	29,011	35.91
10	Taherpur	A	23,162	16.53
11	Goalando	A	22,431	66.68
12	Bonpara	A	22,300	15.29
13	Debidwar	B	63,320	21.93
14	Islampur	B	49,292	16.73
15	Dhanbari	B	42,193	10.43
16	Ramgati	B	38,500	8.56
17	Parshuram	B	38,326	11.48
18	Homna	B	37,568	18.38
19	Bhuapur	B	37,057	12.17
20	Chawgacha	B	35,463	15.54
21	Gangni	B	32,916	11.44
22	Baraigram	B	28,717	13.81
23	Barelekha	B	28,717	13.25
24	Senbagh	B	24,609	8.82
25	Royganj	B	23,195	10.10
26	Nachole	B	22,413	12.85
27	Katakhali	C	36,935	7.47
28	Shibganj	C	27,937	7.21
29	Kamalganj	C	21,787	6.95
30	Kahalu	C	20,869	7.67

## Annex 3: Detailed Project Description

### A. Bangladesh Water Sector

69. Currently, only 10 percent of the population of Bangladesh is served by piped water schemes, most of which is concentrated in the major cities. In rural areas, only two percent have access to piped water, whereas in urban areas 30 percent of the population has access to piped water although most of these are concentrated in the cities where Water and Sewerage Authorities (WASAs) exist. The coverage varies across *pourashavas* from almost nil to about 60 percent. The supply hour varies from two to 12 hours per day and the effective average water supply is only around 75 liters per capita per day (lpcd)<sup>21</sup>. The GOB has committed to achieving the Sustainable Development Goal 6 (2016-30) target of “safe and sustainable sanitation, hygiene and drinking water used by all.” Achieving the SDG 6 will pose several challenges since 20 percent of the urban population experiences arsenic contamination and 55 percent E. Coli contamination in their water supply.

70. About 151 (of the 329) *pourashavas* have basic piped water systems, but these systems cover only a limited population residing in town centers. These systems suffer from maintenance and quality problems, small number of connections, high operational costs, poor service levels and low tariff recovery. Sanitation in *pourashavas* mainly comprises household on-site pits and tanks that are cleaned infrequently and when cleaned, the fecal matter is dumped in drains and open lands posing a public health hazard. Solid waste, drainage and flooding are other common problems. Technical expertise for piped water supply and fecal sludge management are limited at all levels of government.

### B. Institutional Structure

71. Institutionally, the Local Government Division (LGD) within the Ministry of Local Government, Rural Development and Cooperatives (MoLGRD&C) is responsible for the overall development of the water supply and sanitation (WSS) sector, as well as for regulating the *pourashavas*' institutional and financial matters, including their staffing and finances. At the central level, the Department of Public Health Engineering (DPHE), under the MoLGRD&C, constructs water supply infrastructure that it hands over to the *pourashavas* to operate and maintain. There is no separate regulatory body for the water and sanitation sector.

72. The Local Government Act 2010 has legally delegated the responsibility for provision of water and sanitation services to *pourashavas*, but actual decentralization has been limited. *Pourashavas* suffer from weak capacities, have a very small number of trained personnel, rudimentary systems, and small own-source revenues making them near-totally dependent on the government budgetary support. These impact the operational viability of service delivery to citizens. Therefore, *pourashavas* will need to be supported in building capacities for carrying out

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<sup>21</sup> World Bank PID/ISDS Report No: PIDISDSC21197. 2018.

their de jure roles in practice, i.e., managing the design and construction of water and sanitation systems and strengthening their institutional and financial systems for operations and maintenance.

73. For drinking water and sanitation, the GOB has approved: (i) a Sector Development Plan (SDP, 2011-2025) and (ii) a National Strategy for Water Supply and Sanitation (2014), and both have been aligned with the SDG 2030. The SDP target for piped water supply coverage by 2020 is 80 percent in large *pourashavas*, and 70 percent in small *pourashavas*, and by 2025, 90 percent and 85 percent, respectively. The Strategy addresses integrated resources management, water quality, fecal sludge management (FSM), response to urbanization, managing disasters and climate risks.

74. Even though the SDP presents a sector investment plan for resources required over the next five, 10 and 15 years, financial sustainability for the water supply and sanitation sector is not addressed in detail in either the SDP or the Strategy. At present, all capital assets for *pourashavas* are provided by the GOB on a 100-percent grant basis via the Annual Development Program (ADP), with no requirement of repayment of capital or interest. The GOB also provides part-salaries of *pourashavas* but fiscal transfers for operational expenditures are very limited. *Pourashavas* are expected to raise their own revenues to cover operating costs. Currently, most *pourashavas* face annual deficits, primarily because of weak institutional capacity and poor services provision, and poor tax and revenue collections. Thus, achieving financial sustainability will be a significant step to establishing functional and sustainable municipal water supply and sanitation departments that manage piped water and improved sanitation systems.

### **C. Project Objectives**

75. The project objective is to increase access to piped water supply and improve sanitation services in selected *pourashavas* and strengthen the *pourashavas'* institutional capacities for delivering water and sanitation services.

76. The project beneficiaries will be about 600,000 people (about 136,800 households) who shall benefit from piped water connections and improved water services in the participating *pourashavas*. Sanitation improvements will benefit at least 150,000 people in the selected *pourashavas*.<sup>22</sup> Other beneficiaries include staff from implementing agencies, e.g., *pourashavas*, DPHE, other public and private sector agencies, women's groups, poor households, and informal sector cleaning workers who will benefit from capacity building and market development activities supported by the project.

77. The achievement of the overall objective will be measured by indicators that assess the access to piped water supply and improved sanitation services, including the number of *pourashavas* scoring a minimum threshold score in annual performance scorecard:

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<sup>22</sup> The Project does not cover Cox Bazaar that is home to the Rohingya refugees.

- People provided with access to piped water sources.
- People with access to improved sanitation services.
- Number of *pourashavas* scoring 50 percent and above in Performance Assessment Scorecard.
- Number of *pourashavas* with operational water supply systems.

78. A set of intermediate indicators will be used to track component level outputs and results. The Results Framework including monitoring indicators, is presented in Annex 1.

#### **D. Project Description and Components**

79. The project will support the Government of Bangladesh with priority investments in WSS system improvements in selected *pourashavas* that do not have piped water systems and suffer from water quality issues. Water supply infrastructure will comprise construction of intake at raw water source, water treatment plants, treated water storages, and distribution networks. Sanitation improvement will be achieved through safe management of fecal sludge, sewage disposal, critical drainage system improvement and the construction of Pilot Septage Treatment Plants. Infrastructure provision will be combined with the targeted institutional development for the *pourashavas* and DPHE to provide WSS services in a sustainable manner.

80. Recognizing that most of these *pourashavas* have rudimentary systems and personnel, the project will provide institutional development support so that the *pourashavas* can quickly ramp up their capacities, especially to manage the water and sanitation services. These will include implementation of systems and procedures for improved services delivery, customer focus, and financial management. The project will provide trained personnel to support *pourashavas* during the project implementation, while the capacities of the *pourashavas'* own personnel will also be built by the project.

81. External donors have been active in the water sector for decades in Bangladesh. To achieve successful results, the project design builds on the lessons learned from previous investments and international good practices. A few key lessons are: (i) institutional and policy reforms are key to success, (ii) emerging private sector in water supply operations in Bangladesh can yield sustainable operations, (iii) demand-led approaches are critical for success and sustainability of WSS projects and (iv) local governments will achieve improvements with rewards recognizing actions.

82. Past projects have shown that provision of WSS infrastructure that is not commensurate with the demand for customer services and revenue collection potential, can result in systems becoming unviable for *pourashavas* to manage. Therefore, a key feature in the project is the demand-responsive design of WSS infrastructure focusing on the use of simple, technically sound, cost-effective techniques with easy, simple, and sustainable O&M of WSS systems. Equally important, *pourashavas* have committed to ensure participation and collect connection fees from 50 percent and 75 percent of the households respectively prior to the tendering of

construction contracts and water supply provision to ensure a critical mass of client base for financial viability.

83. The project will comprise the following five components, including a detailed description of the subcomponents.

84. **Component 1—Sector Support and Capacity Strengthening of DPHE and *Pourashavas* (Cost: USD21.42 million, including contingencies of USD 0.42 million).** This component will include (i) technical assistance for the *pourashavas* to build their capacity for the effective management and delivery of water supply and sanitation services (e.g., procurement and monitoring of private operators, water quality monitoring, billing and collection, complaint redressal); (ii) incentive grants for *pourashavas* to improve institutional aspects and service delivery based on a performance scorecard approach, verified by a third-party agency, as well as support for the *pourashavas* to ensure operational sustainability during the built up of services and (iii) capacity building for DPHE to effectively support the delivery of water supply and sanitation services at the municipal level, including establishing and adapting technical standards, standard operating procedures, establishing a Management Information System, training and capacity building, guidelines for private sector participation, and creating a Municipal Support Unit within DPHE.

85. **Subcomponent 1.1—Technical Assistance to Build Capacity of *Pourashavas* to Manage WSS (Cost: USD2.52 million).** This subcomponent will provide implementation support to *pourashavas* across three dimensions: a) citizen participation and interface for activities such as implementing mobile and IT enabled complaint redressal systems, and annual citizen surveys; b) WSS institutional capacity improvements such as disseminating model *pourashava* bylaws for WSS, WSS accounting systems, audit, IT systems, and MIS; c) service delivery parameters such as water quality monitoring and expansion of fecal sludge treatment to all *pourashavas* including co-composting with solid waste to ensure safe collection and treatment of fecal sludge. This subcomponent will develop contract management capacities to procure and supervise Private Operators. This component will also finance technical assistance to *pourashavas* on implementation of gender action plans and on the safe disposal and treatment of fecal sludge.

86. **Subcomponent 1.2—Incentive Grants for *Pourashavas* to Improve Service Delivery Based on a Performance Scorecard Approach (Cost: USD15.6 million).** The subcomponent will provide a) support for institutional improvements and service delivery and b) support to promote user charge collection and household enrollment.

87. *Support for institutional improvements and service delivery:* The project will measure the performance of *pourashavas* on institutional actions and service delivery through predetermined indicators (citizen engagement, financial management, revenue systems, WSS organization, water supply coverage, water quality, number of hours of supply, complaint redressal, sanitation coverage, solid waste collection, containment structures in households, gender action plan implementation). This includes indicators on sanitation coverage, solid waste collection and co-composting, preparation of sanitation action plans. An annual performance scorecard for each *pourashava* will be calculated through a third-party agency. Each *pourashava* would receive an

average of BDT18 million (or USD225,000) based on its score. The support is on per capita basis and therefore larger *pourashavas* will receive a larger amount. The *pourashava* will be able to utilize all the additional cash-based support toward ensuring expansion of fecal sludge treatment including co-composting, and drainage improvements that follow the designs as determined by the engineer. The total maximum outlay for this support is USD6.8 million. A Performance Scorecard manual has been prepared detailing the indicators, process of scoring and computing rewards annually.

88. *Household enrollment conditions and Operational Expenditure* support to promote user charge collection: A minimum of 50 percent enrollment (with cash deposit) of households (of the relevant distribution phase planned) will be required for *pourashavas* to prove before tendering of construction contracts, and a minimum 75 percent enrollment will be needed before commencing operations. The project will provide financial support to each *pourashava* to meet operational expenditures during the first three years of operations. Adequate O&M subsidy will be available to guarantee that all 30 systems will cover O&M costs while the project is under implementation. About USD7.89 million is allocated toward this.

89. In selected *pourashavas* where Fecal Sludge Treatment Plants are implemented, the project will provide operations support for FSTP operations for up to three years. This will afford time for the Operator to improve operational efficiencies and develop compost products for the market; and for the *pourashava* to levy sanitation-related taxes and charges from citizens. It is expected that this period will be sufficient for FSTP operations becoming financially sustainable beyond the project and setting examples for other *pourashavas* to emulate. About USD0.9 million is allocated for incremental operating costs.

90. **Subcomponent 1.3—Capacity Building for DPHE to Effectively Support the Delivery of Water Supply and Sanitation Services at the Municipal Level (Cost: USD2.88 million).** DPHE will be supported to strengthen greater sector support roles by financing consultancies that will assist DPHE in: (i) establishing and adapting technical standards, standard operating procedures and manuals on technical, operational, and financial management including instituting Geographic Information System (GIS) and IT-enabled systems (this will also include monitor and control system for water loss reduction and leakage detection); (ii) strengthening DPHE's water quality monitoring and surveillance systems to monitor and prevent bacteriological contamination of water; (iii) establishment of national water and sanitation sector Management Information System (MIS), which will facilitate water quality monitoring, waste reduction, and surveillance of and efficient water resources management; (iv) training and capacity building, including module development, training delivery and exposure visits for DPHE and *pourashava* staff to improve operational efficiencies in water and sanitation systems including the use of energy-efficient pumps to reduce water loss especially in the *pourashavas* at risk of drought, new IT-enabled systems, inclusion and gender-focus in the project, and improve awareness around and response to climate resilience-related challenges and rapid-onset emergencies,<sup>23</sup> (v) Private Sector Participation and regulation guidelines for the water and sanitation sector in *pourashavas*

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<sup>23</sup> These could enable undertaking climate change adaptations to prevent flood-induced bacteriological contamination of surface water resulting in limited availability of drinking water and waterlogging.

