



Landscape of WASH in IWRM in Bangladesh

DRAFT FINAL REPORT

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ACRONYMS AND ABBREVIATIONS

BBS	Bangladesh Bureau of Statistics
BETS	Bangladesh Engineering and Technological Services Ltd.
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CEO	Chief Executive Officer
CWASA	Chittagong Water Supply and Sewerage Authority
DFR	Draft Final Report
DOE	Department of Environment
DPHE	Department of Public Health Engineering
DWASA	Dhaka Water Supply and Sewerage Authority
FAP	Flood Action Plan
FGD	Focus Group Discussion
IWM	Institute of Water Modelling
IWRM	Integrated Water Resources Management
KII	Key Informant Interview
LGRD&C	Local Government Rural Development and Cooperatives
PWD	Public Works Department
SDG	Sustainable Development Goal
WAB	Water Aid Bangladesh
WARPO	Water Resources Planning Organization
WASH	Water, sanitation and hygiene
WHO	World Health Organization
WRP	Water Resources Planning

EXECUTIVE SUMMARY

Achieving Sustainable Development Goal 6 (SDG 6) will require closer links between Water, sanitation and hygiene (WASH) and integrated water resources management (IWRM). WASH and IWRM are dependent on each other firstly because water quality/ quantity is very important for WASH and secondly safe treatment as well as disposal of human excreta must ensure protection of surface and groundwater quality. Thus WASH and IWRM is integrally linked to each other. Moreover, linking WASH and IWRM is needed to ensure sustainable WASH services as the linkage is an integral part of the SDG 6 and of the new WASH strategy.

In order to better understand and to provide insight into WASH related gaps and opportunities in the current landscape of IWRM, WAB developed a terms of reference (TOR) to initiate a study. The objective of this study outlines three primary goals i.e., identify related gaps in the existing IWRM policy, the review of the process of the local level participation in implementing these policies and to recommend opportunities to include WASH in the existing IWRM policies.

The study would need a participatory and multi-disciplinary approach of data collection and analysis to profoundly understand the multi-dimensionality of IWRM and WASH, gaps between IWRM and WASH, developing appropriate strategies, actions and design for IWRM and resilient WASH promotion. The study would make for triangulation of qualitative information and perspectives with quantitative data for understanding the multi-dimensionality of gaps between IWRM and WASH.

The primary methods of analysis to meet the outcome against the set of objectives are analyzed in terms of existing IWRM policy, qualitative and quantitative data collection through key expert interview (KII) and focused group discussion (FGD). Based on the situational evaluation on weighing the key important factors of WASH in relation to IWRM the key opportunities have been prioritized of WASH.

In this study, the collected information (both qualitative and quantitative) have been analyzed and a report would be drafted by triangulating with secondary information, and primary data collection through field survey, FGD and KII. Based on research of the policies and analysis of the collected data, the key opportunities have been summarized. A set of strategies have also been recommended for implementing the opportunities.

Key informants' interviews were conducted with key stakeholders of the target institutions (NGO, LGI, and local level government agency, national institution) in order to explore the technical, financial and human resources available, vulnerability factors, vulnerable exposures, and WASH design for resilient development. Total 15 (Fifteen) KIIs have conducted. Discussions were conducted applying a previously developed checklist.

For this report to understand the gaps of WASH in the current water management policy, all major policy documents connected to water were reviewed, in order to gain a holistic understanding of the current state of water governance in Bangladesh and how WASH is related in the policy framework. Further, the function and the capacity of the water governance institutions have been evaluated in terms of their institutional mandate empowered by the relevant water management policy. The institutional challenges and organizational weakness in order to serve the mandated responsibility have been briefly discussed in this chapter.

The key experts were provided with the TOR and Inception Report of the project, so that they gain an understanding of the project objectives and outcome. Prior to interview, the interviewer explained about the objectives, key goals and expected outcomes of the project. The interviewers asked the key expert about their professional background and experiences. The questions were open ended which were followed by probing questions as the interviewer felt necessary to better understand recommendations for the Landscape of WASH in IWRM Project. Although initially structured questions were developed, it was suggested by WAB staff that the experts' answers based on the understanding of the TOR rather than structured questions due to the variability in the professional background of the experts.

In this study the local level public participation in IWRM and the success and sustainability of WASH in the current implemented projects have been discussed. Further the experience of WASH from implemented projects have been evaluated so the model can be applied in other study areas with a different scenario. As previously mentioned most of the water resources projects have been focused on either flood control or irrigation and there are very few projects that had an integrated WASH component in addition flood control and irrigation. CDSP (I-IV) is one of the known projects led by BWDB that had multi components i.e. irrigation, flood control, infrastructure and water and sanitation.

The goal of the field visits for the IWRM and WASH project was to evaluate the performance and sustainability of the project in terms of the principles of SDG6. In essence it was assessed how the project components fit in with SDG6 goal components and how effective these projects to deliver to needs of the community. The study team visited the CDSP project areas to evaluate the performance of CDSP for valuable insight for future opportunities of IWRM including WASH in the context of implemented IWRM projects in Bangladesh, the team also visited an area under the Blue Gold Project led by BWDB. Through FGD and KII, the performance and success of the projects particularly with respect to WASH were evaluated. Based on this understanding the team visited several unions in Bhola Sadar to assess the WASH related issues how IWRM projects can be implemented where the need is different from CDSP and how the function of the WASH component can be improved.

Bangladesh has started to achieve the targets of SDG 6 in 2016 by mapping the ministries responsible for implementing individual SDGs, data gap analysis in SDGs, a needs assessment to identify challenges and opportunities for implementing different

targets and formulating an Action Plan for achieving SDGs. Bangladesh have also included the SDG targets in its Annual Performance Agreement, and developed a web portal for reporting on progress towards them. In terms of water and sanitation, Bangladesh has aligned its national development plan with SDG 6.

Any act or policy gives direction to better serve mass population with maximum benefit. However, the implementation of the policy and the continuing quality improvement practice both are essential for achieving desired impact in the society. It is the responsibility of the government agencies and other regulatory bodies to ensure proper implementation of policies or strategies through co-ordination and co-operation. It is a known fact that in Bangladesh, lack of co-ordination among different agencies is one of the major causes behind the poor condition of the water sector. Circumstantial evidence shows that in some cases, the responsibilities and scope of work of different agencies are not clearly mentioned. As a result, there remains scope for misinterpretation and no one is held responsible or accountable for non-performance or poor performance. According to a study by *Chen et al. (2016)*, four major weaknesses exist in the water governance institutions of Bangladesh which are weaker water institutions, i.e., implementation delays and lacking of ministerial leadership, centralized decision making, outdated sectorial policies and non-institutionalized IWRM activities

Based on the finding, a series of workshops can be arranged by the Ministry of Water Resources for the organizations like DPHE, BWDB, WARPO and also for different ministries like MoE, MLGD so that respective organizations are aware of their responsibilities and duties. Another important fact is that even though there are good number of policies and acts on water governance, very little attention is given to how these policies are being implemented at the local level. The lack of systematic monitoring and assessment of policy outcomes impedes the potential for wide range impact in the water sector. A functional monitoring policy and a simplified assessment form can be very useful for the water management groups, NGOs and different enforcement agencies. Last but not least, there needs to be major change in our mindset. Engineers, planners, architects, public health officials, administrators and policy makers, all need to realize the importance of 'integrated' and 'inclusive' approach in providing clean water and proper sanitation in a sustainable manner.

Finally, we have developed recommendations and we anticipate that these recommendations would assist Bangladesh in achieving the SDG goal 6 by 2030.

1. Thematic gaps within policies
 2. Water Governance Planning Mechanism
 3. Institutional function and empowerment within policies
 4. Enforcement empowerment within policies
 5. Interactions between water governance institutions
 6. Empowerment of water related institutions
 7. Capacity of water governance institutions
 8. Public and local community participation
-

CHAPTER 01

INTRODUCTION

Water, sanitation and hygiene (WASH) is an essential component linked to integrated water resources management (IWRM). It is due to the fact that water quality/quantity for WASH is dependent on water resources management and poor sanitation can cause pollution of water resources. Linking WASH and IWRM is needed to ensure sustainable WASH services. WASH/IWRM linkages are an integral part of Sustainable Development Goal 6 (SDG6) and of the contemporary WASH strategy. The existing policy, law, plan, guideline, institutional framework and database system provide a good basis for implementing IWRM activities in Bangladesh. There are however still huge gaps in policy, law, plan, institutional framework and database system which hampers an effective implementation of IWRM activities with consideration to WASH in Bangladesh.



Figure 1-1: SDG 6 Goal and Inter relation between the goals

There are 17 sustainable development goals (SDGs) which are universal set of goals, targets and indicators adopted in 2015 that UN member states will use to frame their development agendas and political policies over the next 15 years. The commitment to “leave no-one behind” is a key feature of the SDGs. Among the 17 goals, SDG 6 is about ensuring clean water and sanitation which is a major concern in many developing countries including Bangladesh. The first three sub-goals of SDG 6 (6.1 to 6.3) primarily involve WASH related goals which are safe drinking water, adequate and equitable sanitation and improvement of water quality. On the other hand, the next three sub-goals (6.4 to 6.6) talk about IWRM related goals that include increase in water use efficiency, integrated water resources management and protection and restoration of water related ecosystems. Sub-goals 6.a and 6.b

mention about international cooperation, capacity building and participatory management system to achieve the SDG goals

For minimizing the Water related impacts, it is necessary to fill up the gaps in existing policy, plan, law, and institutional framework; database and information system. Also to meet up global priority, it is very much necessary to take initiatives for evaluation of country's water resources management activities. The goal of this proposal is to critically evaluate the overall challenges in water sector, review existing policy, plan, law, institutional database and information system for sustainable water resources development in Bangladesh and to identify opportunities to minimize the WASH related gaps in implementing IWRM.

1.1 Background

Humans are integrally linked to the environment. WASH activities associated with conservation may integrate health objectives with watershed management approaches, as well as both rural and urban water supply and sanitation, which can reduce the impact of pollution on the watershed and freshwater species found within it. Though conservation efforts more traditionally intersect with WASH at the rural or community level, the rapid growth of towns and cities, increased water variability related to climate change, and water stress have increased attention on the upstream watersheds that filter and regulate urban water supplies.

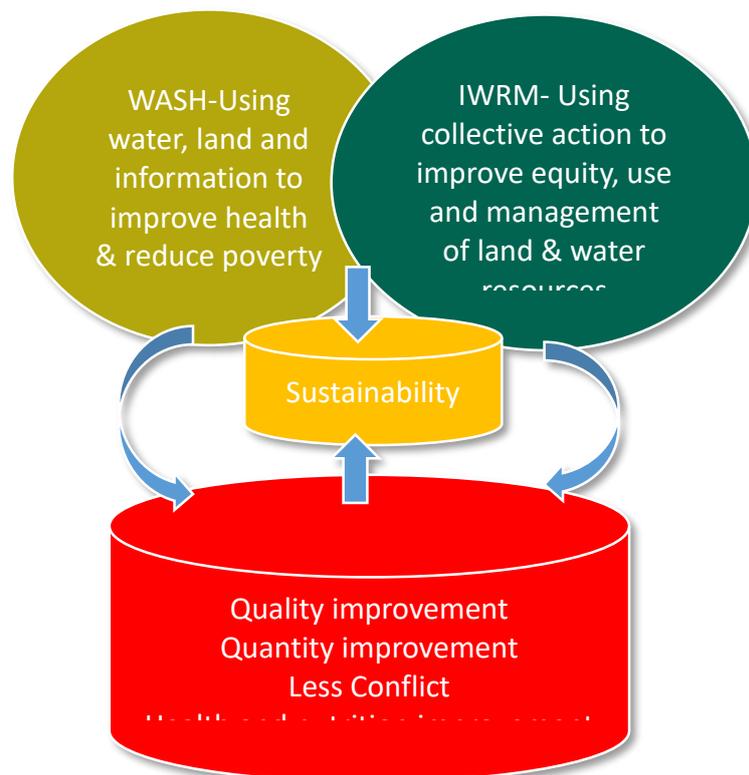


Figure 1-2: WASH and IWRM Relationship

Unfortunately, it is a common misperception among some development and conservation groups that WASH and freshwater conservation projects are distinct and may compete for resources and political attention. Collaboration and

cooperation, however, could produce a better outcome and impact for both priorities. Thus, an improved understanding of the potential overlaps in goals and activities is necessary. Water, poverty and environment are deeply connected. The poor are the most susceptible to environmental risk factors such as unsafe water and climate change. Areas of high endemism and biodiversity, linked with an abundance of freshwater, are often remote. Human communities living in close proximity to these areas tend to be impoverished with little to no access to improved water sources and sanitation facilities.

At present the linkage between WASH and IWRM is poorly defined in the existing policies as well as not well understood by different government WASH agencies. There is a lot of gaps in incorporation of WASH in the existing policy, laws and strategies of IWRM. The inter relation of WASH in the context of IWRM is a complex issue in terms of incorporating WASH opportunities in the IWRM legislative acts and policies in a contentious socio economic environment.

Since the 80's a lot of momentum has been achieved in terms of participatory water management as a footing stone for IWRM. However most of the Water Management associations and organizations have been formed to address equitable management of agricultural water. There are very few legislative policies of participatory approach of IWRM incorporating WASH.

Further, while setting up appropriate Institutional framework in Bangladesh, it has shown that the core organizations who have central role in the Integrated Water Resources Management and WASH activities in Bangladesh according to their priority have lots of drawbacks in their management and organizational structure and co-ordination of activities. The integration between the core water management organizations is very limited.

1.2 Objective and Scope of the Study

The study aims to develop an understanding on the existing policies, strategies, practices and approaches in integrated water resource management aligning SDG6. Further, the study has primarily focused on evaluating the existing programs and approaches of IWRM actors. Based on this understating recommendations has been provided to promote for integration of WASH in integrated water resource management.

