



# Report and Recommendation of the President to the Board of Directors

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Project Number: 49107-006  
August 2018

## Proposed Loan and Administration of Grant and Technical Assistance Grant India: West Bengal Drinking Water Sector Improvement Project

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Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 1 July 2018)

Currency Unit	–	Indian rupees
\$1.00	=	₹68.4907
₹1.00	=	\$0.01460

## ABBREVIATIONS

ADB	–	Asian Development Bank
AMSDF	–	asset management and service delivery framework
GOWB	–	Government of West Bengal
IEE	–	initial environmental examination
lpcd	–	liters per capita per day
O&M	–	operation and maintenance
PAM	–	project administration manual
PHED	–	Public Health Engineering Department
STWM	–	smart water management
TA	–	technical assistance

## NOTE

In this report, “\$” refers to United States dollars.

<b>Vice-President</b>	Wencai Zhang, Operations 1
<b>Director General</b>	Hun Kim, South Asia Department (SARD)
<b>Director</b>	Sekhar Bonu, Urban Development and Water Division, SARD
<b>Team leader</b>	Neeta Pokhrel, Senior Urban Development Specialist, SARD
<b>Co- Team leader</b>	Saugata Dasgupta, Senior Project Officer (Urban), SARD
<b>Team members</b>	Cielo Añon, Operations Assistant, SARD Saswati Belliappa, Safeguards Specialist, SARD Luca Di Mario, Urban Development Specialist, SARD Bebedel Fabe, Project Officer, SARD Prabhjot Khan, Social Development Officer (Gender), SARD Maria Laureen Laurito, Social Development Officer (Safeguards), SARD Rhina Ricci Lopez-Tolentino, Associate Financing Partnerships Analyst, Office of Cofinancing Operations (OCO) Takafumi Mafune, Financing Partnerships Specialist, OCO Sourav Majumder, Project Officer (Urban), SARD Takako Morita, Counsel, Office of General Counsel Jaemin Nam, Financial Management Specialist, SARD Ninette Pajarillaga, Environment Specialist, SARD Zarah Pilapil, Associate Safeguards Officer, SARD Virinder Sharma, Senior Urban Development Specialist, Sustainable Development and Climate Change Department
<b>Peer reviewer</b>	Michael White, Urban Development Specialist, Southeast Asia Department

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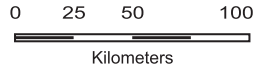
## PROJECT AT A GLANCE









<b>1. Basic Data</b>		<b>Project Number:</b> 49107-006	
<b>Project Name</b>	West Bengal Drinking Water Sector Improvement Project	<b>Department /Division</b>	SARD/SAUW
<b>Country</b>	India	<b>Executing Agency</b>	Public Health Engineering Department, Government of West Bengal
<b>Borrower</b>	Government of India		
<b>2. Sector</b>	<b>Subsector(s)</b>	<b>ADB Financing (\$ million)</b>	
✓ <b>Agriculture, natural resources and rural development</b>	Rural sanitation		1.00
	Rural water policy, institutional and capacity development		27.00
	Rural water supply services		187.00
<b>Water and other urban infrastructure and services</b>	Urban water supply		25.00
	<b>Total</b>		<b>240.00</b>
<b>3. Strategic Agenda</b>	<b>Subcomponents</b>	<b>Climate Change Information</b>	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project	Medium
Environmentally sustainable growth (ESG)	Disaster risk management Eco-efficiency Global and regional transboundary environmental concerns Natural resources conservation Urban environmental improvement	<b>ADB Financing</b> Adaptation (\$ million)	60.00
<b>4. Drivers of Change</b>	<b>Components</b>	<b>Gender Equity and Mainstreaming</b>	
Governance and capacity development (GCD)	Civil society participation Institutional development Organizational development	Gender equity (GEN)	✓
Knowledge solutions (KNS)	Knowledge sharing activities Pilot-testing innovation and learning		
Partnerships (PAR)	Bilateral institutions (not client government) Civil society organizations Implementation Official cofinancing United Nations organization		
Private sector development (PSD)	Conducive policy and institutional environment		
<b>5. Poverty and SDG Targeting</b>		<b>Location Impact</b>	
Geographic Targeting	No	Rural	High
Household Targeting	No	Urban	Low
SDG Targeting	Yes		
SDG Goals	SDG5, SDG6, SDG13		
<b>6. Risk Categorization:</b>	Complex		
<b>7. Safeguard Categorization</b>	<b>Environment: B Involuntary Resettlement: B Indigenous Peoples: B</b>		
<b>8. Financing</b>			
<b>Modality and Sources</b>		<b>Amount (\$ million)</b>	
<b>ADB</b>		<b>240.00</b>	
Sovereign Project (Regular Loan): Ordinary capital resources		240.00	
<b>Cofinancing</b>		<b>3.00</b>	
Japan Fund for Poverty Reduction - Grant projects (Full ADB Administration)		3.00	
<b>Counterpart</b>		<b>106.00</b>	
Government		106.00	
<b>Total</b>		<b>349.00</b>	
Note: An attached technical assistance will be financed on a grant basis by the Urban Climate Change Resilience Trust Fund under the Urban Financing Partnership Facility in the amount of \$2,000,000.			



# INDIA

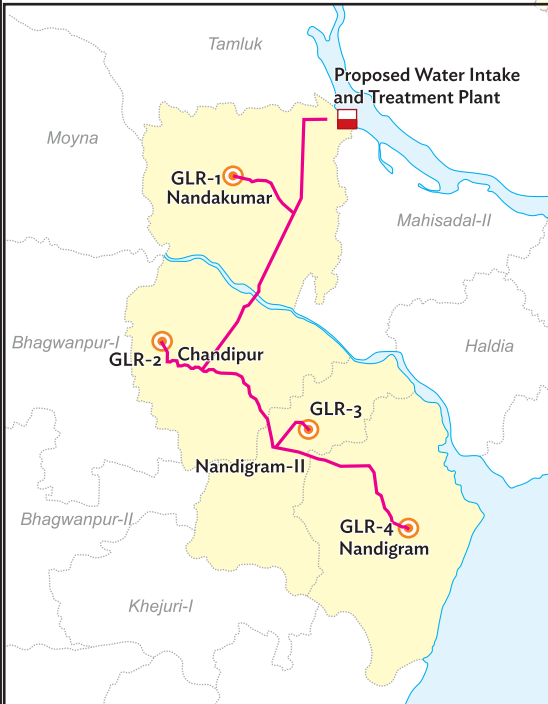
## WEST BENGAL DRINKING WATER SECTOR IMPROVEMENT PROJECT



-  Project Districts
  -  State Capital
  -  Proposed Water Intake and Treatment Plant
  -  Proposed Ground Level Reservoir (GLRs)
  -  Proposed Transmission Mains
  -  River
  -  State or Union Territory Boundary
  -  International Boundary
- Boundaries are not necessarily authoritative.