(including FSM) and (vi) development of policies that adopt climate change–relevant technical guidelines and standards in relation to water supply and sanitation.

91. The project will support the creation and running of a *Pourashava* Support Unit within DPHE that shall provide coordination and support to *pourashavas* as a one-stop window on water and sanitation support services for the sector in the future including measures and technologies to combat climate change and improve resilience. Thus, the project will provide initial support to the DPHE in strengthening its systems to be implemented on a sector-wide basis, beyond the project *pourashavas*.

92. **Component 2—Investment in Water Supply Infrastructure (Cost: USD116.83 million, including contingencies of USD 11.66 million).** This component comprises: (i) infrastructure investments for the installation of piped water supply systems in each *pourashava*, comprising bulk water intake and treatment systems, and piped water distribution systems and (ii) immediate response facility to cope with disasters and climate-induced emergencies. The total investment costs include land acquisition and development,<sup>24</sup> as well as physical and price contingencies not included in the subcomponents below. Piped water supply systems are expected to improve efficiency for the *pourashavas* by diversifying delivery systems away from tube-wells without regard for groundwater management, to sourcing surface water or from aquifers that lie at a depth of at least 300 m rather than shallow aquifers. The latter are more susceptible to salinity intrusion and possible contamination from unsafe disposal of fecal waste, especially if urban flooding occurs frequently.

93. **Subcomponent 2.1—Infrastructure investments for the installation of piped water system (Cost: USD103.0 million).** This will comprise (i) surface or groundwater in-take facility depending on source assessment and sustainability; (ii) water treatment facility based on raw water quality; (iii) water storage; (iv) transmission and distribution pipe network; (v) house connections including meters and (vi) related appurtenances of the water supply system. The basic principles of the system design will be based on a realistic assessment of demand, responsiveness to inland flooding or salinity-induced corrosion of infrastructure or other climate change–induced threats as determined by the design engineers such as raised platform or foundation for installations to respond to flooding, and a phased approach so that as more demand emerges for services, and additional infrastructure can be created. Investments covered under the project will be sized according to the design of individual components (like pump houses, pipelines, overhead tanks) and confirmation of demand from consumers. The provision of energy-efficient pumps has been expressly stipulated to ensure minimal water loss for a given amount of energy used. This arrangement is to ensure that *pourashavas* at risk of drought even those at risk of flooding can efficiently allocate their fresh water resources with minimum wastage.

94. Water provisioning is unbundled into two components due to the distinct and specialized operations and maintenance needs that would influence sustainability, namely: (i) bulk treated supply, which include the intake structures, the treatment plant, storage system of treated water,

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<sup>24</sup> Land acquisition and development to be financed by government's own contribution to the Project.

take-off point, and related pipes and appurtenances and (ii) the distribution system, which include transmission and distribution pipelines, service connections and relevant appurtenances.

95. For the distribution system, the project will promote the mobilization of demand from households by the *pourashava* right from preparation stages. To ensure that experienced contractors provide connections without delay, and households do not have to arrange for personnel and material to get connected, the scheme designs will cover right up to service connections including meters. As an eligibility condition, the project will require each *pourashava* to elicit the commitment of a minimum number of connections by enrolling at least 50 percent of potential customer households from the relevant phase of the distribution system and collecting enrollment deposits from them before according approval to bid out the distribution package. *Pourashavas* shall enroll at least 75 percent of households before commissioning the system. The distribution infrastructure in the project is targeted to cover those areas of the *pourashava* that satisfy the conditions of high enrollment and saturation (and need not necessarily be in the “core” central areas only). These distribution packages are estimated to be eventually covering an average of about 55 percent of the households in the *pourashava*. However, the intention is to saturate 100 percent of the target package area. A higher connection achievement will be rewarded to *pourashavas* under component 1.2.

96. **Subcomponent 2.2—Immediate response facility for disasters and climate-induced Emergencies (Cost: USD2.17 million).** The DPHE does not have emergency response goods and equipment that can immediately mobilize and support the WSS needs of natural disaster affected *pourashavas* across the country. As noted earlier, tropical cyclones and increased inland flooding due to heavier monsoons are expected to increase. These may cause not only damage to water supply infrastructure or contamination of drinking water or both but may also result in residents switching away from piped service due to interruption in service or lack of discernible difference in quality between piped water and that from tube-wells. A financial allocation to support DPHE in purchasing emergency-response related equipment and building up its quick response system will thus be provisioned that will allow the project *pourashavas* to repair their WSS system or to take measures to avoid further deterioration.

97. **Component 3—Improving Sanitation and Drainage (Cost: USD61.33 million, including contingencies of USD 2.30 million).** This component focuses on environmental improvement and public health in the selected *pourashavas* by establishing safe management of fecal sludge, sewage disposal, and implementing critical drainage system improvements. *Pourashavas* will be supported in the preparation and implementation of City Sanitation Action Plans focusing on the entire chain of sanitation activities. The component is divided into two subcomponents, septage management and critical drainage system improvements. The septage management will be monitored by the *pourashavas* and conducted with private sector engagement. Adequate equipment for the safe emptying and management of septage sludge will be procured and leased to private operators. The private operators will also be responsible for the safe disposal and basic treatment (trenching) on land provided by the *pourashavas*. Critical drainage system improvements according to existing drainage master plans will be financed with



a focus to prevent flooding. Locally adapted low-cost solutions for gray wastewater treatment to protect downstream water bodies will be identified and implemented.

**98. Subcomponent 3.1—Improving Sanitation and Septage Management (Cost: USD29.13 million).** For total sanitation improvement of the *pourashavas*, the project will support all elements of the sanitation service delivery chain. Unlike water supply service that will concentrate on specific areas of the *pourashava* where there is demonstrated demand, the scope of sanitation service improvement will entail the entire *pourashava* covering all households. Improved sanitation and septage management will reduce the contamination of surface and groundwater and increase the available water supply, thereby helping alleviate water stress, especially in the coastal areas of Bangladesh (which are affected by salination) and areas affected by drought. The *Pourashava* Sanitation Support Consultants financed by the project, will provide planning and implementation support to the *pourashavas* to help to develop appropriate and sustainable septage management model. The model will be developed considering the population, economic status of household, type and accessibility of containment systems, availability or lack of service providers for emptying, availability of land for the treatment facility, risk of inland flooding due to climate change, policy/regulation and affordability of service.

99. In summary, the project will finance the following under this component:

- Preparation of *pourashava* sanitation plans and implementation support consultancy that will provide support in developing sustainable septage management model.
- Subsidy grant to the poor households for toilet improvements to move up the ladder from unsanitary toilets.
- Reward to *pourashavas* for sanitation access improvements (in subcomponent 1.2).
- Construction of public toilets, and operational models to help floating populations and informal workers access improved toilets.
- Equipment including vacutugs/trucks and safety gear for emptying Operators for fecal sludge management.
- Training and capacity building of informal workers and women's groups for fecal sludge management.
- Basic infrastructure for safe disposal locations for septage in 27 *pourashavas*.
- Pilot Fecal Sludge Treatment Plants in three *pourashavas* and O&M expenses for the first three years to permit stabilization of the business model.

**100. Subcomponent 3.2—Drainage Improvements (Cost: USD29.9 million).** This investment will contribute to the *pourashavas'* measures to manage urban flooding. From the existing Drainage Master Plan that each *pourashava* has, with the help of TSU Consultants, the drainage action plan will identify critical areas in the *pourashavas* that will be increasingly prone to stormwater flooding. Drainage plans will include management and basic treatment of graywater and using appropriate measures to prevent contamination of freshwater flows in the event of inland flooding, thus preventing a public health hazard. The project will only finance investments in critical drainage infrastructure to reduce such flooding in the *pourashavas*—not the whole drainage master plan. The *pourashava* will prioritize those capital works that can be swiftly

implemented as soon as they become eligible. The critical drainage construction items will be developed into a bid document and put out for bidding.

101. **Component 4—Project Implementation and Management Support (Cost: USD9.95 million, including contingencies of USD 0.08 million).** This component will include project management and implementation support to assist DPHE in ensuring seamless coordination, efficient implementation and compliance with the relevant policies. The component entails the following elements: (i) project management consultant; (ii) project annual audits and (iii) project communications, citizens' satisfaction surveys and report cards. This component will also ensure that gender aspects and social inclusion are covered in all stages of the project cycle.

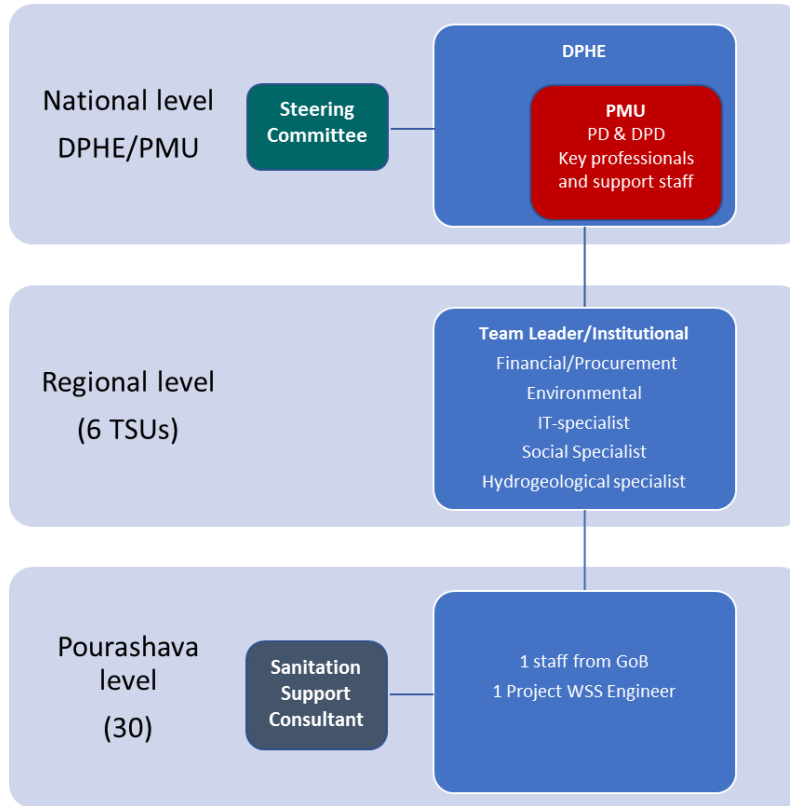
102. **Component 5—Contingent Emergency Response (Cost: USD0 million).** A provisional zero amount component is included under this project that will allow for rapid reallocation of loan proceeds during an emergency. In addition to reallocation of funds from other project components, the contingent component may also serve as a conduit for additional funds to be channeled to the project in the event of an emergency.

## **E. Implementation Arrangements**

103. **A Project Steering Committee (PSC)** will be established in the Local Government Division (LGD), chaired by the Secretary of LGD, to provide overall guidance and policy direction (Figure 2). The PSC will review the semi-annual and annual project performance reports, and based on periodic discussions with the project cofinanciers, issue directions for effective implementation of the project by *pourashavas*. During the first two years of project implementation, the PSC will meet at least twice a year, or more frequently if required, to take stock of project progress and make course corrections.

104. **The DPHE will be the nodal agency** and coordinate all project implementation activities through a Project Management Unit (PMU). The PMU will comprise full-time Project Director and personnel with specialization in requisite disciplines (water and sanitary engineering, financial management, information technology, monitoring and evaluation, environment, social development, procurement, hydrogeology, water quality). A part of the personnel will be posted from within DPHE and a part will be recruited from the open market. The PMU will be responsible for: (i) preparation and execution of Implementation Partnership Agreement (IPA) with the 30 *pourashavas* before loan effectiveness; (ii) preparation of batch-wise subprojects comprising infrastructure components in 15 *pourashavas* at the first stage; (iii) selection of consultants at the municipal level who will assist *pourashavas* in project management and monitoring, O&M planning, social accountability and grievance redressal; (iv) procurement of works; (v) oversight of construction supervision and contract management, and supervision of safeguards implementation; (vi) approval of payment certificates from *pourashavas* for works contracts and authorizations for payment and (vii) supporting the setting up and/or strengthening of national-level systems namely MIS, water quality surveillance, standard operating procedures, manuals.