The specific objectives are as follows:

- Review and stocktaking of existing policies, laws and strategies to ascertain WASH related gaps in WRM.
- To review the processes of local level participation of stakeholders and people in implementing policies and plan.
- To identify and recommend opportunities to incorporate WASH priorities in IWRM policies and strategies in line with SDG6.



Figure 1-3: Specific objectives of the project

1.3 Objectives and Outcome

The primary objective of the study was stock taking of existing IWRM policies and to identify gaps of IWRM policies in aligning with SDG6 principles. It is realized that water management projects primarily focus on the benefit in terms of tangential financial benefit for stakeholders and local community associated with agriculture, fisheries and flood remediation. This is substantiated by the large water resources projects in the last decade such as the Water Management Improvement Project, Coastal Embankment Improvement Project, Blue Gold where the primary focus were flood remediation and water management for increasing agricultural production. Additionally, the WASH component would be a much smaller scope in the objectives of these projects. However, the communities could benefit significantly if WASH opportunities were integrated in tandem to the goals outlined in SDG6 with a holistic watershed planning. This study has looked into the key IWRM policies upon which the projects are formulated and specified where there were specific WASH opportunities and how these WASH opportunities could be incorporated in the IWRM related project scope. Each objective has an expected outcome. The objectives and the key outcome are summarized in the following table.

Table 1-1: Objectives and outcomes

Objectives	Outcome
Review and stocktaking of existing policies, laws and strategies to ascertain WASH related gaps in WRM.	Existing policy analysis in terms of SDG6 goals WASH opportunities identified in IWRM policy Key expert interviewed
To review the processes of local level participation of stakeholders and people in implementing policies and plan.	Understand the local implication through FGD and Key Informant interview
To identify and recommend opportunities to incorporate WASH priorities in IWRM policies and strategies in line with SDG6	Based on the findings summarize and recommend a final report on WASH opportunities in IWRM policies and conduct a national level workshop

1.4 Methodology, Approach and Study Instruments

The study needed a participatory and multi-disciplinary approach of data collection and analysis to deeply understand the multi-dimensionality of IWRM and WASH, gaps between IWRM and WASH, developing appropriate strategies, actions and design for IWRM and resilient WASH promotion. The study has made for triangulation of qualitative information and perspectives with quantitative data for understanding the multi-dimensionality of gaps between IWRM and WASH, developing appropriate strategies, actions and design for IWRM and resilient WASH promotion.

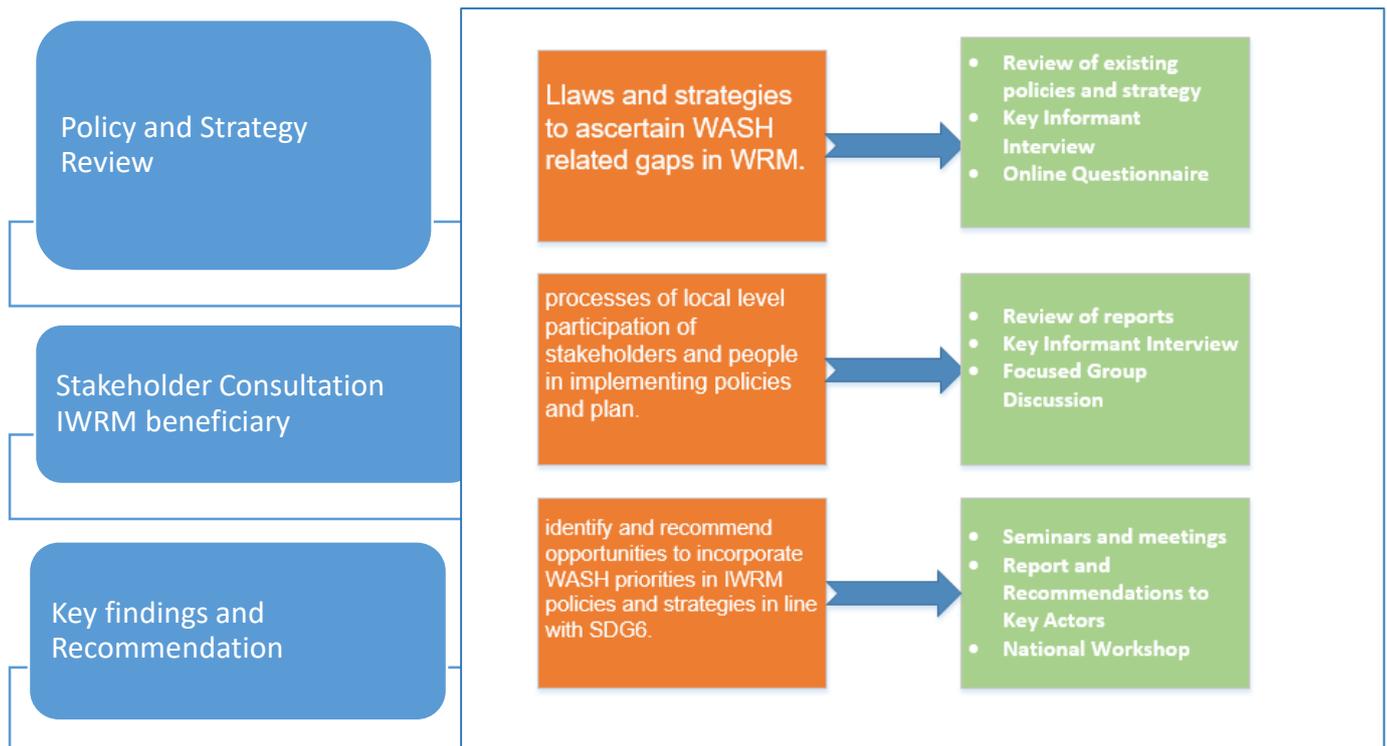


Figure 1-4: Key steps of the project

To understand the complex relationship and interface between IWRM and WASH and recommendation for WASH resilient design, the study has applied both bottom-up and top-down approach. Following three interactive steps has been undertaken in Stakeholder Consultation IWRM beneficiary.

The activities for the projects can be summarized as follows-

- Collection, review and analysis of policy, strategy and actions of IWRM and WASH in Bangladesh to identify scope of integrating WASH priorities in IWRM
- Participatory research to get perspectives and experiential knowledge of the different stakeholders involved and dependent of water resources and WASH interface including marginal farmers, fishermen, indigenous people, women and socially excluded communities on water resource management and WASH facilities, improvement of WASH priorities; and

- Stakeholder consultations at multiple levels to develop strategy, action plans and identify scope of integrating WASH in IWRM Projects. Key findings will be validated and disseminated at regional and national levels through consultation workshop with different key stakeholders and policy makers.

The description of different steps of the methodology is given. A schematic diagram of the methodology has been shown in figure 1-4.

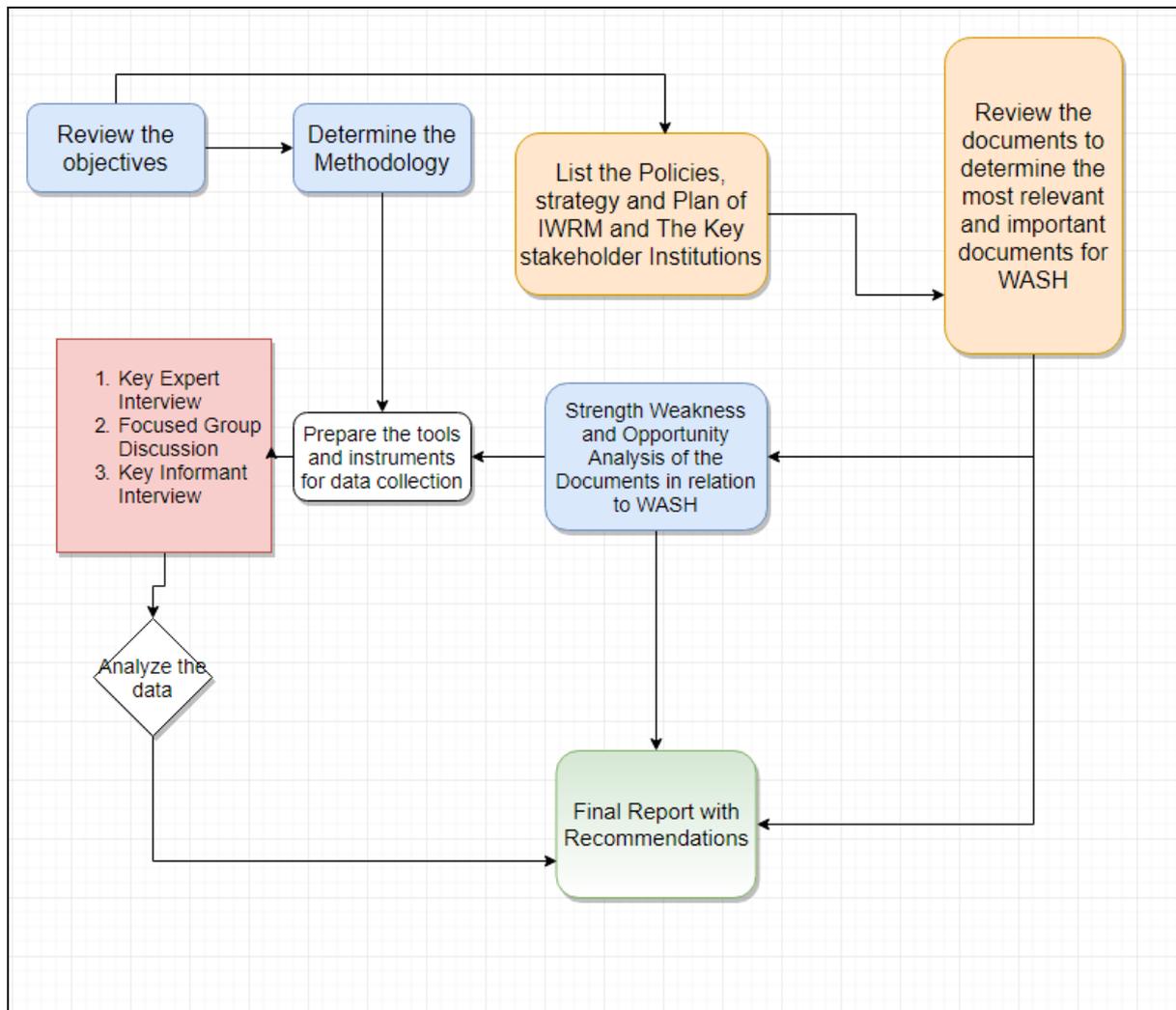


Figure 1-5: Workflow of full activities

A critically important element of IWRM is the integration of various sectoral views and interests in the development and implementation of the IWRM framework. An overview of this process is provided in Figure 1-5.

Secondly, the study has accumulated primary data—both qualitative and quantitative from the study locations through PAR (Participatory Action Research) and consultations with stakeholder’s actors, service providers, and women and socially excluded and discriminated groups, Local Government Institutions (LGI).

Thirdly, study findings have been shared through one national level validation and dissemination. Final findings are submitted to Water Aid. The key activities at

different levels, inter-relationship and outcomes of the study and consultancy are shown in the Figure 1-6 below.

Final study report was prepared based on the data collected from literature review and field location and analysis in consultation with Water Aid team.

1.5 Key Methodology, Steps and Outputs

1.5.1 List the Key Institutions

A list of key national, local and other relevant institutions that play a key role in developing and implementing policies, strategies and plan for IWRM and WASH have been compiled for the purpose of this study.

1.5.2 List the Relevant Policy Strategy and Plan

The policy, strategy and planning documents have been listed as shown in the table. The relevancy of these documents as the IWRM documents will be further discussed with WAB. The following figure shows the hierarchy of the documents.

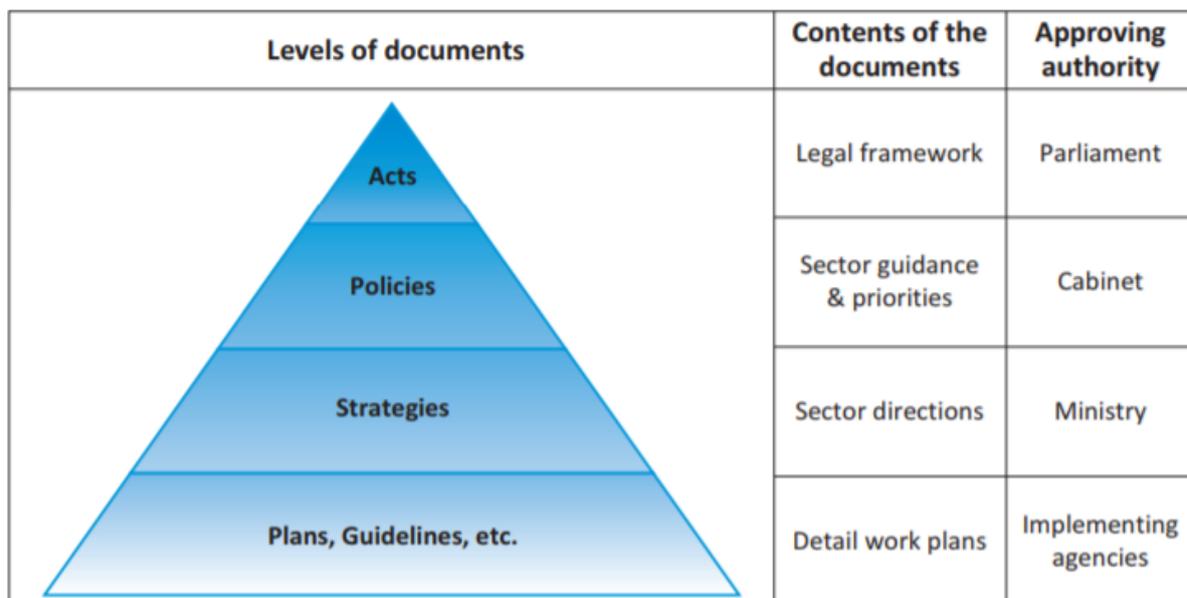


Figure 1-6: Hierarchy of Documents

1.5.3 Secondary documents Review and Analysis

In order to get insight into the problem as well as understanding of the study areas and issues such as gaps and interface between IWRM and WASH, needs and priorities, WASH and water resources, food security and livelihood problems etc., an attempt has been made to review the available secondary documents. It may cover reviewing the project's documents and documents relating context and area profile.