### PROJECT AREA: PURBA MEDINIPUR



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## I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to India for the West Bengal Drinking Water Sector Improvement Project. The report also describes (i) the proposed administration of a grant to be provided by the Japan Fund for Poverty Reduction; and (ii) the proposed administration of the technical assistance (TA) to be provided by the Urban Climate Change Resilience Trust Fund<sup>1</sup> under the Urban Financing Partnership Facility for Strengthening Smart Water Management and Climate and Disaster Resilience in Selected Districts of West Bengal, and if the Board approves the proposed loan, I, acting under the authority delegated to me by the Board, approve the administration of the grant and the TA.

2. The project will provide safe, sustainable, and inclusive drinking water services as per the standards set by the Government of India to about 1.65 million people in the arsenic, fluoride, and salinity-affected selected areas of Bankura, North 24 Parganas, and Purba Medinipur districts of West Bengal (project districts).<sup>2</sup> It will introduce an innovative institutional framework and advanced technology for smart water management (STWM) to enable efficient service delivery in the project districts.<sup>3</sup>

## II. THE PROJECT

### A. Rationale

3. **High arsenic and fluoride levels in drinking water threaten public health in India.** According to a study conducted by the World Bank in 2010, 85% of all rural water supply schemes in India rely on groundwater.<sup>4</sup> One of the greatest public health threats in India is from naturally elevated levels of arsenic and fluoride in groundwater. The Ministry of Drinking Water and Sanitation of the Government of India estimated that around 27 million people in India are at risk from arsenic and fluoride contamination.<sup>5</sup> Drinking water with high concentrations of arsenic in the long term can lead to a range of health problems in humans, including cancer, while chronic exposure to fluoride may cause dental or skeletal fluorosis and bone diseases caused by excessive accumulation of fluoride in the bones.

4. **West Bengal faces many challenges to its rural drinking water security.** West Bengal, the fourth most populous state in India, is by far the worst impacted, hosting around 72% of India's total population at risk from arsenic and 5% of the population at risk from fluoride contamination. Only about 47% of West Bengal's rural population of 74.6 million has piped water supply, compared to the national average of 56%, and piped water supply is through public standposts, generally at fewer than 40 liters per capita per day (lpcd).<sup>6</sup> Government of West Bengal (GOWB) estimates that about 91% of West Bengal's rural population and 41% of its urban population still rely on its groundwater reserves for drinking, despite being located alongside two of the largest

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<sup>1</sup> Financing partners: the Rockefeller Foundation and the governments of Switzerland and the United Kingdom.

<sup>2</sup> The design and monitoring framework is in Appendix 1. One neighboring block in South 24 Parganas district, Bhangur II, was included in North 24 Parganas' drinking water scheme based on need and economy of scale.

<sup>3</sup> ADB supported project preparations mainly through the project preparatory technical assistance for State-Level Support for National Flagship Programs (TA 9022-IND).

<sup>4</sup> World Bank. 2010. *Deep Wells and Prudence: Towards Pragmatic Action for Addressing Groundwater Over-exploitation in India*. Washington, DC.

<sup>5</sup> Government of India, Ministry of Drinking Water and Sanitation. Integrated Management Information System (IMIS). Data valid as of 17 May 2018.

<sup>6</sup> Government of West Bengal (GOWB), Public Health Engineering Department, Data from Integrated Management Information System (IMIS). Data valid as of 17 May 2018. In 2013, the GOWB revised its standards for rural piped water supply to 70 lpcd from 40 lpcd.

rivers in India, the Ganges and Brahmaputra (footnote 6). The excessive reliance on groundwater is aggravating exposure to arsenic and fluoride in drinking water, as well as the effects of climate change. Further, increased withdrawal of groundwater along the state's coastal belt is resulting in intrusion of salinity in groundwater. Five of the state's 23 districts are affected by salinity, Purba Medinipur being the most impacted. The supply systems are also vulnerable to climate change and disaster risks, especially regular flooding.<sup>7</sup>

5. **Government's sector strategy.** The GOWB, through its Vision 2020, and the Government of India, through its National Sub-mission on Arsenic and Fluoride, are prioritizing and investing in shifting people from reliance on groundwater through hand pumps or tube wells to sustainable surface water-based piped schemes.<sup>8</sup> The British Geological Survey, which was engaged by the Asian Development Bank (ADB), conducted a detailed analysis of arsenic and fluoride in drinking water in West Bengal in 2017, including their characteristics, implications, and mitigation, as well as lessons learned from elsewhere. The study confirmed that piped water from surface sources offers greater certainty in water quality security in the long term over in situ groundwater treatment practices for arsenic or fluoride.<sup>9</sup>

6. **Findings from the sector assessment.** The sector assessment shows that throughout India, sustainability of drinking water services has remained a major challenge despite achieving good asset coverage, mainly because of weak institutional arrangements, limited community participation, and inadequate financing of operation and maintenance (O&M).<sup>10</sup> Though the government has launched various policy reforms and programs to decentralize service delivery, most states are struggling to set the right institutional framework to match, and increase, their local bodies' capacities to manage services.<sup>11</sup> In West Bengal, the Public Health Engineering Department (PHED) manages water supply to rural areas and to 80 of the state's 114 municipalities. It also provides bulk water to many urban agglomerations and municipal corporations. In all rural areas, the PHED supplies water through public standposts, without household connections. A survey commissioned by PHED in Baduria district of West Bengal in 2016 showed that such public standpost-based schemes may not result in desired health impacts since people may continue drinking from contaminated on-premises sources, such as hand pumps or wells. Further, because of lack of funds and an integrated approach to planning, schemes are generally designed for smaller block-level habitations rather than spatially for a basin or a district, resulting in suboptimal use of water resources and loss of economies of scale. In North 24 Parganas district alone, the PHED manages 211 individual drinking water schemes.