**Figure 2: Implementation Arrangement**



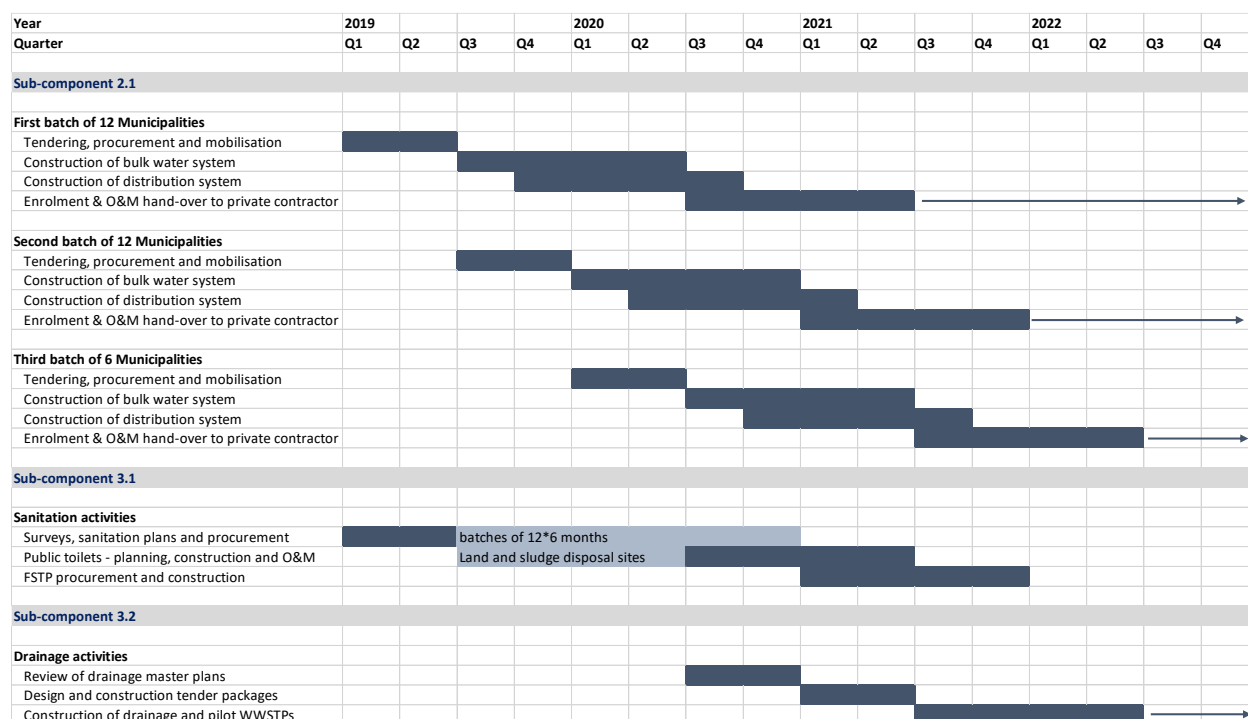
105. At the regional level, Technical Support Units (TSUs) will be established and staffed with experienced multi-disciplinary teams to support *pourashavas* in the implementation of project activities and building their capacities. The TSUs will execute schemes for funding under Components 2 and 3, with the assistance of technical support services of DPHE, and consultants. They will assist the selected *pourashavas* in supervising works, safeguards compliance, preparing O&M plans, and training *pourashavas* engineers. To enhance ownership by *pourashavas*, DPHE will provide technical support and capacity building to ensure their full involvement in project planning, contracting, and execution.

106. Considering the limited experience of the *pourashavas* in the full chain of sanitation, the project will provide a Sanitation Support Consultant (firm) that will first assist the *pourashava* in preparing the *pourashava* sanitation action plan. The consultants will then assist *pourashavas* in implementation of each of the elements in the sanitation plan including households' upgrading of toilets, public toilets operations, service contracts with private informal sector cleaning workers for pit emptying, transportation, and safe disposal of fecal sludge, developing and implementing business models, training and capacity building of women's self-help groups, and cleaning workers, developing and implementing cost recovery plans. The Sanitation Support consultants will assist groups of eight to nine *pourashavas* in phases, and for three *pourashavas*, they will assist with the establishment of fecal sludge treatment facility along with operational plans.

107. Implementation Partnership Agreement (IPA). Prior to receiving project funds, each of the 30 *pourashavas* will sign an IPA with DPHE, which will require the *pourashava* to: (i) execute water supply and sanitation projects using private sector in construction, and O&M; (ii) execute WSS governance measures; (iii) show improvements in revenue mobilization; (iv) achieve operational sustainability of the WSS; (v) carry out community outreach, including household enrollment and extending services to poor households; and (vi) comply with safeguards and other requirements, described in the Project Implementation Manual.

108. **Project Implementation Schedule.** One of the characteristic features of the project is the geographic spread over multiple locations, i.e., 30 *pourashavas* in which implementation must be supported. In addition, further complexity is added due to water supply, sanitation, and drainage components being implemented along-side institutional strengthening of the *pourashavas* that have rudimentary capacities to start with. A linear mapping for each of the project components and activities reveals that the planning and implementation of different components could be protracted and risk considerable implementation delays. The indicative overall timeline for planning and implementation cycles for some of the key components are shown in Figure 3.

**Figure 3: Indicative Project Implementation Plan**



109. To anticipate these risks and take preemptive measures include the following:

- During preparations, bid documents for bulk water supply for 20 *pourashavas* have been prepared and vetted. In addition, draft designs for water distribution systems have also been prepared. At least 15 *pourashavas* are expected to be implementation-ready for bulk water contracts at project effectiveness.

- The DPHE have availed of a Project Preparatory Advance Facility, and have financed preparatory activities, consultancies, and detailed consultations with *pourashavas*.
- Workshops and consultations with Mayors and other stakeholders from the *pourashavas* have been organized to discuss project rules and confirm their willingness to participate and implement preparatory actions, including passing resolutions and agreeing to the draft Implementation Partnership Agreement (IPA). These *pourashavas* have also prepared, with DPHE assistance, the draft financial operating plan, draft operations contracts (water, public toilet, septage management) and indicative cost-recovery tariffs.
- *Pourashavas* have agreed to implement some of the advance eligibility actions, namely opening of separate bank account, raising awareness amongst residents, commencing baseline.
- Packaging of selected contracts has been undertaken for accelerated procurement and implementation.
- Discussions have been held with LGD, GOB, to accelerate the commencement of the process to recruit the Deputy Assistant Engineer position in the *pourashavas*' WSS Section, as provided by rules.

## **F. Selection of *Pourashavas***

110. To bring the hitherto neglected smaller *pourashavas* under sustainable piped water supply and improved sanitation coverage, the DPHE has prepared Masterplans for 148 smaller *pourashavas* and proposed these for funding by GOB and development partners. For the current project, 50 *pourashavas* were initially proposed. During the preparations, 30 *pourashavas* were selected based on their willingness to:

- Create a ring-fenced municipal water and sanitation unit.
- Install (or extend) piped water systems with private sector engagement.
- Collect tariffs for sustainable water supply operations and maintenance.
- Provide financial assistance for sanitation improvements for poor households and reward *pourashavas* for promoting improved sanitation access across all households. Support the construction and sustainable operations and management of public toilets.
- Support informal cleaning/emptying workers with equipment and training and making disposal arrangements for fecal sludge in designated locations (and demonstrating fecal sludge treatment in select *pourashavas*).
- Invest in critical improvements in drainage to address flooding.

111. Availability of land was also a key criterion in the selection of project *pourashavas*. The list of project *pourashavas* is presented in Annex 4. Even with the selection of these better performing *pourashavas*, the government has not underestimated the dual problems of: (i) establishing viable water supply and sanitation operational capacity where none currently exists, and (ii) achieving financial sustainability solely through customer charges.

## **G. Operation and Maintenance**

112. *Pourashavas*, at the local level, will engage the private sector for the construction of the water supply distribution system (Subcomponent 2.1) and shall also engage private operators to manage the operations of the entire water supply system (bulk and distribution). Experience from previous projects suggests that private operators are willing to engage in O&M of water supply systems based on service contracts but are not willing to invest in capital expenditures. On a pilot basis, the project will also explore the possibility of bundling the contracts for constructing water supply distribution, and the operations of the entire system, in the same contract package. Private operators shall also be brought in for the operations and maintenance of all sanitation facilities. *Pourashavas* will be responsible for design, procurement, implementation and maintenance management of critical drainage infrastructure (Subcomponent 3.2).

113. *Pourashavas* will be responsible for monitoring the service standards, particularly ensuring the quantity and hours of supply as agreed with the Private Operator through a service contract. Since the *pourashava* will be responsible for the bulk production asset O&M as well, they will be involved in the supervision of the construction of the bulk production systems. On the other hand, DPHE will be involved in the procurement and construction supervision of the distribution system, given *pourashavas'* weak capacities. The project will provide subsidy grant support to each *pourashava* to meet operational expenditures during the first three years of operations as they increase their revenue collection (Subcomponent 1.2).

## **H. Performance-based scorecard**

114. *Pourashavas* will make land available for construction of water supply and sanitation facilities, set up a ring-fenced WSS department with a separate bank account, dedicated personnel as per standard organogram (taking into consideration private contracts for operation and maintenance), setting cost recovery tariffs, providing separate accounting, and the regular disclosure of water and sanitation services performance. In preparation for the project, the *pourashavas* shall collect advance enrollment fees (at least 50 percent of design Phase 1 of the distribution system) from consumer households and establishments. Water supply operations will commence after 75 percent enrollment is ensured.

115. The project has a measure to support the improvement of municipal infrastructure based on the performance scorecard (Subcomponent 1.2). This includes indicators on (i) participation, (ii) service delivery and efficiency standards and (iii) household enrolment.

117. *Figure 4.* An annual performance scorecard for each *pourashava* will be calculated through a third-party agency.

**Figure 4: Scorecard Summary With Indicators**

Area of performance	Performance	Indicator
<b>I. PARTICIPATION</b>		
<i>IA - Citizens' participation and Customer Interface</i>	Citizen Interface	Town level co-ordination committee formed
<i>IB - Institutional</i>	Staffing	Key staff positions filled
	Ring fencing	WSS powers delegated to WSS Supervisor
	Ring fencing	Separate bank account
	Accounts and Finance	DEAS and finalizing annual accounts
	Accounts and Finance	Financial audit
	Accounts and Finance	No dues to electricity supplier and staff/operator
	Revenue	Cost recovery mechanism for sanitation in place
	Revenue	Paurashava has management arrangements for public toilets
	IT Systems	Connection and billing database
	Reporting	Reporting into M & E system
	Reporting	Regular water quality reporting
<b>II. SERVICE DELIVERY AND EFFICIENCY STANDARDS</b>		
	Coverage	Number of households receiving piped water supply through house connections
	Quality	Water quality at customer end
		Hours of supply
	Complaint Redressal	Percentage of complaints redressed
	Non Revenue Water	Percentage of Non Revenue Water
	Sanitation	Paurashava has prepared sanitation action plans
		People with access to safe and improved sanitation
		Fecal Sludge Management
<b>III. HOUSEHOLD ENROLMENT</b>		
	More than 50%	Pourashavas with HHs from which at least two bills have been collected
	More than 75%	Incentive for user charge collection

118. The *pourashavas* can spend the performance grants for improving municipal infrastructure and services such as reduction of nonrevenue water, solid waste management and public toilets. Activities shall be in accordance with the WB's negative list. About 10 percent of the support will be provided in the initial two years of the project to incentivize institutional actions early in the project and to provide an early demonstration of benefits to the *pourashava*. Performance grants will be administered by DPHE and funds will be reimbursed to the *pourashavas'* WSS bank accounts based on submitted invoices.

### **I. Implementation monitoring**

119. To ensure that monitoring and evaluation can be undertaken effectively, two measures have been built into the project design. First, Components 1 and 4 specifically support the strengthening of the project MIS and building of DPHE and *pourashavas'* performance monitoring systems and progress reporting. Second, the project supports greater accountability and transparency to citizens through social audits e.g., citizens' report card and community consultations as a part of the institutional performance scorecard, a live and strong information disclosure strategy to citizens, and support to the *pourashava's* grievance redress mechanism.

120. To track the Results Framework of the project, a M&E Consultancy Firm shall be hired for the conduct of joint WB and AIIB annual performance assessments and a mid-term review (MTR) at the end of year 2.5. A final assessment will be carried out in year five, and findings disseminated to inform future policies and plans.



## Annex 4: Economic and Financial Analysis

### Economic Analysis

#### Background

121. In its Sector Development Plan (SDP, 2011-2025), the Government of Bangladesh (GoB) sets its target to extend piped water supply to 90 percent of the inhabitants in large *pourashavas* and 85 percent in small *pourashavas* by 2025. The GoB has also adopted a National Strategy for Water Supply and Sanitation (2014), which addresses the issues of integrated water resource management, water quality and fecal sludge management. The project contributes to the GoB's efforts in extending piped water supply and envisages to provide piped water supply, septage management and critical drainage improvement to 30 *pourashavas* with an average size of 34,000 inhabitants (2016).