For the purpose of this review, several documents have been collected which includes documents on socio economic features of study areas e.g. demography, settlement pattern and types, water and sanitation options, food security, natural resource base, WASH protection, hydro-meteorological disaster situation and trend,

disaster vulnerability, disaster coping etc. Project documents e.g. proposal, logical framework analysis, baseline analysis and other documents had been reviewed.

1.5.4 Key Expert Interview

A key part of the first objective which is to understand the gaps of WASH in IWRM in existing policies and strategies is expected to be obtained by key expert interview. Two separate sets of questionnaire were provided to the IWRM and WASH experts so that the questions were relevant to their area of expertise. Sample questions is provided in the appendix for the WASH and IWRM experts. However, these questions will be modified with further discussion with WAB.

For getting more appropriate results on related gaps of IWRM and WASH between agencies, in person interview has been conducted with the National Water Experts.

A list of potential Key Experts has been evaluated Finally, three experts were interviewed and the experts were chosen based on the expertise and experience of the expert that would be most valuable for this project.

1.5.5 Focused Group Discussion

it had been decided that the FGD's would be conducted at Bhola Sadar. Further for the second objective, to understand the local level participation to implement the policies and plan and to identify opportunities for WASH and IWRM integration survey data have been gathered based on questionnaire and FGD. The objective of gathering the data was to analyze how the community participatory approach of IWRM can be connected to WASH related activities. Additionally, this has allowed exploring opportunities for multiple use of water from the same source to be used for drinking and irrigation.

6 Focus Group Discussions (FGDs) has been conducted with:

- Farmers and local stakeholders
- Other water users in rural area (fisher folk, domestic users, navigation etc.)
- Upazila/Union Chairman and ward councilors.

Figure 1-11 shows the location of the FGD. Union Illisha and Char Shibpur have been chosen as erosion site of the Meghna River. Veduriya and Char Shibpur are also char areas. Two FGD's were conducted at each of the unions.

The questionnaire and the FGD were designed and field tested to understand the barriers of integrating WASH with IWRM in a complex socio cultural environment. The requirement, objective and the goals of the primary data collection will be further discussed with Water Aid to ensure that the goals of the projects are met through this process.

The field survey has been employed to gather data and understand the current mechanism of community based participatory approach of IWRM and how it interrelates and affects WASH.

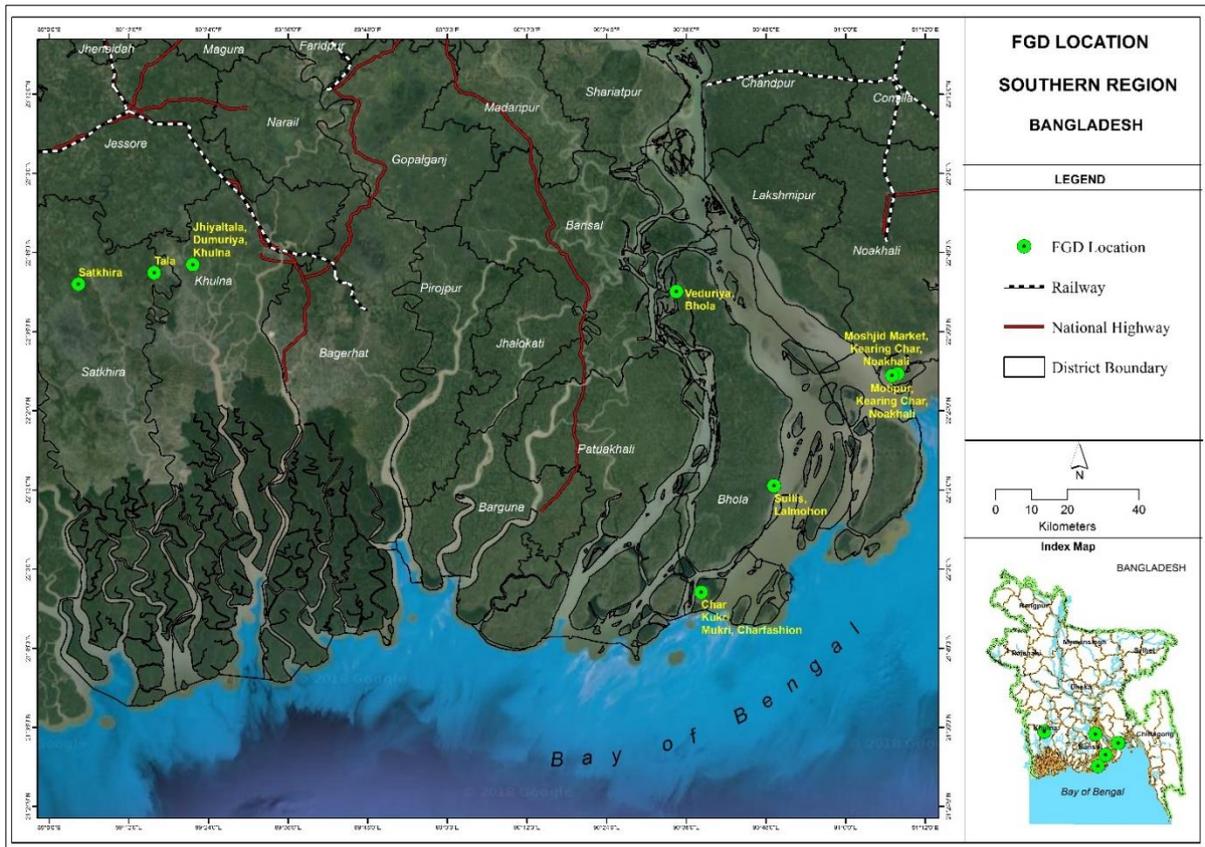


Figure 1-7- FGD locations

Additionally, it will assist to explore whether there are opportunities to implement similar participatory approach for WASH as a component of the IWRM. The study entails collecting primary data from following field locations and analyzing them to draw the benchmark.

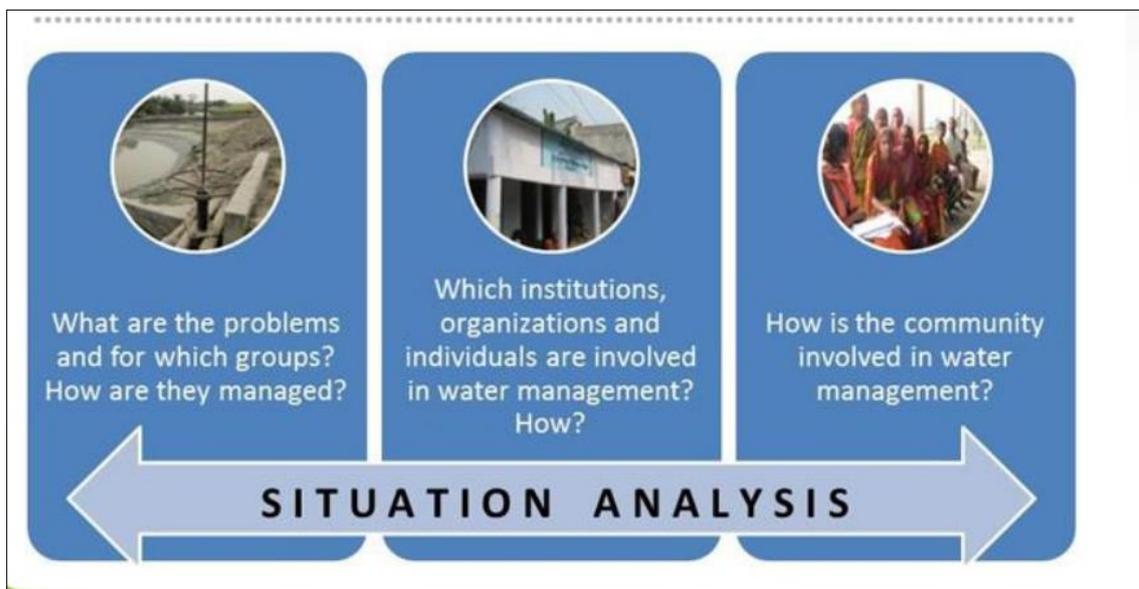


Figure 1-8: Situation Analysis Diagram

Primary data were collected from the local communities and actors including local government and NGOs, sector actors through Participatory Action Research (PAR)

using various participatory research tools like village profiling, historical trend analysis of water resources and social factors, resource mapping and vulnerability assessment/matrix, FGD, KII.

1.5.6 Key Informants Interview (KII)

Key informants' interviews were conducted with key stakeholders of the target institutions (NGO, LGI, and local level government agency, national institution) in order to explore the technical, financial and human resources available, vulnerability factors, vulnerable exposures, and WASH design for resilient development. Total 15 (Fifteen) KIIs will be conducted. Discussions were conducted applying a previously developed checklist with Study Instruments Design and Testing.

1.5.7 Field Test of the Tools and Techniques

The study team conducted Focus Group Discussion (FGD) and Key Informant Interview (KII) to receive the response of the respondents. The questionnaire and checklists were corrected considering the field test outputs. Finally, a sharing meeting with Water Aid officials at Water Aid office was conducted to finalize all the tools and techniques developed for this study.

1.5.8 Overall Process

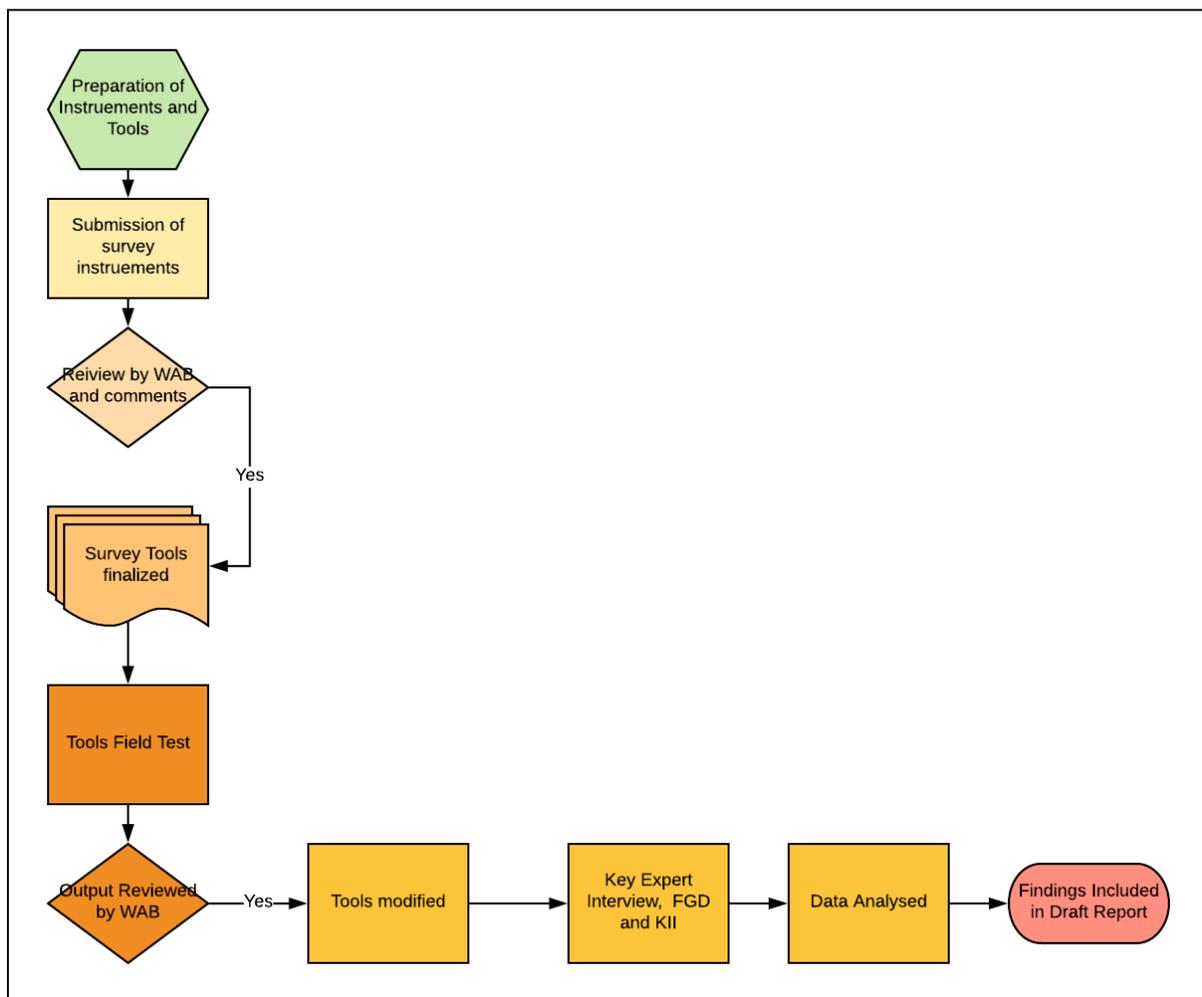


Figure 1-9: Overall process diagram of data collection

The overall process of data collection is summarized in the above figure that has been described in the sections above. Qualitative data were cross checked against findings from different sources and triangulated. The study team explored the possible linkages and relations between different categories of data.

CHAPTER 02

EVALUATION OF WATER GOVERNANCE INSTITUTION AND RELATED POLICY

2 EVALUATION OF WATER GOVERNANCE INSTITUTION AND RELATED POLICY

In this report all major policy documents connected to water were reviewed in order to gain a holistic understanding of the current state of water governance in Bangladesh and to understand how WASH is related in the policy framework. Further, the function and the capacity of the water governance institutions have been evaluated in terms of their institutional mandate empowered by the relevant water management policy. The institutional challenges and organizational weakness in order to serve the mandated responsibility have been briefly discussed in this chapter.

