



Local Government Engineering Department  
Government of the People's Republic of Bangladesh

## Study -2

### Developing a Priority Assessment Framework for the Development of Water Supply and Sanitation

under

### Feasibility and Review Study on Rural Water and Sanitation



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**CEGIS**

Center for Environmental and Geographic Information Services

## **Study-2**

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# 1. Introduction

## 1.1 Background

By 2030, everyone must have equitable access to basic sanitation and hygiene as well as universal access to clean, cheap drinking water, according to SDG 6 and its accompanying targets. In light of this, UN Member States have chosen the "proportion of the population using safely managed drinking water services" as the global indicator for SDG target 6.1 monitoring and the "proportion of the population using safely managed sanitation services including a hand washing facility with soap and water" as the global indicator for SDG target 6.2 monitoring. New service norms have been established as a result of well managed drinking water and sanitation. More than 160 million people live in Bangladesh, one of the world's most densely populated nations, on 147,570 square kilometers of land. The villages make up Bangladesh's basic population units. In the 1980s, Bangladesh had 68 000 villages; today, there are around 87 000. The key to the nation's economic and cultural development is its villages. It is an excellent source of food, nourishment, and readily available labor. Additionally, villages are a source of ecological and natural resources.

The Government of Bangladesh, through its two implementing agencies, LGED and DPHE, has launched the "My Village-My Town" project, which aims to bridge the gaps between urban and rural areas by extending urban services to each village. The major goal of this project is to make Bangabandhu's ideal of a Golden Bengal a reality by providing basic services to all of the communities. Bangladesh contains a number of unique villages. A fish landing facility or cold storage will be necessary for a fishing colony, but a community with tiny cottage industries will profit from improved infrastructure with cutting-edge machinery. While other towns require better canal connectivity, a riverfront community needs an embankment to safeguard people and property from flooding. Every door in a rural community must have access to proper sanitary facilities and safe drinking water. As a result, despite providing basic amenities like power, digital systems, roads, and marketplaces that are often accessible to everyone, consideration must be given to the distinctive qualities of each village. Large-scale, multi-dimensional initiatives should take local needs into account.

The project is a hugely ambitious, intricate, and eagerly anticipated national development endeavor. The creation of a time-bound working plan, an Upazila master plan, and national workshops to "innovate creative working strategy to face the challenges in implementing the program and creating coordinated initiatives among the related organizations" are just a few of the steps the government has been taking to implement this program. 15 villages will be the first to participate in the trial project. Eight villages in eight Upazilas of eight divisions and seven in chosen areas (of Haor, Char, Hill, Coast, Barind, Midland beels and two adjacent economic zones) would be chosen for this initiative, according to the Local Government Division.

Among the six components, Center for Environmental and Geographic Information Services (CEGIS) has been awarded the feasibility and review study of "Rural Water Supply and Sanitation". This priority assessment framework guideline has been prepared as a part of the study.

## 1.2 Purpose of the Guideline

The main purpose of this guideline is to develop a priority assessment framework for the development of water supply and sanitation. Below is the specific purpose outlined:

- To review existing policies, gaps, current practices for water supply and sanitation
- To prepare a framework regarding involvement of different agencies, institutions i.e LGIs, local community for safe water supply and sanitation.
- Develop a community involvement mechanism to ensure the functionality and O&M of the facilities

Users of the guideline will receive advice on how to prioritize villages or zones in terms of water supply and sanitation, rank the villages under study where DPHE must take the lead initially, and consider institutional framework, implementation machinery, and community involvement when doing so. There have been attempts to highlight the current inconsistencies and overlaps in policies, plans, and regulations. The purview of the guideline includes a thorough review of secondary information facilitating the development of a priority assessment framework of water supply. Following this guideline, a detailed analysis of the primary survey that entails the framework and an implementation plan of WSP & SSP at rural areas will be developed.

## 1.3 Guiding Principles

This priority assessment framework guideline is devised based on the guiding principles detailed below:

- Undertaking local values and cultural practices in consideration during designing viable, affordable, and locally appropriate water supply and sanitation activities promoting Indigenous knowledge and local skills at the local levels
- For water supply and sanitation systems to be sustainable, they must be protected from the damaging effects of natural and man-made disasters as well as climate change and ensures proper response to climate change and disasters.
- The gender-sensitive approach through the participation of women in decision making and differently-abled, children, elderly, and women-friendly strategy will be taken
- The water supply and sanitation services need to be transparent and visible both to the service providers and service recipients at all stages of designing, regulation, and implementation.
- The O&M is an integral part of any water supply and sanitation interventions to ensure better functionality and longevity, save resources and reduce the hassles of new facility establishment
- The approaches should be taken so that it ensures participation of all the stakeholders and private sector in the water supply and sanitation facilities implemented by the government bodies, non-government organizations, and development partners and resulting in sustainable water supply and sanitation services in these areas.

## 1.4 Approach of Development of Guideline

The overall approach of development of guideline is graphically represented below:



**Figure 1.1: Approach of Development of Guideline**

### 1.4.1 Review of Policies and Relevant Documents

For assessing the current state of WASH facilities and research works regarding water supply, sanitation and health for disaster preparedness and emergency responses of study area and determination of methodologies used in past studies (if any) of the same topic hence gaining good understanding of the current study, available literatures such as National and international published reports, plans, publications, journals or any relevant literature was reviewed. Any past initiative was also reviewed to gather relevant information hence enhance the knowledge and understanding.

Some relevant policy regarding documents have been identified where several policies regarding water, health and sanitation are mentioned for Bangladesh. Moreover, policy document on water supply strategy during disaster and post disaster was also reviewed.

### 1.4.2 Overview of Existing Situation

Bangladesh has been divided into seven zones based on WASH hostposts, with fifteen villages chosen by a strategized random approach and validated by consulting with DPHE at the end. These villages were chosen in order to encompass all seven (7) zones. The WASH and O&M practices currently used in those villages have been evaluated, and as a result, any shortcomings have been noted.

### 1.4.3 Development of Priority Assessment Framework

This section outlines the way of developing priority assessment framework which will work as a future guideline for its practitioners. This section focuses on how to identify sources, evaluating water demand and availability, choosing interventions and creating a list of interventions for the 15 study villages, prioritizing the villages where initiatives should be implemented first, and creating a list of the 15 prioritized villages.

#### **1.4.4 Stakeholder Involvement and Responsibilities**

The primary duty of project stakeholders is to support the achievement of a project's strategic objectives. Another crucial role of stakeholders is the provision of project necessities. Stakeholders should provide the necessary information and materials so that a project may be defined. Last but not least, the idea has the endorsement of project stakeholders. The comments and recommendations that stakeholders offer are the most beneficial resources for a project. The stakeholders' happiness with a project, in addition to it achieving its objectives, is one of its successful characteristics. A project is frequently deemed failed if it simply meets its objectives but angers the stakeholders. In this section relevant stakeholder has been analyzed and their responsibilities have been identified during the implementation of interventions.

#### **1.4.5 Implementation Strategy and Action Plan**

The intervention has been completed for each hotspot based on the priority criteria stated in the previous section. Both water supply and sanitation are being addressed by the intervention. Based on demand assessments, the hotspot regions' chosen interventions for water supply include installing tubewells, collecting rainfall, creating water treatment plants, and supplying water via pipes. This section demarcates the implementation strategy and action plan for implementing these interventions.

#### **1.4.6 Operation and Maintenance (O&M)**

This section outlines the operation and maintenance guideline for selected interventions.

### **1.5 Structure of the Guideline**

**Chapter-1** is the Introduction which includes background, the purpose of the guideline, the principle and approach, the structure of the guideline, intended users, existing institutional framework, the procedure for revisions and updates, and the disclaimer.

**Chapter-2** focuses on the existing practices in WASH and problems, governing natural hazards, and existing O&M practices.

**Chapter-3** focuses on existing plans, acts, rules and regulations, and identification of gaps, and recommendations for revision.

**Chapter-4** explains the development of a framework for priority intervention selection as well as selection of the best intervention, development of an implementation strategy and action plan for water supply and sanitation services, and set a budget for WSS.

**Chapter-5** outlines implementation strategy and action plan.

**Chapter-6** outlined the Operations and Maintenance guideline for WASH Interventions.

### **1.6 Intended Users**

The users of this framework for water supply and sanitation include but are not limited to the government agencies/departments (e.g., DPHE, LGED etc), local government institutions (e.g., Union Parishad, Upazila Parishad, village council) and other sector stakeholders working in designing, implementing and monitoring of water supply and sanitation infrastructure projects.

### **1.7 Procedure for Revision and Update**

The priority assessment framework is always being updated, and updates are frequently issued. The revision process's addition of new or modified planning criteria does not imply that current aspects

are in any way inadequate, nor does it dictate or advise that new projects or an immediate engineering assessment be initiated. Feedback, queries, and suggestions for improvement are welcomed.

### **1.8 Disclaimer**

The information, recommendations, and references provided here are not meant to replace sound engineering judgment related to WASH facilities. The framework does not seek to cover every circumstance or serve as a full guidebook on water supply and sanitation. This approach should be modified as required to incorporate changing advancements in sanitation and water supply improvement.

## 2. Review of Literatures

This Chapter contains the review of policies, strategies, plans, existing acts, rules, and regulations. In order to build a framework for water supply and sanitation, it is necessary to analyze previous research, plans, and strategies in to provide a strategy and theoretical framework for doing so. Through this evaluation, it was possible to observe earlier studies' methods, conclusions, and suggestions for how to make this one better. The gaps found in the policies, plans, etc. have also been discussed and have been obtained from the review part. This chapter has also evaluated and presented the most recent sanitation and water supply techniques. Challenges and difficulties relating to water supply and section have also been given in this chapter based on the findings from the review section.

### Reviewed Policies and Plans

- 🌐 National Policy for Water Supply and Sanitation, 1998
- 🌐 National Water Policy, 1999
- 🌐 Coastal Zone Policy, 2005
- 🌐 National health policy, 2011
- 🌐 8<sup>th</sup> Fiver Year Plan
- 🌐 Bangladesh Delta Plan 2100
- 🌐 National Plan for Disaster Management (2021-2025)
- 🌐 Bangladesh Climate Change and Gender Action Plan (ccGAP), 2013
- 🌐 Sector Development Plan (FY 2011-25) Water Supply and Sanitation Sector in Bangladesh.
- 🌐 National Adaptation Plan (NAP) for Bangladesh

### Reviewed Strategies

- 🌐 National Hygiene Promotion Strategy for Water Supply and Sanitation Sector in Bangladesh, 2012
- 🌐 National Strategy for Water Supply and Sanitation, 2021
- 🌐 National Sanitation Strategy, 2005
- 🌐 Pro poor strategy for water sanitation sector in Bangladesh, 2020
- 🌐 Bangladesh climate change strategy and action plan, 2009



### 2.1 Policies, Strategies and Plans

Following Policies, Strategies and Plans have been reviewed and analyzed:

- ✅ National Water Policy, 1999
- ✅ National Policy for Safe Water Supply & Sanitation 1998
- ✅ National Policy for Arsenic Mitigation, 2004
- ✅ National Strategy for Water Supply and Sanitation 2014
- ✅ National Strategy for Water and Sanitation Hard to Reach Areas of Bangladesh 2012
- ✅ Coastal Zone Policy, 2005
- ✅ Sector Development Plan (2011-25) WSS Sector in Bangladesh
- ✅ Pro-poor Strategy for Water and Sanitation sector in Bangladesh
- ✅ National Sanitation Strategy – 2005
- ✅ National Cost Sharing Strategy for WSS in Bangladesh 2012
- ✅ Bangladesh Vision 2021
- ✅ Bangladesh Delta Plan 2100
- ✅ 8th Five Year Plan (2021-25)

## 2.2 Existing Acts, Rules and Regulations

Following Existing Acts, Rules and Regulations have been reviewed and analyzed:

- ☑ Bangladesh Water Act, 2013
- ☑ Local Government Acts 2009
- ☑ Environmental Conservation Act (ECA) 1995
- ☑ Environment Conservation Rules (ECR) 1997

## 2.3 Synergies and Gaps

### 2.3.1 Policies, Strategies and Plans

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
<p style="text-align: center;"><b>National Water Policy, 1999</b></p>	<p>The policy recognizes that water is not infinite and cannot be treated as a perpetual gift of nature to be used in any manner chosen. Its availability for sustenance of life, in both quantitative and qualitative terms, is a basic human right and that mandates appropriate use of water without jeopardizing the interest of any member of the society.</p> <p><b>Focused Area:</b></p> <ul style="list-style-type: none"> <li>➤ River Basin Management</li> <li>➤ Planning and Management of Water Resources</li> <li>➤ Water Rights and Allocation</li> <li>➤ Public and Private Involvement</li> <li>➤ Public Water Investment</li> <li>➤ Water Supply and Sanitation</li> <li>➤ Water and Agriculture</li> <li>➤ Water and Industry</li> <li>➤ Water and Fisheries and Wildlife</li> <li>➤ Water and Navigation</li> <li>➤ Water for Hydropower and Recreation</li> <li>➤ Water for the Environment</li> <li>➤ Water for Preservation of Haors, Baors, and Beels</li> <li>➤ Economic and Financial Management</li> <li>➤ Research and Information Management</li> <li>➤ Stakeholder Participation</li> </ul>	<p>The policy recommends accelerating the development of sustainable water service delivery with appropriate legal and financial measures and incentives, including delineation of water rights and water pricing. The policy, from the economic and financial management points of views, acknowledges that changes are required in the pricing system and other economic incentives affecting water demand and supply. In or to convey scarcity value of water, the policy recommends for a system of cost recovery, pricing, and economic incentives/disincentives which is necessary to balance the supply and demand of water. It highlights an importance of public service agencies to be converted into financially autonomous entities, with effective authority to charge and collect fees against services provided. The issue of analyzing Water and Sanitation at basin scale or catchment scale is absent in the policy.</p>
<p style="text-align: center;"><b>National Policy for Safe Water Supply and Sanitation, 1998</b></p>	<p>Safe water and sanitation are essential for the development of public health. The Government's goal is to ensure that all people have access to safe water and sanitation services at an affordable</p>	<p>This policy recognizes that water has an organic, social and concurrently an economic value. The policy states "as water is increasingly considered to be an economic good as well as a social good, water supply services shall be provided</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
	<p>cost. To achieve this goal and to ensure that development in the water supply and sanitation sector is equitable and sustainable, this policy has been formulated.</p> <p><b>Focused Area:</b></p> <ul style="list-style-type: none"> <li>➤ Rural Water Supply</li> <li>➤ Rural Sanitation</li> <li>➤ Urban Water Supply</li> <li>➤ Urban Sanitation</li> </ul>	<p>based on user demand and cost sharing". It emphasizes on a viable service provision where price of services as reflected its economic value, with the eventual objective of covering the cost of production and supply. It also suggests that the transition from the current level of subscription to new rate of payment should be gradual and there should be a safety net for hardcore poor communities. Besides, the policy endorses that physical provision of WSS services alone is not a sufficient pre-condition for sustainable health and wellbeing of the people, there is a need to focus on elements of behavioral changes of users and sustainability through user participation in planning, implementation, management and cost sharing</p>
<p><b>National Environmental Policy, 1992</b></p>	<p>In 1992 the National Environmental Policy (NEP) was drawn up with the aim of providing protection and sustainable management of the environment.</p> <p><b>Focused Area:</b></p> <ul style="list-style-type: none"> <li>➤ Agriculture</li> <li>➤ Food</li> <li>➤ Industry</li> <li>➤ Coastal and marine environment</li> <li>➤ Health and Sanitation</li> <li>➤ Transport and Communication</li> <li>➤ Water development, flood control and irrigation</li> <li>➤ Housing and urbanization</li> <li>➤ Population</li> <li>➤ Education and public awareness</li> <li>➤ Land</li> <li>➤ Forest, wildlife and biodiversity</li> </ul>	<p>terms of water supply and sanitation, the policy highlights that, uncontrolled and open dumping also clog the urban drainage system, causes frequent drainage congestion and threaten the contamination of water supply.</p>
<p><b>National Policy for Arsenic Mitigation, 2004</b></p>	<p>Access to safe water for drinking and cooking shall be ensured through implementation of alternative water supply options in all arsenic affected areas. All arsenicosis cases shall be diagnosed and brought under an effective management system.</p>	<p>The policy recommends for using appropriate alternative and affordable technologies, as shallow tube wells can no longer provide safe water for drinking and cooking in arsenic affected areas. This gives explicit cost implication for all affected communities to access safe drinking water, particularly for the poor as they need comparatively costly options (i.e. deep TW instead of shallow</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
	<p><b>Focused Area:</b></p> <ul style="list-style-type: none"> <li>➤ Public Awareness</li> <li>➤ Alternative Arsenic Safe Water Supply</li> <li>➤ Diagnoses and Management of Patients</li> <li>➤ Capacity Building</li> </ul>	<p>TW) than that they currently use. The situation demands not for cost sharing by the communities but also for well-managed subsidies for the hardcore poor, in particular.</p>
<p><b>Coastal Zone Policy, 2005</b></p>	<p>Coastal zone is different in a number of aspects from rest of the country. A participatory and integrated approach holds the promise of reducing conflicts in the utilization of coastal resources and optimum exploitation of opportunities. The Government, therefore, has formulated this coastal zone policy (CZPo) that would provide a general guidance to all concerned for the management and development of the coastal zone in a manner so that the coastal people are able to pursue their life and livelihoods within secure and conducive environment.</p> <p><b>Focused Area:</b></p> <ul style="list-style-type: none"> <li>➤ Economic growth</li> <li>➤ Basic needs and opportunities for livelihoods</li> <li>➤ Reduction of vulnerabilities</li> <li>➤ Sustainable management of natural resources</li> <li>➤ Equitable distribution</li> <li>➤ Empowerment of communities</li> <li>➤ Women's development and gender equity</li> <li>➤ Conservation and enhancement of critical ecosystems</li> </ul>	<p>This policy provided a general guidance to all agencies and institutions concerned for the management and development of the coastal zone in a manner that provides a secure and conducive environment for coastal communities to pursue their life and livelihoods including intensifying the coverage of safe drinking water facilities, management of groundwater, rainwater harvesting, water conservation and treatment technologies. However, no specific WASH practices were discussed in the policy.</p>
<p><b>National Sanitation Strategy, 2005</b></p>	<p>A nationwide baseline survey was conducted in 2003 with a view to get the scenario of sanitation coverage of the country and the results reveals that, 33% households had hygienic latrines; 25% household had unhygienic latrines and 44% household had no latrines. The primary objective of this strategy was to delineate the ways and means of achieving the national target through providing a uniform guideline for all concerned.</p>	<p>This strategy highlights effective demand creation through health education and hygiene promotion; ensuring individual and community actions; activating LGIs to play the key role for improving sanitation coverage; facilitating adequate supply chain of "Hygienic Latrines"; reaching the hardcore poor. Strategies for improved urban sanitation has also been developed which includes service provision should be delinked from land tenure ship, public-private-community partnership to be promoted for effective</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
	<p><b>Focused Area:</b></p> <ul style="list-style-type: none"> <li>➤ Sanitation</li> <li>➤ Health and Hygiene</li> <li>➤ Hard to reach people</li> </ul>	<p>sanitation service delivery to slums, effective coordination between city planning authorities, city corporations and public utilities must be established in order to ensure appropriate sanitation service delivery, adequate public toilet facilities to be constructed at places where people congregate such as railway stations, bus stations, river stations, parks, markets and other public places. Additionally, a sanitation cell with in each municipality will take the initiative to plan, monitor and coordinate all sanitation programmes including solid waste and waste water disposal facilities in respective municipal service area has proposed for small and medium towns</p>
<p><b>Pro-Poor Strategy for Water and Sanitation Sector in Bangladesh, 2020</b></p>	<p>Pro-poor strategy for drinking water is based on finding clusters or habitations where the basic minimum need for drinking water is not being met, and then launching a "Direct Attack on Poverty" by first identifying the truly poor within them and then providing them with the Basic Minimum Service Level as soon as possible with preference in resource allocation, cost-sharing, voice in decision-making, and responsibility for O &amp; M.</p> <p><b>Four Pillars:</b></p> <ul style="list-style-type: none"> <li>➤ Operational Definition of Hardcore poor households</li> <li>➤ Basic Minimum Level of Service</li> <li>➤ Targeting and Organizing the Hardcore poor Households</li> <li>➤ Mechanism of Administering Subsidies</li> </ul>	<p>Pro-Poor Strategy for Water and Sanitation Sector in Bangladesh (2005) provides an operational definition of hardcore poor. The strategy emphasizes on the existing policy of the government that the community, irrespective of whether the beneficiary household is poor, hardcore poor or non-poor, is required to contribute 10% of the capital cost of water supply projects as the "beneficiary's share". It also provides guidance that the capital cost contribution of the 'Target Group' (of hardcore poor households, residing in clusters below the BMSL5) would be 50% of that earmarked for the non-hardcore poor as their beneficiary's share. This strategy also mentioned that, considering the financial crisis of the poorer section of the population, the micro credit programs should be extended in the un-served and under served areas. There must be regular monthly meeting of the Ward level WATSAN committees and rigorous training programmes should be in place for capacity building of LGIs and person related with water and sanitation activities.</p>
<p><b>National Cost Sharing Strategy for Water Supply and Sanitation in Bangladesh, 2012</b></p>	<p>The strategy involves an analysis of WSS sector context, institutional development and policy reform requirements as well as economic pricing of water supply and sanitation services beforehand recommending cost sharing modalities with an aim to reach</p>	<p>This strategy document highlights on demand creation for improved water supply and sanitation and economic pricing of WSS services such as for sewerage services, creating users demand for improved services and service providers' responsiveness shall be emphasized in the short term, while at</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
	<p>enhanced and well-balanced cost sharing.</p> <p><b>Strategy Purposes:</b></p> <ul style="list-style-type: none"> <li>➤ Recovering costs of services</li> <li>➤ Gaining financial self-sufficiency</li> <li>➤ Standardization of WSS services</li> <li>➤ Ensuring sustainability</li> </ul>	<p>the same time tariff shall be kept low. From the start of the medium term, when service coverage and standards are improved, the tariff for sewerage service shall be gradually adjusted as it applies for water supply and for other component of sanitation services. In a broader term, initial pricing shall be targeted for demonstrating financial viability, while the long-term pricing target shall be for achieving economic efficiency of the sector. This strategy also urges for an equitable cost sharing modalities to be developed for all; while in the urban areas most users are comparatively better-off than the rural people having advantages of getting improved WSS services but at higher subsidized rates. Additionally, this strategy paper has also put the light on cost recovery and effective use of subsidy; management and use of collected (cost sharing money) revenue; subsidy management; gradual phasing-out of subsidies; establishing a safety-net for the poor; institutional capacity strengthening; identification of WSS consumers; private sector participation etc.</p>
<p><b>National Strategy for Water and Sanitation for Hard-to-Reach Areas of Bangladesh, 2011</b></p>	<p>In order to provide immediate and sustainable water supply and sanitation services, this strategy paper has been carefully designed taking into account the unfavorable and varied geophysical and geo-hydrological contexts of the Hard to Reach area. It suggests area-specific appropriate technological solutions.</p> <p><b>Indicators of Identifying Hard to Reach (HtR) Areas:</b></p> <ul style="list-style-type: none"> <li>➤ Availability of water (indicated by the level of groundwater table)</li> <li>➤ Improved drinking water coverage</li> <li>➤ Hygienic sanitation coverage</li> <li>➤ Climatic hotspots</li> <li>➤ Poverty level</li> <li>➤ Child mortality</li> </ul>	<p>Overall WatSan strategies mentioned in this documents includes implementation of acts and laws of the water and sanitation sector adequate monitoring and evaluation is also crucial in all of the hard-to-reach areas; enhance the local government autonomy in these regions and also ensure transparency and accountability of WatSan fund; implement pro-poor strategy for water and sanitation in Bangladesh; allocate funds for research and innovation of sustainable, eco-friendly and user friendly technologies for remote areas of Bangladesh; inclusion of indigenous knowledge and traditional values through deliberative participation of local inhabitants in the mainstream decision making process; encourage public-private partnership in water and sanitation sector of these areas. This document also provides particular strategies for coastal areas, char areas, wetlands (Haors and Beels), barind areas and hill areas covering challenges of each areas, strategies for sustainable</p>