7. **Lessons learned.** Lessons learned from ADB water projects in India and elsewhere show that sustainability of assets and services created under projects are dependent on adequate institutional and operational capacity of local bodies to manage them, and establishment of clear

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<sup>7</sup> Around 42% of West Bengal's land area is flood prone.

<sup>8</sup> Government of West Bengal, Public Health Engineering Department. 2011. *Vision 2020: To Provide Safe, Sustainable, and Adequate Water Supply to All Humans and Livestock in West Bengal by 2020*. Kolkata; and Government of India, Ministry of Drinking Water and Sanitation. 2016. *National Sub-Mission Guidelines to Provide Safe Drinking Water to Arsenic and Fluoride Affected Habitations in Rural India on Mission Mode*. New Delhi.

<sup>9</sup> Arsenic and Fluoride in Drinking Water in West Bengal: Characteristics, Implications, and Mitigation (accessible from the list of linked documents in Appendix 2).

<sup>10</sup> Sector Assessment (Summary): Water and Other Infrastructure and Services (accessible from the list of linked documents in Appendix 2).

<sup>11</sup> The 73rd and 74th amendment acts of the Constitution of India give the responsibilities of managing water supply and sanitation services to local bodies.

mechanisms and political will to charge for services.<sup>12</sup> Experience from the sector also shows that behavior change communication, sanitation support, and community awareness must be integrated with infrastructure to sustain improved health impacts. The inclusion of women is necessary for ensuring responsive service delivery. The GOWB is currently implementing intensive rural sanitation improvement programs across the state. A sanitation improvement action plan was developed for the project to address identified gaps to ensure sustainable sanitation improvement in the project areas.<sup>13</sup> ADB conducted a detailed capacity assessment of all 66 project *gram panchayats* based on their sociodemographic, financial, and operational resources, and ranked them to assist in their capacity building during the project implementation.<sup>14</sup>

**8. Government's sector reforms under the project and synergy with ADB's strategies and policies.** As a result of policy dialogue during project preparations, the GOWB issued a government order on 9 November 2017 to all 66 project *gram panchayats*, with populations ranging from 16,000 to 26,000, on the asset management and service delivery framework (AMSDF), which (i) clearly defined the roles and responsibilities of the PHED, the *gram panchayats*, *panchayat samitis*, and *zilla parishads*; and (ii) set guidelines for operational sustainability parameters such as metering, tariff, and human resourcing.<sup>15</sup> The project, which is included in ADB's country operations business plan for India, 2018–2020, will contribute to Sustainable Development Goals 5, 6, and 13, and is in line with ADB's country partnership strategy, 2018–2022 for India, and ADB's Water Operational Plan.<sup>16</sup>

**9. The project's transformative and innovative features and value addition.** By incorporating the following features the project is expected to create an exemplary model for rural drinking water services in West Bengal and in India: (i) through efficient use of surface water, the project will preserve groundwater, enhance climate resilience, and reduce the burden of disease from arsenic and fluoride; (ii) subprojects stem from district-wide comprehensive drinking water quality action plans that analyze and integrate drinking water sustainability and quality needs. These action plans will assist in guiding development and connect the existing and future systems into a grid-based supply;<sup>17</sup> (iii) the project will provide higher service levels compared with rural schemes in India in general, with individual household connections and district metering area (DMA) based metered continuous water supply;<sup>18</sup> (iv) the project will use a high-technology-based STWM system to efficiently manage water services, which will be a first for rural water schemes in the state and in India; (v) the project, through the AMSDF, will cement an innovative and sustainable institutional model for the sector; and (vi) the project will include women in service delivery, and empower them through employment, leadership, and increased awareness.

<sup>12</sup> Independent Evaluation Department. 2017. *Country Assistance Program Evaluation: India, 2007–2015*. Manila: ADB; and Independent Evaluation Department. 2016. *Sustainability of Urban Water Supply and Sanitation Operations: Findings and Lessons*. Manila: ADB.

<sup>13</sup> Sanitation Improvement Action Plan (accessible from the list of linked documents in Appendix 2).

<sup>14</sup> *Gram panchayats* are governing bodies at the village level. Capacity Assessment of the project *gram panchayats* is accessible from the list of linked documents in Appendix 2.

<sup>15</sup> Government order on asset management and service delivery framework (accessible from the list of linked documents in Appendix 2). *Panchayat samitis* are governing bodies at the block level, and *zilla parishads* are governing bodies at the district level. They will provide coordination, technical, and monitoring support.

<sup>16</sup> ADB. 2017. *Country Operations Business Plan: India, 2018–2020*. Manila; Sustainable Development Knowledge Platform. Sustainable Development Goals, 5, 6, and 13; ADB. 2017. *Country Partnership Strategy: India, 2018–2022*. Manila; and ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.

<sup>17</sup> Drinking water quality action plans for the project districts, prepared by the project preparatory team and adopted by the PHED, are available at <http://www.wbphed.gov.in/en/pages/wbdwsip>. The project will also assist the PHED in preparing drinking water quality action plans for all remaining districts in the state.

<sup>18</sup> A district metering area refers to a zone of a water supply network that can be hydraulically isolated and provided with a bulk meter to measure input water quantity and consumer meters to measure consumption.

## B. Impact and Outcome

10. The project is aligned with the following impact: drinking water security ensured in West Bengal (footnote 8). The project will have the following outcome: safe, sustainable, and inclusive drinking water service received in project districts.