Background of Development of Water Governance

During the past two decades the Government of Bangladesh has formulated many policies intended to deal with various aspects of water resources management in the context of the National Development Objectives, which aim to-

- (i) alleviate poverty and provide sustainable economic growth,
- (ii) provide food security,
- (iii) promote public health and safety, and
- (iv) protect the natural environment.

Lots of studies and plan have been undertaken chronologically by the Government of Bangladesh during the last few decades for systematic Water Resources development and management.

The Bangladesh Water Act 2013 is the newest water-related policy in Bangladesh, and has absorbed the National Water Policy 1999 and superseded all other direct water acts. Therefore, it is vital to understand how this policy functions and how well it has covered the key aspects of effective water governance. Following is a list of documents that have been reviewed in terms of identifying the gaps of WASH-IWRM.

Table 2-1: List of key IWRM and WASH documents

No	Title of Document	IWRM/ WASH	Year of Publication
ACT			
1	Bangladesh Water Act 2013	IWRM	May 2013
2	Bangladesh Water Rules (বাংলাদেশপানিবিধিমালা) 2018	IWRM	August 2018
3	Environmental Conservation Act	IWRM	1995
4	Environmental Conservation Rules	IWRM	1997

POLICY			
5	National Water Policy 1999	IWRM	Jan 1999
6	Coastal Zone Policy 2005	IWRM	July 2005
7	National Policy for Safe Water Supply and Sanitation (1998)	WASH	1998
8	National Environment Policy (1992)	IWRM	1992
9	National Agriculture Policy (1999)	IWRM	1999
10	National Agriculture Extension Policy 2012	IWRM	2012
11	National Policy for Arsenic Mitigation (2004)	IWRM	2004
STRATEGY			
12	NWMP Development Strategy	IWRM	June 2004
13	Coastal Development Strategy	IWRM	July 2006
14	National Sanitation Strategy (2005)	WASH	2005
15	National Cost Sharing Strategy for Water and Sanitation for HTR areas of Bangladesh	WASH	2012
16	National Strategy for Water and Sanitation for Hard-to-Reach Areas of Bangladesh	WASH	2012
17	National Hygiene Promotion Strategy for Water Supply and Sanitation	WASH	2012
18	National Strategy for Water Supply and Sanitation	WASH	2014
PLAN			
19	Flood action plan 2015	IWRM	1993
20	Bangladesh Delta Plan 2100	IWRM	2018
21	Bangladesh Climate Change Strategy and Action Plan	IWRM	2009

INSTITUTIONAL ANALYSIS

Table 2-2: List of the Key Institutions

Agency	IWRM	WASH
National Agency	<ol style="list-style-type: none"> 1. National Economic Council 2. Planning Commission 3. National Water Resources Council (NWRC) 4. Ministry of Water Resources (MoWR) 5. Water Resources Planning Organization (WARPO) 6. Joint Rivers Commission (JRC) 7. Bangladesh Water Development Board (BWDB) 8. Bangladesh Inland Water Transport Authority (BIWTA) 9. Ministry of Agriculture 10. Department of Fisheries (DoF) 11. Ministry of Local Government, Rural Development and Cooperatives (MoLGRDC) 12. Ministry of Environment and Forests (MoEF) 13. Department of Environment (DoE) 14. Soil Research Development Institute (SRDI) 15. Bangladesh Haor and Wetland Development Board 16. River Research Institute 	<ol style="list-style-type: none"> 1. Ministry of Local Government, Rural Development and Co-op 2. Ministry of Health 3. Department of Public Health Engineering 4. Local Government Engineering Department 5. Ministry of Education
Local Government Institutions	<ol style="list-style-type: none"> 1. City Corporations: 2. Paurashava (Municipalities): 3. Zila (District) Parishad: 4. Upzila (Thana) Parishad: 5. Union Parishad: 	<ol style="list-style-type: none"> 1. WASA 2. City Corporations: 3. Paurashava (Municipalities): 4. Zila (District) Parishad: 5. Upzila (Thana) Parishad: 6. Union Parishad:

2.1 Policy Analysis

Though there are significant numbers of policies and strategies related to IWRM, most of the policies, plans and strategies are developed fragmentally for a single ministry. So the concept of IWRM including WASH in line with SDG 6 has a lot of opportunities to be addressed in the existing IWRM policies and plans. The need of detailed regional watershed planning to assess the socio economic need of a community is not clearly indicated in the policies. Most of the strategies and plans are broad and in the absence of any regional approach based on an IWRM in line with SDG6. Additionally, critical issues for water management are often not properly identified and proper planning for implementation of projects is often a challenge. The new Water Rules 2018 specifies a permitting mechanism for water abstraction. There are significant grey areas on how this permitting process will be implemented and enforced, particular as the responsibility is assigned with WARPO, which is historically not an enforcement organization. Further, there is no clear mechanism on the decision making on the amount of abstraction that will be allowed for groundwater stressed areas.

Delta plan 2100 is impressive in terms of evaluating the legal and institutional framework of water management and sanitation. Further, it has identified the current situation in a baseline study and came up with key medium term and long term goals for water and sanitation. However, they have been criticized by experts that the Delta plan it advocates the same structural approach of watershed management that had been adopted in Bangladesh in last 50 years. This approach had failed in many places and required continuous maintenance after several years following a flood event. The Delta plan also did not emphasize on adoption of the SDG6 that is proposed by the UN and adopted by many countries. It is imperative that for a long-term solution for watershed health improvement, restoration of watershed to improve groundwater, surface water and ecological habitat will have to be adopted. BCCAP (2009) lacks in providing direction for ecological and holistic approach for watershed management which is consistent with the SDG6. The existing National Strategy for Water Supply and Sanitation 2014 has been found to be ineffective in Government facilitated projects outside the WASA jurisdiction.

The details description of the acts, plans, policies and strategies related to WASH and IWRM is given in **Annex 01**.

2.2 Institutional Analysis for Water Management

As the institutions have the responsibility and empowered with ensuring the IWRM and WASH policies are implemented through projects and programs, it is important to understand the current organization weakness, co-ordination and capacity issues faced by the water governance and WASH related institutions. Through the study of the institutions through key expert interview and research of published studies including the most recent document the Delta Plan 2100, it has been inferred that the water governance institutions are facing many challenges in terms of technical capacity, maintaining data repository, manpower shortage, legal ability of enforcement, monitoring and feedback mechanism for project performance, co-ordination among agencies and often bureaucratic and political complexities. There is severe lacking among the co-ordination among agencies and policies and programs of water resources management are delivered in piece meal basis rather than understanding of need through a coordinated long-term watershed focused planning. Further, the WASH related projects are fragmented within DPHE, WASA and other than few projects water governance institutions have not focused on WASH in the recent water management projects.

The legal framework for comprehensive water management has been provided in Water Act 2013 and water rules 2018. Though the act provides a strong basis the institutions have not evolved to function accordingly, particularly in managing ground water resources.

Institutional Responsibility and Analysis

Name of Institutions	Responsibilities	Analysis
MoWR	The MoWR will formulate a framework for institutional reforms to guide all water sector related activities. It will periodically review the mandates of all water sector institutions and redefine their respective roles, as necessary, to ensure efficient and effective institutions commensurate with changing needs and priorities.	The National Water Resources Council (NWRC) coordinates all water resources management activities in the country.
WARPO	The WARPO will be the exclusive government institution for macro-level water resource planning. <i>It will act as a clearing house for all water sector projects. It will also serve</i>	In the Water Rules 2018 WARPO has been assigned as the enforcement organization. Since its inception WARPO has been a planning and policy organization and not an enforcement

	<p><i>as the Executive Secretariat of the ECNWRC</i></p>	<p>organization. It does not have the manpower and capability to enforce</p> <p>There is an extreme shortage of man power in WARPO. The service rule for the WARPO professionals is quite inadequate. It has no regional offices for competent authority for each hydrological region. Existing staffing structure, strength, support and service of WARPO are not sufficient to commensurate with its mandate and redefined functions effectively</p>
<p>BWDB</p>	<p>Bangladesh Water Development Board (BWDB) is responsible for implementing all major surface water development projects and other FCDI projects with command area above 1000 hectares</p>	<p>Among them the conflicting of power exercise between BWDB and Ministry; shortage of manpower; constraining of operational budget for emergency work such as river erosion mitigation; lack of communication skill; slow rate of internal management system; lack of upzilla level office for local water resources development; Lack of manpower for implementing and monitoring participatory water management, inadequate service role for BWDB; absence of trained personnel in appropriate place, lack of proper management Information system (MIS) are mentionable.</p> <p>The BWDB continues to follow a response-based approach rather than seeking a long-term, sustainable solution to floods and erosion. The effectiveness has been limited by inadequate designs, insufficient maintenance, failure to address</p>

		<p>river erosion, and limited long-term planning. Current management practices are also inflexible in dealing with the dynamic nature of the river system and adapting to climate change. (Delta Plan 2100)</p> <p>Though currently BWDB has adopted a new approach in the level of flood level of 200 and 100 years for major and interior embankments recently, it is impractical in many cases due to the complexity and lengthy process of land acquisition.</p> <p>Further, most BWDB projects have been evolved and continued from previous project, focused on reconstruction of embankments and canal dredging, so out of the box concept for IWRM is mostly missing. Other than few projects, integrated water resources planning concept in line with SDG6 and co-ordination with other agencies have not evolved.</p>
<p>LGED</p>	<p>The LGED (Local Government Engineering Department) implements a large number of projects in the water sector, mostly to strike a balance between water use for small-scale and large-scale water-related projects. The smallscale projects are implemented mainly by LGED, and the large-scale projects are implemented exclusively by BWDB. Given that the demand for small-scale water- related projects greater than for large-scale projects,</p>	<p>LGED is facing a lack of skilled manpower, appropriate scientific and technical knowledge alongside insufficient allocation of funds, an inadequate research base and low access to modern technologies</p>

	LGED receives around 60% of the money allocated by the Planning Commission to implement projects in the water sector. At present,.	
DPHE	Department of Public Health Engineering (DPHE) is most important government body dealing with water supply and sanitation, responsible for planning, designing, and implementing water supply and sanitation services in rural areas, and in urban areas outside Dhaka and Chittagong. DPHE is also responsible for Arsenic Mitigation in Bangladesh. (www.dphe.gov.bd)	DPHE is mostly supply driven and does not respond well to user need. Lack of ownership by the end users tends to hinder sustainable operation of the systems.

A global norm adopted as a general principle in water and sanitation is the separation of implementation from regulation and (compliance) monitoring, this consideration is missing in Bangladesh, as for example currently there is no organization with dedicated responsibility for groundwater management, and such expertise as exists is thinly scattered between DPHE, BWDB, BADC etc. Resolving such a question would require, inter alia, considering what types of function are to be assigned. It has been recognized to ensure sustainable use of groundwater, some form of abstraction licensing is required, at least in Water Stressed Areas.

Currently there is no agency ideally suited in terms of skills, conflicts with existing functions and geographical spread to undertake the administration of licensing. In the water rules 2018 WARPO has been empowered with the licensing of groundwater abstraction including in groundwater stressed areas. However, WARPO historically has been a planning organization rather than a monitoring organization, thus in terms of capacity and human resource to implement the licensing program for WARPO would be challenging.

In the context of the various new responsibilities that have been created under the Local Government and WASA acts, there may be a need to clarify the role and responsibilities of DPHE through the bye-laws to be established. (Delta Plan 2100). Currently the Department of Public Health Engineering (DPHE) is most important government body dealing with water supply and sanitation, responsible for planning, designing, and implementing water supply and sanitation services in rural areas, and

in urban areas outside Dhaka and Chittagong. DPHE is also responsible for Arsenic Mitigation in Bangladesh. (www.dphe.gov.bd)

Each City Corporation is a corporate body which is responsible for raising taxes and other income. City Corporations of Dhaka and Chittagong are supported by Water Supply and Sewerage Authorities (WASAs) formed in accordance with the 1996 WASA Act. WASA is a corporate body under the authority of the Water Supply Wing of the Local Government Division and responsible for provision and up-keep of potable water supply, sewerage and storm drainage.

The WASAs are allowed to levy tariffs and fees at rates the Government Approves. WASAs are suffering for lack of sufficient autonomy to take important decisions on planning, implementation, tariff, staffing and other aspects of water supply and sanitation service. Tariffs have to be approved by central government and do not reflect the cost of water production.

Dhaka WASA is facing a serious water shortage. Over-exploitation of groundwater has reached critical levels and is causing serious environmental problems. Surface water in rivers is heavily polluted from industrial and domestic wastes. However, several projects to increase water supplies are being studied.

Local and International NGOs are providing goods and service normally associated with the public and private sectors. The NGOs are playing significant role in environment and water management planning. The private sector is closely involved in all aspects of water resources development and management by consulting, contracting, supplying equipment and training the agencies. Private sector activities have expanded significantly over the last 20 years and they are particularly active in minor irrigation, rural water supply and sanitation. But there is a lack of coordination between the Public, private sector and NGOs.

CHAPTER 03

KEY EXPERT INTERVIEW

3 KEY EXPERT INTERVIEW

3.1 Methods and Tools for Interview

The key experts were provided with the TOR and Inception Report of the project, so that they gain an understanding of the project objectives and outcome. Prior to interview, the interviewer explained about the objectives, key goals and expected outcomes of the project. The interviewers asked the key expert about their professional background and experiences. The questions were open ended which were followed by probing questions as the interviewer felt necessary to better understand recommendations for the Landscape of WASH in IWRM Project. Although initially structured questions were developed, it was suggested by WAB staff that the experts' answers based on the understanding of the TOR rather than structured questions due to the variability in the professional background of the experts.

Further, the experts were asked about a multiple choice question about the status of IWRM. The experts had a chance to look at the questions and answer their position.