Policies/Strategies/Plans	Remarks/Focues Areas	Synergies and Gaps
		<p>solutions, strategies for immediate solutions, development decision and ownership, design and implementation. This document also acknowledges that successful implementation of these strategies for the Hard-to-Reach areas requires appropriate institutional arrangements.</p> <p>This strategy also acknowledges that, the communities and the local authorities (LGIs) will be at the core of decision making for the required development. The community will place its demand for improved services to the local government ministry through the local authority. The local authority will ensure participation of local community in the entire processes of identification, planning, design, implementation, monitoring, and operation and maintenance, The NGOs and other Development Partners will facilitate the local community and the LGL s in awareness building, identification and assessment of needs and in implementation monitoring.</p>
<p><b>National Hygiene Promotion Strategy for Water Supply and Sanitation Sector in Bangladesh 2012</b></p>	<p>Hygiene promotion includes strategies that encourage or facilitate a process whereby people assess, make considered choices, demand, effect, and sustain hygienic and healthy behaviors. This encompasses personal, domestic, and environmental hygiene practices and any action or initiative taken to erect barriers to diseases. In this strategy paper, the 'Hygiene Promotion' is considered particularly related to water supply and sanitation.</p> <p><b>Focused Areas:</b></p> <ul style="list-style-type: none"> <li>➤ Sanitation hygiene</li> <li>➤ Water hygiene</li> <li>➤ Personal (including menstrual) hygiene</li> <li>➤ Food hygiene</li> <li>➤ Environmental hygiene</li> </ul>	<p>The strategy suggests that during the early phase of implementation of hygiene promotion three critical behaviors of personal hygiene, food hygiene and menstrual hygiene to be addressed. The development of the strategy involves a variety of participatory methods and a wider consultative process and the outcomes from the consultation helped in developing the strategies. The National Hygiene Promotion Strategy is a dynamic document and will be reviewed after five years. About ten strategies have been developed which were compliance to the existing public policies, strategies and legal instruments; focal ministries and agencies and their role and responsibilities, role of NGOs and private sector, national level hygiene promotion, hygiene promotion in hard-to-reach areas, behavioral and social change communication(BSCC) strategy, explore and replicate successful hygiene promotion models, ensure the potential use of the social organizations, budgetary allocation for hygiene</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
		<p>promotion, gender mainstreaming in the service planning, implementation and monitoring.</p> <p>This document also gave emphasis on capacity building of WSS sector institutions; R&amp;D initiatives on health and hygiene issues; monitoring and evaluation guideline; operational guidelines for measuring behavior change. Water hygiene such as percent of population safely collect, store and use drinking water etc., sanitation hygiene such as percent of population/households regularly use sanitary latrines etc., personal (including menstrual) hygiene percent of population use soap and clean water for hand-washing before handling/taking meals/food etc., food hygiene percent of population/families keep food always covered (domestic and commercial) etc., environmental hygiene such as percent of population/households/institutions use to keep their premise surroundings always clean were the behavioral domains for the operational guidelines. It also provided Key steps for implementation.</p> <p>The only legal document regarding hygiene is the National Hygiene Promotion Strategy for Water Supply and Sanitation Sector in Bangladesh 2012. As of now, this has no roadmap or action plan to be implemented at the local level or considerations of the long-term impacts of climate change.</p>
<p><b>National Strategy for Water Supply and Sanitation, 2021</b></p>	<p>The National strategy for Water Supply and Sanitation 2014 is an integral part of the Sector Development Plan (SDP) 2011-25 for water and sanitation sector in Bangladesh. The strategy provides the Sector Context, Goal and Objectives, Guiding Principles, Framework, Strategic Direction, Institutional Arrangement and Implementation Plan for water supply and sanitation promotion at national, regional and local level. The strategy formulation made through a wide range of stakeholders consultation at different levels and finally reviewed by the members of</p>	<p>The water supply and sanitation strategy suggest to achieve the sector goal and in accordance with the guiding principles, a set of seventeen strategies have been formulated. The strategies are broadly grouped into three themes- (a) WASH Interventions- increasing the coverage and improving the quality of WASH interventions, (b) Emerging challenges-addressing the emerging challenges in the sector, and (c) Sector Governance-strengthening sector governance. Ensure safe drinking water, give priority to arsenic mitigation, undertake specific approaches for hard-to-reach areas and vulnerable people, move ahead on the sanitation ladder, establish fecal sludge management, manage solid waste</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
	<p>expertise from concerned organizations those are involved in water and sanitation sector, like-representatives from DPHE, UNICEF, WHO, WSP-WB, WaterAid, BRAC, NGO Forum for Public Health etc.</p> <p><b>Focused Areas:</b></p> <ul style="list-style-type: none"> <li>➤ WASH Interventions</li> <li>➤ Emerging Challenges</li> <li>➤ Sector Governance</li> </ul>	<p>judiciously, improve hygiene promotion, mainstream gender, facilitate private sector participation are developed strategy under WASH Interventions group. Emerging challenges group focused on adopting integrated water resource management, addressing growing pace of urbanization, coping with disaster, adapt to climate change and safeguard environment, institutionalizing research and development. Moreover, undertaking integrated and accountable development approach; recovering cost of services while keeping a safety net for the poor; strengthening and reposition institutions and enhancing coordination and monitoring were highlighted under sector governance group.</p>
<p><b>Bangladesh Vision 2021</b></p>	<p>The vision for Bangladesh in 2021 is composed of eight inter-related goals. The goals outlines some of the key targets that as a nation we would need to achieve under each of these goals if we are to materialize our vision. Some of these targets can be achieved in the short term while others would require a longer time frame for their realization.</p>	<p>This document envisioned that, by the year of 2021 access to clean water and sanitation will no longer remain a luxury. To achieve this, the key strategy was to ensure efficient public health management through providing access to piped water, a well-maintained functioning sewerage system, environmentally-sound hospitals and industrial waste disposal, etc. This document also recognized the need to help communities gain access to geological and engineering skills that can provide a supply of water, maintain it and monitor its quality. In this regard, the of communities and local government structures to be able to take up national policies and translate them into practical, long-term strategies to ensure that they have, and can sustain, a supply of safe water, systems for monitoring water quality, access to safe disposal of excreta, and on-going education of both the young and old on how to ensure good hygiene practices was also highlighted.</p>
<p><b>Bangladesh Delta Plan 2100</b></p>	<p>Since the BDP 2100 includes integrated water management in the context of its interactions with climate change, environment, ecology, biodiversity, agriculture, and land management, the plan has adopted the most expensive definition of the Delta Region.</p>	<p>Balancing water supply and demand for sustainable growth for coastal zone; ensuring water supply and sanitation in Barind and Drought prone area; and improved urban services such as water supply, sanitation, wastewater, and solid waste management are the developed strategies. The plan also highlighted that, increasing risks of floods in inner city</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
	<p><b>Focused Areas:</b></p> <ul style="list-style-type: none"> <li>➤ Socio-economic characteristics of Bangladesh Delta</li> <li>➤ Climate change, environment and ecological issues</li> <li>➤ National and transboundary water management</li> <li>➤ Adaptive delta management</li> <li>➤ Managing water resources</li> <li>➤ Sustainable land use and spatial planning across the dynamic delta</li> <li>➤ Sustainable agriculture, food security, nutrition and livelihoods</li> <li>➤ Inland water transport system</li> <li>➤ Urban water management</li> <li>➤ Governance and institutions</li> </ul>	<p>areas; breakdown of basic services-water supply, sanitation, waste disposal; increase in water borne diseases; contamination of surface waters; reduced recharging of ground water sources are the changes expected in urban areas due to climate change induced vulnerabilities. To reduce the vulnerabilities, the plan suggests to develop flood proof water supply and improved drainage system.</p>
<p><b>Bangladesh Climate Change and Strategy Action Plan (2009)</b></p>	<p>The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) is a knowledge strategy built upon the National Adaptation Plan of Action (2005 and 2009). It sets out 44 programs to be taken by Bangladesh over the short, medium and long term within six strategic areas:</p> <p><b>Thematic Areas:</b></p> <ul style="list-style-type: none"> <li>➤ Food security, social protection and health</li> <li>➤ Comprehensive disaster management</li> <li>➤ Infrastructure</li> <li>➤ Research and Knowledge Management</li> <li>➤ Mitigation and low carbon development</li> <li>➤ Capacity building and institutional</li> </ul>	<p>The BCCSAP can be the guiding document to ensure that, climate change is integrated into planning and practice while Bangladesh continues its journey to become a developing country by 2024 and then developed country by 2041. This planning document doesn't contain any specific program or intervention regarding WASH activities or water supply and sanitation.</p>
<p><b>8th Five Year Plan (2021-25)</b></p>	<p>The 8FYP aims to have 8.5 percent GDP growth by 2025. There are also targets for many indicators including inflation, public and private investment, employment, poverty reduction, revenue mobilization, allocation for Annual Development Plan (ADP), and sectoral performances including education and health.</p> <p><b>Sectors:</b></p> <ul style="list-style-type: none"> <li>➤ General public services</li> <li>➤ Public order and safety</li> </ul>	<p>The 8th Fiver Year Plan has developed strategies for water sector which encompasses ensuring safe water to sustainable drinking water and sanitation. The 8th Five Year Plan has addressed that sustainable use and availability of safe water for drinking and sanitation purpose will be ensured. Initiatives will be undertaken to encourage rainwater harvesting where feasible. Besides, increasing storage in existing water retention bodies should be promoted. The plan also recognizes</p>

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
	<ul style="list-style-type: none"> <li>➤ Industrial and economic services</li> <li>➤ Agriculture</li> <li>➤ Power and energy</li> <li>➤ Transport and communications</li> <li>➤ Local government, rural development and cooperatives</li> <li>➤ Environment and climate change</li> <li>➤ Housing and community amenities</li> <li>➤ Health</li> <li>➤ Education and technology</li> <li>➤ Digital Bangladesh and information communications technology</li> <li>➤ Recreation, culture and religion</li> <li>➤ Social protection</li> </ul>	<p>that, urban drinking water and sanitation authorities are key actors in implementing proper interventions to ensure quality of freshwaters. The demand for water and sanitation services in Bangladesh far exceeds the capacities of the municipalities, especially in small towns. While some of the gap can be met through private participation, the capacity of the municipalities can be substantially strengthened by instituting sound cost recovery policies based on beneficiary and polluter pays principles.</p> <p>Under the 8FYP, the Government will support the establishment of the Water and Sanitation Regulatory Agency (WASRA) that will be charged with regulating the public and private utilities engaged with supply water and sanitation services and setting prices. This will follow the participation of private actors in such markets, so that equitable pricing policy ensures both private investment and fair pricing for such basic services.</p> <p>Higher population density associated with urbanization provides an opportunity for governments to deliver basic services such as water and sanitation more cost-effectively to greater numbers of people. Easy access to safe water for drinking and household use facilitates women's empowerment by reducing time spent on searching for safe water and thereby allowing them to be engaged in productive endeavours. Access to water and sanitation services is also essential for household health care. It can save the family from 669 additional expenses and women from care services. These services, both at home and in public places would be expanded to facilitate women's participation in economic and political activities. Arsenic and saline screening would be ensured and traditional filtering methods would be disseminated widely. Also, water conservation programme for the Northern region and coastal belt is important to ease water stress and protect from salinity.</p>
<b>Sector Development Plan (2011-25) for Water</b>	The Sector Development Plan (SDP) is considered as the strategic	A broader consensus is built through a series of stakeholder consultations on a

Policies/Strategies/Plans	Remarks/Focus Areas	Synergies and Gaps
<p><b>Supply and Sanitation Sector in Bangladesh</b></p>	<p>as well as the planning document for the sector to achieve its national goal and targets. In the revised SDP, the issue of 'cost recovery' has been considered central to the improvement of service coverage and standards.</p> <p><b>Focused Areas:</b></p> <ul style="list-style-type: none"> <li>➤ Surface Water Resource Management</li> <li>➤ Groundwater Resource Management</li> <li>➤ Water Quality</li> <li>➤ Arsenic Mitigation</li> <li>➤ Water Safety Plan</li> <li>➤ Hygiene Promotion</li> <li>➤ Vulnerable Groups</li> <li>➤ Public-Private Sector Participation</li> <li>➤ Environment, Climate Change and Disaster Management</li> <li>➤ Research and Development</li> <li>➤ Chittagong Hill Tracts</li> </ul>	<p>set of principles related to cost recovery, which include: a) operation and maintenance of the water supply and sanitation systems based on sound technical and financial management practices, b) adoption of cost recovery measures for WSS services in a manner that will ensure recovery of at least the operation and maintenance costs in the shortest possible time and then gradually recover capital costs and also generate funds for rehabilitation of degraded systems and expansion of facilities to meet future demands, c) ensuring fairness and social justice among the customers and service providers while establishing service standards and tariff, and d) providing safety net for the poor and address the needs of women, children and people with disability. A need for sector reforms to meet the sector challenges is suggested in the SDP. According to this, reform will take place for institutional and organizational development of the service providing agencies (e.g., DPHE, WASAs, City Corporations, Pourashavas and Private Operators) and establishment of a regulatory framework. A Water and Sanitation Regulatory Commission (WSRC) is therefore recommended to regulate the overall provision of water supply and sanitation services. The SDP recommendation provides a basis for taking immediate actions for a uniform but reasonably flexible cost sharing strategy for Bangladesh's water supply and sanitation sector.</p>