122. This project will finance the construction of water supply systems in 30 *pourashavas* (from source to household connection with water meter) providing piped water supply, septage management and sanitation, and critical drainage improvements to a total population of 600,000 million people in 30 *pourashavas*. Construction is planned to commence in 2019 and the implementation period is estimated five years.

#### Approach and methodology

123. A cost-benefit analysis was carried out to assess the economic viability of the project comparing “with-” and “without-project” scenarios. The Economic Internal Rate of Return (EIRR) and Economic Net Present Value (ENPV) of the project was estimated based on a discounted cashflow analysis considering costs and benefits. Sensitivity Analysis was performed taking into consideration (i) increased investment costs; (ii) increased O&M costs; (iii) decreased benefits and (iv) a worst-case scenario, which combines the three previous scenarios.

124. **Data:** Primary information on project cost, households' current water consumption, expenditures and coping cost related to inadequate water supply was collected during the preparation of the technical designs<sup>25</sup> through engineering consultants. The primary data was complemented with demographic information, public health data, other household characteristics, and technical assumptions. A data verification process was conducted jointly including the Bank's and the WB's team.

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<sup>25</sup> 30 Project Reports were prepared by engineering firms describing the current situation in the *pourashavas* in terms of water supply and describing the future water supply schemes. Information on expected capital cost was collected from the Project Reports and future O&M costs were estimated based on a financial model.

## Key assumptions

- Population growth: 1.0 percent p.a.
- Standard Conversion Factor was assumed at 0.95.<sup>26</sup>
- Shadow Wage rate for domestic work: 90 percent of unskilled wage (for household members who carry out domestic work).<sup>27</sup>
- Project duration is assumed to be 25 years.
- Project implementation period is assumed to be five years.
- The benefits are assumed to realize with a phase-in of 75 percent in year three, 80 percent in year four, 85 percent in year five and 90 percent in year six, corresponding to the rate of household service connections.
- The discount rate is 10 percent.<sup>28</sup>

## Key technical assumptions are summarized below:

- Lifetime of shallow tube-wells and pumps is assumed 20 years.
- A shallow-tube well is assumed to be shared among 1.8 households.
- Lifetime of civil works: 30 years.
- Lifetime of electro-mechanical equipment 20 years.
- Service level benchmark: 100 liters per capita per day.

125. **Project Benefits:** The expected project benefits include improved health outcomes (reduced water-related morbidity and mortality, reduced malnutrition in children), increased economic productivity, increased school attendance, improved scholastic achievement, reduced malnutrition, time savings from water hauling, and cost savings from reduced coping costs (shallow tube-wells).<sup>29</sup> As women and girls carry a disproportionate time share in water hauling and handling and are more exposed to water related disease, a larger share of the health and time-related benefits are expected to be accrued by women and girls.<sup>30</sup> Similarly, children carry a disproportionate burden of water-related disease, which is one of the major preventable causes of death in children under five years of age in developing countries.<sup>31</sup> Only a part of the above-described benefits were quantified in this economic analysis, which can hence be interpreted as a conservative or lower bound estimate of the economic benefit of this project.

126. For valuation purposes, the quantifiable benefits summarized in Table 3 were considered. Benefits from non-incremental water supply include the avoidance of direct and indirect coping costs from inadequate water supply. Household expenditures such as installation and operation

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<sup>26</sup> Conversion factor was estimated by World Bank based on the breakdown of project cost by different categories.

<sup>27</sup> Given the low nominal unemployment rate of 4.2 percent according to national statistics, a 90-percent shadow wage rate has been assumed for household members without a paid activity outside the household. It is assumed that the unskilled wage rate is not distorted given the low unemployment rate. Therefore, no shadow wage rate was applied.

<sup>28</sup> Planning Commission, GoB.

<sup>29</sup> Waddington et al. (2009) provide a comprehensive overview of rigorous impact evaluations in the water sector. Moore et al. (2001) and Niehaus et al. (2002) show negative long-term consequences of early childhood diarrhea on nutritional status and cognitive development.

<sup>30</sup> Waddington et al. (2009).

<sup>31</sup> World Health Organization (2018), Drinking-water: <http://www.who.int/news-room/fact-sheets/detail/drinking-water>

of private water wells and pumps are considered direct coping costs. Indirect coping costs comprise the time value lost through water hauling or sickness (or caretaking of sick family members) related to water-related disease. The lost time is valued at the shadow price for unskilled labor without employment outside the household, which is assumed at 90 percent of an unskilled wage for household members that engage in economic activity outside the household.

**Table 3: The Valuation of Economic Benefits**

<b>A. Value of non-incremental water</b>	
<b>a. Direct coping costs</b>	
- Installation and operation of private shallow tube-wells	Cost saving compared to piped water supply considering investment and O&M costs over the lifetime of the tube-wells. The following conservative assumptions apply: Shallow tube-wells used for 20 years, 1.8 households share a tube-well.
<b>b. Indirect coping costs</b>	
- Time	Time savings for hauling water x shadow wage <sup>32</sup>
- Health	Expected reduction in water-related disease prevalence x health costs (sick days, caretaker days and health cost)

127. **Estimated value and breakdown of benefits:** Project benefits are estimated at USD30.2 per household per month. This corresponds to a total annual benefit of USD37.0 million per year based on the assumption of the network covering 55 percent of households in the *pourashavas* and a connection rate of 90 percent after a gradual increase of household connections until year six.

128. The benefits from safe and affordable non-incremental water supply are reported in Table 4. Direct coping costs cumulatively account for 24.5 percent of the benefit, which is due to the installation and O&M of private tube-wells, which are shared on average among 1.8 households. Indirect coping costs, avoided through access to piped safe water supply at the household level, accounts for 75.5 percent of the project benefits. The targeted households are expected to save approximately one hour per day on average<sup>33</sup> in hauling and handling water (48.3 percent of estimated project benefit). In addition, households are expected to benefit from improved health, resulting in reduced time loss for productive and domestic use due to sickness and related health

<sup>32</sup> The health cost consists of time saving for caregiving of mothers for sick children, adult sick days and health costs. The disease prevalence data is based on estimates from the WSP report “Economic Impact of Inadequate Sanitation in Bangladesh.” The health cost is estimated based on information from the Bangladesh Household Expenditure Survey 2016. The expected reduction in diarrhea prevalence for a joint water supply and sanitation intervention is assumed at 42 percent.

<sup>33</sup> On average, a household will save 0.5 hour per trip and two trips are required on average.

cost, corresponding to 27.1 percent of the total project benefit.<sup>34</sup> Given the widespread availability of close by, but unsafe water source, only benefits of non-incremental water were considered for this economic evaluation.

**Table 4: Breakdown of Project Benefits**

<b>Economic benefit</b>	<b>Benefit per household and month</b>	<b>Benefit per household per year</b>	<b>Benefit per year</b>	<b>Benefit as share of total benefit</b>
	<b>(in USD)</b>	<b>(in USD)</b>	<b>(in USD million)</b>	<b>(in percent)</b>
<b>1.1. Direct coping costs</b>				
Installation and O&M of private shallow tube wells	<b>7.4</b>	<b>88.9</b>	<b>9.1</b>	<b>24.5%</b>
<b>1.2. Indirect coping costs</b>				
Time-saved from water hauling	<b>14.6</b>	<b>175.1</b>	<b>17.8</b>	<b>48.3%</b>
Health costs	<b>8.2</b>	<b>98.3</b>	<b>10.0</b>	<b>27.1%</b>
<b>Total economic benefit</b>	<b>30.2</b>	<b>362.4</b>	<b>36.9</b>	<b>100.00%</b>

<sup>34</sup> Water-related sick days were estimated based on the WSP report “Economic Impacts of Inadequate Sanitation in Bangladesh,” 2012, and disaggregated into adult and child sick days with the assumption that child sick days account for more than 60 percent of the sick days.

**Table 5: Project Costs**

Pourashava	Investment Cost				Annual O&M Costs			
	Financial Cost		Economic Cost		Financial Cost		Economic Cost	
	Investment Cost Tk Crore	US\$ Million	Taka Lakhs	US\$ Million	Tk Lakhs	US\$ Million	Tk Lakhs	US\$ Million
Akhaura	47.27	5.52	45.09	5.27	95.08	0.11	90.71	0.11
Banskhali	38.96	4.55	37.17	4.34	108.54	0.13	103.55	0.12
Chandanaish	52.28	6.11	49.88	5.83	97.58	0.11	93.09	0.11
Homna	43.52	5.08	41.52	4.85	85.47	0.10	81.54	0.10
Parshuram	28.64	3.35	27.33	3.19	103.99	0.12	99.20	0.12
Senbagh	18.91	2.21	18.04	2.11	76.55	0.09	73.03	0.09
Tarabo	139.56	16.30	133.14	15.55	448.20	0.52	427.58	0.50
Goalando	25.02	2.92	23.87	2.79	78.38	0.09	74.77	0.09
Chaugacha	28.51	3.33	27.20	3.18	85.92	0.10	81.97	0.10
Gangni	33.66	3.93	32.12	3.75	97.08	0.11	92.61	0.11
Bhuapur	37.72	4.41	35.98	4.20	105.85	0.12	100.98	0.12
Dhanbari	47.27	5.52	45.10	5.27	126.52	0.15	120.70	0.14
Islampur	49.70	5.81	47.41	5.54	131.78	0.15	125.72	0.15
Madhupur	72.65	8.49	69.31	8.10	189.38	0.22	180.67	0.21
Debdiwar	124.31	14.52	118.59	13.85	184.52	0.22	176.03	0.21
Ramgati	54.36	6.35	51.86	6.06	92.60	0.11	88.34	0.10
Akkelpur	32.06	3.74	30.58	3.57	93.60	0.11	89.29	0.10
Bagha	34.45	4.02	32.86	3.84	81.49	0.10	77.74	0.09
Baraigram	21.82	2.55	20.82	2.43	84.77	0.10	80.87	0.09
Bonpara	23.27	2.72	22.20	2.59	74.58	0.09	71.15	0.08
Kahaloo	18.99	2.22	18.11	2.12	57.38	0.07	54.74	0.06
Katakhali	37.60	4.39	35.87	4.19	105.59	0.12	100.74	0.12
Nachole	23.38	2.73	22.30	2.61	74.82	0.09	71.38	0.08
Panchbibi	22.03	2.57	21.02	2.46	85.35	0.10	81.43	0.10
Royganj	23.32	2.72	22.25	2.60	74.70	0.09	71.26	0.08
Shibganj	28.79	3.36	27.46	3.21	86.53	0.10	82.55	0.10
Taherpur	23.23	2.71	22.16	2.59	63.09	0.07	60.19	0.07
Ullapara	61.72	7.21	58.88	6.88	165.72	0.19	158.10	0.18
Baralekha	29.55	3.45	28.19	3.29	88.18	0.10	84.12	0.10
Kamalganj	16.90	1.97	16.12	1.88	70.90	0.08	67.64	0.08
<b>Total</b>	<b>1,239.45</b>	<b>144.80</b>	<b>1,182.44</b>	<b>138.14</b>	<b>3,314.14</b>	<b>3.87</b>	<b>3,161.69</b>	<b>3.69</b>

129. **Project Costs:** The total project cost is estimated at USD210 million. For this cost-benefit analysis, capital investment cost for the water supply systems under Component 2, and septage management and sanitation under Component 3 are considered.<sup>35</sup> Economic investment costs are estimated at USD138 million (see Table 5). The costs of the institutional component, project management and drainage improvements have been excluded.<sup>36</sup> The lifecycle O&M cost for the planned water supply schemes has been included in the project costs.<sup>37</sup> To convert financial costs to economic costs, a standard conversation factor has been applied to correct for other taxes and distortions in the economy.

## Results of Economic Analysis

130. The analysis underlines the high economic value of this project. The EIRR is estimated at 24.4 percent clearly exceeding the social discount rate of 10 percent. The Economic Net Present Value is estimated at USD142 million, based on a 10 percent discount rate. Given the strong socio-economic benefits of providing access to safe water supply and improved septage management to a large and currently underserved population in Bangladesh, the high economic evaluation is in line with theoretical expectations. The results are summarized in Table 6.

**Table 6:** Results of Cost-Benefit Analysis

	NPV in million USD
<b>Project costs</b>	<b>136</b>
Construction	111
O&M	25
<b>Project benefits</b>	<b>278</b>
Cost saving	68
Time savings	134
Health benefits	76
<b>Economic Valuation of the Project</b>	
Net present value	278
Internal Rate of Return (percent)	24.4%

131. A Sensitivity Analysis was performed taking into consideration (i) a cost overrun in investment costs by 20 percent; (ii) a cost overrun in O&M costs by 20 percent; (iii) lower than expected benefits by 20 percent and (iv) a worst-case scenario, which combines all three previous

<sup>35</sup> Excluding the institutional component, project management and taxes.