The following is the summary of the process for the Key Expert Interview:

- Experts provided with the TOR and Inception Report
- The project was explained and open ended questions were asked
- Experts were asked about their experience
- The Key IWRM and Water Resource Management Policies
- Lacking in policies
- Issues with implementation
- Asked on directions how the project can be approached
- Asked on directions and methods of the Landscape of WASH Project

3.2 List of Experts Interviewed to Date

The following experts were interviewed

1. Mr. Wadud Bhuiya, Retired ADG Planning, PD-CDSP 1
2. Mr. Abdur Rahman, Retired Chief Engineer, BWDB
3. Mr. Amirul Hossain, Project Director, Blue Gold Project BWDB
4. Ms. Nasrin Akhter Khan, Executive Engineer, Blue Gold Project BWDB
5. Engr. Md. Muktadir. Executive Engineer, DPHE, Dhaka

3.3 Excerpts and Findings from Key Expert Interviews

The synopsis of discussion with the experts are summarized as follows-

CDSP 1-IV are ideal model of Integrated Water Resources Management project that included WASH and some of the goals of SDG-6. He recommended that the pros and cons of this model can be studied to develop different models for different needs

catering to needs of various regions in the country. Further, he recommends that FGD's can be performed at the CDSP project area to develop a field level understanding from the WASH beneficiaries. From the insight of the FGD feasibility of applying this model to different geographical needs of the country can be applied. The different stakeholder government departments and NGO's will have to work together to implement a project and make it a reality. He further mentioned there are some administrative challenges with project with different working government organizations in terms of formal communication, mutual agreements and project administration. However, his position has been as CDSP projects have been successful implemented in the past, newer working models with different needs I.e., other than land allocation for example, flood control, infrastructure rehabilitation, employment creation, climate resilience technologies etc.

A number of government agencies implement the program. The Bangladesh Water Development Board (BWDB) is the lead agency, responsible inter alia for protecting the communities from flooding and surges by ensuring the integrity of the embankments and associated structures, and for forming and registering water management organizations (WMOs). There are three different members in the WMG that include the land owners, the land less and female. There are currently 514 registered WMO's with 21 lakh registered members. The Department of Agricultural Extension (DAE) works alongside farmers to encourage the selection and cultivation of crops and varieties that are well-suited to the coastal environment and which, as part of an interlinked annual cropping system, form the basis for profitable business. In addition, the Department of Livestock Services (DLS) and Department of Fisheries (DoF) provide specialist advice for the development of training modules to farmer field schools, and contribute to other project interventions.

Royal Dutch Embassy has initiated an Innovation Fund for the Blue Gold project to support and implement innovative technologies to improve the living and the livelihood of the project beneficiaries. With the support of the innovation fund piped water supply system has been installed and currently operating in Khulna polder 26 and Golachipa polder 55. Though WASH is not a component of the Blue Gold project, such innovation has provided the opportunity for WASH. In conclusion he mentioned that integrated approach with different government organizations including WASH with DPHE, LGED and NGO's to provide better results for the needs of the community. Thus, he is supporting of integrated project with BWDB and different government stakeholders. He would support such projects in the future and continue to look forward to work with different government organizations.

One of the experts, mentioned though there are some great end results there are challenges in managing and decision making with projects with multiple government stakeholders, primarily with the availability of officials of arranging intermenstrual meeting. Additionally, the formal chain of communication and concurrence of inter ministry and departments is time consuming for key decisions.

CHAPTER 04

EXPERIENCE FROM IMPLEMENTED PROJECTS

4 EXPERIENCE FROM IMPLEMENTED PROJECTS

In this chapter the local level public participation in IWRM and the success and sustainability of WASH in the current implemented projects have been discussed. Further the experience of WASH from implemented projects have been evaluated so the model can be applied in other study areas with a different scenario. As previously mentioned most of the water resources projects have been focused on either floor control or irrigation and there are very few projects that had an integrated WASH component in addition flood control and irrigation. CDSP (I-IV) is one of the known projects led by BWDB that had multi components i.e. irrigation, flood control, infrastructure and water and sanitation.

The goal of the field visits for the IWRM and WASH project was to evaluate the performance and sustainability of the project in terms of the principles of SDG6. In essence it was assessed how the project components fit in with SDG6 goal components and how effective these projects to deliver to needs of the community. The study team visited the CDSP project areas to evaluate the performance of CDSP for valuable insight for future opportunities of IWRM including WASH in the context of implemented IWRM projects in Bangladesh, the team also visited an area under the Blue Gold Project led by BWDB. Through FGD and KII, the performance and success of the projects particularly with respect to WASH were evaluated. Based on this understanding the team visited several unions in Bhola Sadar to assess the WASH related issues how IWRM projects can be implemented where the need is different from CDSP and how the function of the WASH component can be improved.

Table 4-1: CDSP Project FGD Locations

FGD Location	Project Name	FGD Issues
Char Bhatirtek, Companiganj, Noakhali	CDSP I	Sea dyke, homestead level water management, resilient livelihood, WASH
South Hatiya, Noakhali	CDSP II	Low embankment, canal excavation for drainage, WASH
Boyer Char, Noakhali	CDSP III	Interior dyke, sluice, excavation/re-excitation of shortcut channel; re-excitation of river, Fixation diluvium lines of Boar Char
Noler Char and Caring Char, Noakhali	CDSP IV	Interior dyke, canal excavation, embankment, potable water, WASH
Dumuria, Khulna	Blue Gold	Polder management, Water management, livelihood interventions

4.1 Experience from the CDSP

4.1.1 Background of the Project

The Bangladesh Government, with assistance from the Government of the Netherlands, initiated development activities in the late 1970s aimed at increasing the security of households in the coastal chars of south-eastern Bangladesh by providing them with individual assets (land being the most important one) and collective goods, as embankments, roads and cyclone shelters. These activities evolved from a single agency project in Noakhali District under the Land Reclamation Project, to a regional multi-sectoral and multi-agency programs under the successive phases of the Char Development Project (CDSP). The project was divided into four phases with different timeframe which is illustrated in the following table:

Table 4-2: CDSP Project period

Project Phase	Duration
CDSP I	1994 to 2000
CDSP II	2000 to 2005
CDSP III	October 2005 to December 2010
CDSP III & CDSP IV bridging period	January 2011 to March 2011
CDSP IV	March 2011 to December 2018

The overall objective of the project is to reduce poverty and hunger for poor people living on newly accreted coastal chars, which would be achieved via improved and more secure livelihoods. The purpose is therefore to improve and enhance the security of the livelihoods of the settlers in the project areas. This applies in particular for the 28,000 households in the CDSP IV project areas. The purpose would be achieved through the following outputs:

CDSP in different period works six project components: protection from climate change climate resilient infrastructure and water supply and sanitation, land settlement and titling, livelihood support, institutional development and knowledge management.

Each component also implemented with different sub-component. The following figure illustrates the component and sub-component of CDSP project. Under the Protection for Climate Change Component, the major sub-component is water management which was implemented through construction of sluice, construction and repairing embankment, excavation and re-excavation of canal for drainage channel and closures. Under the Climate resilient infrastructure and water supply and sanitation, the instalment of deep tube wells is the most important drinking water intervention. In areas where aquifers did not provide reliable drinking water ponds with sand filters (PSF) and rain water harvesting devices were constructed for

drinking water supply. Each household was received a sanitary latrine (rings and slabs) while also public toilets were established at market places.



Figure 4-1: Component of CDSP

CDSP has developed multi sectoral dynamic management with public and private organization. Bangladesh Water Development Board (BWDB), Ministry of Land (MoL), Local Government Engineering Department (LGED), Department of Public Health Engineering (DPHE), Department of Agriculture Extension (DAE) and Forest Department (FD) are the key partner from government agencies and four other non-government organization were the implementing partners of the project.

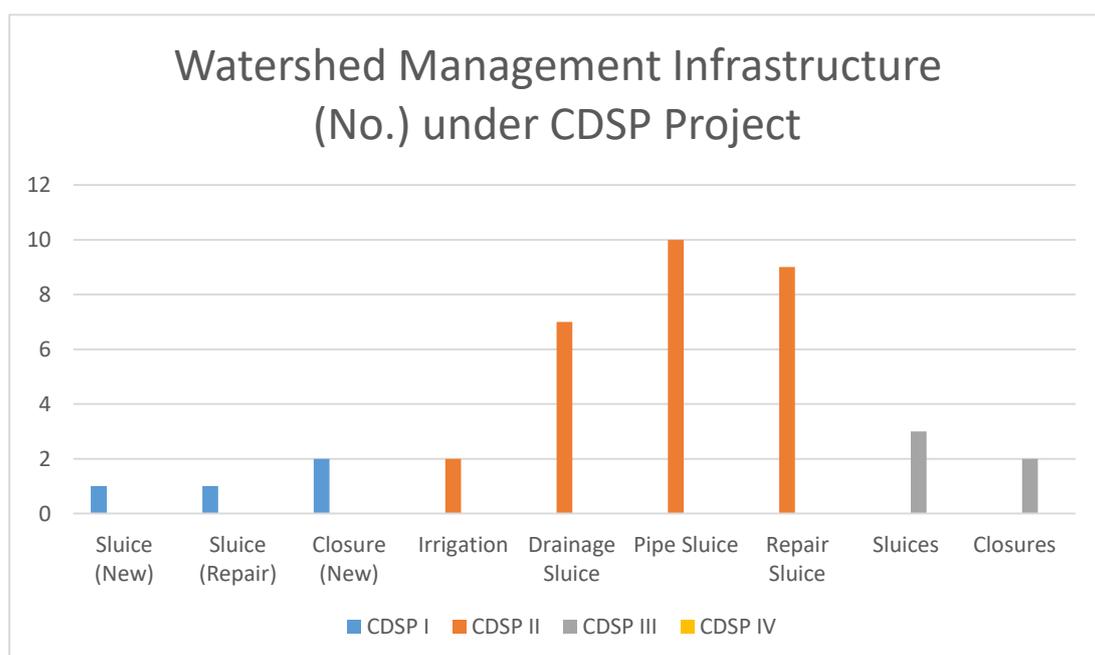
One deep tube was provided for 15 to 20 households and it is found that 25717 sanitary latrines were provided in the CDSP IV project (according to Project Coordinator, CDSP IV which was determined during Key Informants Interview) and the Total project period (CDSP I, CDSP II, CDSP III and CDSP IV) total sanitary latrines were 5000, 7379, 8500 and 25717 (Table 4-3).

Deep tube well, cluster pond, pond sand filter, rain water harvesting was provided as drinking water supply technology from the CDSP project. In the phase IV of CDSP, the highest number of technology were provided to the beneficiaries which were 1930 and almost 29000 char dwellers were benefited from these technologies (Table 4-3).

Table 4-3: Drinking water supply technologies in different phase of CDSP Project

Name of technology	Number of technology in different phase			
	CDSP I	CDSP II	CDSP III	CDSP IV
Cluster Village Pond	34		79	
Deep Tube well	156	540		
Shallow Tube well	75			
Tube wells (Construction & Repair)			600	
Ponds excavation				
Ponds(Repair)				
Deep tube wells installation			47	
Pond sand filters			60	
Rain water harvesting schemes				
Access to safe drinking water				28970
Water supply points				1454

To promote and manage water and sanitation (WASH) interventions, CDSP has taken some steps in the community level and the first steps of the WASH was raising mass awareness among community people through mass awareness campaigns about water and sanitation issues. The implementing NGOs have formed Tube Well User Groups (TUG) containing 12-15 household as member to install deep tube well



and they have mobilized group members for contributions for installation of deep tube wells.