### 2.3.2 Existing Acts, Rules and Regulations

Acts, Rules and Regulations	Remarks/Focus Areas	Synergies and Gaps
<p><b>Bangladesh Water Act, 2013</b></p>	<p>The Bangladesh Water Act of 2013 (BWA) is a framework law for integrating and coordinating the management of the nation's water resources. The BWA calls for a coordinated and all-encompassing approach to the development, management, extraction, distribution, use, protection, and preservation of the nation's water</p>	<p>The Act provides the legal framework for integrated development, management, abstraction, distribution, usage, protection and conservation of water resources in Bangladesh. In respect of water supply and sanitation, this act mentions potable water, use of water for hygiene and sanitation to be considered as a universal right. The act also identifies potable water and water for domestic use</p>

Acts, Rules and Regulations	Remarks/Focus Areas	Synergies and Gaps
	<p>resources. It is commonly agreed that a comprehensive legal framework is necessary to address the expanding issues of water rights, the preservation of water resources, water use, and water services and administration.</p> <p><b>Key Measures:</b></p> <ul style="list-style-type: none"> <li>➤ Rights to Water</li> <li>➤ Adoption of National Water Policy and National Water Resources Plan</li> <li>➤ Clearance Certificates</li> <li>➤ Water Stressed Area and Safe yield</li> <li>➤ Restricting abstraction, Protection Orders and Compliance Orders</li> <li>➤ Protection of flood control embankment</li> <li>➤ Conservation of water and management</li> <li>➤ Restrictions on water storing and flood management</li> <li>➤ Punishment for giving false information</li> <li>➤ Water resource pollution control and water quality standards</li> </ul>	<p>as the two top priorities for use of water resources in scarcity stricken areas. The Water Act of 2013 was unable to demonstrate a clear government commitment to ensure water quality. Water pollution issues are referred to in the provision of the Environmental Protection Act of 1995, but no further clarification is given. There is a need for amendments that address the drawbacks of the Act</p>
<b>Water Rules 2018</b>	<p>Bangladesh Water Rules, 2018 have been formulated under the Bangladesh Water Act, 2013.</p> <p><b>Key Measures:</b></p> <ul style="list-style-type: none"> <li>➤ Rights to Water</li> <li>➤ International and local co-operation</li> <li>➤ Adaption of National Water Act</li> <li>➤ Restricting abstraction, Protection Orders and Compliance Orders</li> <li>➤ Inspection and Detention</li> <li>➤ Project clearance</li> <li>➤ Declaration of water and endangered areas and their management</li> <li>➤ Groundwater Protection and Management</li> <li>➤ Natural water flow management</li> </ul>	<p>The Water Rules 2018, despite being quite a recent document, fails to effectively address climate change-related issues, including adaptation and mitigation, in the provisions for water scarcity and water resource management. The document mostly highlights provisions for water scarcity in terms of man-made crises – for instance, excessive water extraction or water pollution. Long-term water scarcity issues due to climate change and waterlogging issues could be researched and incorporated</p>
<b>Local Government Acts 2009</b>	<p>Local Government Act 2009 was undertaken as the existing ordinance related to Union Parishad has been canceled. The Local Government (union Parishad) Act ,2009 demands a widespread commendation. Before the enactment of this ordinance it was</p>	<p>The management of drainage and trash is the responsibility of local governments in Bangladesh, but there are differences in structure between rural and urban areas. Such as- According to Local Government Acts, 2009 for City Corporations enables City Corporations to specify the tariffs, tolls, taxes, and fees that will be charged</p>

Acts, Rules and Regulations	Remarks/Focues Areas	Synergies and Gaps
	<p>operated under Local Government (union Parishad) ordinance, 1983. Present ordinance has ensured some changes.</p> <p><b>Key Measures:</b></p> <ul style="list-style-type: none"> <li>➤ Constitution of Union Parishads</li> <li>➤ Removal of Chairman</li> <li>➤ Budget</li> <li>➤ Punishment</li> <li>➤ Functions</li> </ul>	<p>for essential municipal services such solid waste management, water supply, and drainage but they must first acquire government approval before enacting any tariff increases or the creation of new tariffs. For Pourashavas it explains Pourashava's obligations, which include providing water supply, sanitation, and waste management services. It permits Pourashavas to establish committees at the town level to consult with residents about municipal services and issues pertaining to development efforts, such as the setting and collection of tariffs. It provides the Pourashavas authority to impose tariffs and taxes, subject to prior government permission. It enables Union Parishads to undertake public health awareness, coordination and development activities within respective territories. The Local Government Acts for the rural areas does not specifically mention the responsibilities of the Union Parishad, Upazila Parishad or Zila Parishad to provide rural water supply and sanitation. Under the Union Parishad Act (2009), ward committee will assist in selecting the safe water sources, the Union Parishad shall form a standing committee for water supply, sanitation and sewerage, however the functions of the committee are not defined in the Act</p>
<p style="text-align: center;"><b>Environmental Conservation Act (ECA) 1995</b></p>	<p>Environmental Conservation Act (ECA) 1995 is to provide for conservation of the environment, improvement of environmental standards and control and mitigation of environmental pollution.</p> <p><b>Key Measures:</b></p> <ul style="list-style-type: none"> <li>➤ Conservation and improvement of environment</li> <li>➤ Declaration of Ecologically critical areas</li> <li>➤ Environmental clearance</li> <li>➤ Regulation of the industries and other development activities discharge permit.</li> <li>➤ Promulgation of standards for quality of Air, Water, Noise and Soil for different areas for different purposes.</li> <li>➤ Promulgation of standard limit for discharging and emitting waste.</li> </ul>	

Acts, Rules and Regulations	Remarks/Focues Areas	Synergies and Gaps
	<ul style="list-style-type: none"> <li>➤ Formulation and declaration of Environmental guidelines.</li> <li>➤ Power and functions of the authorities</li> </ul>	
<p style="text-align: center;"><b>Environment Conservation Rules (ECR) 1997</b></p>	<p>The Department of Environment has promulgated the Environment Conservation Rules 1997 under the ECA 1995 to evaluate, review the Environmental Impact Assessment (EIA) of various projects and activities, and procedures be established for approval.</p> <p><b>Key Measures:</b></p> <ul style="list-style-type: none"> <li>➤ A list of industries, indicating their allocation to the Green, Amber -A, Amber-B, and Red categories</li> <li>➤ Application format for Environmental clearance</li> <li>➤ Ambient standards in relation to water pollution, air pollution and noise, as well as permitted discharge/Emission levels of water and air pollutants and noise by industries.</li> <li>➤ The Rules incorporate "inclusion lists " of projects requiring varying degrees of Environmental investigation</li> <li>➤ Feasibility Study Report of the industry (Project)</li> <li>➤ IEE/EIA Report</li> <li>➤ An NOC (Notice of Consent) from the local authorities concerned</li> <li>➤ Pollution minimization plane including Emergency plane for mitigation of adverse environmental impacts</li> <li>➤ Outline of relocation planes</li> <li>➤ Other information as deemed necessary</li> </ul>	

### 3. Overview of Existing WSS Situation

Two crucial areas in creating a development strategy for a region are water supply and sanitation. Sanitation and access to clean water for drinking are fundamental human rights and necessities. Bangladesh faces numerous difficulties in the areas of water, sanitation, and hygiene. To ensure that the rural population leads a healthy life, Bangladesh's rural areas' water supply and sanitary conditions need to be improved. Although the GoB has taken significant steps, the WSS sector in rural areas still requires more appeal. This chapter outlines the existing WASH practices and problems in fifteen villages. Also, the whole Bangladesh has been demarcated into seven zones based on WASH hotspots with fifteen villages chosen by a strategized random approach and validated by consulting with DPHE at the end. These villages were chosen in order to encompass all seven (7) zones. The WASH and O&M practices currently used in those villages have been evaluated, and as a result, any shortcomings have been noted.

#### 3.1 Demarcation of Zone Boundary

Using WSS hotspots as a guide, Bangladesh has been divided into seven zones. The delineation was completed based on research of the literature and the expert opinion of the distribution of natural catastrophes along Bangladesh that have an impact on the WSS in Bangladesh. The delineated zones were later verified by discussion with DPHE.

Identified seven zones are namely known as:



Defintion of the demarcated zones are as below:

**Table 3.1: Definition of Delineated Zones**

Icon	Zone Name	Description
	Coastal Area	"The area where saline water has intruded into shallow or deep aquifers or both" is how the DPHE defined a coastal belt (DANIDA, 1999). Coastal zone is defined based on criteria of tidal water movement, Salinity intrusion and cyclone risk specially. Nineteen (19) districts falls under the coastal zone of Bangladesh.

Icon	Zone Name	Description
	Barind Area	The Barind Tract is an elevated Pleistocene Terraces (about 11-48 m amsl) in northwestern Bangladesh and is widely accepted Tract to have been evolved from tectonic upliftment and /or exists as an erosional geomorphic feature. The Barind Tract covers most parts of the greater dinajpur, rangpur, pabna, rajshahi, bogra, joypurhat and naogaon districts of Rajshahi division.
	Haor Area	The wetland ecosystem, also known as a backswamp, is located in the northeastern region of Bangladesh and is physically shaped like a shallow dip in the shape of a bowl or saucer.
	Hill Tracts	Hill areas especially at Eastern Zone (Chattogram) and North Eastern zone of Bangladesh.
	Flood Prone Area	There are five land types in Bangladesh based on inundation: Highland (F0), Medium Highland (F1), Medium Lowland (F2), Lowland (F3), and Very Lowland (F4). The F3 and F4 landtypes are considered as flood prone area as normally flooded up to between 180 and 300 cm deep of more than 300cm deeper during the flooding season.
	Plain Land	Any relatively level area of the surface exhibiting gentle slopes and small local relief. Most of the land is shallowly flooded during monsoons.

### 3.2 Selection of Villages

To carry out this study on water supply, sanitation, and hygiene, forty (40) villages from 15 different districts were chosen in accordance with the Terms of Reference (ToR). Nine criteria were used to choose the villages these include the following: arsenic contamination, barind area, coastal, cyclone-prone, beel/char, haor, hilly, flood-prone, and plain land. Seven study area districts from remote locations and eight study area districts from eight divisions are chosen. The feasibility study focuses on fifteen (15) of the forty (40) villages. The following criteria were used to choose the 15 villages:

- All the defined zones (section 2.1) are covered by the villages.
- The 40 villages that were chosen for the pilot research are not far from the 15 villages.
- Villages are into Hard to Reach (HtR) areas

Later, after consulting with DPHE, the villages chosen were validated.

**Table 3.2: List of Selected Villages**

SL	Category	Villages Name	Upazilla/District	Number of Villages
1.	Coastal Area	Datinakhali*	Shyamnagar/Shatkhira	3
		Induria	Hijla/Barishal	
		Charsharat	Mirsarai/Chattogram	
2.	Barind Area	Khordachompa*	Niamatpur/Naogaon	1
3.	Haor Area	Shimulbank*	Shantiganj/Sunamganj	2

SL	Category	Villages Name	Upazilla/District	Number of Villages
		Bagaiya	Gowainghat/Sylhet	
4.	Hill Area	Chota Harina (mouza)	Barkal/Rangamati	1
5.	Plain Land	Khordachompa	Niamatpur/Naogaon	6
		Sonadanga	Bagmara/Rajshahi	
		Beelchanda	Muksudpur/Gopalganj	
		Pathordubi	Bhurungamari/Kurigram	
		Hafizpur	Manohardi/Narsingdi	
		Dakkhin Demura	Barhatta/Netrokona	
6.	Flood Prone Area	Fulchari	Fulchhari/Gaibandha	2
		Pathardubi	Bhurungamari/Kurigram	
7.	As Contaminated Area	Saikchail	Manoharganj/Cumilla	4
		Tipna	Dumuria/Khulna	
		Shimulbank	Shantiganj/Sunamganj	
		Datinakhali	Shyamnagar/Shatkhira	

\*Villages falls into more than one zones

**Table 3.3: Hard to Reach (HtR) areas**

SL	Village Name	Hard to Reach	Frequency
1.	Datinakhali, Shimulbank, Khordacompa, Sonadanga, Induria, Bagaiya, Chota Harina (mouza), Hafizpur, Dakkhin Demura	Extremely	9
2.	Tipna, Charsharat, Fulchari, Pathordubi	Very	4
3.	Saikchail, Beelchanda	N/A	2

N.B. This table is generated based on Rokeya Ahmed and Shareful Hassan's "Hard-to-Reach Areas: Providing Water Supply and Sanitation Services to All" (2012) guidance note.

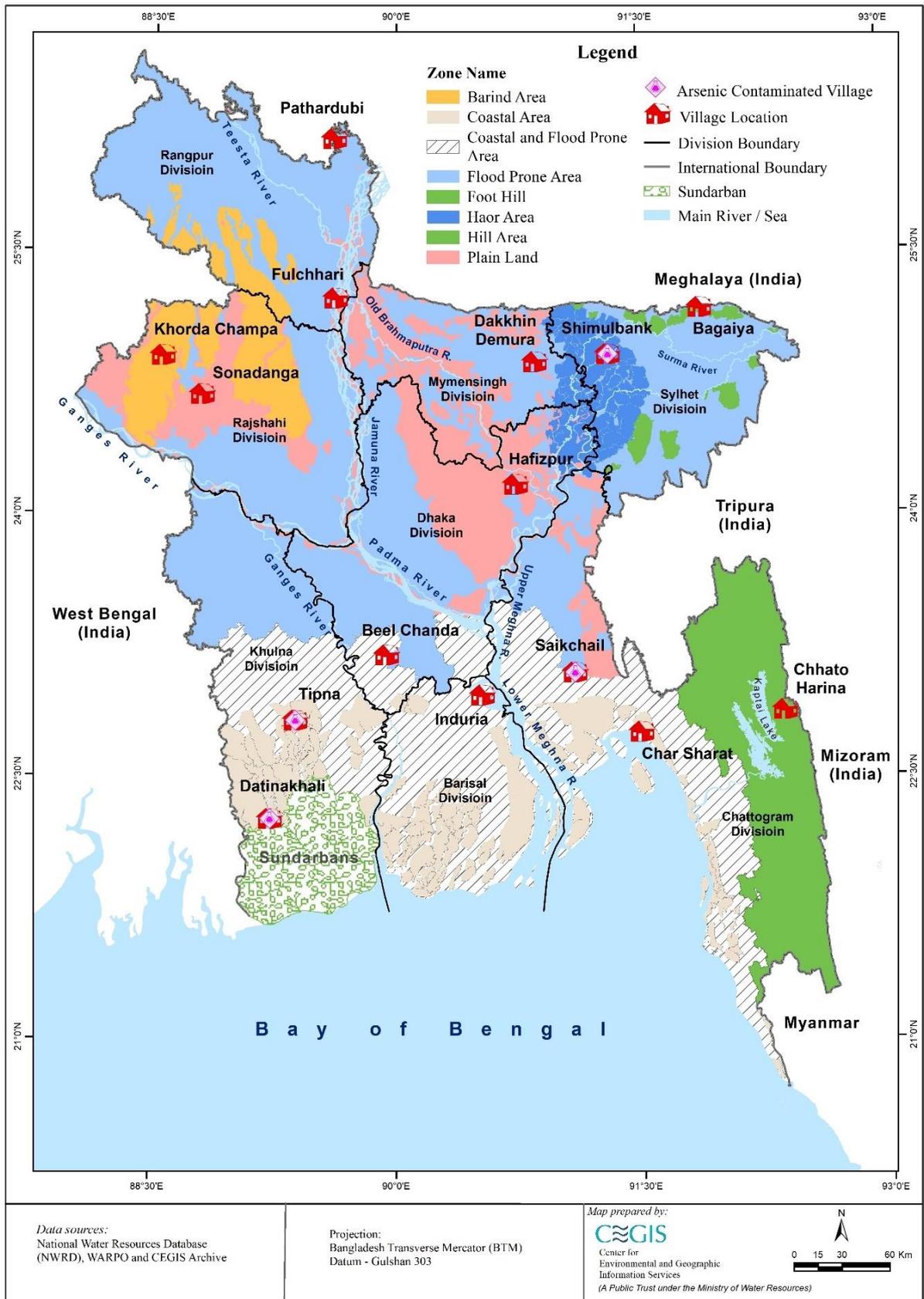


Figure 3.1: Demarcated Zones

### 3.3 Governing Natural Hazards

As previously indicated, the delineation of seven (7) zones was accomplished in accordance with a review of the literature and the professional opinion of the distribution of natural disasters along Bangladesh that have an impact on the WSS in Bangladesh. The distribution of natural disaster among these seven (7) zone are tabulated below:

**Table 3.4: Distribution of Natural Disaster Among the Seven (7) Zones**

SL	Category	Villages Name	Upazilla/District	Governing Natural Hazards
1.	Coastal Area	Datinakhali	Shyamnagar/Shatkhira	Storm surges, Tsunami, Tidal Flood, Flooding Due to Cyclone Induced Storm Surges, Coastal Erosion, Sea-level rise, Salinity , River Bank Erosion
		Induria	Hijla/Barishal	
		Charsharat	Mirsarai/Chattogram	
2.	Barind Area	Khordachompa	Niamatpur/Naogaon	Drought, Flash Flood, Monsoon Flood
3.	Haor Area	Shimulbank	Shantiganj/Sunamganj	Flash Flood, River Bank Erosion
		Bagaiya	Gowainghat/Sylhet	
4.	Hill Area	Chota Harina (mouza)	Barkal/Rangamati	Land Slide, Flash Flood
5.	Plain Land	Khordachompa	Niamatpur/Naogaon	Monsoon Flood, Riverbank Erosion, Flash Flood
		Sonadanga	Bagmara/Rajshahi	
		Beelchanda	Muksudpur/Gopalganj	
		Pathordubi	Bhurungamari/Kurigram	
		Hafizpur	Manohardi/Narsingdi	
		Dakkhin Demura	Barhatta/Netrokona	
6.	Flood Prone Area	Fulchari	Fulchhari/Gaibandha	Monsoon Flood, Riverbank Erosion
		Pathardubi	Bhurungamari/Kurigram	
7.	As Contaminated Area	Saikchail	Manoharganj/Cumilla	Flash Flood, River Bank Erosion, Monsoon Flood, Flooding Due to Cyclone Induced Storm Surge (Shatkhira), Salinity
		Tipna	Dumuria/Khulna	
		Shimulbank	Shantiganj/Sunamganj	
		Datinakhali	Shyamnagar/Shatkhira	

### 3.4 Existing WASH Practices

In 15 pilot villages, the level of the water supply and sanitation is not quite sufficient. Water is mostly obtained via personal tubewells, neighbor's tubewells, government tubewells, community tubewells, rainwater, ponds, individual projects/NGO, and other sources in all villages. In Fulchari, Pathordubi, and Hafizpur villages, over 60% of residents utilize personal tubewells; in Shimulbank and Tipna villages, the percentages are 70% and 49%, respectively. In Datinakhali village, there are several different sources of water, including streams, NGO/project-provided water, and so on. Again, the sanitation practices of all pilot villages are in alarming condition. At least 85% toilet availability has been found only in Hafizpur village otherwise the toilet unavailability rate is >85% to the rest of the villages. The most devastating situation prevailed in Fulchari, Khordachompa and Shimulbank village as the rate is <40%.