<sup>36</sup> Based on available information, the benefits of those components cannot be quantified.

<sup>37</sup> The investment costs are based on the engineering designs as reported in the project reports. The O&M costs have been estimated by the World Bank team based on the financial model.

scenarios. The stream of economic costs and benefits and the net-flow under the sensitivity analysis are presented in Table 7. The sensitivity analysis shows that the project EIRR remains at or above 15.4 percent, which indicates strong economic viability under all sensitivity analysis scenarios. The economic viability of the project is more sensitive to a decrease in project benefits, followed by cost overrun in investment costs. Increased O&M cost only marginally affect the EIRR and ENPV of the project.

**Table 7: Sensitivity Analysis**

USD in million	Cost		Economic benefits				Base Case	Sensitivity Analysis				
	Year	Construction	Operation & Maintenance	Cost savings	Time savings	Health benefit		Total Benefits	Net Benefits	20% increase in investment cost	20% increase in O&M cost	20% decrease in benefits
2019	54	0	0	0	0	0	0	-54	-65	-54	-54	-65
2020	29	0	0	0	0	0	0	-29	-35	-29	-29	-35
2021	18	3.4	7.5	14.9	8.4	31	9	6	9	3	-1	
2022	19	3.4	8.1	16.0	9.0	33	10	7	10	4	-1	
2023	18	3.4	8.6	17.0	9.6	35	14	10	13	7	3	
2024	0	3.4	9.1	18.0	10.1	37	34	34	33	26	26	
2025	0	3.4	9.2	18.2	10.2	38	34	34	34	27	26	
2026	0	3.4	9.3	18.4	10.3	38	35	35	34	27	26	
2027	0	3.4	9.4	18.6	10.4	38	35	35	34	27	27	
2028	0	3.4	9.5	18.8	10.5	39	35	35	35	28	27	
2029	0	3.4	9.6	18.9	10.6	39	36	36	35	28	27	
2030	0	3.4	9.7	19.1	10.7	40	36	36	35	28	28	
2031	0	3.4	9.8	19.3	10.9	40	37	37	36	29	28	
2032	0	3.4	9.9	19.5	11.0	40	37	37	36	29	28	
2033	0	3.4	10.0	19.7	11.1	41	37	37	37	29	29	
2034	0	3.4	10.1	19.9	11.2	41	38	38	37	30	29	
2035	0	3.4	10.2	20.1	11.3	42	38	38	38	30	29	
2036	0	3.4	10.3	20.3	11.4	42	39	39	38	30	30	
2037	0	3.4	10.4	20.5	11.5	42	39	39	38	31	30	
2038	0	3.4	10.5	20.7	11.6	43	39	39	39	31	30	
2039	0	3.4	10.6	20.9	11.7	43	40	40	39	31	31	
2040	0	3.4	10.7	21.1	11.9	44	40	40	40	32	31	
2041	0	3.4	10.8	21.3	12.0	44	41	41	40	32	31	
2042	0	3.4	10.9	21.6	12.1	45	41	41	41	32	32	
2043	0	3.4	11.0	21.8	12.2	45	42	42	41	33	32	
Total	138	78	226	445	250	920	704	676	688	520	476	
NPV	111	25	68	134	76	278	142	120	137	87	60	
IRR							24.4%	20.4%	23.9%	19.1%	15.4%	

## Financial Analysis

132. The objective of this financial analysis is to assess the financial sustainability of the project financed by this loan. Total project cost is estimated at USD210 million, which is financed by a loan amount of USD100 million provided by WB and AIIB each and a counterpart contribution of USD9.5 million provided by the Government of Bangladesh. The loan amount as well as the financing from the GoB will be transferred to the *pourashavas* as a grant. The *pourashavas* will not face any financing costs for the planned infrastructure investment but are responsible for the O&M of the water supply systems. For this reason, a conventional financial analysis, including the estimation of a Financial Internal Rate of Return and Financial Net Present Value, was not conducted. Instead, the analysis focuses on the financial sustainability of the planned water supply infrastructure and assesses whether the tariff revenue from the provision of the water supply services is sufficient to cover the O&M expenditure requirements to sustain the provision of water supply services at adequate levels.

133. This is particularly important as the *pourashavas* do not have the fiscal space to subsidize water supply services from tax revenue. On average, *pourashavas* achieved an annual surplus of just TK0.3 million on TK18.4 million of revenues during fiscal year 2016. In the previous year, *pourashavas* incurred an average deficit of TK0.023 million on TK15.6 million in revenue.

## Data and approach

134. The data for the financial and economic analyses were collected jointly. Primary information on project cost, households' current water consumption, and expenditures was collected during the preparation of the technical designs through engineering consultants and the WB. The primary data was complemented with demographic information, other household characteristics and technical assumptions. A data verification process was jointly undertaken with the WB team.

135. A cash flow analysis was conducted comparing the tariff revenue with the estimated costs<sup>38</sup> required for adequate O&M for each *pourashava* for a period of 10 years. For the revenue stream, the proposed volumetric tariff under the project was considered. An affordability analysis was carried out to ensure that households can pay the proposed tariff levels after the implementation of the project. A sensitivity analysis has been conducted with respect to i) slower progress in connecting households resulting in a lower rate of household service connections (HSC) by 10 percentage points, ii) an increase in O&M costs by 10 percent and iii) a worst-case scenario combining the above scenarios.

## Key assumptions

- The following key assumptions were used in the analysis.
- Population growth: 1.75 percent.

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<sup>38</sup> The estimated O&M costs were estimated by the World Bank based on the data provided by the engineering consultants in the frame of the technical preparation of the project.

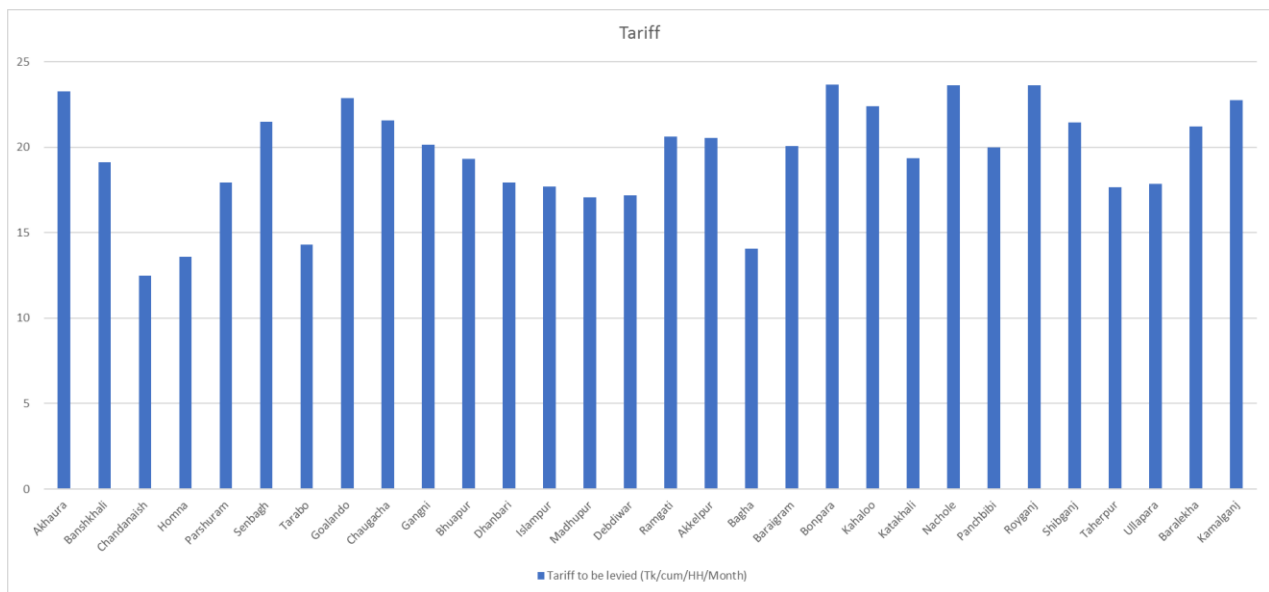


- Collection efficiency: 90 percent in year one, increasing to 95 percent after five years.
- Household service connection rate: initially 50 percent, increasing to 90 percent after five years.
- Household size: Five.
- Sensitivity scenario i) HSC rate decreased by 10 percentage points.  
ii) O&M cost increases by 10 percent.  
iii) Worst case: HSC rate as in i) and O&M cost as in ii).

### Proposed volumetric tariff and affordability

The tariff structure was proposed based on the O&M requirement of the water supply schemes in the 30 *pourashavas*. The proposed tariff structure is illustrated in Figure 5.

**Figure 5: Proposed Tariff Structure in the 30 *Pourashavas***



The proposed tariff ranges from TK12 per cbm of water to TK24 per cbm depending on the estimated O&M requirement in the respective *pourashava*. The average tariff is estimated at TK19 per cbm. Based on a consumption of 100 lpcd, the average tariff is TK285 per household per month. The proposed tariff structure corresponds to 0.8 percent to 1.6 percent of the income of a median household and is below international affordability benchmark thresholds.<sup>39</sup>

<sup>39</sup> The United Nations Development Program set the affordability threshold at three percent as a percentage of median household income. Source: <http://pacinst.org/wp-content/uploads/2013/01/water-rates-affordability.pdf>

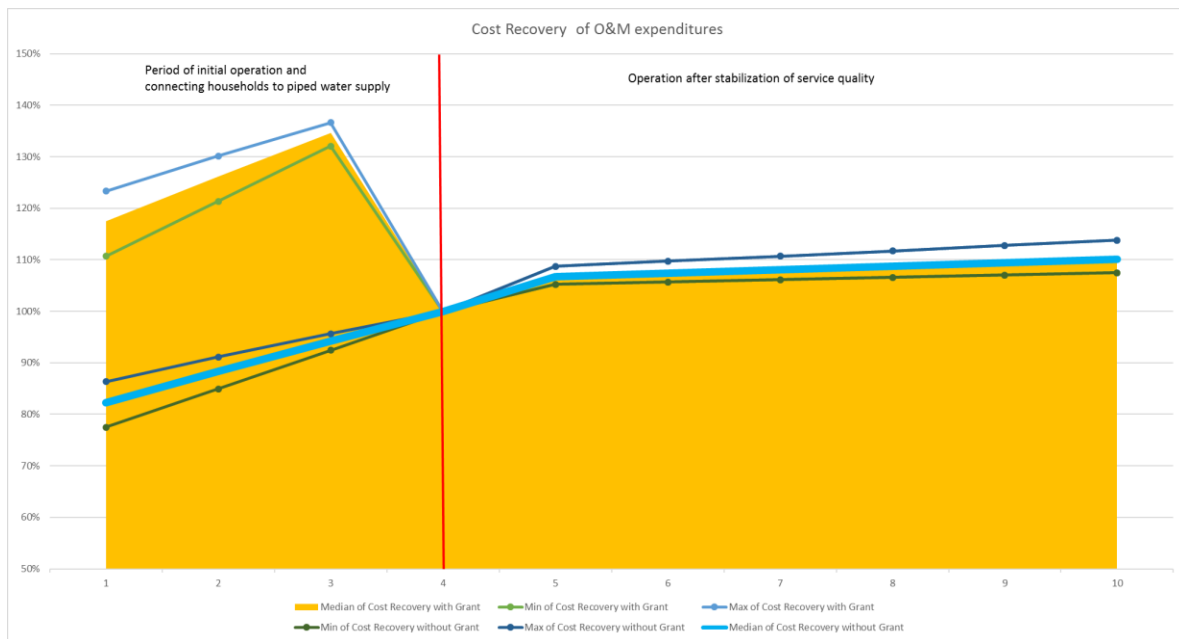
## Results

136. Currently, there are no public piped water supply systems in the *pourashavas* and, hence, no baseline data on the cost recovery of municipal water supply services is available. Through the project, piped water supply systems will be constructed, and water supply provision will be newly established. The investment in hard infrastructure is accompanied with capacity building to support the *pourashavas* to develop systems, train personnel and establish good business practices.

137. The financial analysis was conducted for each *pourashava* by comparing the cashflow of tariff revenue and O&M expenditures for a period of 10 years. Under the base case scenario, the proposed volumetric tariff as per estimated O&M requirement was considered.