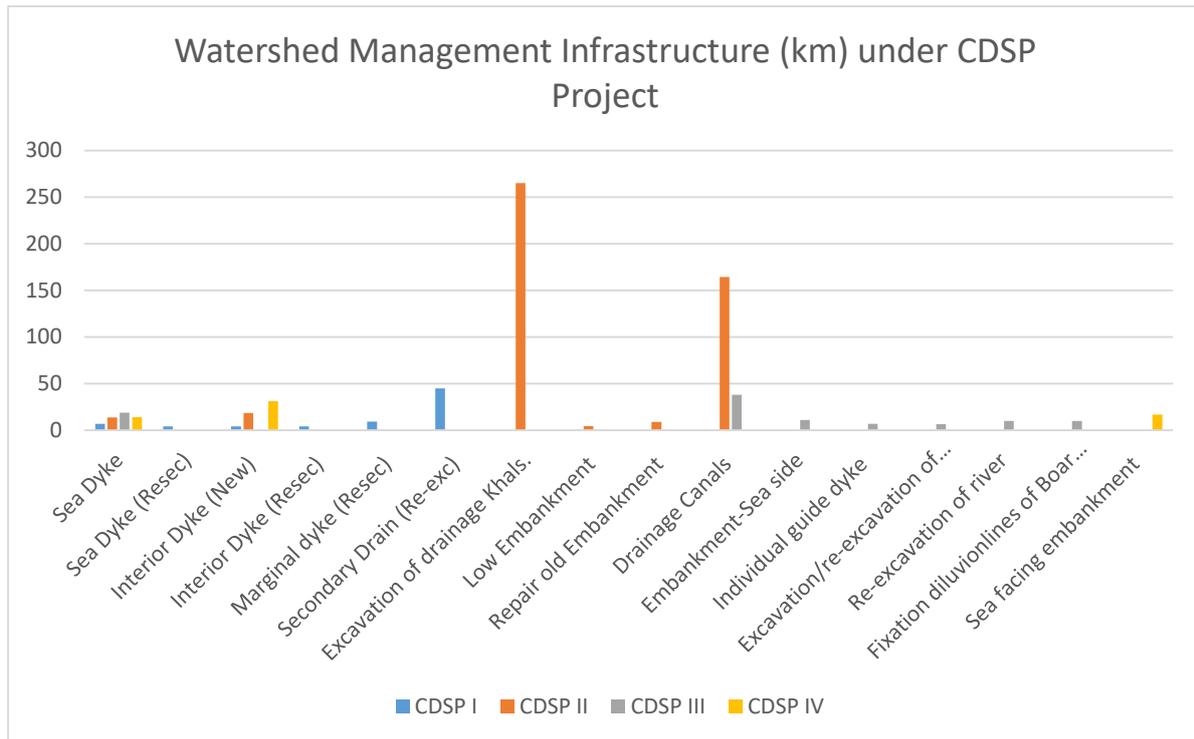


Figure 4-2: Watershed Management Infrastructure under CDSP Project

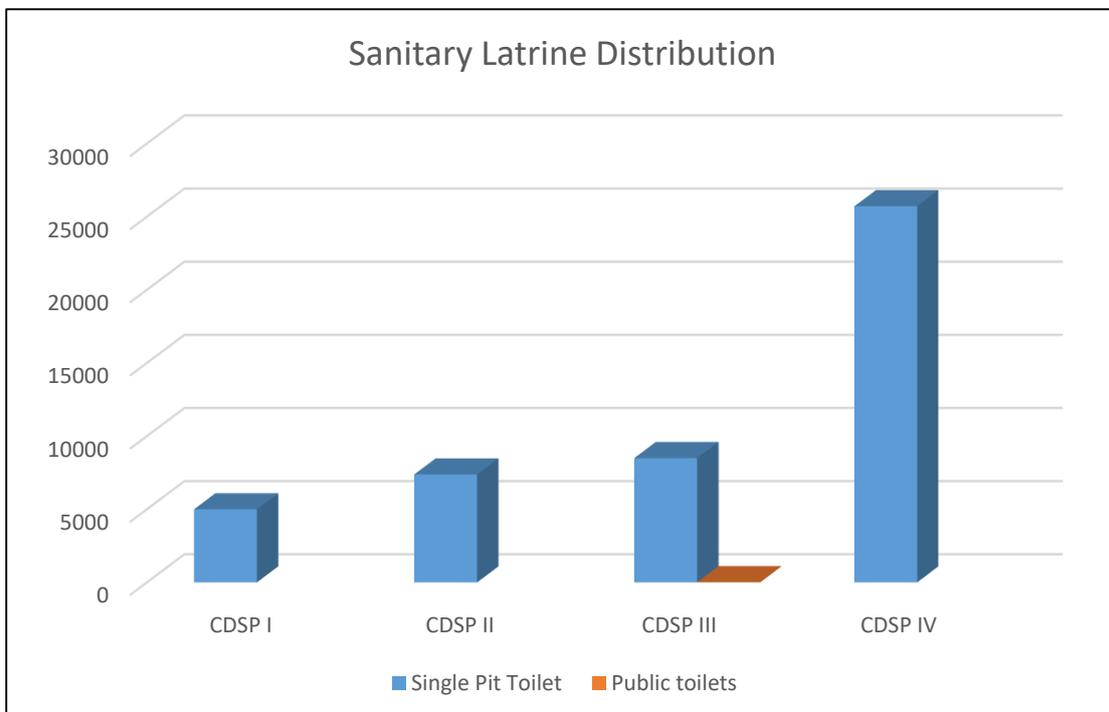


Figure 4-3: Sanitary Latrine Distribution under the visited location

The project has also constructed new sluices, repaired old sluices), new closure constructed, excavated irrigation channel, constructed drainage sluice and pipe

sluice for water management in the project area in light of agricultural development (Figure).

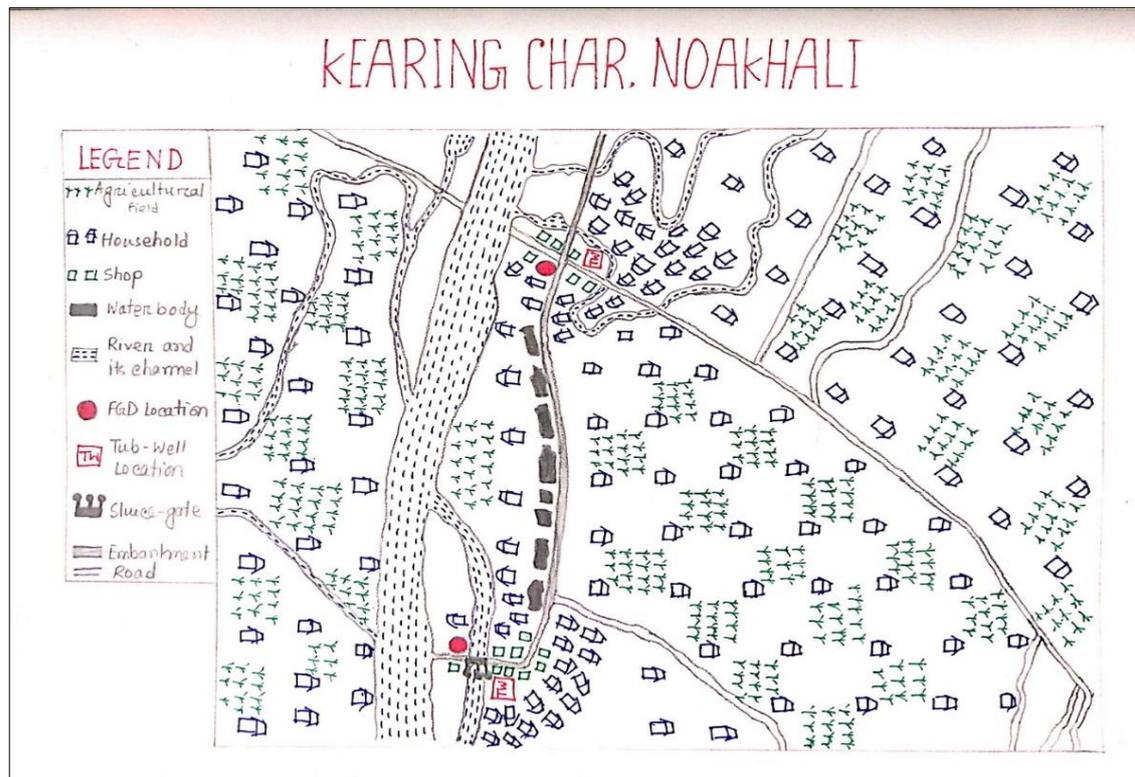


Figure 4-4: Resource Map of Kearing Char, Noakhali

The Water supply technologies as well as tube-well were installed in the CDSP project areas to share 15-30 households for one tube-well which was found during Focus Group Discussion and Resource Mapping (Figure 4-2)

CDSP has developed a dynamic system to manage water management intervention in the project area. It has formed different community based organization to ensure proper management of water interventions under the Guideline of Participatory Water Management (GPWM) approved by the Ministry of Water Resources in 2001. The project has formed Water Management Organizations in different tire namely Water Management Group (WMG), Water Management Association (WMA) and Water Management Federation (WMF).

In the focus group discussion with water management groups and key informants interview with CDSP project Coordinator, it is found that in the project area, CDSP has formed 1 Water Management Federation containing 33 Water Management Association (11 Water Management Group for each Water Management Association) and formed 3 Water Management Association with 33 Water Management Groups, each Water Management Group were formed by 60 members.

4.1.2 Assessment of Effectiveness of CDSP WASH and Watershed Management Interventions

With regard to the water and sanitation interventions and water management interventions, in terms of effectiveness, community people and tube well user groups expressed their opinion that multiple interventions are significantly more effective in reducing water borne diseases. Due to lack of clean water for drinking purposes, in the char area and one tube well for every 12 to 15 households is not sufficient. But in this h. Though some pond sand filter and rain water harvesting technology were provided but those are not effective in the area because of lack of maintenance. The villagers mentioned that tube well is more effective than pond sand filters and rain water harvesting... In the rainy season, for some households who are residing far away from a tube well, it is not effective for them because they cannot collect drinking from 3 to 4 km away. In this perspective, for distant households the proximity of the tube well becomes a critical issue.

Water management especially sluice, embankment, are effective interventions for the project area for flood control and irrigation. Before construction of sluice and embankment, most of the area would be flooded during the rainy season and crop production was restricted. But after the construction of water management infrastructure tidal inundation has decreased in the area and crop production increased.

4.1.3 Sustainability of CDSP WASH and Watershed Management Interventions

Based on FGD and field research identified there were no follow-up and maintenance mechanism. During the tube well installation, tube well user groups were formed and made functional but beyond the project tube well user groups are not active. On the other hand, Water Management Groups are not working well though these groups are registered with BWDB as well as Department of Cooperative.

4.2 Blue Gold Project

4.2.1 Background of the Project

Blue Gold is a collaboration program between the Government of the Netherlands (donor) and the Government of Bangladesh. The program is implemented by the Ministry of Water Resources, through Bangladesh Water Development Board (BWDB, lead agency) and the Department of Agricultural Extension (DAE). Blue Gold is a collaboration program between the Government of the Netherlands (donor) and the Government of Bangladesh. The program is implemented by the Ministry of Water Resources, through Bangladesh Water Development Board (BWDB, lead agency) and the Department of Agricultural Extension (DAE). The overall objective of the Blue Gold Project is to reduce poverty for 150,000 households living in 160,000 ha area of selected coastal polders by creating a healthy living environment and a

sustainable socio-economic development which was started in March 2013 and will end in June 2020 for a 7 years and 3 months' project.

The Blue Gold Project covers many aspects of polder development which concentrate around three components: community mobilization and water resources management, food security and business development, and livelihood and cross-cutting issues.

4.2.2 Community Mobilization and institutional strengthening

The community participation which was undertaken to ensure that the community would be at the driving seat. Under this intervention, Blue Gold Project has formed Water Management Groups (WMGs) and Water Management Associations (WMAs) by the active participation of water dependent communities in and around the watershed in the project area who are actively involved in the design and planning of the water resources infrastructure and even in its implementation by labor contracts and also monitoring. Moreover, the WMGs take over part of the operation and maintenance (O&M) for the water related infrastructure.

4.2.3 Integrated Water Resources Management

Under the programme, another important core component is the water resources management which comprises of two sub-components as follows:

Rehabilitation of water resources management infrastructure in selected polders. Erosion and sedimentation, increased salinization of groundwater, cyclone surges and climate change are major challenges for an effective water resources management. Whenever applicable innovative solutions will be applied to increase sustainability of the infrastructure. Optimization of the water use for the productive sectors, often overcoming conflicting interests, will have to be ensured.

Capacity building of the BWDB district officers in particular in: participatory water resources development with the community as well with other stakeholders, high quality standards of design and implementation, introduction of innovative concepts and technical solutions. The main partner of this component will be the Bangladesh Water and Development Board (BWDB), in addition the Ministries of Agriculture and of Fisheries and Livestock should be closely involved as water is an important input for their sectors. This component is further elaborated in section 3.2.

By organizing the people from the communities, Water Management Organizations (WMO) and Water Management Groups (WMG) were formed align with the Guideline of Participatory Water Management (GPWM) approved by the Ministry of Water Resources in 2001 as like as CDSP. Water Management at the basis of Water Management Association (WMA), they are an effective partner and the driving force behind the operation for water management.

4.2.4 Sustainability of Blue Gold and Watershed Management Interventions

WMGs are more likely to sustain when because they work for their own agricultural and fisheries development in their locality. In terms of sluice management, WMGs are highly active and they work voluntarily to manage water related problems like tidal inundation, water logging etc. Though the project has planned to recruit a person for sluice management but event now no one is recruited and WMG Secretary is involved with this management. They also involved with providing and sharing information related to water with another WMG members.

4.3 Experience from DPHE 37 District Towns Water Supply Project

4.3.1 Background of the Project

in June 2008, after completion of “18 District Towns Water Supply Project” to meet up the increased demand of water supply because of the geographical expansion of the pourashavas, the Planning Commission in lieu of extension of the previous project taken up a new project for increased number of pourashavas. Under such a situation, “**37 District Towns Water Supply Project**” was initiated to reduce the sufferings of the urban population as regard water supply in areas where no investment or study project was being implemented. In where the project was undertaken, water productions through the existing facilities in those towns were not enough to meet the demand. Of those 37 towns, only a few towns were capable of providing water to cover around 60% of their population and those are Gopalganj, Panchagarh, Bhola, Kushtia etc. On the other hand, some towns were not capable to distribute water properly because of inadequate distribution pipelines. In many of the pourashavas for example in Manikgonj, Satkhira, Rangpur, Gazipur and Satkhira towns, the service coverage was very poor which was far below the average coverage of piped water supply in the country. Moreover, due to water quality constraint in many towns, treatment of water was supposed to be crucial. In such situation, it was necessary to expand the existing systems along with repair and rehabilitation of the existing facilities in 37 pourashavas.