## C. Outputs

11. The project will have two outputs. All subprojects will be selected in compliance with the subproject selection criteria in the project administration manual (PAM).<sup>19</sup>

12. **Output 1: Climate-resilient drinking water infrastructure constructed.** The project will provide a minimum of 70 lpcd of continuous potable water through metered connections to the households in selected areas of the project districts. The distribution systems will be designed on a DMA basis. Both the bulk and the distribution systems will be integrated with modern STWM and monitoring tools, including supervisory control and data acquisition and geographic information systems. Bulk water supply systems, consisting of intakes, water treatment plants, and transmission mains, will be sized to provide water supply en route to urban and rural areas. They will be connected into a grid with the existing and the new systems in the project districts, where feasible, to reduce redundancy, improve resilience, and efficiently manage the system.

13. **Output 2: Institutions and capacity of stakeholders for drinking water service delivery strengthened.** The project will strengthen institutions and the capacity of stakeholders, including the PHED and the project *gram panchayats*, for sustainable service delivery. It will support them to operate the STWM system, including water quantity and quality monitoring, electronic billing and collections, meter reading, and accounting.<sup>20</sup> The project will build capacities and skills of the stakeholders on O&M, and support public awareness on water, sanitation, and hygiene. It will strengthen the sector through introducing and implementing an AMSDF; institutionalizing water and sanitation safety planning; and developing a regulatory framework for, and piloting, fecal sludge and septage management.<sup>21</sup>

## D. Summary Cost Estimates and Financing Plan

14. The project is estimated to cost \$349 million (Table 1).<sup>22</sup> Detailed cost estimates by expenditure category and by financier are included in the PAM.

**Table 1: Summary Cost Estimates**  
(\$ million)

Item	Amount <sup>a</sup>
<b>A. Base Cost<sup>b</sup></b>	
1. Climate-resilient drinking water infrastructure constructed	275.7
2. Institutions and capacity of stakeholders for drinking water service delivery strengthened	20.2
<b>Subtotal (A)</b>	<b>295.9</b>
<b>B. Contingencies<sup>c</sup></b>	<b>33.2</b>

<sup>19</sup> Project Administration Manual (accessible from the list of linked documents in Appendix 2).

<sup>20</sup> Project Smart Water Management System (accessible from the list of linked documents in Appendix 2).

<sup>21</sup> ADB has partnered with the World Health Organization to jointly support the GOWB in preparing a water safety plan and sanitation safety plan guidelines for West Bengal. A model plan each for water and sanitation safety was also developed.

<sup>22</sup> Loan Agreement, Project Agreement, and Grant Agreement are accessible from the list of linked documents in Appendix 2).

Item	Amount <sup>a</sup>
<b>C. Financing Charges<sup>d</sup></b>	<b>19.9</b>
<b>Total (A+B+C)</b>	<b>349.0</b>

<sup>a</sup> In end-2017 prices; an exchange rate of \$1 = ₹65 is used.

<sup>b</sup> Includes taxes and duties of \$32.4 million to be financed from government resources by cash contribution.

<sup>c</sup> Physical contingencies computed at 5.0% for civil works. Price contingencies computed at 1.4%–1.6% on foreign exchange costs and 4.0%–4.6% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

<sup>d</sup> Includes interest and commitment charges. Interest during construction for the Asian Development Bank (ADB) loan has been computed at the 5-year United States dollar fixed-swap rate plus a spread of 0.5% and a maturity premium of 0.1%. Commitment charges for the ADB loans are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

15. The government has requested (i) a regular loan of \$240 million from ADB's ordinary capital resources, and (ii) a grant of \$3 million from the Japan Fund for Poverty Reduction to help finance the project.<sup>23</sup> The loan will have a 25-year term including a grace period of 5 years, an annual interest rate determined in accordance with ADB's London interbank offered rate-based lending facility, and such other terms and conditions set forth in the draft loan and project agreements. Based on the straight-line repayment method, average maturity is 15.25 years, and annual maturity premium payable to ADB is 0.10%.

16. The sector lending modality is appropriate for the project since (i) the GOWB has a clear sector development plan, Vision 2020, to meet sector priority needs; (ii) project preparatory team carried out detailed analysis to establish that the PHED is a capable executing agency with adequate institutional capacity to implement the sector development plan and the project; and (iii) the policies applicable to the sector are appropriate and will be improved through the project.

17. The summary financing plan is in Table 2. ADB will finance the expenditures in relation to works, goods, consulting services, and capacity building. The government will on lend the ADB loan proceeds to the GOWB. The GOWB will provide \$106 million to the investment costs of the project to finance (i) taxes and duties, (ii) O&M, (iii) land acquisition and resettlement, (iv) incremental recurrent costs, (v) financing charges during implementation, and (vi) part of the civil works and equipment. The GOWB will provide the loan and grant proceeds and counterpart funds to the implementing agency as a loan and grant. The governments of India and West Bengal have assured ADB that they will meet any financing shortfall to achieve the project outputs.

**Table 2: Summary Financing Plan**

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	240.0	69.0
Japan Fund for Poverty Reduction (grant) <sup>a</sup>	3.0	1.0
Government of West Bengal	106.0	30.0
<b>Total</b>	<b>349.0</b>	<b>100.0</b>

<sup>a</sup> To be administered by the Asian Development Bank.

Source: Asian Development Bank estimates.

18. ADB will finance 70% of the estimated \$85.9 million of climate change adaptation costs.<sup>24</sup>

<sup>23</sup> The attached grant proposal under the Japan Fund for Poverty Reduction (JFPR) will support the communities to sustainably operate the water services (accessible from the list of linked documents in Appendix 2). It will provide smart water management equipment for the project *gram panchayats* and assist in sanitation improvement under output 1 of the project, and capacity building of the *gram panchayats* under output 2 of the project.

<sup>24</sup> Project Administration Manual and Summary Project Climate and Disaster Risk Assessment and Management Report (accessible from the list of linked documents in Appendix 2).

## E. Implementation Arrangements

19. The implementation arrangements, summarized in Table 3, are described in the PAM.

20. The PHED will be the executing agency and will be responsible for overall project management. Through its project management unit (PMU) and three project implementation units, the PHED will also be the implementing agency, responsible for planning, supervising and monitoring the project. The PMU will engage a project management consultant and three design, supervision, and institutional support consultants using the quality- and cost-based selection method in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).<sup>25</sup> The PHED will be responsible for operating the bulk systems up to each *gram panchayat's* boundaries, providing technical support and training, and regulating the services to customers. Each *gram panchayat* will operate and maintain its respective distribution system.