138. The analysis shows that cost recovery from tariff revenue can only be reached after an initial period of buildup and stabilization of service quality, and after a critical mass of households have been connected to the piped water supply system. The proportion of households with a household service connection is expected to gradually increase from an initial 50 percent to 90 percent after five years. Cost recovery is achieved when approximately 80 percent of the households are connected. To bridge shortfalls in cost recovery during the initial phase of operation, an O&M grant will be provided to the *pourashavas* to cover O&M expenditures during the initial three years. Figure 6 shows projected cost recovery with and without the O&M support. Table 8 shows projected cost recovery with O&M support.

**Figure 6:** Cost Recovery of O&M Expenditure With and Without O&M Support



**Table 8: Cost Recovery Under Base Case Scenario With Initial O&M Support**

Sl.No.	Pourashava	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1	Akhaura	116.28%	125.32%	134.17%	99.99%	107.06%	107.79%	108.52%	109.26%	110.01%	110.76%
2	Banskhali	119.63%	127.65%	135.39%	100.00%	106.17%	106.76%	107.35%	107.95%	108.55%	109.15%
3	Chandanaish	114.19%	123.85%	133.40%	99.99%	107.66%	108.49%	109.32%	110.16%	111.00%	111.85%
4	Homna	113.15%	123.09%	132.98%	99.96%	107.92%	108.79%	109.67%	110.56%	111.46%	112.36%
5	Parshuram	118.60%	126.94%	135.02%	100.00%	106.44%	107.07%	107.71%	108.35%	108.99%	109.63%
6	Senbagh	115.72%	124.93%	133.97%	100.00%	107.23%	107.98%	108.74%	109.51%	110.28%	111.05%
7	Tarabo	123.33%	130.16%	136.65%	99.98%	105.23%	105.68%	106.13%	106.58%	107.03%	107.49%
8	Goalando	116.55%	125.51%	134.28%	99.99%	106.99%	107.71%	108.43%	109.16%	109.89%	110.63%
9	Chaugacha	117.48%	126.16%	134.62%	100.00%	106.74%	107.41%	108.10%	108.78%	109.47%	110.17%
10	Gangni	118.65%	126.97%	135.04%	100.00%	106.43%	107.06%	107.69%	108.33%	108.97%	109.61%
11	Bhuapur	119.42%	127.50%	135.31%	99.99%	106.22%	106.82%	107.42%	108.03%	108.63%	109.24%
12	Dhanbari	120.88%	128.51%	135.82%	100.00%	105.85%	106.39%	106.93%	107.48%	108.03%	108.58%
13	Islampur	121.17%	128.70%	135.91%	99.98%	105.76%	106.28%	106.82%	107.35%	107.88%	108.42%
14	Madhupur	121.97%	129.25%	136.20%	99.99%	105.57%	106.07%	106.58%	107.08%	107.58%	108.09%
15	Debdiwar	121.82%	129.14%	136.14%	99.99%	105.61%	106.11%	106.62%	107.13%	107.64%	108.15%
16	Ramgati	118.24%	126.69%	134.89%	99.99%	106.53%	107.17%	107.82%	108.48%	109.13%	109.80%
17	Akkelpur	118.30%	126.73%	134.91%	99.99%	106.51%	107.16%	107.80%	108.46%	109.11%	109.77%
18	Bagha	112.80%	122.86%	132.87%	99.98%	108.06%	108.95%	109.85%	110.75%	111.67%	112.59%
19	Baraigram	116.74%	125.65%	134.35%	100.00%	106.95%	107.66%	108.37%	109.09%	109.82%	110.54%
20	Bonpara	116.04%	125.15%	134.09%	100.00%	107.14%	107.88%	108.63%	109.38%	110.13%	110.90%
21	Kahaloo	116.88%	125.74%	134.40%	100.00%	106.91%	107.61%	108.32%	109.03%	109.75%	110.47%
22	Katakhali	119.39%	127.49%	135.30%	99.99%	106.23%	106.83%	107.43%	108.03%	108.64%	109.25%
23	Nachole	116.07%	125.18%	134.10%	100.00%	107.13%	107.87%	108.61%	109.36%	110.12%	110.88%
24	Panchbibi	116.79%	125.67%	134.35%	99.98%	106.91%	107.62%	108.33%	109.04%	109.77%	110.49%
25	Royganj	116.05%	125.16%	134.10%	100.00%	107.13%	107.87%	108.62%	109.37%	110.13%	110.89%
26	Shibganj	117.55%	126.21%	134.64%	100.00%	106.72%	107.39%	108.07%	108.76%	109.44%	110.14%
27	Taherpur	110.68%	121.32%	132.05%	99.98%	108.72%	109.71%	110.72%	111.74%	112.77%	113.81%
28	Ullapara	121.00%	128.59%	135.87%	100.00%	105.82%	106.36%	106.90%	107.44%	107.98%	108.53%
29	Baralekha	117.74%	126.35%	134.71%	100.00%	106.67%	107.34%	108.01%	108.69%	109.37%	110.05%
30	Kamalganj	114.93%	124.37%	133.68%	99.99%	107.45%	108.24%	109.04%	109.84%	110.65%	111.46%
Min		110.68%	121.32%	132.05%	99.96%	105.23%	105.68%	106.13%	106.58%	107.03%	107.49%
Max		123.33%	130.16%	136.65%	100.00%	108.72%	109.71%	110.72%	111.74%	112.77%	113.81%
Average		117.60%	126.23%	134.64%	99.99%	106.72%	107.40%	108.09%	108.77%	109.46%	110.16%
Median		117.52%	126.19%	134.63%	99.99%	106.73%	107.40%	108.09%	108.77%	109.46%	110.15%

139. Without the O&M support, tariff revenues will fall short of O&M expenditures by 14-23 percent in the first year of operation. The shortfall is expected to decrease from an average 17.7 percent in year one to 5.7 percent in year three. The O&M support under the project allows *pourashavas* to cover the initial shortfall during the build-up of water supply operations and to build small financial headroom to absorb negative shocks or finance small network extensions. With the O&M support, cost recovery is estimated at 110.7-136.7 percent during the initial three years. O&M cost recovery from tariff revenue is expected to reach 100 percent in year four and increase continuously thereafter. At the end of the period of analysis, O&M cost recovery is projected at an average 110 percent.

140. **Sensitivity analysis** was conducted with respect to three scenarios i) a decrease in the household connection rate by 10 percentage points, ii) an increase of O&M cost by 10 percent and iii) a worst-case scenario combining the previous two cases. The results are summarized in Figure 7.

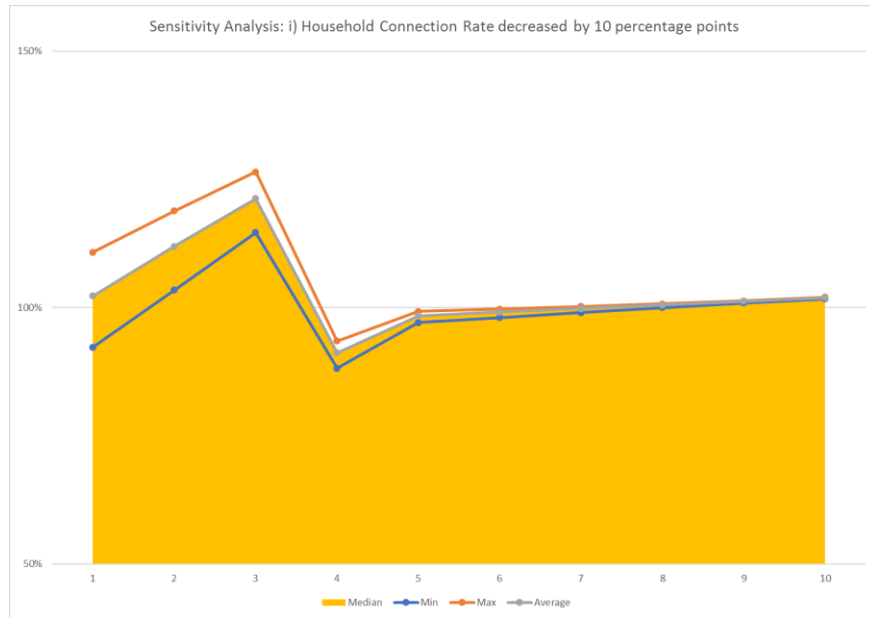
141. Figure 10 and detailed results are reported in the Table 9 to Table 11. The analysis confirms that the financial sustainability of the project is indeed sensitive to a decrease in the household connection rate and an increase in O&M costs.

142. Under the sensitivity scenario i) the cost recovery rate drops to an average 102.3 percent-121.2 percent during the three initial years of operations with some *pourashavas* experiencing a shortfall of up to 7.7 percent in the first year. With the O&M support, the impact on cost recovery is initially mitigated, after the phase-out of the O&M grant in year four, the cost recovery ratio drops to an average of 91.2 percent, after which it rises to an average 98.4 percent in year five and continuously thereafter, reaching cost recovery in year six when a critical mass of household connections of 80 percent is achieved. The shortfall in O&M cost recovery under scenario i) is temporary in nature. The O&M grant allows 28 of 30 *pourashavas* to build up initial financial headroom during years one to three to compensate for the temporary shortfall during the fourth and fifth year of operation. However, six of 30 *pourashavas* encounter a temporary shortfall in cost recovery levels during the first year and would need to subsidize operations from tax revenue and government allocations during the first year or raise tariffs to cover O&M expenditures during year one. For two *pourashavas* an increase in tariff would be advisable to ensure O&M at adequate levels. The cost recovery under scenario i) is reported in Figure 7.

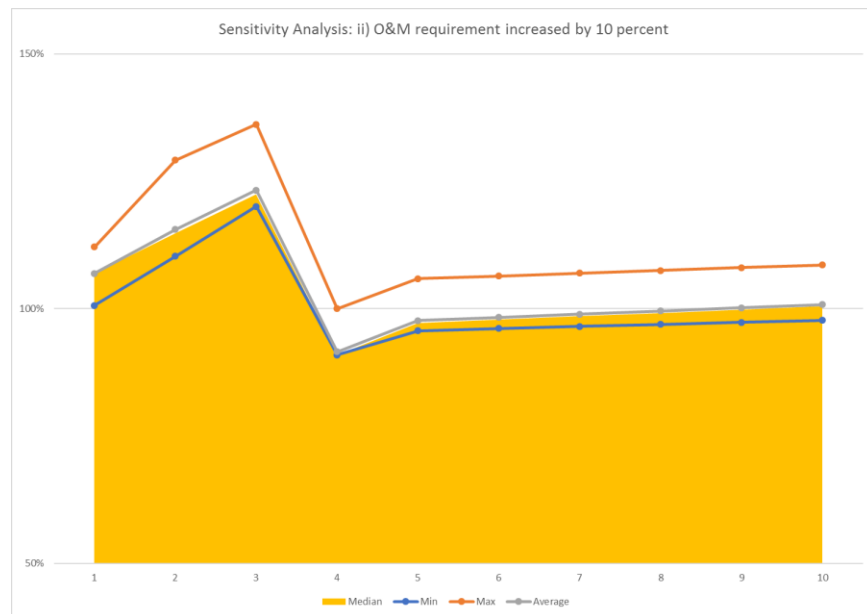
143. Cost increases for the O&M requirement, under scenario ii), lead to a temporary, but prolonged, shortfall in revenue as compared to the increased O&M costs. An increase of O&M expenditures by 10 percent would lead to a shortfall in revenue as compared to O&M expenditures after year four for most *pourashavas*. Cost recovery is projected between 110.6 percent and 136.2 percent during the initial three years of operation and allows *pourashavas* to build up financial headroom due to the O&M support. With the phase-out of the O&M support, cost recovery drops to an average 91.5 percent in year four. Average cost recovery improves continuously thereafter and would reach cost recovery levels in year eight with some *pourashavas* remaining in deficit. Twenty of 30 *pourashavas* can cover the shortfall in revenues throughout the period of analysis

with the initial financial headroom. For one *pourashava* an increase in tariff is required to ensure adequate O&M throughout the period of analysis.