The existing water supply problem is not getting safe & adequate water for their daily use. The reason behind the Water scarcity in selected villages is given below:

- Declination of GW Table
- Drying up of the water of river, pond, Khal & other sources
- Sinking down of tubewells in flood period
- Rain is not proper
- Poverty

The sanitation and hygiene practice is not above average condition in all pilot villages. The main problem is toilet unavailability, inadequate toilet facilities, knowledge gap about cleanliness and health consciousness.

**Table 3.5: Summary of Existing Water Supply and Sanitation Options**

SL	Category	Villages Name	Existing WS options	Existing Sanitation options
1.	Coastal Area	Datinakhali	Neighbour's tubewell, government tubewell, Personal tubewell, rainwater, project water	1. Pit Latrine, 2. VIP latrine, 3. Flash Latrine
		Induria		
		Charsharat		
2.	Barind Area	Khordachompa	Motorized Personal Tubewell, Community Tubewell, Pipe water supply	1. VIP latrine, 2. Flash Latrine, 3. Pit Latrine
3.	Haor Area	Shimulbank	Neighbour's tubewell, Government Tubewell	1. Pit Latrine 2. Septic Tank latrine 3. Flash latrine 4. VIP latrine
		Bagaiya		
4.	Hill Area	Chota Harina (mouza)	Neighbour's tubewell, Spring, Pond/River, Government tubewell	1. Pit Latrine 2. VIP Latrine 3. Flash latrine 4. Open Latrine
5.	Plain Land	Khordachompa	Personal Tubewell, Motorized Personal Tubewell, Neighbour's tubewell	1. Pit Latrine 2. VIP Latrine 3. Septic tank latrine 4. Flash latrine
		Sonadanga		

SL	Category	Villages Name	Existing WS options	Existing Sanitation options
		Beelchanda		
		Pathordubi		
		Hafizpur		
		Dakkhin Demura		
6.	<b>Flood Prone Area</b>	Fulchari	Personal Tubewell, Neighbour's tubewell	1. Pit Latrine 2. Flash latrine 3. VIP latrine
		Pathardubi		
7.	<b>As Contaminated Area</b>	Saikchail	Personal Tubewell, Government Tubewell, Neighbour's tubewell, rainwater, project water	1. Pit Latrine 2. VIP latrine 3. Flash latrine 4. Septic Tank latrin
		Tipna		
		Shimulbank		
		Datinakhali		

### 3.5 Challenges & Issues regarding Village Water Supply and Sanitation Services

The major challenges and issues in village water supply are:

- Growing water demand and water scarcity
- Lack of safe water sources and climate change impacts
- Insufficient access to safe water supply
- Lack of infrastructure and technical facilities for water storage, treatment and supply
- Improper planning, management and lack of good governance
- Unavailability of water sources and improper collection
- Poor practices of rainwater collect and storage
- Lowering of groundwater level and contamination of water with Fe, Mn, As and fecal materials
- Lack of coordination between government agencies, NGOs and private sectors
- Lack of protocol and institutional arrangement for quality assessment of rural water supply.

Major challenges and issues in rural sanitation:

- Lack of proper infrastructures (unimproved) and containments for sanitation
- Lack of awareness of the rural community
- Financial Constraints
- Lack of technology for faecal sludge management
- Organizational support and institutional arrangement for sanitation services
- Lack of coordination among Governmental organizations, NGOs and private sectors
- Lack of appropriate sanitation technologies in water stress and flood prone and hilly areas of Bangladesh.

### 3.6 Existing O&M Practices

The following water supply and sanitation O&M issues were identified from the field visit, consultation with the users, caretakers, operators, technology providers, government agencies, LGI leaders, and

officials, which altogether have made the water supply and sanitation technologies non-functional, non-operational or inaccessible:

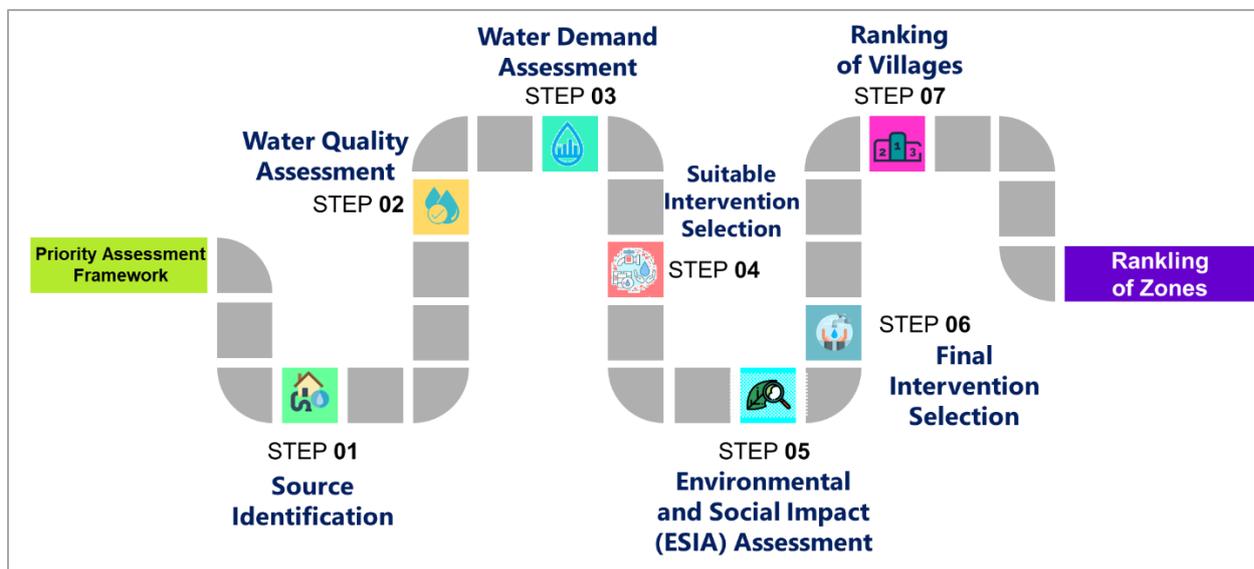
- **The community-based O&M approach is not functional for most community-based water options**, including PSF, AIRP, MAR, and Ring well, due to wrong site selection, absence of ownership and mobilization of the user community, proper O&M plan, and follow-up actions.
- The **absence of local-level technical skills and spare parts at the local markets** for sophisticated technological options like Tara pump, RO plant, or any other piloted specialized options keep them non-functional once they go out of order.
- The **coexistence of multiple water options in the same area** (like PSF, MAR and RO in the coastal area, and tube well/Tara pump with piped water supply in Barind or other areas) contributes to the number of abandoned water options, as well as lack of ownership among users for any option.
- The **water source is critically impacted by the current operation and maintenance practice for many water supply systems**. For example, the extensive use of the submersible pump makes the Tara pump redundant; deforestation causes the drying of natural stream sources, making GFS non-functional and abandoned; saline water intrusion contaminates the fresh pond making PSF non-functional; salty taste and foul odor often restrain people from using MAR water.
- **High-cost involvement and labor-intensive cleaning and maintenance for the filter** of AIRP, GFS and PSF demotivate the users and caretakers to clean the systems regularly, resulting in the system's inactivation or poor-quality of water.
- **Technical support is not available at the local level** for the community model of rural piped water supply, solar power operated PSF and RO plant which is increasing non-functionality of these options once they get out of order. Cleaning of system components is irregular, and as a result, the water quality is often not up to the standard.
- **In a non-metering piped water supply system, water is wasted**. The flat-rate tariff system fails to maintain equity as it does not consider the consumption rate per household. In addition, the tariff does not cover the O&M cost for the system.
- The **absence of a financially viable business model for any community water option with high replacement costs** such as submersible pump-driven rural piped water supply system (with or without treatment options) and RO plant-based water supply system in the coastal region. It becomes challenging to run the systems after the expiry of the warranty period.
- The **non-existence of a dedicated and sustainable O&M fund for community-based WASH options at the local-level and Government revenue budget** makes the major repair, maintenance, and rehabilitation almost impossible, which results in more non-functional water options.
- The **absence of service standard and standard operating procedure (SOP)** for O&M of WASH technologies makes the achievement of SDG indicators (e.g., accessibility, quality, quantity, reliability, affordability, and non-discrimination or equity) more difficult.
- The **absence of a government body/third party for water quality surveillance, monitoring, and service regulation** makes the service providers more unaccountable in terms of service provision and its O&M.
- **GoB projects have less focus on the repair and rehabilitation of non-functional water supply** and sanitation facilities. GoB projects undertaken for new construction of water

supply and sanitation facilities lacks rehabilitation, including O&M and community mobilization components.

- **The NGO facilitated O&M fund in urban slum is not often easily accessible** for immediate use by the O&M committee for repair and maintenance of water supply and sanitation infrastructures during emergency. Again, without NGO facilitation, the O&M fund is at risk of misuse.
- **Community toilets are mostly unclean.** Toilet facilities are inadequate and not friendly to females and people with disabilities. Septic tanks of these community toilets often overflow, leak, and pollute the environment.
- **The School-level Improvement Plan (SLIP) fund does not cover O&M costs** in primary school, and it is absent in high schools and other educational institutions.
- There is **no allocation from GoB for maintenance of the WASH facilities in primary healthcare facilities** like community clinics. Currently, repair and maintenance are done with the contribution of money from the patients visited.
- The **provision of running water with the availability of soap in or near the toilet is almost absent** in communities, schools, and health care facility toilets. Availability of menstrual hygiene management (MHM) corners with MHM kits and their safe disposal after use is practically absent in almost all these toilet facilities.
- In **clayey soil and high-water table areas, toilets/pits become unusable due to low or no drainage of liquid** from the pits, particularly in the wet season. It causes the pit to be filled up quickly before the expected time.
- In most cases, **both the pits of the twin pit latrines are found to be used simultaneously** (i.e., not resting a pit while the other one is used), for which the users do not get benefits of the twin pit latrines. Sometimes the diversion box (Y-junction) suffers operational problems.
- **Climate change-induced events and disasters** like cyclones, intense storms, flash floods, and droughts cause **damage/uprooting/submergence of water supply and sanitation infrastructures** and threaten access to water supply and sanitation services during disasters.

## 4. Development of Priority Assessment Framework

Selection of the WSS intervention is based on the source's accessibility and availability, management of the water demand analysis, and order of the indicators and intervention. In areas where surface water is available and accessible to locals, a suitable surface water-based WSS intervention is selected. If a given area lacks an adequate surface water source, the appropriate ground water-based solution is selected. To determine the amount of water needed for drinking and sanitary purposes after choosing the source, the water demand for a specific area is evaluated. After determining the water demand, regions are prioritized to determine which ones require immediate WSS intervention. Some indicators and sub indicators are selected to for final selection of the intervention. Finally, a tentative budget of the selected intervention is estimated for overall implementation of the selected WSS intervention. The approach followed for development of Priority Assessment Framework are graphically represented in [Figure 4.1](#).



**Figure 4.1: Approach of Development of Priority Assessment Framework**

### 4.1 Source Identification

Existing water sources were identified via extensive field survey work. A questionnaire was prepared by conducting thorough research on previous similar data and inquiries in this regard. The questionnaire was validated by the DPHE officials and after that it was implemented in the Field test. In the field test, the enumerators used the prepared and validated questionnaire to conduct a test survey. After that the questionnaire was finally effectuated in the survey. The water sources for both water supply and sanitation were recorded separately for each village. But in [Table 4.1](#) summary of Identified Sources of Water Supply and Sanitation have been presented:

**Table 4.1: Identified Sources of Water Supply and Sanitation**

Zone	Water supply Options	Sanitation Options
Plain zone	Hand tubewell, deep tubewell	Single and twin pit latrines, septic tank
Coastal zones	Pond sand filter (PSF), rainwater harvesting, pond water, deep tubewell, surface water treatment plant.	Single and twin pit latrine with elevated platform, hanging latrine
Arsenic affected zones	Deep tubewell, shallow tubewell, arsenic removal technologies (e.g., SIDKO plant, community-based arsenic iron removal plant, READF)	VIP latrine, flash latrine, septic tank latrine
Hilly Zones	Spring, deep tubewell, surface water treatment plant	Single pit, open pit
Haor area	Motorized tubewell, river water, pond water	Single pit, VIP latrine, Flash latrine
Flood Prone area	Personal tubewell, neighbours pipe supply, neighbours tubewell	Pit latrine, VIP latrine, Flash latrine
Barind Area	Deep tubewell, shallow tubewell	Pit latrine, VIP latrine, flash latrine, septic tank latrine

#### 4.2 Water Demand Assessment

Water demand is analyzed based on three categories which includes domestic water, non-domestic water and water losses. Water demand varies due to average and peak flows, dry and wet season, diurnal flow, drought and non-drought periods. Factors affecting water demand includes weather, population, service level, health and epidemiology, political developments, economic growth and decline. On the other hand, water demand management seeks to influence water demand in order to achieve consumption levels that are equitable, efficient and sustainable.

Under the current socio-economic conditions prevailing in villages, a water demand of 125 lpcd has been considered. A projection of the future population and water demand was made in each village under the project and an investment plan can be developed. This was conducted in case of a piped water supply system will be undertaken in a village.

**Table 4.2: Villagewise Existing HH Avg. daily water uses/demand (L)**

Category	Village Name	Main Water Sources	HH Avg. daily water uses/demand (L)
Coastal Area	Datinakhali, Induria, Charsharat,	Neighbour's tubewell, Rainwater, Buy water, Govt. Tubewell, Personal Tubewell	14.34
As Contaminated Area	Saikchail, Tipna, Datinakhali, Shimulbank	Govt. Tubewell, Personal Tubewell, Rainwater, Buy water, Neighbour's tubewell,	14.39
Haor Area	Shimulbank, Bagaiya	Govt. Tubewell, Neighbour's Tubewell, Personal Tubewell, Pond, Spring	15.31
Barind Area	Khordachompa	Motorized Personal Tubewell, Community Tubewell, Pipe Supply,	13.56

Category	Village Name	Main Water Sources	HH Avg. daily water uses/demand (L)
Hill Area	Chota Harina (mouza)	Ringwell, Spring, Pond/River,	13.75
Flood Prone Area	Fulchari, Pathardubi	Personal Tubewell, Neighbour's tubewell, Motorized Personal Tubewell	12.24
Plain Land	Khordachompa, Sonadanga, Beelchanda, Pathordubi, Hafizpur, Dakkhin Demura	Personal Tubewell, Neighbour's tubewell, Motorized Personal Tubewell	11.97

### 4.3 Water Quality Assessment

During the survey, respondents were asked about the quality of water source. In reply, 74.08% of the respondents told that the quality of water sources is good and the highest is found in Khordachompa (96.26%) village. About 15.08% households reply, the quality of water sources is bad the highest is found in Dakkhin Demura (58.98%) village and 22.79% of the respondents told that the quality of water sources is acceptable. The detail is presented in [Figure 4.2](#).

Respondents were asked about the main reason for poor water quality. In reply, respondents told that, the main reason for poor water quality is iron (44.32%), odor (18.15%), turbidity (11.26%), bad taste (10.76%), arsenic (9.81%), salinity (5.51%) and others (0.18%) respectively. [Table 4.3](#) shows the details.

**Table 4.3: Villagewise Existing HH Avg. daily water uses/demand (L)**

Water Quality	%	Max.	Min.
Arsenic	9.81	Saikchail	Fulchari, Khordachompa, Datinakhali
Bad Taste	10.76	Fulchari	Khordachompa, Datinakhali
Iron	44.32	Hafizpur	Datinakhali
Odor	18.15	Khordachompa	Tipna
Others	0.18	Charsharat	Saikchail, Fulchari, Beelchanda, Tipna, Pathordubi, Khordachompa, Datinakhali, Shimulbank, Bagaiya Sonadanga
Salinity	5.51	Datinakhali	Fulchari, Beel canda, Khordachompa, Dakkhin Demura, Sonadanga
Turbidity	11.26	Chota Harina (mouza)	Hafizpur

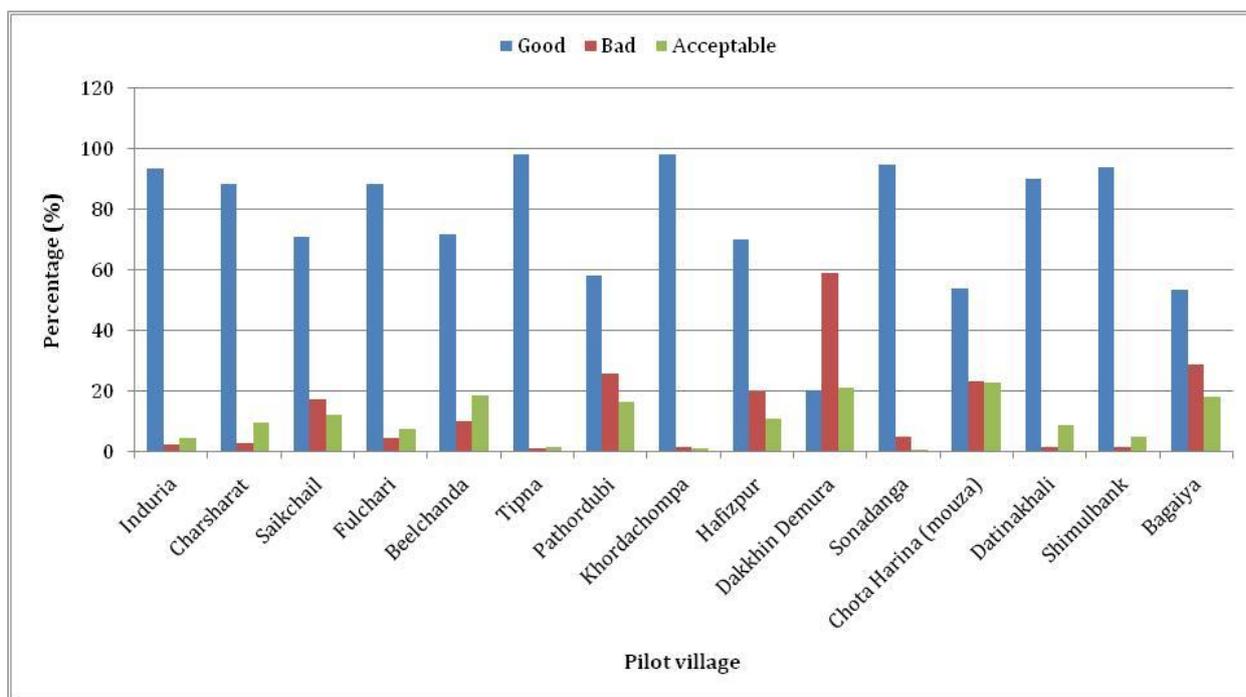


Figure 4.2: Quality of Drinking Water in Pilot Villages

#### 4.4 Suitable Intervention Selection

Based on the seven (7) criteria as in: Physiology of the villages, Hydrology, Hydrogeology, Disaster, Hard to Reach area, Water quality, Development, Expert opinion & consultation with local DPHE officials and local community, the following interventions are suggested by our experts to lessen the sufferings of those villagers of selected 15 pilot villages. [Table 4.4](#) depicts the interventions related to water supply and sanitation.