The broad objective of the project was to ensure sustainable drinking water supply system in the selected 37 towns of Bangladesh. The specific objectives were:

- Expansion & rehabilitation of existing water supply infrastructures.
- Awareness building towards sustainable water supply.
- To increase the coverage of safe water supply services

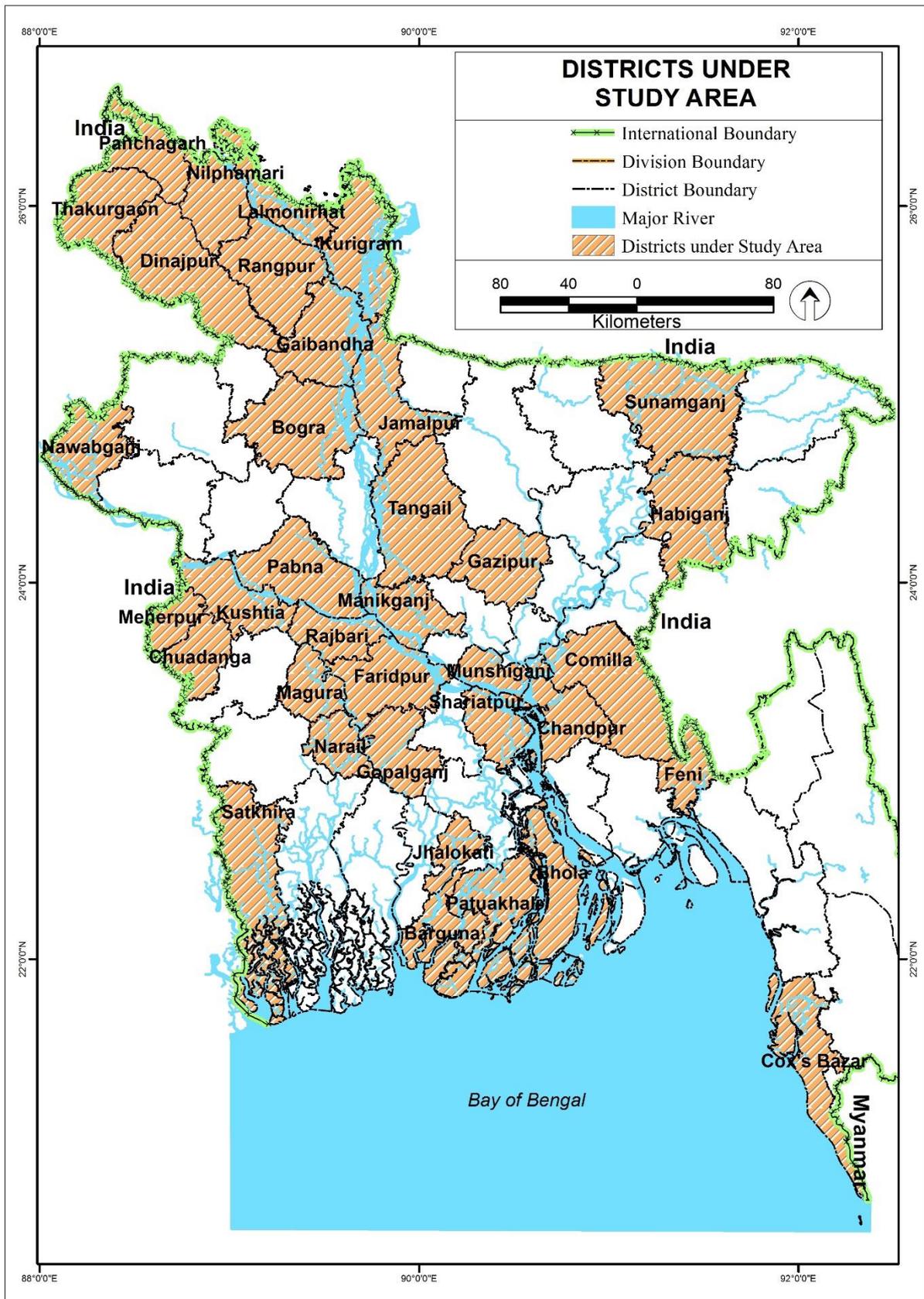


Figure 4-4: Location of DPHE 37 districts project.

Project Location

The project was implemented in Faridpur, Shariatpur, Gopalganj, Rajbari, Munshiganj, Tangail, Gazipur, Manikganj, Jamalpur, Cox's Bazar, Feni, Comilla, Chandpur, Hobiganj, Sunamganj, Rangpur, Bogra, Kurigram, Dinajpur, Nilphamari, Gaibandha, Thakurgaon, Panchagar, Lalmonirhat, Pabna, Naogaon, Chapainawabganj, Jalokhati, Bhola, Barguna, Patuakhali, Magura, Narail, Meherpur, Satkhira, Kusthia and Chuadanga (**Map 4-3**).

Major activities of the project

- Production well regeneration
- Deep Tube Well with no 6 shallow tube well
- Tara Dev Shallow Tube well
- Overhead tank rehabilitation
- Water treatment plant

The **37 District Towns Water Supply Project** has installed 8 production tube well, 5 pump house, 1 treatment plant and 44.2 km water pipeline in Satkhira Pourashava. Pourashava is responsible for all activities including site selection, operation and maintenance, revenue collection. DPHE is responsible for only installation. After installation, DPHE hand over the technologies to the Pourashava authority. the Water and Sanitation (WASH) and Integrated Water Resource Management (IWRM) situation in Bhola, the following matrix was utilized:

4.3.2 Available sources of drinking water

Available drinking water sources identified during the Focus Group Discussion (FGD) and Key Informant Interview (KII) in Bhola Sadar, Charfasson were tube well (shallow and deep), pond and rain water.

Mostly deep tube well is used for drinking water in Bhola Sadar and Charfasson but in Char Kukrimukri of Charfasson, some of households use pond water for drinking purpose especially during rainy season. In Char Kukrimukri, it is found that 40-50 households share one tube well for drinking water source and tube well is almost 3-3 km far away. Being a low land and island, during rainy season most of the area become flooded due to tidal inundation and community people cannot collect drinking water swimming over the flood water from long distance. Rain water was also used occasionally as drinking water and it is not planned or scientifically.

Table 4-4: Union interventions quantity from field visit

Interventions	Quantity
East Ilisha Union	
Total Household	9541
Household having sanitary latrine	2078
From 2003, Installation of sanitary latrine	5637
At present, Household having sanitary latrine	7715
Percentage of Household having sanitary latrine	81%
West Ilisha Union	
Total Household	3015
Household having sanitary latrine	742
From 2003, Installation of sanitary latrine	2210
At present, Household having sanitary latrine	2952
Percentage of Household having sanitary latrine	98%
Shibpur Union	
Total Household	4491
Household having sanitary latrine	1061
From 2003, Installation of sanitary latrine	3284
At present, Household having sanitary latrine	4345
Percentage of Household having sanitary latrine	97%
Veduriya Union	
Total Household	6062
Household having sanitary latrine	2060
From 2003, Installation of sanitary latrine	3084
At present, Household having sanitary latrine	5144
Percentage of Household having sanitary latrine	85%

According to the respondents, water quality is good but number of tube well is not enough in Bhola. Though pond water is almost polluted in Bhola and they avoid pond water as drinking source but used it for bathing, washing and to some extent for cooking. They are unable to use deep tube well water in all household work because of high demand and hard working in collection from far away. In Veduriya union of Bhola Sadar, a tube well should be shared with 30 households which is mentioned in FGD and also Key Informants Interview with Union Parishad Chairman and School Teacher.

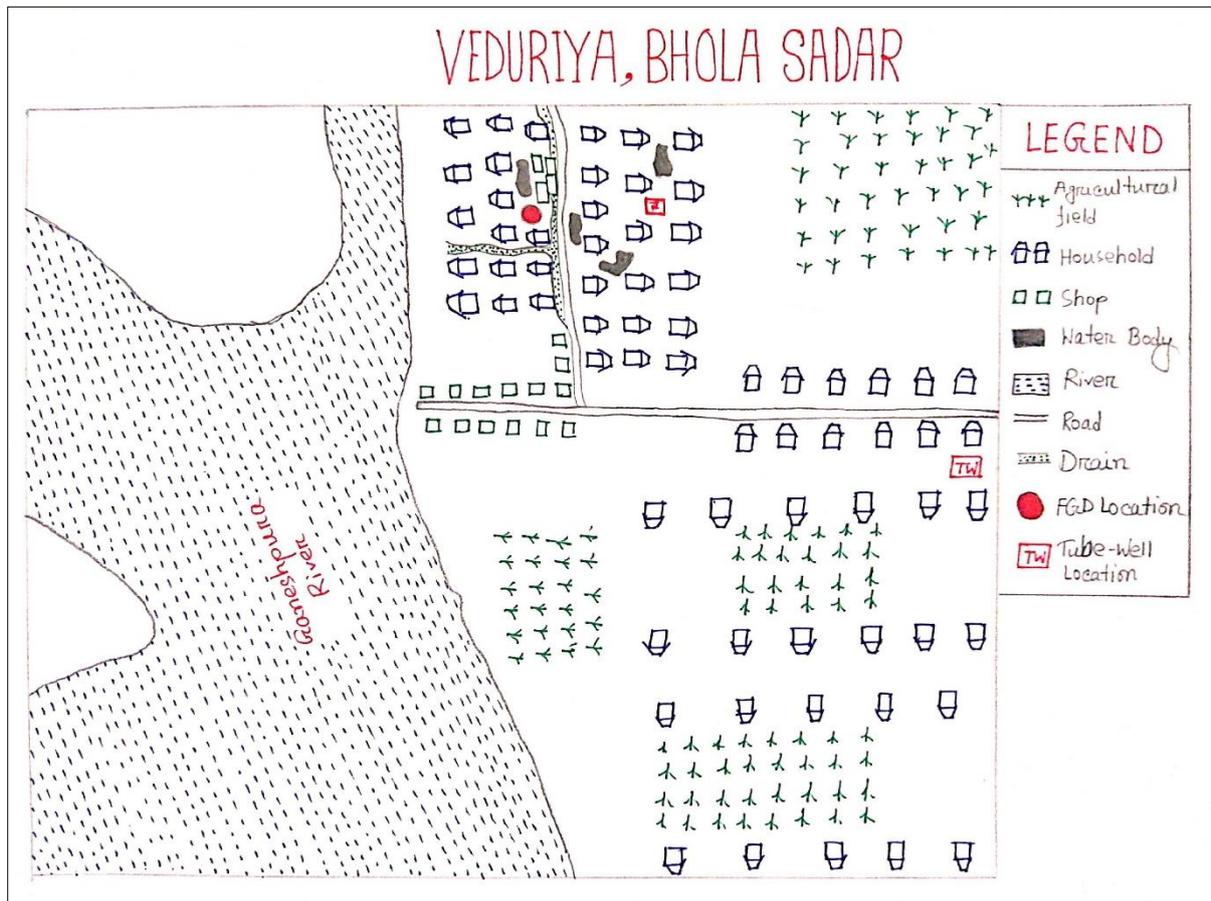


Figure 5-5: Resource Map of Veduriya, BholaSadar

Veduriya union of Bhola Sadar is situated nearby river and highly vulnerable for river bank erosion, tidal flood. In the rainy season, most of the union over flooded and flood level reach up to 3 to 4 feet. There is no embankment or flood protection infrastructure to management the flood water and crop production also become restricted during the rainy season. On the other hand, Suilis village of Charfasson (outer embankment) is affected by tidal inundation, storm surge, and riverine flood, riverbank erosion, ground water depletion. In the last 10 years, ground water level has decreased almost 400 feet in this area. In some areas of the villagers uses pond water or river water because tube well is unavailable in this area. In the Bhola sadar, water and sanitation is at satisfactory level (Table) but in some areas of Charfasson, water and sanitation is at crucial.

Department of Public Health Engineering (DPHE) and by the initiative of individual efforts, there are some tube-well are installed in Veduriya union of Bhola Sadar to meet the purpose of drinking water. The tube-wells were installed in this union to share 30-50 households for one tube-well which was found during Focus Group Discussion and Resource Mapping (Figure). According to the figure 5-1 it is found that households of more than 3 k, far away have to collect drinking water from a tube-well which is almost tough during rainy season because the village road submerged due to tidal flood.

Access to safe water

Safe water remained a crisis in Veduriya union of Bhola sadar and Cha KukriMukri of Charfasson and it is hardship to collect safe drinking water from far distance. In these areas, people collect tube well water from long distance during the winter and summer season but during raining season, flood restricts their movement and they cannot collect tube well water. Installation of deep tube well is costly and water cannot extract from surface. Above 800 feet is general picture in Bhola to collect safe water using tube well and it is not possible for most of the households. The possibility of getting the level of safe water was very low even after digging deeper into the ground. According to the DPHE Engineer of Bhola, "We had to fix pipe very deep into the ground to get fresh water". In some places, DPHE installed deep tube well even above 1000 feet depth to get fresh water.

Water Management initiatives

In the study area hydro-meteorological and water related disasters are common. Tidal Inundation, Storm surge, Riverine flood, Riverbank erosion, ground water depletion, surface water pollution is common phenomenon which were found during the consultation with different stakeholders. The villages of nearby river are exposed to flood and tidal inundation but there are no protection measures in Charfasson, Char KukriMukri.

Water related interventions by type of organizations

Most of the respondents stated that non-government organizations are not working here to provide water and sanitation services. Some NGOs are working with hygiene promotional activities. Department of Public Health Engineering (DPHE) is working with water and sanitation services but not sufficient. Recently DPHE is working to restore surface water in Bhola and they are conducting feasibility study on this initiative. Bangladesh Water Development Board is working with polder to manage river bank erosion with special concentration to Bhola Sadar. Though a mega project was started in Charfasson to construct polder and block but due to massive corruption, the project is paused situation.

4.4 Current IWRM and WASH Model: Effectiveness and Sustainability

Based on the evaluation of the project, Tube well User Group (TUG) and Water Management Group (WMG) are the current model of WASH and Water Management in Bangladesh. It is to be concluded by the consultation with project management authorities and community people, it is found that TUGs are not sustainable management model because there is none is responsible for this group management beyond the project. In CDSP project area a little number of TUGs working well beyond the project which are formed by Sagarika because their groups are monitoring by the organization and these groups are affiliated with Micro-Credit Groups of the organization. In this perspective, it is to be said, if the TUGs can be affiliated with Micro-Credit groups of different organization then these will work properly and water and sanitation supply technologies will be maintained and monitored regularly. On the other hand, TUGs are not a legal groups registered with government agencies, they have no any saving by which they can repair or maintain the technologies so why poor people cannot repair or maintain the technologies. To ensure sustainability of these groups, the groups should be registered with any government agency and a minimum saving should be ensured from community subscription to maintain and repair the technologies beyond the project.

WMGs are not working properly though these are registered with Department of Cooperatives. By the consultation with WMGs, it is found that though CDSP and Blue Gold has planned to recruit a person to manage water management infrastructure especially sluice with an amount of monthly honorarium but it was not implemented and the WMG committees are not active for water management without interest. There is another provision to activate and ensure sustainability of the WMGs that Water Development Board, Local Government Engineering Department will provide construction and repairing work to the WMG but WMG do not get any work so why they lost interest in some cases to work for water management, repairing and maintaining water management infrastructure.