**Figure 7: Cost Recovery Under Sensitivity Scenario i) Decrease of HSC Rate by 10 Percentage Points**



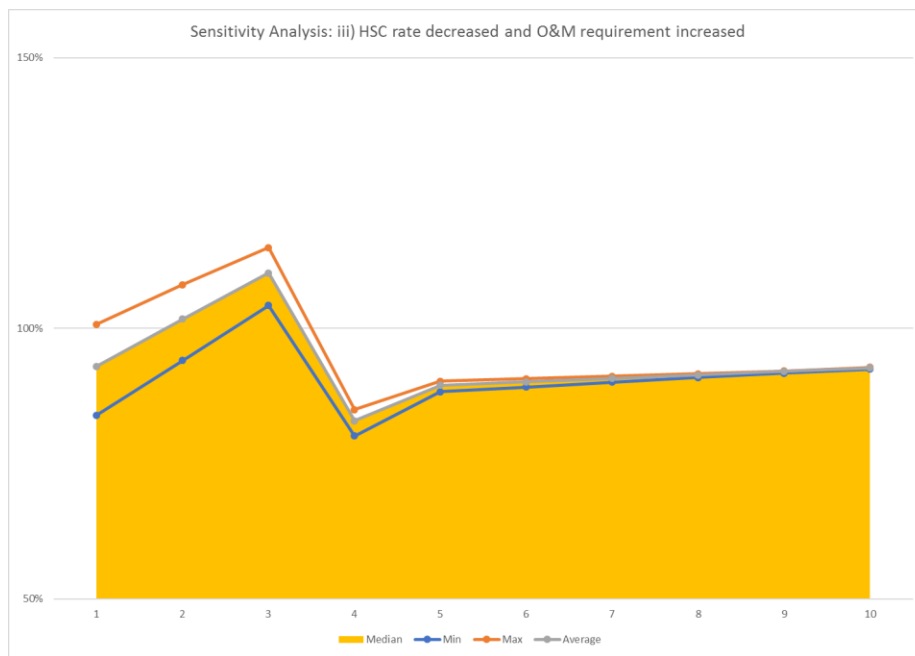
**Figure 8: Cost Recovery Under Sensitivity Scenario ii) Increase of O&M Cost by 10 Percent**



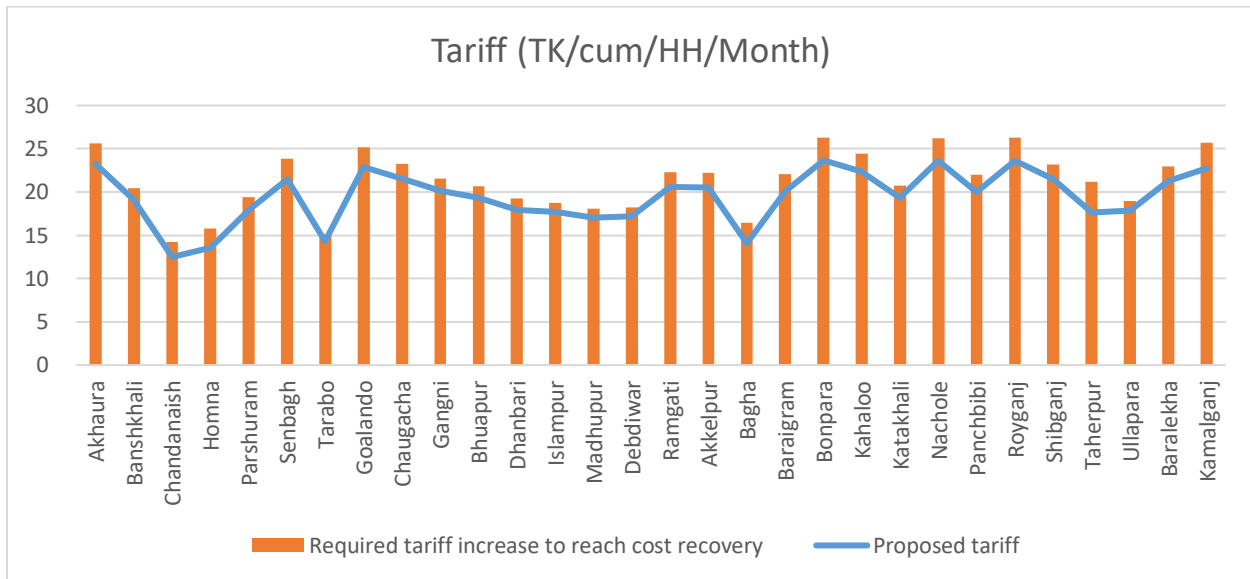
144. Under the worst-case scenario, the O&M support only partially compensates the combined impact of the lower rate of household connections and cost increase in the O&M requirement and

cannot prevent a shortfall below cost recovery levels in year one for most *pourashavas* and some *pourashavas* in year two. In year three, with the O&M support, all *pourashavas* reach cost recovery at an average rate of 110 percent. However, with the phase-out of the O&M support, cost coverage drops to an average 82.9 percent in year four. Despite a positive trend, break-even is not reached during the period of analysis. Under the worst-case scenario, an increase in tariff of roughly 10 percent would be advisable for all *pourashavas* to ensure cost recovery throughout the period of analysis. The required adapted tariff schedule would imply an increase of the average tariff from TK19 per cbm to TK21 per cbm or an estimated increase in household expenditure for water per month from TK285. To TK315, which is well below international affordability thresholds.

**Figure 9:** Cost Recovery Under Sensitivity Scenario iii) Combined Worst Case



**Figure 10: Required Increase in Tariff to Reach Cost Recovery Under Worst Case Scenario**



## Conclusion

The proposed water tariff schedule allows *pourashavas* to fully recover the cost of O&M expenditures throughout the period of analysis under the base case scenario. The O&M support in the initial three years enables *pourashavas* to cover shortfalls in revenues during the initial period of buildup and operation and allows them to accumulate some financial headroom to finance small network extensions or absorb adverse shocks. However, the sensitivity analysis also shows that the absorption capacity is limited. While the transitory shortfall in revenue as compared to O&M cost can be covered for most of the *pourashavas* with the initially accumulated financial headroom under scenario i) and ii), an increase in tariff of 10 percent for all *pourashavas* would be advisable under the worst-case scenario to ensure O&M at adequate levels throughout the period of analysis.

Lessons-learned from other projects in Bangladesh and the financial analysis demonstrate that a critical mass of households being connected to the piped waters supply system is critical for financial sustainability. For this reason, advance enrollment and advance payment of households for obtaining household service connections was made a condition for *pourashavas* to participate in the project. The *pourashavas* will ensure 50-percent enrollment and advance payment of households prior to tendering of construction contracts and 75 percent enrollment prior to provision of water supply services.

**Table 9: Sensitivity Scenario i) Lower Rate of Household Service Connections**

Household enrollment lower by 10%

Sl.No.	Pourashava	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1	Akhaura	100.35%	110.36%	120.11%	90.73%	98.26%	99.00%	99.76%	100.51%	101.28%	102.05%
2	Banshkhali	105.24%	114.40%	123.17%	92.10%	98.78%	99.40%	100.03%	100.66%	101.29%	101.92%
3	Chandanaish	96.95%	107.40%	117.71%	89.51%	97.56%	98.38%	99.21%	100.06%	100.90%	101.76%
4	Homna	95.57%	106.22%	116.79%	89.09%	97.39%	98.26%	99.13%	100.01%	100.90%	101.80%
5	Parshuram	103.64%	113.08%	122.15%	91.63%	98.57%	99.23%	99.89%	100.56%	101.23%	101.91%
6	Senbagh	99.49%	109.63%	119.54%	90.46%	98.13%	98.90%	99.67%	100.45%	101.24%	102.03%
7	Tarabo	110.78%	118.84%	126.41%	93.48%	99.24%	99.73%	100.22%	100.71%	101.21%	101.70%
8	Goalando	100.73%	110.68%	120.36%	90.85%	98.31%	99.04%	99.78%	100.53%	101.28%	102.04%
9	Chaugacha	102.08%	111.80%	121.21%	91.23%	98.45%	99.15%	99.86%	100.57%	101.29%	102.00%
10	Gangni	103.78%	113.21%	122.27%	91.70%	98.63%	99.29%	99.95%	100.62%	101.29%	101.96%
11	Bhuapur	104.92%	114.14%	122.97%	92.01%	98.74%	99.37%	100.01%	100.64%	101.28%	101.93%
12	Dhanbari	107.11%	115.93%	124.30%	92.59%	98.96%	99.54%	100.12%	100.70%	101.29%	101.87%
13	Islampur	107.57%	116.29%	124.56%	92.70%	98.99%	99.56%	100.13%	100.70%	101.27%	101.85%
14	Madhupur	108.76%	117.26%	125.28%	93.02%	99.12%	99.66%	100.20%	100.74%	101.28%	101.83%
15	Debdiwar	108.54%	117.08%	125.15%	92.96%	99.10%	99.64%	100.19%	100.73%	101.28%	101.83%
16	Ramgati	103.19%	112.72%	121.90%	91.53%	98.57%	99.24%	99.92%	100.60%	101.28%	101.97%
17	Akkelpur	103.28%	112.79%	121.96%	91.56%	98.58%	99.25%	99.92%	100.60%	101.28%	101.97%
18	Bagha	95.09%	105.82%	116.49%	88.97%	97.37%	98.25%	99.13%	100.03%	100.94%	101.85%
19	Baraigram	100.94%	110.84%	120.47%	90.88%	98.29%	99.02%	99.75%	100.49%	101.24%	101.99%
20	Bonpara	99.99%	110.06%	119.89%	90.64%	98.23%	98.98%	99.75%	100.51%	101.29%	102.07%
21	Kahaloo	101.20%	111.07%	120.66%	90.98%	98.36%	99.08%	99.81%	100.55%	101.29%	102.03%
22	Katakali	104.88%	114.11%	122.95%	92.00%	98.74%	99.37%	100.01%	100.64%	101.28%	101.93%
23	Nachole	100.04%	110.10%	119.92%	90.65%	98.23%	98.99%	99.75%	100.51%	101.29%	102.07%
24	Panchbibi	101.02%	110.90%	120.50%	90.89%	98.28%	99.01%	99.74%	100.48%	101.22%	101.97%
25	Royganj	100.01%	110.08%	119.90%	90.64%	98.23%	98.99%	99.75%	100.51%	101.29%	102.07%
26	Shibganj	102.18%	111.88%	121.27%	91.26%	98.46%	99.16%	99.87%	100.57%	101.29%	102.00%
27	Taherpur	92.29%	103.43%	114.63%	88.13%	97.08%	98.04%	99.02%	100.00%	101.00%	102.01%
28	Ullapara	107.29%	116.07%	124.41%	92.64%	98.98%	99.56%	100.13%	100.71%	101.29%	101.87%
29	Baralekha	102.45%	112.11%	121.44%	91.33%	98.49%	99.19%	99.88%	100.58%	101.29%	102.00%
30	Kamalganj	98.37%	108.68%	118.81%	90.14%	98.01%	98.81%	99.61%	100.42%	101.24%	102.07%

Min	92.29%	103.43%	114.63%	88.13%	97.08%	98.04%	99.02%	100.00%	100.90%	101.70%
Max	110.78%	118.84%	126.41%	93.48%	99.24%	99.73%	100.22%	100.74%	101.29%	102.07%
Average	102.26%	111.90%	121.24%	91.21%	98.40%	99.10%	99.81%	100.51%	101.23%	101.95%
Median	102.13%	111.84%	121.24%	91.24%	98.46%	99.16%	99.86%	100.57%	101.28%	101.97%