**Table 3: Implementation Arrangements**

Aspects	Arrangements		
Implementation period	July 2018–June 2024 (loan); July 2018–October 2022 (JFPR)		
Estimated completion date	30 June 2024 (loan); 31 October 2022 (JFPR)		
Estimated closing date	31 December 2024 (loan); 30 April 2023 (JFPR)		
Project management			
(i) Oversight body (state level)	Chief secretary (chair) Additional chief secretary, PHED; principal secretary, P&RDD; principal secretary, finance; principal secretary, IWD; engineer-in-chief, PHED, project director (member secretary) (members)		
(ii) Oversight body (district level)	District magistrate (chair) Additional executive officer of the district, block development officers, concerned <i>panchayat samiti</i> (governing body working at the block level) representatives, head project implementation unit (member secretary) (members)		
(iii) Executing agency	PHED		
(iv) Implementing agency	PHED		
Procurement	ICB	1 DBO contract	\$52 million
	NCB	3 DBO, 8 works, and 3 goods contracts	\$212 million
	Shopping	Multiple contracts	\$0.2 million
	Community participation	Multiple contracts	\$0.1 million
Consulting services	Project management consultant (QCBS, 80:20 quality–cost ratio)	348 person-months	\$15.7 million
	DSISCs (QCBS, 80:20 quality–cost ratio)	1,050 person-months	
	JFPR consultants (FBS)	615 person-months	
	TA consultants (QCBS)	108 person-months	
Retroactive financing and/or advance contracting	There will be advance contracting and retroactive financing of civil works, equipment, and consulting services. Retroactive financing will be considered for up to 20% of the loan amount for eligible expenditures incurred prior to loan effectiveness, but not earlier than 12 months prior to the signing of the loan agreement.		
Disbursement	The loan proceeds will be disbursed following ADB's <i>Loan Disbursement Handbook</i> (2017, as amended from time to time) and detailed arrangements agreed between the Government of India and ADB.		

ADB = Asian Development Bank; DBO = design–build–operate; DSISC = design, supervision, and institutional support consultant; FBS = fixed-budget selection; ICB = international competitive bidding; IWD = Irrigation and Waterways Department; JFPR = Japan Fund for Poverty Reduction; NCB = national competitive bidding; PHED = Public Health Engineering Department; P&RDD = Panchayats and Rural Development Department; QCBS = quality- and cost-based selection; TA = technical assistance.

Source: Asian Development Bank.

<sup>25</sup> Three nongovernment organizations and/or consulting firms will be engaged to support activities under the attached JFPR grant and the transaction technical assistance.

21. A comprehensive procurement capacity assessment carried out by ADB found PHED capable of managing procurement under the project. ADB also reviewed and approved the GOWB's e-procurement system and the master bidding documents for the project. Advance contracting and retroactive financing will be provided for the project. ADB has advised the Government of India and GOWB that approval of advance contracting and retroactive financing does not commit ADB to finance the project. Procurement of works and equipment under the project will follow ADB's Procurement Guidelines (2015, as amended from time to time).

### III. ATTACHED TECHNICAL ASSISTANCE

22. The attached transaction TA, Strengthening Smart Water Management and Climate and Disaster Resilience in Selected Districts of West Bengal, will support the GOWB in strengthening STWM, and climate and disaster resilience in project districts. It will assist in (i) implementing a central-level STWM system within the PHED; (ii) improving a flood-related early warning and response system in Purba Medinipur; and (iii) building capacity of stakeholders on O&M, climate change, and disaster resilience. The TA is estimated to cost \$2 million, which will be financed on a grant basis by the Urban Climate Change Resilience Trust Fund (footnote 1) under the Urban Financing Partnership Facility and administered by ADB.<sup>26</sup> The PHED will be the executing and implementing agency for the TA, to be implemented over 3 years. The government will provide counterpart support in the form of staff, office space, and other in-kind contributions.

### IV. DUE DILIGENCE

#### A. Technical

23. The project is climate resilient and compatible with local capacity. The PHED engaged design consultants, supported by a large team of ADB grant-funded consultants, to undertake surveys and project preparation, including evaluation of alternative techno-economic options and full life cycle costs. ADB conducted a detailed climate risk and vulnerability assessment to ensure project components incorporate necessary climate resilience and mitigation measures in the preliminary, detailed design, and implementation stages.<sup>27</sup> The project will be sustainable operationally by incorporating the following approaches: (i) ensuring that bulk supply schemes remain with the PHED, (ii) building a 2-year O&M period into the contracts for both the bulk and distribution schemes to assist in capacity building, and (iii) implementing an AMSDF and including extensive capacity building of stakeholders through support from the attached grant and TA.

#### B. Economic and Financial

24. **Economic analysis.** The economic rationale for the government's intervention is sound, as the project will provide sustainable drinking water services in the project *gram panchayats*. The economic analysis was conducted for the three sample project *gram panchayats* for which engineering designs were finalized: Chaltaberia, Kashbalanda, and Sonapukur Sankarpur. The estimated economic internal rates of return of these *gram panchayats* ranged from 13.0% to 14.2%, while the combined economic internal rate of return was estimated at 13.5%, higher than the economic opportunity cost of capital estimated at 9.0%, indicating significant economic returns. Sensitivity analysis revealed that the results are satisfactory, except under the scenario

<sup>26</sup> Attached Technical Assistance Report (accessible from the list of linked documents in Appendix 2).