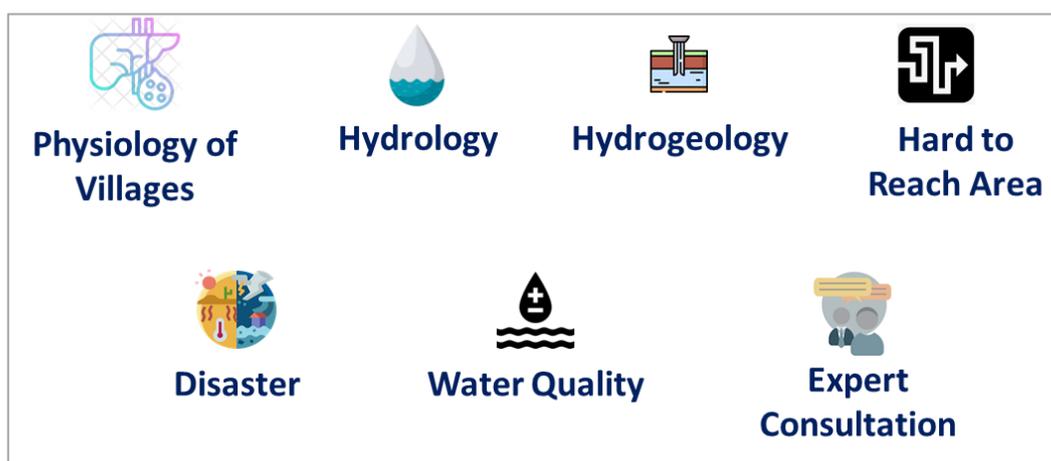


Figure 4.3: Considered Criterias for Selection of Interventions

**Table 4.4: Proposed Interventions (Village-wise) of water supply and sanitation**

Name	Existing and Demanded Options	Proposed Intervention Options
<i>Datinakhali</i> , Labsa, Shyamnagar, Satkhira	<ol style="list-style-type: none"> <li>1. Pipe Water supply</li> <li>2. Region based deep tubewells</li> <li>3. Govt., non-Govt. water supply during disaster</li> </ol>	<ol style="list-style-type: none"> <li>1. Rain Water Harvesting System (RWHS)</li> <li>2. Pond Sand Filter (PSF)</li> <li>3. Reverse Osmosis (RO) plant</li> <li>4. Water Treatment Plant</li> <li>5. Household Filters</li> <li>6. Solar Disinfection (SODIS)</li> </ol>
<i>Induria</i> , Memania, Hijla, Barishal	<ol style="list-style-type: none"> <li>1. Elevated installation of tubewell</li> <li>2. Region based deep tubewell</li> <li>3. Arsenic free tubewell</li> <li>4. Pipe water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini piped water supply</li> <li>2. Rain water harvesting</li> <li>3. Submersible tubewell</li> <li>4. Water treatment plant</li> <li>5. Ring well</li> </ol>
<i>Charsharat</i> , Ichakhali, Mirsarai, Chittagong	<ol style="list-style-type: none"> <li>1. Elevated installation of tubewell</li> <li>2. Piped water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini piped water supply</li> <li>2. Submersible tubewell</li> <li>3. Ring well</li> <li>4. Rainwater harvesting</li> <li>5. Water treatment plant</li> </ol>
<i>Shimulbank</i> , Shimulbank, Shantiganj, Sunamganj	<ol style="list-style-type: none"> <li>1. Arsenic free tubewell</li> <li>2. Elevated installation of tubewell</li> <li>3. Piped water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Rural Piped water supply</li> <li>2. Deep Tubewell</li> <li>3. Dug Well</li> </ol>
<i>Bagaiya</i> , Rustampur, Gowainghat, Sylhet	<ol style="list-style-type: none"> <li>1. Elevated installation of tubewell</li> <li>2. Piped water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini piped water supply</li> <li>2. Submersible tubewell</li> <li>3. Ring well</li> <li>4. Rainwater harvesting</li> <li>5. Water treatment plant</li> </ol>
<i>Khordachompa</i> , Hajinagar, Niamatpur, Naogaon	<ol style="list-style-type: none"> <li>1. Arsenic free tube well</li> <li>2. Elevated installation of tube wells</li> <li>3. Region based deep tube wells.</li> <li>4. Pipe Water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini piped water supply</li> <li>2. Deep Tube well</li> <li>3. Shallow tube well</li> <li>4. No (6) tube well</li> <li>5. Tara pump</li> <li>6. Submersible tube well</li> <li>7. Dug well</li> <li>8. Iron removal technology</li> <li>9. Rain water harvesting</li> </ol>
<i>Fulchhari</i> , Fulchhari, Fulchhari, Gaibanda	<ol style="list-style-type: none"> <li>1. Elevated installation of tubewell</li> <li>2. Arsenic free tubewell</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini piped water supply</li> <li>2. Rainwater harvesting</li> <li>3. Submersible tubewell</li> <li>4. Water treatment plant</li> <li>5. Ring well</li> </ol>
<i>Pathordubi</i> , Pathardubi, Bhurungamari, Kurigram	<ol style="list-style-type: none"> <li>1. Arsenic free tube well</li> <li>2. Elevated installation of tube wells</li> <li>3. Region based deep tube wells.</li> <li>4. Pipe Water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Submersible tube well</li> <li>2. Iron removal technology</li> <li>3. Shallow tube well</li> <li>4. No (6) tube well</li> <li>5. Tara pump</li> <li>6. Submersible tube well</li> <li>7. dug well</li> <li>8. Mini piped water supply</li> </ol>

		9. Rain water harvesting
Beelchanda, Jalirpar, Muksudpu, Gopalganj	<ol style="list-style-type: none"> <li>1. 1.Arsenic free tube well</li> <li>2. 2.Elevated installation of tube wells</li> <li>3. 3. Pipe water Supply</li> <li>4. 4.Region based deep tube wells</li> </ol>	<ol style="list-style-type: none"> <li>1. Submersible tube well.</li> <li>2. Deep Tube well</li> <li>3. Shallow tube well</li> <li>4. Tara pump</li> <li>5. No (6) tube well</li> <li>6. Dug well</li> <li>7. Mini piped water supply</li> <li>8. Iron removal technology</li> <li>9. Rain water harvesting</li> </ol>
Hafizpur, Chalakchar, Manohardi, Narsingdi	<ol style="list-style-type: none"> <li>1. Arsenic free tube well</li> <li>2. Elevated installation of tube wells</li> <li>3. Region based deep tube wells.</li> <li>4. Pipe Water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini piped water supply</li> <li>2. Rural piped water supply</li> <li>3. Submersible tube well</li> <li>4. Deep Tube well</li> <li>5. Shallow tube well</li> <li>6. No (6) tube well</li> <li>7. Tara pump</li> <li>8. Dug well</li> <li>9. Iron removal technology</li> <li>10. Rainwater harvesting</li> </ol>
Dakkhin Demura, Sahata, Barhatta, Netrakona	<ol style="list-style-type: none"> <li>1. Arsenic free tube well</li> <li>2. Elevated installation of tube wells</li> <li>3. Region based deep tube wells.</li> <li>4. Pipe Water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini piped water supply</li> <li>2. Deep Tube well</li> <li>3. Shallow tube well</li> <li>4. No (6) tube well</li> <li>5. Tara pump</li> <li>6. Submersible tube well</li> <li>7. Dug well</li> <li>8. Iron removal technology</li> <li>9. Rainwater harvesting</li> </ol>
Sonadanga, Sonadanga, Bagmara Rajshahi	<ol style="list-style-type: none"> <li>5. Arsenic free tube well</li> <li>6. Elevated installation of tube wells</li> <li>7. Region based deep tube wells.</li> <li>8. Pipe Water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Submersible tube well</li> <li>2. Deep Tube well</li> <li>3. Shallow tube well</li> <li>4. No (6) tube well</li> <li>5. Tara pump.</li> <li>6. Dug well</li> <li>7. Mini piped water supply</li> <li>8. Iron removal technology</li> <li>9. Rainwater harvesting</li> </ol>
Chotoharina, Bhusonchora, Barkal, Rangamati.	<ol style="list-style-type: none"> <li>1. Hand Tubewell</li> <li>2. Pipe Water supply</li> <li>3. Ringwell</li> </ol>	<ol style="list-style-type: none"> <li>1. No. 6 Tubewell</li> <li>2. Dug Well</li> <li>3. Pond Sand Filter (PSF)</li> <li>4. Rainwater Harvesting Plant</li> <li>5. Water Treatment Plant</li> </ol>
Saikchail, Bipulasar, Manoharganj, Cumilla.	<ol style="list-style-type: none"> <li>4. Arsenic free tubewell</li> <li>5. Region based deep tubewells</li> <li>6. Pipe Water supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Mini Piped Water Supply</li> <li>2. Submersible Tubewell</li> <li>3. Dug Well</li> <li>4. Pond Sand Filter (PSF)</li> </ol>

		<ol style="list-style-type: none"> <li>5. Infiltration gallery/Well</li> <li>6. Arsenic Iron Removal Plant (AIRP)</li> </ol>
<i>Tipna</i> , Kharnia, Dumuria, Khulna	<ol style="list-style-type: none"> <li>1. Region based deep Tubewells</li> <li>2. Pipe Water supply</li> <li>3. Arsenic free tubewell</li> </ol>	<ol style="list-style-type: none"> <li>1. Submersible Tubewell</li> <li>2. Deep tubewell</li> <li>3. Solar Disinfection (SODIS)</li> </ol>

**Table 4.5: Proposed Interventions (Zonewise) of water supply and sanitation**

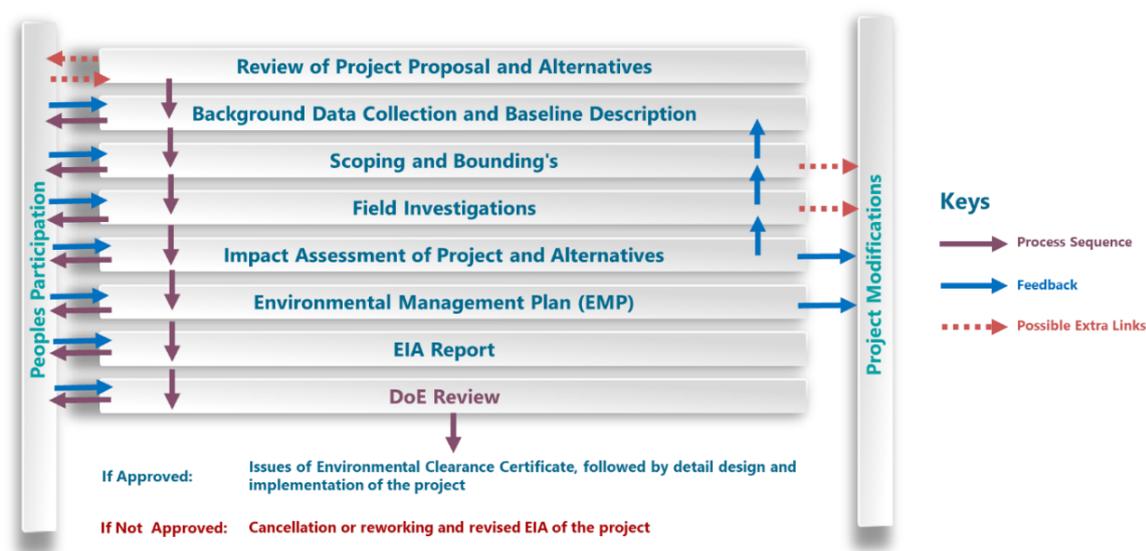
Zone	Water supply Options	Sanitation Options
<b>Plain Land</b>	<ul style="list-style-type: none"> <li>• Submersible tube well</li> <li>• Deep Tube well</li> <li>• Shallow tube well</li> <li>• No (6) tube well</li> <li>• Tara pump</li> <li>• dug well</li> <li>• Mini piped water supply</li> <li>• Iron removal technology</li> <li>• Rain water harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion of single pit latrine to twin pit latrine</li> <li>• Complete twin pit latrine</li> <li>• Flash latrine</li> <li>• Septic tank flash latrine</li> </ul>
<b>Coastal area</b>	<ul style="list-style-type: none"> <li>• Mini piped water supply</li> <li>• Rainwater harvesting</li> <li>• Submersible tubewell</li> <li>• Water treatment plant</li> <li>• Ring well</li> <li>• Pond Sand Filter</li> <li>• RO Plant installation</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion of single pit latrine to twin pit latrine</li> <li>• Complete twin pit latrine</li> <li>• Flash latrine</li> <li>• Septic tank flash latrine</li> </ul>
<b>Arsenic contaminated zones</b>	<ul style="list-style-type: none"> <li>• Rural Piped water supply</li> <li>• Deep Tubewell</li> <li>• Dug Well</li> <li>• Mini Piped Water Supply</li> <li>• Submersible Tubewell</li> <li>• Pond Sand Filter (PSF)</li> <li>• Infiltration gallery/Well</li> <li>• Arsenic Iron Removal Plant (AIRP)</li> <li>• Rain Water Harvesting System (RWHS)</li> <li>• Reverse Osmosis (RO) plant</li> <li>• Water Treatment Plant</li> <li>• Household Filters</li> <li>• Solar Disinfection (SODIS)</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion of single pit latrine to twin pit latrine</li> <li>• Complete twin pit latrine</li> <li>• Flash latrine</li> <li>• Septic tank flash latrine</li> </ul>
<b>Hilly Zones</b>	<ul style="list-style-type: none"> <li>• 6 No Tubewell</li> <li>• Ring well</li> <li>• Rainwater Harvesting Plant</li> <li>• Water Treatment Plant</li> <li>• Mini Piped water supply</li> <li>• Household Filters</li> <li>• Solar Disinfection</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion of single pit latrine to twin pit latrine</li> <li>• Complete twin pit latrine</li> <li>• Flash latrine</li> <li>• Septic tank flash latrine</li> </ul>

Zone	Water supply Options	Sanitation Options
<b>Haor area</b>	<ul style="list-style-type: none"> <li>• Mini piped water supply</li> <li>• Submersible tubewell</li> <li>• Deep tubewell</li> <li>• Ring well</li> <li>• Rainwater harvesting</li> <li>• Water treatment plant</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion of single pit latrine to twin pit latrine</li> <li>• Complete twin pit latrine</li> <li>• Flash latrine</li> <li>• Septic tank flash latrine</li> </ul>
<b>Flood Prone area</b>	<ul style="list-style-type: none"> <li>• Submersible tube well</li> <li>• Iron removal technology</li> <li>• Shallow tube well</li> <li>• No (6) tube well</li> <li>• Tara pump</li> <li>• Submersible tube well</li> <li>• dug well</li> <li>• Mini piped water supply</li> <li>• Rain water harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion of single pit latrine to twin pit latrine</li> <li>• Complete twin pit latrine</li> <li>• Flash latrine</li> <li>• Septic tank flash latrine</li> </ul>
<b>Barind Area</b>	<ul style="list-style-type: none"> <li>• Mini piped water supply</li> <li>• Deep Tube well</li> <li>• Shallow tube well</li> <li>• No (6) tube well</li> <li>• Tara pump</li> <li>• Submersible tube well</li> <li>• dug well</li> <li>• Iron removal technology</li> <li>• Rain water harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion of single pit latrine to twin pit latrine</li> <li>• Complete twin pit latrine</li> <li>• Flash latrine</li> <li>• Septic tank flash latrine</li> </ul>

#### 4.5 Environmental and Social Impact Assessment

Throughout unanticipated shocks and stresses and minimize environmental and social negative impacts. They also create co-benefits and are designed to leverage social, economic, and environmental benefits, informed by desired outcomes beyond business-as-usual approaches. Resilient WASH systems take into account how the future will look and address multiple challenges at a time.

An environmental screening format will be developed and environmental screening will be collected to collect the baseline information on WASH condition of selected unions. The baseline data will be collected during the field survey. Based on the preliminarily selected options, Environment and Social Impact assessment will be carried out considering nature-based solutions to assess all significant changes likely to be generated by the interventions. The overall ESIA process will be conducted following the standard guideline prescribed by DoE, ESSF, IFC, EHS which is illustrated in the [figure 4.4](#).



**Figure 4.4: Steps of ESIA**

**Data Collection:** According to the steps, initially the background data and baseline will be assessed where data for water quality, surface water level, ground water level etc. will be collected for conducting the baseline assessment.

**Scoping and Bounding:** A scoping process will be followed for selecting the Important Environmental, and Social Components (IESCs) of water supply sector, which are likely to be impacted by the proposed interventions under the study. The boundings of the selected unions will be identified based on the proposed interventions and existing water supply and sanitation facilities.

**Field Investigation and Impact Assessment:** A field investigation work will be conducted to assess the probable impact on water supply and sanitation sector.

**Development of Management Plan:** Afterwards, feasible and cost-effective options will be identified for each impact to reduce all potentially adverse environmental and social impact to acceptable levels. Capital and recurrent cost of measures, and institutional, training and monitoring requirements to effectively implement selected options will also be identified.

#### 4.6 Selection of Final Intervention

Based on ESIA, the finally selected interventions have been finalized and validated by DPHE later on.