**Table 10: Sensitivity Scenario ii) Cost Increase in O&M Requirement**

**O&M COST INCREASE BY 10%**

Sl.No.	Pourashava	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1	Akhaura	105.71%	113.93%	121.97%	90.90%	97.32%	97.99%	98.66%	99.33%	100.01%	100.69%
2	Banskhali	108.76%	116.05%	123.08%	90.91%	96.52%	97.05%	97.59%	98.13%	98.68%	99.22%
3	Chandanaish	103.81%	112.59%	121.28%	90.90%	97.88%	98.63%	99.38%	100.14%	100.91%	101.69%
4	Homna	102.87%	111.90%	120.89%	90.87%	98.11%	98.90%	99.70%	100.51%	101.32%	102.14%
5	Parshuram	107.82%	115.40%	122.75%	90.91%	96.76%	97.34%	97.92%	98.50%	99.08%	99.67%
6	Senbagh	105.20%	113.58%	121.80%	90.91%	97.48%	98.16%	98.85%	99.55%	100.25%	100.96%
7	Tarabo	112.12%	118.33%	124.23%	90.89%	95.66%	96.07%	96.48%	96.89%	97.30%	97.71%
8	Goalando	105.96%	114.10%	122.07%	90.90%	97.26%	97.92%	98.57%	99.23%	99.90%	100.57%
9	Chaugacha	106.80%	114.69%	122.38%	90.90%	97.03%	97.65%	98.27%	98.89%	99.52%	100.15%
10	Gangni	107.86%	115.43%	122.76%	90.91%	96.75%	97.33%	97.90%	98.48%	99.06%	99.65%
11	Bhuapur	108.56%	115.91%	123.01%	90.90%	96.56%	97.11%	97.66%	98.21%	98.76%	99.31%
12	Dhanbari	109.89%	128.51%	135.82%	100.00%	105.85%	106.39%	106.93%	107.48%	108.03%	108.58%
13	Islampur	110.16%	117.00%	123.56%	90.89%	96.14%	96.62%	97.11%	97.59%	98.08%	98.56%
14	Madhupur	110.88%	117.50%	123.81%	90.90%	95.98%	96.43%	96.89%	97.34%	97.80%	98.26%
15	Debdiwar	110.74%	129.14%	136.14%	99.99%	105.61%	106.11%	106.62%	107.13%	107.64%	108.15%
16	Ramgati	107.49%	115.17%	122.63%	90.90%	96.84%	97.43%	98.02%	98.62%	99.21%	99.81%
17	Akkelpur	107.55%	115.21%	122.65%	90.90%	96.83%	97.42%	98.00%	98.60%	99.19%	99.79%
18	Bagha	102.55%	111.69%	120.79%	90.89%	98.24%	99.05%	99.86%	100.69%	101.52%	102.36%
19	Baraigram	106.13%	114.22%	122.14%	90.91%	97.22%	97.87%	98.52%	99.17%	99.83%	100.49%
20	Bonpara	105.49%	113.77%	121.90%	90.91%	97.40%	98.07%	98.75%	99.43%	100.12%	100.81%
21	Kahaloo	106.25%	114.31%	122.18%	90.91%	97.19%	97.83%	98.47%	99.12%	99.77%	100.43%
22	Katakali	108.54%	115.90%	123.00%	90.90%	96.57%	97.11%	97.66%	98.21%	98.77%	99.32%
23	Nachole	105.52%	113.80%	121.91%	90.91%	97.39%	98.06%	98.74%	99.42%	100.11%	100.80%
24	Panchbibi	106.17%	114.25%	122.14%	90.89%	97.19%	97.83%	98.48%	99.13%	99.79%	100.45%
25	Royganj	105.50%	113.79%	121.91%	90.91%	97.39%	98.07%	98.75%	99.43%	100.12%	100.81%
26	Shibganj	106.87%	114.74%	122.40%	90.91%	97.02%	97.63%	98.25%	98.87%	99.50%	100.12%
27	Taherpur	100.62%	110.30%	120.04%	90.89%	98.84%	99.74%	100.65%	101.58%	102.51%	103.46%
28	Ullapara	110.00%	116.90%	123.52%	90.91%	96.20%	96.69%	97.18%	97.67%	98.17%	98.66%
29	Baralekha	107.04%	114.86%	122.47%	90.91%	96.97%	97.58%	98.19%	98.81%	99.42%	100.04%
30	Kamalganj	104.48%	113.06%	121.52%	90.90%	97.68%	98.40%	99.12%	99.85%	100.59%	101.33%

Min	100.62%	110.30%	120.04%	90.87%	95.66%	96.07%	96.48%	96.89%	97.30%	97.71%
Max	112.12%	129.14%	136.14%	100.00%	105.85%	106.39%	106.93%	107.48%	108.03%	108.58%
Average	106.91%	115.53%	123.22%	91.51%	97.66%	98.28%	98.91%	99.53%	100.17%	100.80%
Median	106.83%	114.72%	122.39%	90.90%	97.19%	97.83%	98.48%	99.13%	99.78%	100.44%

**Table 11: Sensitivity Scenario iii) Worst Case**

**O+M Cost increase by 10% and Household enrollment lower by 10%**

Sl.No.	Pourashava	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1	Akhaura	91.22%	100.32%	109.19%	82.48%	89.33%	90.00%	90.69%	91.38%	92.07%	92.77%
2	Banshkhali	95.67%	104.00%	111.97%	83.72%	89.80%	90.36%	90.93%	91.51%	92.08%	92.66%
3	Chandanaish	88.14%	97.64%	107.01%	81.38%	88.69%	89.44%	90.20%	90.96%	91.73%	92.51%
4	Homna	86.88%	96.57%	106.18%	80.99%	88.54%	89.32%	90.12%	90.92%	91.73%	92.54%
5	Parshuram	94.22%	102.80%	111.05%	83.30%	89.61%	90.21%	90.81%	91.42%	92.03%	92.64%
6	Senbagh	90.45%	99.66%	108.67%	82.24%	89.21%	89.91%	90.61%	91.32%	92.04%	92.76%
7	Tarabo	100.71%	108.04%	114.92%	84.98%	90.21%	90.66%	91.11%	91.56%	92.01%	92.46%
8	Goalando	91.57%	100.62%	109.42%	82.59%	89.37%	90.04%	90.71%	91.39%	92.08%	92.76%
9	Chaugacha	92.80%	101.64%	110.19%	82.93%	89.50%	90.14%	90.78%	91.43%	92.08%	92.73%
10	Gangni	94.34%	102.91%	111.15%	83.36%	89.66%	90.26%	90.87%	91.47%	92.08%	92.69%
11	Bhuapur	95.38%	103.76%	111.79%	83.64%	89.77%	90.34%	90.92%	91.50%	92.08%	92.66%
12	Dhanbari	97.37%	105.39%	113.00%	84.17%	89.97%	90.49%	91.02%	91.55%	92.08%	92.61%
13	Islampur	97.79%	105.72%	113.24%	84.27%	89.99%	90.51%	91.03%	91.55%	92.07%	92.59%
14	Madhupur	98.88%	106.60%	113.89%	84.56%	90.11%	90.60%	91.09%	91.58%	92.08%	92.57%
15	Debdiwar	98.67%	106.43%	113.77%	84.51%	90.09%	90.58%	91.08%	91.58%	92.08%	92.58%
16	Ramgati	93.81%	102.47%	110.82%	83.21%	89.60%	90.22%	90.83%	91.45%	92.08%	92.70%
17	Akkelpur	93.89%	102.54%	110.87%	83.24%	89.61%	90.22%	90.84%	91.46%	92.08%	92.70%
18	Bagha	86.45%	96.20%	105.90%	80.88%	88.52%	89.31%	90.12%	90.94%	91.76%	92.59%
19	Baraigram	91.76%	100.76%	109.51%	82.62%	89.36%	90.02%	90.69%	91.36%	92.04%	92.72%
20	Bonpara	90.90%	100.05%	108.99%	82.40%	89.30%	89.99%	90.68%	91.38%	92.08%	92.79%
21	Kahaloo	92.00%	100.97%	109.69%	82.71%	89.42%	90.08%	90.74%	91.41%	92.08%	92.76%
22	Katakali	95.35%	103.74%	111.77%	83.63%	89.76%	90.34%	90.91%	91.49%	92.08%	92.66%
23	Nachole	90.94%	100.09%	109.02%	82.41%	89.30%	89.99%	90.68%	91.38%	92.08%	92.79%
24	Panchbibi	91.83%	100.82%	109.55%	82.63%	89.35%	90.01%	90.67%	91.34%	92.02%	92.70%
25	Royganj	90.92%	100.07%	109.00%	82.40%	89.30%	89.99%	90.68%	91.38%	92.08%	92.79%
26	Shibganj	92.89%	101.71%	110.25%	82.96%	89.51%	90.15%	90.79%	91.43%	92.08%	92.73%
27	Taherpur	83.90%	94.02%	104.21%	80.12%	88.26%	89.13%	90.02%	90.91%	91.82%	92.74%
28	Ullapara	97.54%	105.52%	113.10%	84.22%	89.98%	90.51%	91.03%	91.55%	92.08%	92.61%
29	Baralekha	93.14%	101.92%	110.40%	83.03%	89.54%	90.17%	90.80%	91.44%	92.08%	92.73%
30	Kamalganj	89.42%	98.80%	108.01%	81.94%	89.10%	89.82%	90.55%	91.29%	92.04%	92.79%

Min	83.90%	94.02%	104.21%	80.12%	88.26%	89.13%	90.02%	90.91%	91.73%	92.46%
Max	100.71%	108.04%	114.92%	84.98%	90.21%	90.66%	91.11%	91.58%	92.08%	92.79%
Average	92.96%	101.73%	110.22%	82.92%	89.46%	90.09%	90.73%	91.38%	92.02%	92.68%
Median	92.84%	101.67%	110.22%	82.95%	89.51%	90.14%	90.78%	91.42%	92.08%	92.70%

## Annex 5: Sovereign Credit Fact Sheet

### A. Recent Economic Development

Bangladesh is a lower-middle income country with GDP per capita at USD 1,517 and a population of 164.7 million.<sup>40</sup> The country's economy continues to perform well with robust and stable growth. Growth accelerated to 7.7 percent in 2018 due to higher public investment<sup>41</sup> and stronger private consumption buoyed by a recovery in remittances.<sup>42</sup> However, the current account deficit widened from 2.1 percent of GDP in 2017 to 2.8 percent in 2018 with surging imports of capital goods, food grains, and intermediate goods despite revived remittances. Inflation remained moderate at 5.6 percent, close to the central bank's 5.5 percent average inflation target<sup>43</sup>.

Bangladesh's fiscal deficit increased from 3.3 percent of GDP in 2017 to 4.1 percent in 2018, within its budget target of 5 percent, mainly due to the implementation of the government's priority development projects. The government continues to prefer concessional external borrowing, especially to finance infrastructure projects.<sup>44</sup>

### B. Economic Indicators.

**Selected Macroeconomic Indicators - Bangladesh (2015-2020)**

Economic Indicators	2015	2016	2017	2018*	2019*	2020*
<i>Real GDP growth</i>	6.8	7.2	7.6	7.7	7.3	7.0
<i>CPI Inflation (% change, average)</i>	6.2	5.7	5.6	5.6	5.4	5.4
<i>Current account balance (% of GDP)</i>	1.9	0.6	-2.1	-2.8	-1.9	-1.7
<i>General government overall balance (net lending/borrowing, % of GDP)</i>	-4.0	-3.4	-3.3	-4.1	-4.2	-3.7
Nominal gross public debt (% of GDP)	33.7	33.3	33.2	34.0	35.2	36.1
Public gross financing needs (% of GDP)	7.8	6.5	9.2	9.8	8.5	7.2
External debt (% of GDP)	19.1	18.5	18.5	17.5	17.2	17.2
Gross external financing need (% of GDP) **	-0.1	1.5	3.7	6.6	6.0	5.1
Foreign Direct Investment (% of GDP)	0.9	0.6	0.7	0.7	0.8	0.7
Gross official reserves (months of imports)	6.5	7.2	7.0	6.4	5.7	5.2
Broad money (M2, % change)	12.4	16.3	10.9	12.9	--	--
Exchange rate (BDT/USD, EOP) ***	78.1	79.1	82.7	83.6	84.5	--

Note: \* denotes projected figures. Italic data from IMF WEO April 2019

\*\* Staff calculation based on gross external financing need and GDP in USD provided by IMF

<sup>40</sup> The income group classification for the fiscal year 2019 is based on World Bank criteria, details are as below: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>; GDP Per Capita and population use World Bank 2017 data.

<sup>41</sup> Bangladesh public investment rose from 7.4 percent of GDP in 2017 to 8.0 percent in 2018, reflecting substantial progress in implementing large infrastructure projects, notably the Padma Bridge and Dhaka Metro Rail.

<sup>42</sup> Remittances rebounded to grow by 17.3 percent to \$15 billion in 2018, reflecting an increase in the number of workers going abroad in the past few years, a more favorable exchange rate, and measures to foster money transfer through official channels.

<sup>43</sup> Central Bank of Bangladesh Monetary Policy July-December 2017 <https://www.bb.org.bd/openpdf.php>

<sup>44</sup> ADB Asian Development Outlook 2019 Strengthening Disaster Resilience, April 2019

\*\*\* FX rate from Thomson Reuters, 2019 FX rate as of June 11, 2019

EOP: end of the period.

Source: IMF Country Report No. 18/158.

### **C. Economic Outlook and Risks.**

Looking ahead, Bangladesh's GDP growth is projected to stabilize around 7 percent, driven by strong domestic demand. Inflation is expected to ease to an average of 5.4 percent in 2019, with price pressures largely contained by a good harvest and lower global food and oil prices. The current account deficit is projected to narrow to around 2 percent, with trade tensions between China and the US possibly increasing Bangladesh's attraction as an alternative base for manufacturing. This could boost export growth. The main downside risks include failure to boost revenue to support priority projects implementation, the rise of global oil prices, further increasing of the nonperforming loans<sup>45</sup>, and adverse weather.

Bangladesh's risks of external and overall debt distress continue to be assessed as low. Over the medium term until 2023, debt ratios are projected to remain on a sustainable path. The external debt to GDP ratio is projected to remain stable around 18 percent in the medium term, while public debt to GDP ratio is expected to gradually increase from 35.2 percent in 2019 to 40.5 percent in 2028, before trending down over the long term. External risks include contracting large amounts of short-term debt, a protracted slowdown in key export markets, a rapid build-up of non-concessional debt, or a combination thereof.<sup>46</sup>

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<sup>45</sup> There are concerns about the increases in nonperformance loans and the concentration of nonperformance loans in the state-owned large banks. <https://www.thedailystar.net/business/news/high-npls-slow-growth-1694863>

<sup>46</sup> International Monetary Fund (IMF), 2018 Country Report No.18/158 2018 Article IV consultation – Press release; staff report; and statement by the executive director for Bangladesh, Jun. 2018.