<sup>27</sup> Summary Project Climate and Disaster Risk Assessment and Management Report (accessible from the list of linked documents in Appendix 2).

of all downside risks occurring together, i.e., (i) capital cost overrun of 20%, (ii) overrun in O&M costs of 20%, (iii) decline in estimated benefits of 20%, and (iv) 1-year delay in implementation.<sup>28</sup>

25. **Financial analysis.** Financial analysis was conducted for the project to ascertain its sustainability and to determine the extent to which the water supply will generate revenues to cover O&M costs. An incremental recurrent costs analysis was conducted for the three sample *gram panchayats*, as the proposed water tariffs are expected to recover O&M costs only. The analysis concluded that the suggested tariff under the AMSDF would generate sufficient revenues for O&M cost recovery. A cash flow analysis was conducted in case unforeseen circumstances constrain tariff revision or recovery. The financial projections of the sample *gram panchayats* show that their revenue account will remain in surplus with (i) improved collection efficiency, (ii) an STWM system and financial management, and (iii) continued financial support from the government. Implementation of an AMSDF will help them improve financial sustainability.

### C. Governance

26. The financial management assessment concluded that the PHED can conduct adequate financial management of the project.<sup>29</sup> The PHED has experience in handling large-scale projects funded by GOWB and with external support. It has an established legal, institutional, and monitoring framework available for budgeting, accounting, and auditing. Based on these factors, the financial management risk for the project is moderate. The project design includes the following risk mitigation measures: (i) building PHED's capacity on ADB's project financial management requirements, (ii) strengthening the PHED's project account and finance divisions by engaging qualified staff and consultants, (iii) strengthening the PHED's internal audit process, and (iv) implementing water user charge structure and its regular revisions under the AMSDF.

27. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the governments of India and West Bengal and the PHED. Specific policy requirements and supplementary measures are described in the PAM. The mitigation measures in the project design (i) establish regular voluntary disclosure of project-related information to residents, (ii) use and maintain an e-procurement system to enhance transparency, and (iii) establish a grievance redress mechanism to ensure a quick and effective complaints resolution.

### D. Poverty, Social, and Gender

28. **Poverty and social.** The project will contribute to poverty reduction by improving infrastructure and quality of life, reducing women's drudgery, reducing health morbidity and health impacts of arsenic and fluoride contamination, and stimulating economic growth. The project will provide free water supply connections to the households in the project area, including the poor and vulnerable. Based on the affordability and willingness-to-pay survey carried out by the project preparatory team in the sample *gram panchayats*, user charges will be affordable (at less than 2.5% of the mean monthly household income) and within the household's willingness to pay.<sup>30</sup>

29. **Gender.** The project is classified as gender equity. The gender equality and social inclusion action plan for the project has clear targets, responsibilities, and resource allocation.<sup>31</sup> The project will generate employment for over 350 locals in the project *gram panchayats*, of whom

<sup>28</sup> Economic Analysis and Financial Analysis (accessible from the list of linked documents in Appendix 2).

<sup>29</sup> Financial Management Assessment (accessible from the list of linked documents in Appendix 2).

<sup>30</sup> Summary Poverty Reduction and Social Strategy (accessible from the list of linked documents in Appendix 2).

<sup>31</sup> Gender Equality and Social Inclusion Action Plan and Gender Analysis (accessible from the list of linked documents in Appendix 2).



33% will be women. It will provide continuous potable water through metered connections to about 390,000 households. This will reduce drudgery of women and girls and time poverty, and free time for more productive work, including attending schools. Trade-certified trainings on utility management will enhance local women's employability. The PHED will conduct a gender audit and develop and adopt a gender strategy. The project will institutionalize a gender-responsive policy framework for drinking water service delivery in West Bengal through the AMSDF.

## E. Safeguards

30. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.<sup>32</sup>

31. **Environment (category B).** The PHED prepared an environmental assessment and review framework in line with ADB's Safeguard Policy Statement and applicable laws to guide the screening and environmental assessment of the subprojects. Three draft initial environmental examination (IEE) reports prepared for the sample subprojects show that they are not likely to cause significant adverse environmental impacts, and that any impacts during construction and O&M can be mitigated through appropriate design and good practices.<sup>33</sup> The project will not include category A subprojects. The PHED conducted public consultation during the preparation of the sample subprojects and will continue consultation throughout project implementation. Environmental, social, and resettlement-related grievances will be handled following the grievance redress mechanism for the project, detailed in the PAM. All IEEs will form part of the bid and contract documents. All draft IEEs prepared will be updated during detailed engineering design and submitted to ADB for review and disclosure. The PHED will prepare and submit semiannual environmental monitoring reports for ADB review and disclosure.

32. **Involuntary resettlement (category B).** The PHED prepared a resettlement framework in line with ADB's Safeguard Policy Statement and applicable laws to guide subproject screening and assess resettlement impacts. Subprojects with significant involuntary resettlement impacts will not be eligible for funding. Based on three sample subprojects' draft resettlement plans and one due diligence report, the project will not cause significant involuntary resettlement impacts.<sup>34</sup> The draft resettlement plans will form part of bids and contract documents, be updated during detailed engineering design, and submitted to ADB for review and disclosure. The PHED will acquire land through negotiated settlement without recourse to expropriation as per GOWB regulations. Based on preliminary designs, around 7 acres are estimated to be acquired from around 42 private owners. The PHED will prepare semiannual social safeguards monitoring reports for ADB's review and disclosure. The resettlement framework and resettlement plans have been disclosed to project-affected people, and on the ADB and PHED websites.

33. **Indigenous peoples (category B).** Indigenous peoples or scheduled tribes comprise 7.8% of the rural population of West Bengal as a whole. Based on three sample subprojects' appraised, scheduled tribes (i) will benefit from project investments as beneficiaries of improved water supply facilities, free universal household connections, and capacity building and livelihood support programs; and (ii) are not considered to be made vulnerable by the project. PHED prepared an indigenous peoples planning framework, in line with ADB's Safeguard Policy

<sup>32</sup> ADB. *Safeguard Categories*. <https://www.adb.org/site/safeguards/safeguard-categories>.

<sup>33</sup> Environmental Assessment and Review Framework (accessible from the list of linked documents in Appendix 2). The framework as well as sample IEE reports have been endorsed and disclosed by the PHED on its website.

<sup>34</sup> Resettlement Framework and Resettlement Plans: Bulk Supply and Distribution Systems for North 24 Parganas, and Bulk Supply System for Bankura (accessible from the list of linked documents in Appendix 2).