**Table 4.6: Finally Selected Appropriate Interventions**

District	Village	Total Population	Total HH	Final Selected Water Supply Options	Final Selected Sanitation Options
Barishal	Induria	3392	728	Mini piped Water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine
Chattogram	Charsharat	4573	941	Mini piped Water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine

District	Village	Total Population	Total HH	Final Selected Water Supply Options	Final Selected Sanitation Options
Cumilla	Saikchail	8929	1652	Mini piped Water supply Submersible tubewell	Single pit latrine to twin pit latrine conversion New twin pit latrine
Gaibandha	Fulchari	1583	377	Mini piped Water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine
Gopalganj	Beelchanda	1582	392	Submersible tubewell	Single pit latrine to twin pit latrine conversion New twin pit latrine
Khulna	Tipna	3270	772	Submersible tubewell	Single pit latrine to twin pit latrine conversion New twin pit latrine
Kurigram	Pathordubi	10038	2469	Deep tubewell with Iron removal plant	Single pit latrine to twin pit latrine conversion New twin pit latrine
Naogaon	Khordachompa	1783	459	Mini piped Water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine
Narsingdi	Hafizpur	7126	1646	Rural piped water supply Mini piped Water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine
Netrakona	Dakkhin Demura	1777	373	Mini piped Water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine
Rajshahi	Sonadanga	2625	709	Submersible tubewell	Single pit latrine to twin pit latrine conversion New twin pit latrine
Rangamati	Chota Harina (mouza)	1081	215	Ring well Rainwater harvesting	Single pit latrine to twin pit latrine conversion New twin pit latrine
Satkhira	Datinakhali	2256	568	Rainwater harvesting Pond with sand filter Water treatment plant	Single pit latrine to twin pit latrine conversion New twin pit latrine
Sunamganj	Shimulbank	2629	462	Rural piped water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine
Sylhet	Bagaiya	5399	921	Mini piped Water supply	Single pit latrine to twin pit latrine conversion New twin pit latrine

#### 4.7 Ranking of Villages

A customized Multi Criteria Analysis (MCA) chart was used for prioritization of the pilot villages. Each village was judged and compared with other villages. The MCA for alternative options should be prepared mainly on criteria with multiple indicators. The interventions selected based on the main criteria, which are Technical feasibility, Environmental sustainability Social acceptability. For assessing the mentioned feasibility of abovementioned aspects weights based on expert opinion and literature review were provided to each of the criteria. Afterwards normalization was done to keep all the weight between 0 to 1 scoring was provided based on weights between 1 to 3 (3=High, 2=Medium, 1=Low). **Table 4.6 and Table 4.7** Contain the result of MCA. The priority is getting low for going ascending order of ranking of the pilot villages (Rank=1 means high priority & Rank=15 means least priority) and it goes for zone prioritization also.

**Table 4.7: Considered Criterias for Ranking of Villages**



**Population:** (Low: 1, Medium: 2, High: 3)  
**Socio-Economic condition:** (Low: 1, Medium: 2, High: 3)  
**Water Demand:** (Low: 1, Medium: 2, High: 3)  
**Iron Contamination:** (Low: 1, Medium: 2, High: 3)  
**Arsenic Contamination:** (Low: 1, Medium: 2, High: 3)  
**Drought Proneness:** (Low: 1, Medium: 2, High: 3)  
**Tube well Depth:** (Low: 1, Medium: 2, High: 3)  
**Flood:** (Low: 1, Medium: 2, High: 3)  
**Cyclone:** (Low: 1, Medium: 2, High: 3)  
**Hard to Reach Areas (HtR):** (Low: 1, Medium: 2, High: 3)  
**Coverage:** (Low: 1, Medium: 2, High: 3)  
**Hydrogeological condition:** (Bad: 1, Good: 2, Excellent: 3)  
**Toilet availability:** (No: 1, Yes: 2)  
**Climate Resilience:** (Bad: 1, Good: 2, Excellent: 3)

**Table 4.7: Prioritized Villages**

District	Upazila	Union	Village	Rank
Satkhira	Shyamnagar	Labsa	Datinakhali	1
Khulna	Dumuria	Kharnia	Tipna	2
Kurigram	Bhurungamari	Pathardubi	Pathordubi	3
Sylhet	Gowainghat	Rustampur	Bagaiya	4
Barishal	Hijla	Memania	Induria	5
Sunamganj	Shantiganj	Shimulbank	Shimulbank	6
Naogaon	Niamatpur	Hajinagar	Khordachompa	7
Rajshahi	Bagmara	Sonadanga	Sonadanga	8
Rangamati	Barkal	Bhushanchhara	Chota Harina (mouza)	9
Chattogram	Mirsarai	Ichhakhali	Charsharat	10
Gaibandha	Fulchhari	Fulchhari	Fulchari	11
Netrakona	Barhatta	Sahata	Dakkhin Demura	12
Cumilla	Manoharganj	Bipularsar	Saikchail	13
Narsingdi	Manohardi	Chalakchar	Hafizpur	14
Gopalganj	Muksudpur	Jalirpar	Beelchanda	15

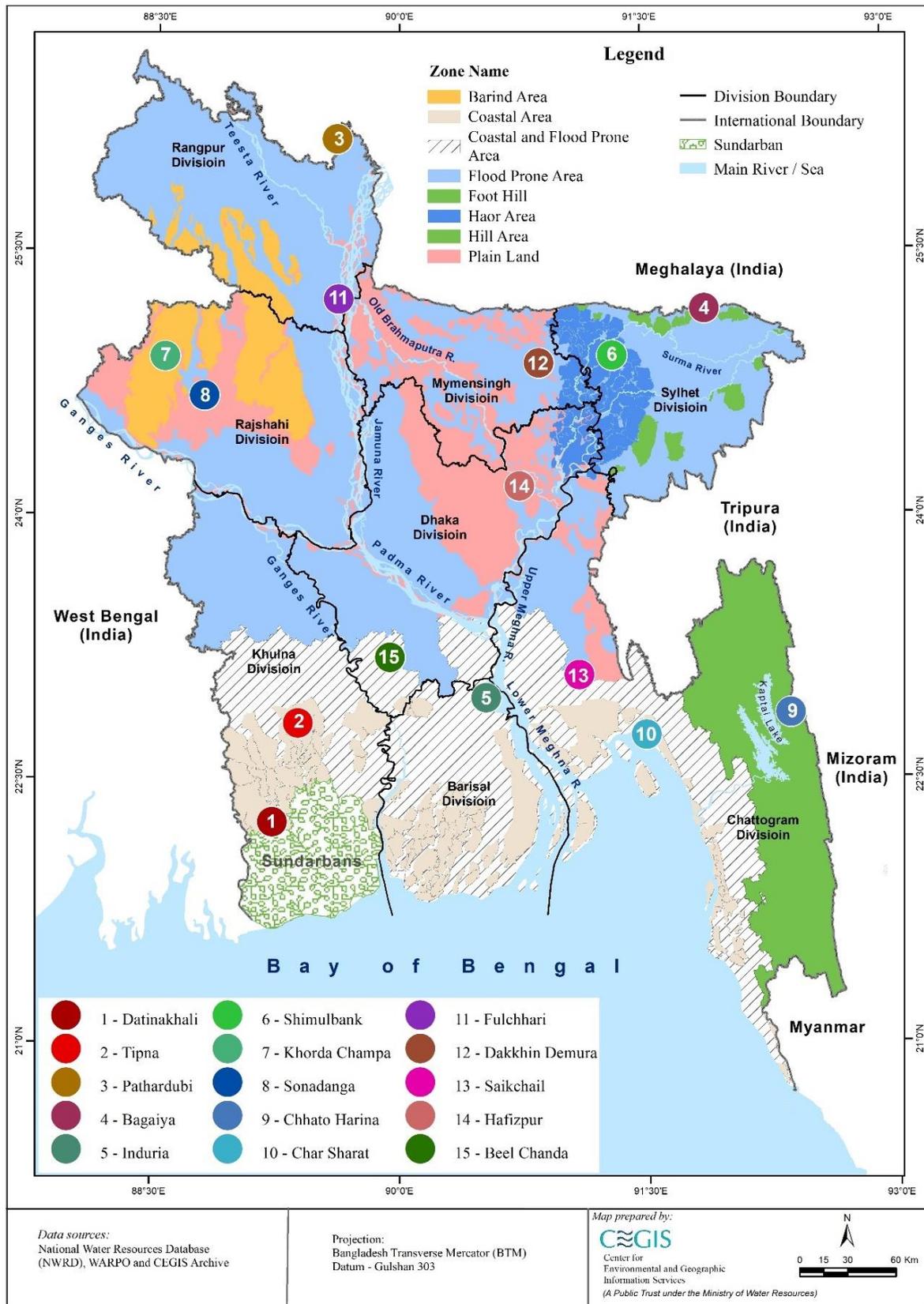


Figure 4.5: Map showing Prioritized Villages

## 5. Stakeholder Involvement and Responsibilities

Project stakeholders' main responsibility is to aid in the accomplishment of a project's strategic goals. Stakeholders work to achieve the project's objectives using their viewpoints, expertise, and efforts. A project's principal goal is to accomplish its objectives, and it cannot be effective without its stakeholders. The provision of project necessities is another important function of stakeholders. Stakeholders should offer the essential documents and resources so that a project may be articulated. Finally yet importantly, project stakeholders support the initiative. The most valuable support that stakeholders provide for a project is their opinions and suggestions. In addition to meeting goals, one of a project's successful features is the stakeholders' satisfaction with it. Frequently, a project might be considered unsuccessful if it simply achieves its goals but displeases the stakeholders.

### 5.1 Analysis of Stakeholders in Water Supply and Sanitation

**Decision Maker:** Stakeholders who take decision on the project. A decision maker is any government department or any international organization like- Oxfam, UNICEF who is in charge of making crucial strategic decisions depending on a variety of factors, such as the length of time available, the resources at hand, the type and quality of information at hand, and the number of interested parties.

**Expert:** Stakeholders who have the knowledge and experience on the relevant field and provide information and their opinion. For example: BUET, Dhaka University. Professors of these institutions are enriched with substantial knowledge or skill gained via research, experience, or employment in a certain field of study is referred to as an expert in a broader sense. Experts are consulted for guidance on various topics, although they don't necessarily agree on the specifics of a given field of study.

**Implementers:** Stakeholders who are assigned to implement the project. They can be called as "Master Planners and Executors". Some examples of implementers in the field of water supply and sanitation system are- WASA, LGED, and DPHE etc.

**Users:** Stakeholders who will get benefit by the project like the people living in the area where the project is implementing or the institutions situated that area.

**Co-operating:** where the stakeholders who do not play active role in the project but have to inform the necessity of the project. This holder also provides financial support.

**Co-thinking:** Stakeholders who will not get the benefit of the project directly but are regarded as a source of knowledge and information.

**Co-knowing:** Stakeholders who are participating and will get the benefit directly from the project.

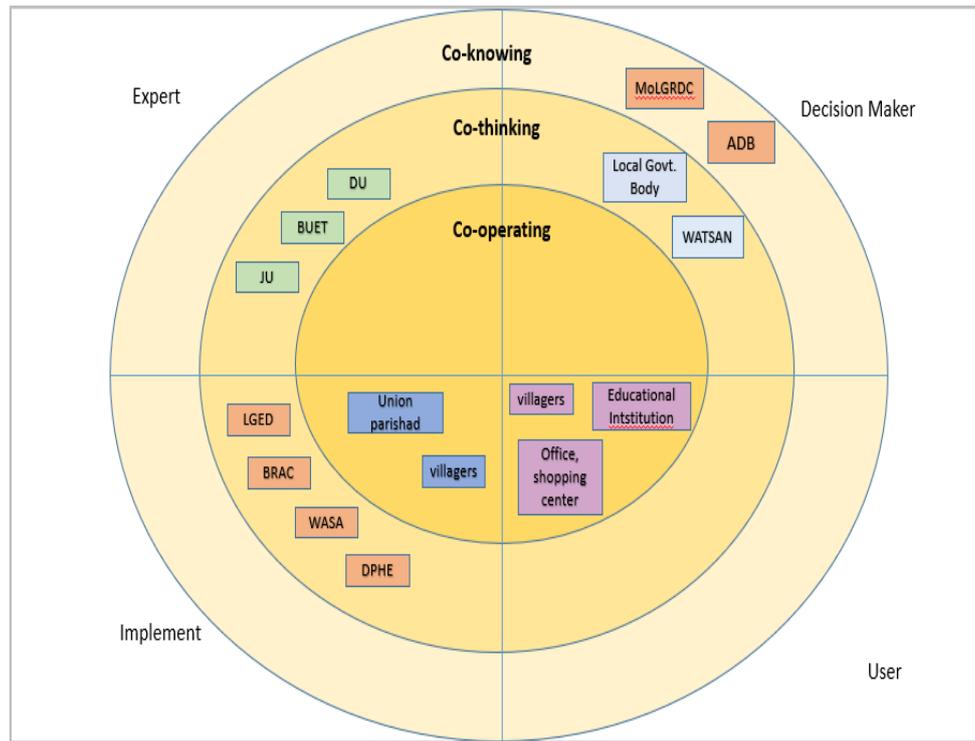


Figure 5.1: Diagram of Stakeholder Analysis

## 5.2 Roles and Responsibilities of Relevant Agencies

1. **Department of Public Health Engineering (DPHE):** The Department of Public Health Engineering is the national lead government agency responsible for both urban and rural water supply and sanitation services, and waste management in the country excepting Dhaka, Narayanganj, Khulna, Rajshahi and Chittagong cities where WASAs operate. Their main functions are divided into two categories.
  - a) **Rural Water Supply and Sanitation:** For rural locations, DPHE offers water supply options include hand pumps, shallow and deep tube wells, natural spring development, infiltration galleries, deep set pumps, ring wells, etc. The DPHE is also entrusted with the maintenance of tube-wells and other water delivery infrastructure. It also ensures rural sanitation through the production and distribution of water seal latrines as well as through health promotion initiatives.
  - b) **Urban Water Supply and Sanitation:** Except for Dhaka and Chittagong WASA areas, all district and subdivisional towns are covered by DPHE activities in the urban sector. It has included the important thana headquarters and created bazars in its agenda. It intends to gradually expand its operations to the Thana headquarters in the future. The DPHE implements piped water supply system, which includes treatment facilities, production wells, a water distribution network, storage reservoirs, and pumping installations. The municipality typically takes on the maintenance role.
2. **Local Government Division (LGD):** The primary agency in charge of sanitation in Bangladesh is the Local Government Division (LGD), which is a division of the Ministry of Local Government, Rural Development, and Cooperatives (MoLGRDC). The structures of the management of sanitation, including drainage and waste vary between rural and urban areas.
  - I. **Rural Water Supply and Sanitation:** Zila parishads, upzila parishads, and union parishads are the three types of rural governmental bodies. Their functions are-

- coordinating the delivery of sanitation services in rural communities
  - Union parishads, which are the smallest administrative units, are in charge of FSM services.
- II. **Urban Water Supply and Sanitation:** Pourashavas (urban governments) and city corporations constitute urban local governance. Their responsibilities are-
- To coordinate the provision of sanitary services in urban contexts
  - Management of the FSM and its services

As per Pourashava Act (2009), Pourashavas (municipalities) operate and maintain the water supply system and sanitation. These systems are financed and constructed by the central government through the Department of Public Health and Engineering (DPHE) and the Local Government Engineering Department (LGED).

3. **Water Supply and Sewerage Authority (WASA):** The principal organization in charge of managing Bangladesh's water supply, drainage, and sanitation systems is the Water Supply and Sewerage Authority, or WASA. Water supply, sewerage, and drainage infrastructure must be planned, designed, and built by WASA for the rehabilitation and expansion of the current system. The local government-owned Water and Sewerage Authority provides water supply and sanitation in the major urban cities of Dhaka, Chittagong, Rajshahi, and Khulna (WASA).

### 5.3 Community Groups in Water Supply and Sanitation

There are some community groups who work for some certain level of people in living in remote areas or for villagers. Their main focus is to provide proper sanitation and safe water for that specific people with whom the governmental departments can't provide proper benefits directly.

1. **Bangladesh Rural Advancement Committee (BRAC):** After having had great success in transforming water and sanitation interventions using a community-driven approach in rural Bangladesh to accomplish the Millennium Development Goals, BRAC's WASH program started its most current phase of operations in 2016. (MDGs). The program made sure that 775,875 participants had access to safely managed sanitary services and that 332,441 participants had safe drinking water over the period of 2016 to 2020. Major activities of their wash programme are:
- Improve drinking water services and practices
  - Improve sanitation and hygiene services and practices
  - Improve WASH services at schools
  - Improve WASH situations in emergency
  - Improve fecal sludge and solid waste management services in small towns/pourashavas
2. **WaterAid:** Since 1986, WaterAid has operated in Bangladesh as one of the key players in the water, sanitation, and hygiene (WASH) sector. The organization has extensive experience in developing, expanding, and administering massive projects that are aimed at assisting the poor, the vulnerable, and the excluded. Since 1996, it has had an NGO Affairs Bureau registration. Urban slums, challenging terrain, and environmentally hazardous regions including hill tracts and hillocks, dry and arid Barind tract, salinity-prone coastal belt, haor, and flood-prone chars are all part of WaterAid Bangladesh's geographic focus (What We Do - Bangladesh | WaterAid Bangladesh, n.d.). In distinct hydro-geological contexts of Bangladesh, it has successfully designed and implemented model systems for delivering sustainable community-controlled WASH services and facilities for the poor, extremely poor, and marginalized people.

- In order to increase accountability and responsiveness, it educates and empowers communities to assert their WASH rights.
  - Through advocacy and capacity building, it enables wider replication of the model solutions we present.
  - Through partnerships, it includes WASH into other development domains and incorporates components from the health, education, nutrition, and other sectors into our work.
  - It works to increase sector performance and accountability for more long-lasting WASH services, and we aim for the greatest quality and durability in our initiatives.
- 3. United Nations International Children's Emergency Fund (UNICEF):** With the help of proper hygiene behaviors and care practices, UNICEF aims to provide all children and women with access to and use of quality, equitable, resilient, and sustainable WASH services. The 8FYP WASH targets set by the Ministry of Local Government, Rural Development, and Cooperatives are supported by this. When it comes to ensuring that children have access to WASH facilities, UNICEF's objectives include equity and regions with less-developed services, particularly in low-income areas, urban slums, remote rural areas, climate-vulnerable regions, and areas with chemical contamination. Evidence-based policy advocacy and sector regulations will be supported to boost human and financial assets, improve targeting, respond to climate change impacts and address gender barriers. Piloting and expanding facilities that are disaster- and climate-resilient will increase the resilience of WASH services (Water, Sanitation and Hygiene, n.d.).
- 4. Oxford Committee for Famine Relief (OXFAM):** Beginning in 1970, Oxfam worked in Bangladesh, helping those affected by the 1970 storm and lending a hand to the population throughout the 1971 Liberation War. 2012 saw only three organizations recognized as Friends of the Bangladesh Liberation War, with Oxfam being one of them. It engages with a broad spectrum of groups, including NGOs, media outlets, international and domestic colleges, private businesses, and governmental agencies at various levels.
- Oxfam has started a new inclusive WASH (water, sanitation, and hygiene) project to improve the water supply network and sanitation systems in the hilly area of Cox's Bazar as the Rohingya crisis response approaches its fourth year in Bangladesh. In close coordination with the Department of Public Health Engineering (DPHE), it aims to maintain enhanced water supply, fecal sludge management (FSM), meaningful involvement, and capacity building of communities in accordance with the WASH sector's 2021 priorities. The project will collaborate with the government, UN systems, and other players and is funded by the UNHCR (Bangladesh Rohingya Refugee Crisis, 2022).
- 5. Practical Action:** It collaborates with local governments to create creative, long-lasting, and locally owned solutions for sustainable energy, water and waste management, agriculture, and climate resilience (Practical Action, 2022). Their main aims related to water supply and sanitation are:
- To increasing the availability of clean water for drinking and washing
  - Encourage localities to collect, confine, and process garbage in a safe, sustainable manner
  - Work with migrant and seasonal trash workers to ensure their safety and dignity at work.