Statement and applicable laws to ensure that scheduled tribes will receive culturally appropriate benefits and that any adverse impacts will be addressed in all subprojects under the project, which has been approved by ADB, and disclosed on the ADB and PHED websites.<sup>35</sup>

## F. Summary of Risk Assessment and Risk Management Plan

34. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.<sup>36</sup>

**Table 4: Summary of Risks and Mitigating Measures**

<b>Risks</b>	<b>Mitigation Measures</b>
Extreme climate events beyond projections disrupt availability of water supply and infrastructure built.	Through the climate risk and vulnerability assessment the project incorporates adequate climate resilience measures.
Unforeseen circumstances, such as flooding, affect the ability of project <i>gram panchayats</i> and the government to allocate resources to ensure water service delivery and sustainability.	The government issued an order to ensure resources, including water user charges and staff, are allocated by the <i>gram panchayats</i> and the PHED. It has agreed to provide transfers in case charges are not implemented or recovered.
Competing priorities of the government and <i>gram panchayats</i> may affect timely project completion and capacity building.	Intensive capacity building has been included in the project through additional grant support from the Japan Fund for Poverty Reduction and attached technical assistance.

PHED = Public Health Engineering Department.

Source: Asian Development Bank.

## V. ASSURANCES

35. The governments of India and West Bengal have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and loan documents.

36. The governments of India and West Bengal have agreed with ADB on certain covenants for the project, which are set forth in the loan agreement, project agreement, and grant agreement.

## VI. RECOMMENDATION

37. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of \$240,000,000 to the Government of India for the West Bengal Drinking Water Sector Improvement Project, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Takehiko Nakao  
President

2 August 2018

<sup>35</sup> Indigenous Peoples Planning Framework (accessible from the list of linked documents in Appendix 2).

<sup>36</sup> Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

## DESIGN AND MONITORING FRAMEWORK

<b>Impact the Project is Aligned with</b> Drinking water security ensured in West Bengal (Vision 2020; and National Sub-Mission Guidelines on Arsenic and Fluoride) <sup>a</sup>			
<b>Results Chain</b>	<b>Performance Indicators with Targets and Baselines</b>	<b>Data Sources and Reporting Mechanisms</b>	<b>Risks</b>
<p><b>Outcome</b> Safe, sustainable, and inclusive drinking water service received in project districts<sup>b</sup></p>	<p>By 2025:</p> <p>a. At least 1.65 million people received continuous potable<sup>c</sup> piped water supply (2017 baseline: 0.8 million people in project areas affected with arsenic, fluoride, and salinity; no piped water supply)</p> <p>b. At least 70% of project <i>gram panchayats</i> (governing bodies working at the village level) recovered a minimum of 80% operation and maintenance costs, and operated with less than 15% nonrevenue water on average (2017 baseline: no services existed in project areas)</p> <p>c. At least 70% of project <i>gram panchayats</i> provided potable water supply on average to 100% of poor households and households headed by women, and operated services with a minimum of 33% female staff<sup>d</sup> (2017 baseline: not applicable)</p>	<p>a–c. Annual reports, including water quality, from PMU, PHED; and project quarterly progress reports</p>	<p>Extreme climate events beyond projections disrupt availability of water supply and infrastructure built</p> <p>Unforeseen circumstances, such as flooding, affect the ability of project <i>gram panchayats</i> and the government to allocate resources to ensure water service delivery and sustainability</p>
<p><b>Outputs</b> 1. Climate-resilient drinking water infrastructure constructed</p>	<p>By 2024:</p> <p>1a. Connections to at least 390,000 households<sup>e</sup> for 70 liters per capita per day of piped water supply completed (2017 baseline: 0)</p> <p>1b. Three additional water treatment plants of at least 232 million liters per day of total capacity, and 110 storage reservoirs (ground level and overhead) with at least 94 million liters of total capacity commissioned, all equipped with smart water management devices (2017 baseline: 0)</p> <p>1c. At least 4,800 kilometers of additional water distribution network laid and commissioned (2017 baseline: 0)</p> <p>1d. 100% of water treatment plants, storage reservoirs, and distribution network commissioned under the project incorporate climate</p>	<p>1a–1d. PMU's annual reports, project quarterly progress reports</p>	<p>Competing priorities of the government and <i>gram panchayats</i> may affect timely project completion and capacity building</p>

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	resilience measures (2017 baseline: not applicable)		
2. Institutions and capacity of stakeholders for drinking water service delivery strengthened	<p>By 2024:</p> <p>2a. Government order on asset management and service delivery framework<sup>1</sup> adopted by at least 70% of the project <i>gram panchayats</i> (2017 baseline: not applicable)</p> <p>2b. District-level drinking water quality action plan developed for all districts of West Bengal (2017 baseline: 3 out of 23 districts)</p> <p>2c. Smart water management system commissioned in PHED and project <i>gram panchayats</i> (2017 baseline: not commissioned)</p> <p>2d. Guidelines for water safety plan and sanitation safety plan for West Bengal developed (2017 baseline: not completed)</p> <p>2e. Flood forecasting and early warning system commissioned in Purba Medinipur (2017 baseline: not commissioned)</p> <p>2f. Gender strategy for PHED developed (2017 baseline: not applicable)</p> <p>2g. Fecal sludge and septage management regulatory framework completed for West Bengal, and a pilot treatment plant commissioned in one project district (2017 baseline: not completed, not commissioned)</p> <p>2h. At least 660 additional locals in project <i>gram panchayats</i>, with a minimum of 33% females, and a minimum of 200 PHED staff reported increased skills in utility management (2017 baseline: 0, 0%, 0)</p> <p>2i. At least 300 locals in project <i>gram panchayats</i>, with a minimum of 33% females, reported increased leadership and water-related livelihood skills (2017 baseline: 0, 0%)</p>	2a–2j. PMU's and PHED's annual reports, project quarterly progress reports	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	2j. At least 500 locals in project <i>gram panchayats</i> , with a minimum of 33% females, reported increased awareness on water conservation, demand management, and water sanitation and hygiene (2017 baseline: 0, 0%)		
<b>Key Activities with Milestones</b>			
<p><b>1. Climate-resilient drinking water infrastructure constructed</b></p> <p>1.1. Prepare detailed designs and bidding documents (Q2 2017–Q2 2018)</p> <p>1.2. Award civil works contracts (Q2 2018–Q4 2018)</p> <p>1.3. Construct and commission water supply schemes (Q3 2018–Q4 2021)</p> <p>1.4. Operate and maintain water supply schemes (Q4 2021 onwards)</p> <p><b>2. Institutions and capacity of stakeholders for drinking water service delivery strengthened</b></p> <p>2.1. Mobilize nongovernment organizations and consultants for community awareness and training on water sanitation and hygiene, and on benefits and opportunities arising from the project (Q2 2018)</p> <p>2.2. Conduct community awareness and training activities (Q3 2018–Q4 2022)</p> <p>2.3. Facilitate adoption of asset management and service delivery framework, through passing of resolution, by the project <i>gram panchayats</i> (Q3 2017–Q2 2018)</p> <p>2.4. Develop drinking water quality action plan for all districts in West Bengal (Q2 2018–Q2 2019)</p> <p>2.5. Procure and commission PHED- and <i>gram panchayat</i>-level smart water management systems (Q1 2018–Q2 2022)</p> <p>2.6. Award contracts for PHED- and <i>gram panchayat</i>-level smart water management systems (Q2 2020–Q4 2020)</p> <p>2.7. Commission PHED- and <i>gram panchayat</i>-level smart water management systems (Q3 2020–Q2 2022)</p> <p>2.8. Train PHED and <i>gram panchayat</i> staff on smart water management (Q3 2020–Q2 2022)</p> <p>2.9. Mobilize consultants for flood forecasting and early warning system in Purba Medinipur (Q3 2018)</p> <p>2.10. Complete gender audit for PHED and approve gender strategy (Q1 2020)</p> <p>2.11. Operationalize flood forecasting and early warning system in Purba Medinipur (Q3 2020)</p> <p>2.12. Complete FSSM regulatory framework; operationalize, test, and evaluate FSSM pilot (Q4 2022)</p> <p>2.13. Develop water and sanitation safety plans for West Bengal and samples for one project district (Q4 2017)</p>			
<p><b>Project Management Activities</b></p> <p>Establish PMU and project implementation unit offices fully with dedicated staff and offices (Q4 2017)</p> <p>Engage and mobilize consultants (Q2 2018)</p> <p>Conduct regular monitoring, reporting, and evaluation (2018–2024)</p>			
<p><b>Inputs</b></p> <p>Asian Development Bank: Ordinary capital resources: \$240 million (regular OCR loan)</p> <p>Japan Fund for Poverty Reduction: \$3 million (grant)</p> <p>Urban Climate Change Resilience Trust Fund under the Urban Financing Partnership Facility:<sup>9</sup> \$2 million (TA grant)</p> <p>Government of India: \$106 million</p>			
<p><b>Assumptions for Partner Financing</b></p> <p>Not applicable</p>			

FSSM = fecal sludge and septage management, OCR = ordinary capital resources, PHED = Public Health Engineering Department, PMU = project management unit, Q = quarter, TA = technical assistance.

<sup>a</sup> Government of West Bengal, Public Health Engineering Department. 2011. *Vision 2020: To Provide Safe, Sustainable, and Adequate Water Supply to All Humans and Livestock in West Bengal by 2020*. Kolkata; and Government of India, Ministry of Drinking Water and Sanitation. 2016. *National Sub-Mission Guidelines to Provide Safe Drinking Water to Arsenic and Fluoride Affected Habitations in Rural India on Mission Mode*. New Delhi.

<sup>b</sup> Project districts are Bankura, North 24 Parganas (with one neighboring block of South 24 Parganas included), and Purba Medinipur.

<sup>c</sup> Complying with Indian drinking water standards (Bureau of Indian Standards, IS 10500).

<sup>d</sup> GOWB Government Order issued on 9 November 2017 mandates a 33% reservation for women in project generated employment at the local level.

<sup>e</sup> Household service connection is a pipe and fixture that connects the network to a consumer.

<sup>f</sup> As per a GOWB Government Order on the asset management and service delivery framework issued on 9 November 2017. The project *gram panchayats* will pass resolution to officially adopt them.

<sup>9</sup> Financing partners: the Rockefeller Foundation and the governments of Switzerland and the United Kingdom. Administered by the Asian Development Bank.

Source: Asian Development Bank.

### LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=49107-006-3>

1. Loan Agreement
2. Project Agreement
3. Grant Agreement
4. Sector Assessment (Summary): Water and Other Infrastructure and Services
5. Project Administration Manual
6. Contribution to the ADB Results Framework
7. Development Coordination
8. Attached Technical Assistance Report
9. Financial Analysis
10. Economic Analysis
11. Country Economic Indicators
12. Summary Project Climate and Disaster Risk Assessment and Management Report
13. Summary Poverty Reduction and Social Strategy
14. Gender Equality and Social Inclusion Action Plan
15. Environmental Assessment and Review Framework
16. Initial Environmental Examination: Bulk Water Supply for North 24 Parganas
17. Initial Environmental Examination: Water Distribution Systems for North 24 Parganas
18. Initial Environmental Examination: Bulk Water Supply for Two Blocks in Bankura
19. Resettlement Framework
20. Indigenous Peoples Planning Framework
21. Resettlement Plan: Bulk Water Supply for Two Blocks in Bankura
22. Resettlement Plan: Water Distribution Systems in North 24 Parganas
23. Resettlement Plan: Bulk Water Supply for North 24 Parganas
24. Risk Assessment and Risk Management Plan
25. Japan Fund for Poverty Reduction Grant

### Supplementary Documents

26. Arsenic and Fluoride in Drinking Water in West Bengal: Characteristics, Implications, and Mitigation
27. Capacity Assessment of Project *Gram Panchayats*
28. Government Order on Asset Management and Service Delivery Framework
29. Sanitation Improvement Action Plan
30. Project Smart Water Management System
31. Financial Management Assessment
32. Gender Analysis
33. Cost and Benefit Flow Streams of Sample *Gram Panchayats*