## 5.4 Involvement Mechanism of Different Stakeholders

Roles and responsibilities of these agencies and their ministries are mentioned below:

### **Ministry of Local Government, Rural Development, and Cooperatives (MoLGRDC):**

MoLGRDC is in charge of housing and construction, regional and rural policy, municipal and city administration and finances, and election administration.

#### **1. Department of Public Health Engineering (DPHE):**

Except for the four WASA zones, DPHE is active in both urban and rural areas, offering both hardware (such as pit latrines and shared latrines) and software (e.g., social mobilization and hygiene behavior training).

#### **2. Local Government Institutions (LGIs):**

**a) Zila parishads, upzila parishads, and union parishads:** Zila parishads, upzila parishads, and union parishads are the three types of rural governmental bodies. They are in charge of coordinating the delivery of sanitation services in rural communities. Union parishads, which are the smallest administrative units, are in charge of FSM services.

**b) Pourashavas and city corporations:** Pourashavas (urban governments) and city corporations constitute urban local governance. The management of the FSM and its services is the joint responsibility of Pourashavas and city corporations.

#### **3. Water Supply and Sewerage Authority (WASA):**

Water supply, sewerage, and drainage infrastructure must be planned, designed, and built by WASA for the rehabilitation and expansion of the current system.

**4. The Ministry of Education (MoE):** MoE is in charge of WASH in secondary schools, and it contributes to ensuring gender-separated better sanitation facilities in secondary schools.

**5. Ministry of Primary and Mass Education (MoPME):** By 2022, DPHE will have provided gender-segregated WASH-block latrines in all primary schools, working collaboratively with the Ministry of Primary and Mass Education (MoPME).

**6. Ministry of Planning:** It monitors the Bangladeshi government's financial policy and is in charge of managing statistics and socioeconomic planning

**7. The Bangladesh Bureau of Statistics (BBS):** It is the main government agency in Bangladesh responsible for gathering and disseminating data on the country's demographics, economy, and other facts.

**8. Bangladesh's Ministry of Finance:** It is in charge of the country's state finances, including the national budget, taxation, and economic strategy.

**9. Ministry of Health and Family Welfare:** It works for hygiene promotion, wash in health care facilities

**10. Ministry of Housing and Public Works:** It works for sustainable, safe and affordable housing for the low and medium income people of the country by ensuring optimal use of land through sound planning and research, planned urbanization and construction of infrastructure with modern facilities for various ministries/ departments/ organizations of the government.

## 6. Implementation Strategy and Action Plan

The intervention has been selected both for water supply and sanitation. For Water supply installation of tubewell, rainwater harvesting, establishment of water treatment plant, pipe water supply are the selected intervention for the hotspot regions based need assessment. On the other hand, conversion of single pit latrine to twin pit, new pit latrine are suggested. **Table 6.1** shows the list of selected intervention for each hotspot region.

**Table 6.1: List of Finally Selected Interventions**

Hotspot	Village	Water Supply	Sanitation
Coastal Area	Datinakhali, Satkhira	Rainwater harvesting - 300 Pond with sand filter - 1 Water treatment plant - 1	Single pit latrine to twin pit latrine conversion - 400 New twin pit latrine - 200
	Charsharat, Chattogram	Mini piped Water supply - 25	Single pit latrine to twin pit latrine conversion - 1200 New twin pit latrine - 600
	Induria, Barishal	Mini piped Water supply - 25	Single pit latrine to twin pit latrine conversion - 400 New twin pit latrine - 240
Barind Area	Khordachompa, Naogaon	Mini piped Water supply - 10	Single pit latrine to twin pit latrine conversion - 200 New twin pit latrine - 150
Haor Area	Simulbank, Sunamganj	Rural piped Water supply - 1	Single pit latrine to twin pit latrine conversion - 200 New twin pit latrine - 100
	Bagaiya, Sylhet	Mini piped Water supply - 40	Single pit latrine to twin pit latrine conversion - 400 New twin pit latrine - 250
Hilly Area	Chota Harina (Mouza), Rangamati	Ring well- 50 Rain water Harvesting Plant- 50	Single pit latrine to twin pit latrine conversion - 400 New twin pit latrine - 250
Plain Land	Khordachompa, Naogaon	Mini piped Water supply - 10	Single pit latrine to twin pit latrine conversion - 200 New twin pit latrine - 150
	Sonadanga, Rajshahi	Submersible tubewell - 20	Single pit latrine to twin pit latrine conversion - 300 New twin pit latrine - 150
	Beelchand, Gopalganj	Submersible tubewell- 10	Single pit latrine to twin pit latrine conversion - 150 New twin pit latrine - 100
	Pathardubi, Kurigram	Submersible tubewell- 80	Single pit latrine to twin pit latrine conversion - 1200 New twin pit latrine - 600

Hotspot	Village	Water Supply	Sanitation
	Hafizpur, Narshingdi	Mini piped Water supply- 5 Rural piped water supply- 1	Single pit latrine to twin pit latrine conversion – 400 New twin pit latrine – 200
	Dakkhin Demura, Netrakona	Mini piped Water supply - 20	Single pit latrine to twin pit latrine conversion – 400 New twin pit latrine – 200
Flood Prone	Fulchari, Gaibandha	Mini piped Water supply - 15	Single pit latrine to twin pit latrine conversion – 150
	Pathardubi, Kurigram	Submersible tubewell- 80	Single pit latrine to twin pit latrine conversion – 1200 New twin pit latrine – 600
Arsenic Contamination	Saikchail, Cumilla	Mini piped Water supply - 20 Submersible tubewell – 30	Single pit latrine to twin pit latrine conversion – 400 New twin pit latrine – 200
	Tipna, Kulna	Submersible tubewell – 20	Single pit latrine to twin pit latrine conversion – 300 New twin pit latrine – 150
	Datinakhali, Satkhira	Rainwater harvesting -300 Pond with sand filter – 1 Water treatment plant - 1	Single pit latrine to twin pit latrine conversion – 400 New twin pit latrine – 200
	Simulbank, Sunamganj	Rural piped Water supply -	Single pit latrine to twin pit latrine conversion – 200 New twin pit latrine – 100

### 6.1 Current Insitutional Gaps

In rural areas, water supply and sanitation services are the responsibility of the Upazila Parishad or Union Parishad. However, in practice, the low capability of the Zila, Upazila and Union Parishads in providing these services has led to low level of water supply and sanitation coverage. LGED provides infrastructure development funds and programs, which could include water supply and sanitation. The Zila, Upazila and Union Parishad are responsible to implement LGED's projects.

In rural areas, the Union Parishad (the lowest level of local government institution) is usually responsible for operation and maintenance of water supply system. In some rural areas, the operation and maintenance of the piped water supply system is carried out by community user association or NGOs. These systems are usually built as part of a development project, financed either by donor funds or central government budget allocation.

Central government engineers and officers from the DPHE and LGED are often stationed in the local offices, which can be in a small urban town governed by Pourashava, or in Upazila (sub-district) headquarter towns. The engineers and officers in these local offices are often involved in and provided assistance to Pourashavas and Upazila and/or Union Parishads in terms of operating and maintaining WSS systems.

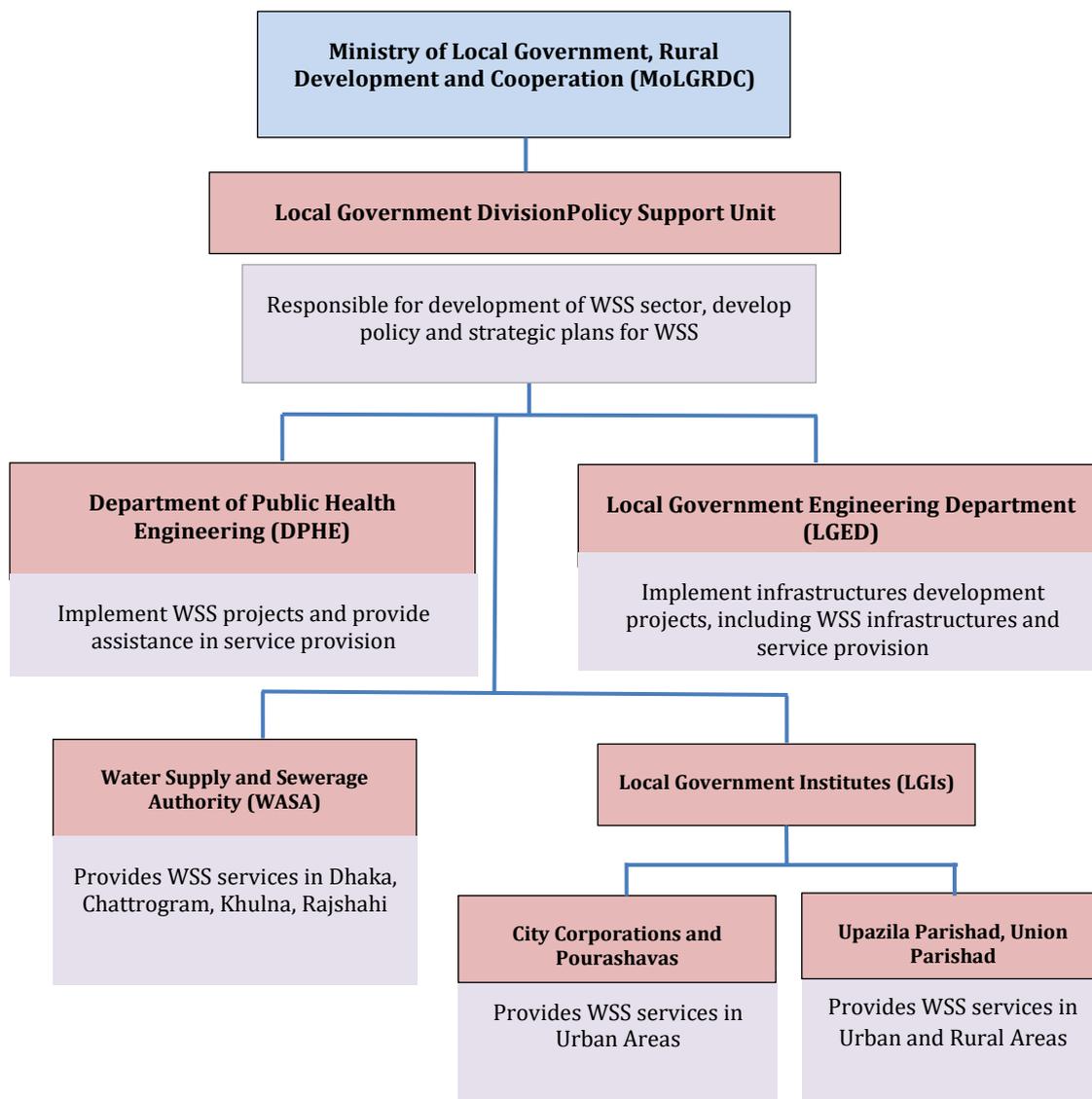
In union level, there is no WATSAN committee, the standing committee is not functional and Union Parishad lacks the financial and technical capacity to facilitate WSS in the village level.

In terms of regulation, Bangladesh does not have a single regulator for the WSS sector. The Local Government Acts (for Municipalities and City Corporations) stated that the City Corporation and

Pourashavas are responsible for provision and regulation of water supply services. However, it is unclear who actually perform the economic regulatory functions, such as tariff approvals and performance monitoring. The technical regulation is loosely performed by DPHE and LGED.

## 6.2 Institutional Arrangement for Water Supply and Sanitation

In Bangladesh, the institutional arrangement for water supply and sanitation is as follows:



**Figure 6.1: Institutional Arrangement of WSS**

**Ministry of Local Government, Rural Development, and Cooperatives (MoLGRDC):** MoLGRDC is in charge of housing and construction, regional and rural policy, municipal and city administration and finances, and election administration. It contains two divisions. Local Government Department (LGD) is one of them. Within the LGD, a special unit called the Policy Support Unit (PSU) is responsible for developing water supply policy and strategies.

Major activities of LGD on sanitation and water supply are-

- Deal with drinking water issues
- Development of water supply, sanitation, drainage and sewage disposal in rural and urban areas. The structures of the management of sanitation, including drainage and waste vary between rural and urban areas.

1. **Department of Public Health Engineering (DPHE):** The MoLGRDC regulates DPHE, the national agency for efforts in water sanitation and hygiene. Except for the four WASA zones, DPHE is active in both urban and rural areas, offering both hardware (such as pit latrines and shared latrines) and software (e.g., social mobilization and hygiene behavior training). By 2022, DPHE will have provided gender-segregated WASH-block latrines in all primary schools, working collaboratively with the Ministry of Primary and Mass Education (MoPME). Additionally, MoPME is putting programs in place to meet the students' WASH needs. The Ministry of Education (MoE) is in charge of WASH in secondary schools, and it contributes to ensuring gender-separated better sanitation facilities in secondary schools.
2. **Water Supply and Sewerage Authority (WASA):** The principal organization in charge of managing Bangladesh's water supply, drainage, and sanitation systems is the Water Supply and Sewerage Authority, or WASA.
3. **Local Government Institutions (LGIs):** The Local Government Institutions (LGIs) include a three-tiered rural local government system made up of 64 zila (district) parishads, 492 upazila (sub-district) parishads, 4,573 union parishads, and three hill district parishads. Single-tier urban authorities are made up of 11 city corporations and 329 municipalities (Pourashavas).
  - a) **Zila parishads, upzila parishads, and union parishads:** Zila parishads, upzila parishads, and union parishads are the three types of rural governmental bodies. The LGIs in the Zila Parishads, Upazila Parishads, and Union Parishads are in charge of coordinating the delivery of sanitation services in rural communities. Union parishads, which are the smallest administrative units, are in charge of FSM services.
  - b) **Pourashavas and city corporations:** Pourashavas (urban governments) and city corporations constitute urban local governance. The coordination of the provision of sanitary services in urban contexts is the responsibility of both Pourashavas and city corporations. The management of the FSM and its services is the joint responsibility of Pourashavas and city corporations. Dhaka, Chittagong, Khulna, and Rajshahi Water Supply and Sewerage Authorities (WASAs) are in charge of providing water and treating sewage in four City Corporations.
  - c) **WATSAN:** Water and sanitation (WATSAN) committees participate in village-level WASH decision-making. It will work for the improvement of water supply in sanitation system in Zilla, upazillas, unions and in ward sectors where the City Corporation and WASA aren't active. WATSAN committee at zilla and upazilla level consists of chairman of that zilla, civil surgeon, deputy commissioner, executive engineer of LGED, deputy director of department of planning and instructor of ministry of education and others. Whereas the union and ward sector the committee consists of chief of gram Sarkar, female member of that union, a landless farmer, a teacher, a selected member from NGOs, a religious leader of that union.

### 6.3 Implementation Framework

For developing a framework at first all the stakeholders should be categorized with respect to the role of planning, designing and implementing in Water Supply and Sanitation (WSS) management. Ministry of Local Government, Rural development and Cooperatives (MoLGRDC) is in charge of planning for water supply and sanitation, making policy, Strategies and making decisions like- needs of the project, location, time length and for which sector of users is the main target. They Co-operate with other ministries such as- Ministry of Finance, Ministry of Planning, Ministry of Health and Family Welfare, Ministry of Education and Ministry of Public works and department for implementation.

Ministry of Planning will provide the policy, strategy, and acts taken BY Bangladesh Government related to the Water supply and sanitation systems. They also provide statistical information such as- area, population, sex ration, land use etc. of the area selected for the project. This information is controlled by Bangladesh Bureau of Statistics and General Economic Division. Ministry of Finance will monitor the financial policy and managing the socioeconomic planning. Local Government Division will work under MoLGRDC to develop water supply and sanitation sectors and strategic plans.

The Engineers of Local Government Engineering Department (LGED) is in charge of planning, monitoring and the design of infrastructure with the guidance of the experts from BUET, Dhaka University and Jahangirnagar University who have the substantial knowledge and research experience in the related field.

Department of Public Health Engineering (DPHE), Local Government Institution (LGI) and Water Supply and Sewerage Authority (WASA) will work in implementation of water supply and sanitary system. DPHE works both in rural and urban areas except the city co-corporation. Other Ministries such as Ministry of Education, Ministry of Public health and Welfare also works with DPHE for hygiene promotion. By 2022, DPHE will have collaborated with the Ministry of Primary and Mass Education to install gender-segregated WASH-block latrines in all primary schools (MoPME). In addition, MoPME is implementing programs to address the WASH requirements of the students. The Ministry of Education (MoE) is in charge of WASH in secondary schools, and it contributes to sure that these facilities are improved and are gender-separated. WASA is in charge of providing and managing water supply, drainage, and sanitation systems in the Dhaka, Chittagong, Khulna and Narayangonj city co-corporation. LGI promotes WSS management in Zila to union Parishad, Pourashavas and city corporations. Water and sanitation (WATSAN), a governmental community group which participate in village-level WASH decision-making. The involvement mechanisms of the various stakeholders in rural WSS are shown in [Figure 6.2](#).

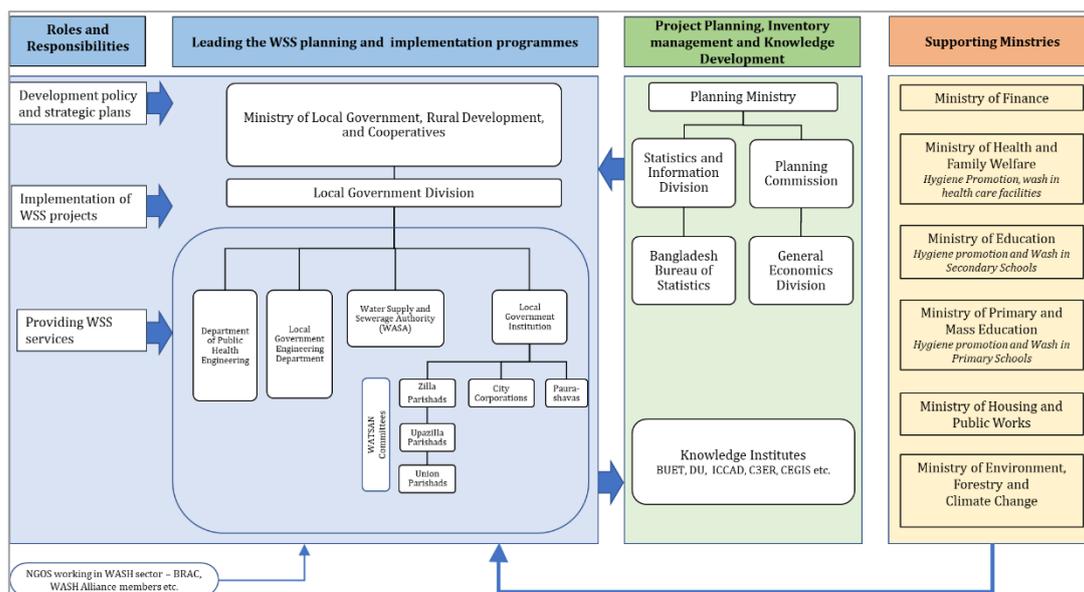


Figure 6.2: Stakeholder Involvement Mechanism Framework

#### 6.4 WATSAN Committee: Function and Responsibilities

WATSAN committees provide water supply and sanitation services at community level. Functions and formation of WATSAN committee may vary from Zila, Upazila, and union level. The formation of WATSAN committees that functions under different tiers of local government are given below:

Table 6.2: Members of Zila WATSAN Committee

Zila WATSAN COMMITTEE (Except for Chittagong Hill Tract)	
Deputy Commissioner	Chairman
Chief Executive Officer, zila parishad	Member
Civil Surgeon	Member
Pourashava Chairman	Member
Upazila Executive Officer	Member
Deputy Director, Local Government	Member
Zila Information Officer	Member
Executive Engineer, LGED	Member
Deputy Director, Department of Social Services	Member
Deputy Director, Family Planning	Member
Deputy Director, Bangladesh Rural Development Board	Member
Deputy Director, Islamic Foundation	Member
Deputy Director, Department of Youth Development	Member
Zila Education Officer	Member
Zila Primary Education Officer	Member
NGO member (selected by Deputy Commissioner)	Member
Executive Engineer, DPHE	Member Secretary

**Table 6.3: Members of Pourashava WATSAN Committee**

<b>Paurasava WATSAN COMMITTEE</b>	
Paurasava Chairman	Chairman
All Ward Commissioner	Member
Paurasava Health Officer	Member
Representative of DPHE	Member
2 Reporter	Member
Chairman of Paura Bazar Committee	Member
Headmasters of Secondary and Higher Secondary School	Member
5 NGO representative ( selected by the Paurasava Chairman)	Member
Paurasava Sanitary Inspector	Member
Paurasava Water Supervisor	Member
Chief Executive Officer of Paurasava	Member Secretary

**Table 6.4: Members of Upazila WATSAN Committee**

<b>Upazilla WATSAN COMMITTEE</b>	
Upazila Executive Officer	Chairman
Upazila Family Planning and Health Officer	Member
All Union Parishad Chairman	Member
Upazila Secondary Education Officer	Member
Upazila Primary Education Officer	Member
Upazila Engineer, LGED	Member
Upazila Rural Development Officer	Member
Upazila Statistics Officer	Member
Upazila Social Service officer	Member
Upazila Woman Affairs Officer	Member
Upazila Youth Development Officer	Member
NGO Representative	Member
Sub- Assistant Engineer, DPHE	Member Secretary

**Table 6.5: Members of Union WATSAN Committee**

<b>Union WATSAN COMMITTEE</b>	
Chairman of Union Parishad	Chairman
Members of Union Parishad	Member
Union Tubewell Mechanic, DPHE	Member
Assistant of Health and Family Planning Department	Member
Head of Local Secondary School	Member
Head of Local Primary School	Member
Religious Leader (selected by UNO)	Member
NGO representative	Member
Secretary of Union Parishad	Member Secretary

Roles and Responsibilities of Union WATSAN Committee (PI complete this section, role include site selection for WSS, development of database, support for O&M, coordinate with DPHE and others)

## 6.5 Monitoring Rural Watersupply and Sanitation Options

The Union Parishad shall be responsible for the monitoring the rural WSS options. However, due to lack of financial and technical capability, union parishad will not capable of monitoring the rural WSS services in the village. Thus, the technical and financial capability of the Union Parishad should be strengthening with support from Ministry, DPHE and LGED. Apart from that the government agencies that are responsible for implementing the project interventions can also play an active role in project monitoring activities.

With support from local DPHE, the Union Parishad shall monitor the water quality of the water supply systems in the village (tubewell water, mini grid, RWH, PSF and others).

## 6.6 Budget for Water Supply and Sanitation Programs and Projects

The WSS sector needs more funding in the upcoming budget to meet demands for safe drinking water and sanitation at a time when the government is already on pace to execute the SDGs. Thereby, a tentative estimate of the selected intervention is provided in the following table.

**Table 6.6: Budget Estimation for Water Supply Program and Project**

Intervention	District	Upazila	Union	Village	Number of Intervention	Total Estimated Expenditure (in Lacs)
Village Pipe Water Supply	Narsingdi	Manohardi	Calakchar	Hafizpur	1	350
	Sunamganj	Shantiganj	Simulbak	Simulbak	1	210
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	-	0
	Cumilla	Manoharganj	Bipulshar	Sekchail	-	0
	Rajshahi	Bagmara	Sonadanga	Sonadanga	-	0
	Khulna	Dumuria	Khurnia	Tipna	-	0
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	-	0
	Barishal	Hijla	Memania	Induria	-	0
	Sylhet	Goainghat	Rustampur	Bagaiya	-	0
	Netrokona	Barhatta	Shahata	Demura	-	0
	Gaibandha	Fulchari	Fulchari	Fulchari	-	0
	Naogaon	Niamatpur	Hazinagar	Khordocampa	-	0
	Rangamati	Barkal	Vhusanchara	Choto Horin	-	0
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	-	0
Chattogram	Mirsarai	Ichakhali	Charsharat	-	0	
Mini piped water supply	Narsingdi	Manohardi	Calakchar	Hafizpur	5	25
	Sunamganj	Shantiganj	Simulbak	Simulbak	0	0
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	0	0
	Cumilla	Manoharganj	Bipulshar	Sekchail	20	100
	Rajshahi	Bagmara	Sonadanga	Sonadanga	-	0
	Khulna	Dumuria	Khurnia	Tipna	-	0
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	-	0

Intervention	District	Upazila	Union	Village	Number of Intervention	Total Estimated Expenditure (in Lacs)
	Barishal	Hijla	Memania	Induria	25	125
	Sylhet	Goainghat	Rustampur	Bagaiya	40	200
	Netrokona	Barhatta	Shahata	Demura	20	100
	Gaibandha	Fulchari	Fulchari	Fulchari	15	75
	Naogaon	Niamatpur	Hazinagar	Khordocampa	10	50
	Rangamati	Barkal	Vhusanchara	Choto Horin	-	0
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	-	0
	Chattogram	Mirsarai	Ichakhali	Charsharat	25	125
Installation of deep/ submersible pumped tubewells	Narsingdi	Manohardi	Calakchar	Hafizpur	-	0
	Sunamganj	Shantiganj	Simulbak	Simulbak	-	0
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	-	0
	Cumilla	Manoharganj	Bipulshar	Sekchail	30	36
	Rajshahi	Bagmara	Sonadanga	Sonadanga	20	24
	Khulna	Dumuria	Khurnia	Tipna	20	17
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	80	96
	Barishal	Hijla	Memania	Induria	-	0
	Sylhet	Goainghat	Rustampur	Bagaiya	-	0
	Netrokona	Barhatta	Shahata	Demura	-	0
	Gaibandha	Fulchari	Fulchari	Fulchari	-	0
	Naogaon	Niamatpur	Hazinagar	Khordocampa	-	0
	Rangamati	Barkal	Vhusanchara	Choto Horin	-	0
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	10	12
Chattogram	Mirsarai	Ichakhali	Charsharat	-	0	
Water supply through ring wells	Narsingdi	Manohardi	Calakchar	Hafizpur	-	0
	Sunamganj	Shantiganj	Simulbak	Simulbak	-	0
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	-	0
	Cumilla	Manoharganj	Bipulshar	Sekchail	-	0
	Rajshahi	Bagmara	Sonadanga	Sonadanga	-	0
	Khulna	Dumuria	Khurnia	Tipna	-	0
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	-	0
	Barishal	Hijla	Memania	Induria	-	0
	Sylhet	Goainghat	Rustampur	Bagaiya	-	0
	Netrokona	Barhatta	Shahata	Demura	-	0
	Gaibandha	Fulchari	Fulchari	Fulchari	-	0
	Naogaon	Niamatpur	Hazinagar	Khordocampa	-	0
	Rangamati	Barkal	Vhusanchara	Choto Horin	50	62.5

Intervention	District	Upazila	Union	Village	Number of Intervention	Total Estimated Expenditure (in Lacs)
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	-	0
	Chattogram	Mirsarai	Ichakhali	Charsharat	-	0
Construction of water treatment plant	Narsingdi	Manohardi	Calakchar	Hafizpur	-	0
	Sunamganj	Shantiganj	Simulbak	Simulbak	-	0
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	1	40
	Cumilla	Manoharganj	Bipulshar	Sekchail	-	0
	Rajshahi	Bagmara	Sonadanga	Sonadanga	-	0
	Khulna	Dumuria	Khurnia	Tipna	-	0
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	-	0
	Barishal	Hijla	Memania	Induria	-	0
	Sylhet	Goainghat	Rustampur	Bagaiya	-	0
	Netrokona	Barhatta	Shahata	Demura	-	0
	Gaibandha	Fulchari	Fulchari	Fulchari	-	0
	Naogaon	Niamatpur	Hazinagar	Khordocampa	-	0
	Rangamati	Barkal	Vhusanchara	Choto Horin	-	0
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	-	0
Chattogram	Mirsarai	Ichakhali	Charsharat	-	0	
Rainwater harvesting system Water supply	Narsingdi	Manohardi	Calakchar	Hafizpur	-	0
	Sunamganj	Shantiganj	Simulbak	Simulbak	-	0
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	300	165
	Cumilla	Manoharganj	Bipulshar	Sekchail	-	0
	Rajshahi	Bagmara	Sonadanga	Sonadanga	-	0
	Khulna	Dumuria	Khurnia	Tipna	-	0
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	-	0
	Barishal	Hijla	Memania	Induria	-	0
	Sylhet	Goainghat	Rustampur	Bagaiya	-	0
	Netrokona	Barhatta	Shahata	Demura	-	0
	Gaibandha	Fulchari	Fulchari	Fulchari	-	0
	Naogaon	Niamatpur	Hazinagar	Khordocampa	-	0
	Rangamati	Barkal	Vhusanchara	Choto Horin	50	27.5
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	-	0
Chattogram	Mirsarai	Ichakhali	Charsharat	-	0	
Excavation of pond and installation of PSF	Narsingdi	Manohardi	Calakchar	Hafizpur	-	0
	Sunamganj	Shantiganj	Simulbak	Simulbak	-	0
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	1	45
	Cumilla	Manoharganj	Bipulshar	Sekchail	-	0
	Rajshahi	Bagmara	Sonadanga	Sonadanga	-	0

Intervention	District	Upazila	Union	Village	Number of Intervention	Total Estimated Expenditure (in Lacs)
	Khulna	Dumuria	Khurnia	Tipna	-	0
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	-	0
	Barishal	Hijla	Memania	Induria	-	0
	Sylhet	Goainghat	Rustampur	Bagaiya	-	0
	Netrokona	Barhatta	Shahata	Demura	-	0
	Gaibandha	Fulchari	Fulchari	Fulchari	-	0
	Naogaon	Niamatpur	Hazinagar	Khordocampa	-	0
	Rangamati	Barkal	Vhusanchara	Choto Horin	-	0
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	-	0
	Chattogram	Mirsarai	Ichakhali	Charsharat	-	0
Total					724	1885

Table 6.7: Budget Estimation for Sanitation Program and Project

Intervention	District	Upazila	Union	Village	Number of Intervention	Total Estimated Expenditure (in Lacs)
Single pit latrine to twin pit latrine conversion	Narsingdi	Manohardi	Calakchar	Hafizpur	430	86
	Sunamganj	Shantiganj	Simulbak	Simulbak	195	39
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	410	82
	Cumilla	Manoharganj	Bipulshar	Sekchail	390	78
	Rajshahi	Bagmara	Sonadanga	Sonadanga	285	57
	Khulna	Dumuria	Khurnia	Tipna	300	60
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	1260	252
	Barishal	Hijla	Memania	Induria	415	83
	Sylhet	Goainghat	Rustampur	Bagaiya	400	80
	Netrokona	Barhatta	Shahata	Demura	405	81
	Gaibandha	Fulchari	Fulchari	Fulchari	155	31
	Naogaon	Niamatpur	Hazinagar	Khordocampa	205	41
	Rangamati	Barkal	Vhusanchara	Choto Horin	390	78
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	155	31
Chattogram	Mirsarai	Ichakhali	Charsharat	350	70	
New twin pit latrine	Narsingdi	Manohardi	Calakchar	Hafizpur	190	95
	Sunamganj	Shantiganj	Simulbak	Simulbak	105	52.5
	Satkhira	Shyamnagar	Burigoalini	Datinakhali	198	99
	Cumilla	Manoharganj	Bipulshar	Sekchail	102.5	102.5
	Rajshahi	Bagmara	Sonadanga	Sonadanga	81	81

<b>Intervention</b>	<b>District</b>	<b>Upazila</b>	<b>Union</b>	<b>Village</b>	<b>Number of Intervention</b>	<b>Total Estimated Expenditure (in Lacs)</b>
	Khulna	Dumuria	Khurnia	Tipna	72.5	72.5
	Kurigram	Bhurungamari	Pathordubi	Pathordubi	290	290
	Barishal	Hijla	Memania	Induria	115	115
	Sylhet	Goainghat	Rustampur	Bagaiya	125	125
	Netrokona	Barhatta	Shahata	Demura	95	95
	Gaibandha	Fulchari	Fulchari	Fulchari	47.5	47.5
	Naogaon	Niamatpur	Hazinagar	Khordocampa	72.5	72.5
	Rangamati	Barkal	Vhusanchara	Choto Horin	125	125
	Gopalganj	Muksadpur	Jolirpaar	Bilchanda	45	45
	Chattogram	Mirsarai	Ichakhali	Charsharat	97	97.5
				<b>Total</b>	<b>7506</b>	<b>2664</b>

## 7. Operation and Maintenance (O&M) Guideline

This section has been suggested for proper operation and maintenance of the projects. This set up will be activated after completion of the project works under the project sites. An individual O&M section will be proposed in the Head office of DPHE at Dhaka consisting of 4 staffs under Planning and Monitoring Unit. This unit will also be responsible for monitoring the activities of O&M office at Project Sites in different places of Bangladesh. A brief description of O & M is given below.

### 7.1 Operation Plan

#### 7.1.1 Regular Checking of Structures

This is also a typical monitoring activity to be carried out by O&M field staffs of DPHE to detect structural problems of the interventions. During off-peak season, the concerned maintenance engineer of the project should check all the physical structures and fittings of utility services periodically (every three months), if any reconstruction works would be needed for giving better services to vulnerable peoples/local peoples. During peak season (flooding or other disaster), all the structures and fittings of utilities services should be checked by the concerned maintenance engineer daily to check if any emergency work would be needed for giving better services to users.

#### 7.1.2 Frequent Watching of Facilities in the WATSAN Program

This is a typical monitoring activity to be carried out by the O&M staff of DPHE. It is intended mainly to detect weak management system, unhygienic quality in toilets and collect views of users opinion about the service. Recommendations for improvement of services have been detailed in the reports.

#### 7.1.3 Condition Survey and Engineering Survey

The survey data obtained by the O&M field staff of DPHE are used for estimating the required maintenance works. Physical conditions of WATSAN structures are investigated through field surveys once in a year. This is specially required to prepare the details for carrying out periodic maintenance works.

#### 7.1.4 Supervision of Preventive Maintenance Works

Preventive maintenance works are done by the maintenance engineer as and when required round the year. The works are the simplest, cheap and cost effective maintenance works and are implemented more or less continuously. The field staffs of O&M section of DPHE should supervise all preventive maintenance works.

A good planning for operation of structures and facilities is essential to avoid dissatisfaction of users. In this situation, during the peak season, monthly, weekly or daily operational adjustments will be required. Routine monitoring of management system and users opinions will dictate the needs of adjusting the operational measures.

### 7.2 Maintenance Plan

Maintenance of facilities and structures is the most important item of activities. It is necessary and cannot be avoided because it helps preserving the infrastructure in good and functional condition; protects investments; and prevents high rehabilitation costs. In the project, only the following works which directly serve user services should be regularly maintained.

### **7.2.1 Routine Maintenance**

The objective of preventive maintenance is to keep the overall system including all its facilities under the project in good functional order thereby reducing the need of periodic maintenance, eventually avoiding high rehabilitation costs. The works are simple and cost effective, and can be implemented by the maintenance engineer of the project site. Preventive maintenance is carried out round the year, almost continuously or as and when required. The works are mentioned below:

- All activities related to WATSAN interventions;
- Small earthworks for the placement of Geo-bag by support staff of raised platform;
- Cleaning, and washing of the facilities by cleaner;
- Cleaning outfall Drains/ septic tank;
- Checking water treatment facilities in the project area;
- Ensuring and monitoring the water quality of the drinking water in every sites

### **7.2.2 Periodic Maintenance**

Periodic Maintenance intends to bring the components of the infrastructure back to its design standard. The works are more expensive than preventive maintenance and are implemented by central authority of DPHE. Periodic maintenance has the character of repair works and is identified during the field assessment at (more or less) regular intervals.

- Minor Periodic Maintenance Works
- Minor repair of facilities by maintenance engineer; and
- Minor repair of structures by Civil engineer;
- Major Periodic Maintenance Works (cleaning of septic tank)
- Marking of the structures of the WATSAN structures and
- Major repair of existing facilities under the WATSAN structures;

The total allocated maintenance cost including the preventive and periodic have been estimated as Tk. 1 crore for the WATSAN facilities under the project.

### **7.2.3 Emergency Maintenance**

Emergency works cover unforeseen structural works that require immediate actions to protect the facilities in the project area, as a whole or a part thereof from the adverse effects of natural disasters, associated with damage of lives and properties. This type of work requiring immediate attention includes the riverbank site, the repair and replacement of facilities, or the construction of any civil works if structure fails. The estimated emergency maintenance amount is Tk. 50 lacs. The budget items cover unforeseen works because of major calamities like flush flood, riverine floods, cyclones or tidal surges.

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