DPHE don't have any expert on operation and maintenance of production well, pump house, water treatment plant etc. In this point of view, sustainability of the water supply system in Pourashava area is in a big question. The project is only water supply related project. It does not align with WSH or IWRM related project. Gaps between current IWRM and WASH Model

WASH interventions are not properly implementing considering climate change related disaster as well as flood level consideration.



Figure 4-5: Tube-well constructed without addressing flood issue

Almost 90% sanitary latrines were installed nearby surface water or ground water point though it is mentioned that a latrine should be installed at least 30 feet away from water sources.



Figure 4-6: Toilet installed near water body

There is no solid waste management, sludge management intervention in and around the sanitary system.

Though CDSP has formed Water Management Federation to develop linkage with Water Management Groups and Water Management Association but there is no linkage with Water Management Federation with another places. A Water Management Federation represents the water management issues of a sub-district but a river network or a water body can cover more than one sub-district and water related problem such as floods, water logging, tidal inundation is related to river network or water body so linkage should be established with other water federation who are laid down the similar river network or water body.

In the Blue Gold Project, there is no higher tier Water Management Federation so why one association is not aware about the problems and issues of another association. There is a major gap in a similar hydrological regime. Local Government is not involved with TUG or WMG and no one is responsible to WASH or water management beyond the project. Project implementing organizations dropped out beyond the project for which effectiveness and sustainability of the interventions is a big question.

CHAPTER 05

SITUATIONAL ANALYSIS OF WASH AND IWRM

5 SITUATIONAL ANALYSIS OF WASH AND IWRM

5.1 Analysis of government's current SDG6 goal

The Sustainable Development Goal-6 has 6 targets that include free access to safe drinking water equitably and universally, providing equitable and adequate sanitation and hygiene, enhancing the quality of water, increasing efficiency of water-use, having water resources management integration and conserve water-related ecosystems. Of these targets, the first target is likely to be achieved as access to safe drinking water already stands at 98.3 percent in Bangladesh. Bangladesh is a riverine country having huge water in rivers though we have lost most of our fundamental rivers. Making efficiency of the water resources is the prime challenges to attain sustainable development. To achieve the universal coverage, maintenance, and monitoring, strong efforts are needed to the water supply services. The ministries of local government and rural development, as well as water resources are relevant for achieving SDG targets.

Bangladesh has started to achieve the targets of SDG 6 in 2016 by mapping the ministries responsible for implementing individual SDGs, data gap analysis in SDGs, a needs assessment to identify challenges and opportunities for implementing different targets and formulating an Action Plan for achieving SDGs. Bangladesh have also included the SDG targets in its Annual Performance Agreement, and developed a web portal for reporting on progress towards them. In terms of water and sanitation, Bangladesh has aligned its national development plan with SDG 6.

Several Ministries and Institution are involved in the management of water resources in Bangladesh. Ministry of Water Resource is the principal water regulator, whilst the Ministry of Environment and Forests acts as the principal water pollution monitor, with the authority to take legal measures against various polluters, particularly the industrial ones. Other Ministries involved include Ministry of Industries, Ministry of Local Government and Cooperatives, Ministry of Jute and Textile, Ministry of Agriculture, Ministry of Fisheries and Livestock etc. Bangladesh Bureau of Statistics is authorized to collect all types of data including on SDG 6.

Government of Bangladesh has planned to achieve SDG 6 within the timeframe and already undertaken the following tasks:

- National Development Plan Aligned with SDG 6
- Data collection systems reviewed for Data Gap Analysis
- Mapping of Ministries by Targets in implementation of SDGs
- SDGs Action Plan formulated through consultations
- Challenges to meet SDG 6 targets are identified
- Inclusion of SDG Targets in Annual Performance Agreement

- SDGs Implementation Needs Assessment
- Voluntary National Review
- National SDG Coordinator appointed at Prime Minister’s Office
- SDG Tracker - web portal for monitoring SDG implementation

Government of Bangladesh has also set target aligned with global target to achieve the SDG 6 target and the baseline situation of SDG 6 has provided in the following table:

Table 5-1: Baseline Situation of SDG 6

Indicator	Description	Baseline Value %	Source
6.1.1	Proportion of population using safely managed drinking water services	86.85	SID>BBS>MICS
6.2.1	Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	60.56	SID>BBS>MICS
6.3.1	Proportion of wastewater safely treated	-	Not Available
6.3.2	Proportion of bodies of water with good ambient water quality	-	Not Available
6.4.1	Change in water-use efficiency over time	-	Not Available
6.4.2	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	18	MoWR>WDB
6.5.1	Degree of integrated water resources management implementation (0-100)	-	Not Available
6.5.2	Proportion of transboundary basin area with an operational arrangement for water cooperation	-	Not Available
6.6.1	Change in the extent of water-related ecosystems over time	-	Not Available
6.a.1	Amount of water and sanitation-related official development assistance that is part of a government-coordinated spending plan	338.1	ERD
6.b.1	Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management	-	Not Available

Bangladesh is highly determined to achieve the WASH and IWRM target within the timeframe and Prime Minister Sheikh Hasina has sought Bangladesh to be showcased as an international model for SDG 6, involving clean water and sanitation, through adopting appropriate strategy and action plan (Dhaka Tribune, 2016).

5.2 Evaluation of projects based on SDG6 goals

In order to understand how the assessed projects for this study i.e., address the SDG6 goals the following matrix has been developed based on the SDG6 key factors

Project	6.1 Drinking Water	6.2 Sanitation and Hygiene	6.3 Waste Water and Water Quality	6.4 Water Use and Scarcity	6.5 Water Management	6.6 Eco- system	6.a International cooperation and capacity development	6b Stakeholder participation
CDSP	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Blue Gold	No	No	No	No	Yes	Yes	No	Yes
DPHE Projects	Yes	No	No	Yes	No	No	No	Yes

Based on the assessment in the matrix it can be seen that the CDSP Project addressed the majority of the of the SDG6 goals therefore added value in several aspects. This has been possible due to the multi-agency co-ordination addressing different objectives by each agency. Whereas the Blue Gold and 37 district water supply project addressed some of the SDG6 goals as Blue Gold project has been administered by BWDB and DAE and 37 District Water Supply Project by DPHE. The goals of this project has been limited to the mandate of these agencies, thus addressed only the SDG6 principles consistent with the empowered mandate of the agency.

5.3 Benefits and Challenges of Integration WASH in IWRM

5.3.1 Benefits of Integration WASH in IWRM

Integration WASH in IWRM is important issue to achieve SDG 6 and manage water ecosystem. It will build coalitions and bridge the gap between the WASH and IWRM stakeholders. Integrated intervention in WASH and IWRM will draw in a range of stakeholders and increase momentum, especially for important water biodiversity conservation, water pollution prevention work and best practice of agricultural production. Most importantly, integration of WASH and IWRM will increase the social capital around water conservation and broader water governance.

WASH and IWRM integration will allow the local community to have their basic needs met, which will help demonstrate to the community that the community

people will care about the populations living in high biodiversity environments. In turn, this will allow to engage the community and can ultimately result in community-based natural resources management, which is a best practice for conservation. This will build the capacity of the community to manage resources at a wider scale, and in some cases, the communities become the best advocates for water conservation.

WASH interventions are more visual, shorter in duration, and in general more easily communicate the urgency of the need than water management. Thus, integrating WASH components with IWRM can increase the attention to water resource management.

WASH integration with IWRM will ensure drinking water from surface water. In Bangladesh, ground water level is depleting day by day and surface water pollution is increasing because of want of water management. As a result, Pond Sand Filters (PSF) are not feasible in Bangladesh. WASH integration with IWRM will renovate surface water which will reduce pressure on ground water.

5.3.2 Challenges of Integration WASH in IWRM

WASH integration with IWRM will require more patience, sophistication and effort especially because water management typically take more time than WASH. Technical expertise will also require to incorporate IWRM elements into WASH interventions. Multi-sectoral experts should be engaged in such type of interventions which is time consuming and costly. It will also require more work related to the governance of the watershed. WASH and IWRM integrated interventions will run the risk of becoming too large to implement because these will require work at a watershed level. Especially in geographies where catchments span large geographic areas and cross boundaries, they can become difficult to scope.

WASH and IWRM integrated intervention is hardship to take location specific pollution prevention measures. In this intervention, pollution should be taken into account in prevention from source or point pollution. Integrated intervention should be implemented with multi stakeholder engagement and collaboration with lot of stakeholders is a tough job.

CHAPTER 06

CONCLUSION AND RECOMMENDATIONS

6 CONCLUSION AND RECOMMENDATIONS

The primary objective of the current study is to identify the WASH related gaps in IWRM policies and practices and provide recommendations aligning with the SDG#6 goals and objectives. In this section, we provide recommendations based on thorough review of existing IWRM and WASH policy documents, field assessment of IWRM and WASH related projects and feedback from Bangladesh Water Governance Institutions, local government actors and the local communities that are the beneficiary of the projects. Summary of all the major policy documents is presented in the Appendix. While providing recommendations, we have primarily focused on most recent and relevant acts and policies and have identified areas and best practices which are more effective in bringing cumulative improvement in the water and sanitation sector.

It is clear that to successfully attain SDG goal 6, a holistic approach needs to be taken that includes both IWRM and WASH by involving all major stakeholders at all levels of governance; local, regional and national. For example, provision of safe drinking water not only involves water quality improvement, but also requires securing the water sources so that the quantity can be ensured. With rapidly declining groundwater table, contaminated surface water sources and diminishing water bodies, exclusive WASH activities cannot ensure clean water and sanitation for all without incorporating them in the IWRM initiatives.

Any act or policy gives direction to better serve mass population with maximum benefit. However, the implementation of the policy and the continuing quality improvement practice both are essential for achieving desired impact in the society. It is the responsibility of the government agencies and other regulatory bodies to ensure proper implementation of policies or strategies through co-ordination and co-operation. It is a known fact that in Bangladesh, lack of co-ordination among different agencies is one of the major causes behind the poor condition of the water sector. Circumstantial evidence shows that in some cases, the responsibilities and scope of work of different agencies are not clearly mentioned. As a result, there remains scope for misinterpretation and no one is held responsible or accountable for non-performance or poor performance. According to a study by *Chen et al. (2016)*, four major weaknesses exist in the water governance institutions of Bangladesh which are weaker water institutions, i.e., implementation delays and lacking of ministerial leadership, centralized decision making, outdated sectorial policies and non-institutionalized IWRM activities. Findings from our field assessment, policy review and interview with key persons are also similar to the above study. In this regard, the Ministry of Water Resources can undertake an initiative to review the existing scope of works for all the regulatory authorities who prepare, implement and supervise water related policies and acts and identifies the possible overlaps and gaps in the tasks assigned. Based on the finding, a series of workshops can be arranged by the Ministry of Water Resources for the organizations like DPHE, BWDB, WARPO and

also for different ministries like MoE, MLGD so that respective organizations are aware of their responsibilities and duties. Another important fact is that even though there are good number of policies and acts on water governance, very little attention is given to how these policies are being implemented at the local level. The lack of systematic monitoring and assessment of policy outcomes impedes the potential for wide range impact in the water sector. A functional monitoring policy and a simplified assessment form can be very useful for the water management groups, NGOs and different enforcement agencies. Last but not least, there needs to be major change in our mindset. Engineers, planners, architects, public health officials, administrators and policy makers, all need to realize the importance of ‘integrated’ and ‘inclusive’ approach in providing clean water and proper sanitation in a sustainable manner. If rivers are pollutant free and groundwater is adequate and un-contaminated, our water sources are secured and safe, then the supplied water will be safe and we will remain healthy- if all stakeholders and beneficiaries understand the connectivity between different processes, achieving clean water and sanitation for all will not be a far cry anymore.

We have developed the following recommendations and we anticipate that these recommendations would assist Bangladesh in achieving the SDG goal 6 by 2030. The recommendations are categorized in the following manner:

- Thematic gaps within policies
- Water Governance Planning Mechanism
- Institutional function and empowerment within policies
- Interactions between water governance institutions
- Enforcement empowerment within policies
- Public and local community participation.

Thematic Gaps within Policy

Policy	Issue	Recommendation
Water Rules 2018	<p>1. The new Water Rules 2018 specifies a permitting mechanism for water abstraction. However, it lacks clear articulation of how this permitting process will be implemented and enforced, particular as the responsibility is assigned with WARPO. Historically WARPO is a planning organization, not an enforcement body. Further, there is no clear mechanism on the decision making on the amount of abstraction that will be allowed for groundwater stressed areas.</p> <p>2. A major drawback of this policy is that no court can accept a lawsuit without a written complaint from the Director General of the Water Resource Planning Organization (WARPO) or his/her appointee. The Act undermines the power of citizens and NGOs.</p>	<p>1. Develop a policy on 'water abstraction permit process' that will focus on the amount of water abstracted and the process to be followed to get the permit. This will provide clear guidance to WARPO on what basis the water abstraction will take place and how to execute the permit process. This proposed policy will facilitate the achievement of SDG sub-goals 6.4 and 6.5.</p> <p>2. Introduce a mechanism such that field level stakeholders can lodge a formal complaint to the WARPO. This way the Act can become more inclusive, participatory and comprehensive (SDG goal 6.a).</p> <p>3. Assess the water rules 2018 along with the existing Water Act 2013, NWMP Development Strategy, WASA Act 1996, various LGI Acts, Rules and Regulations (like the ECA Rules, Biological Diversity Act, Hazardous Waste and Ship Breaking Rules, Medical Waste (Management) to effectively address the issues concerning water resource protection and its proper management. This will address the SDG sub-goal 6.6.</p>
Water Act 2013	<p>1. There are no guidelines relating to non-point water pollution sources like fertilizer and pesticides in the Water Act 2013.</p> <p>2. In the Water Act 2013, there is a provision for using ground water for industrial and irrigation purposes. However, some stakeholders suggested that there should be bans on extensive withdrawal of groundwater (particularly for irrigation) using tube wells in specific high-risk areas, for example the Barind Tract area. WWF, 2015)</p>	<p>1. Develop new laws focusing on non-point source water pollution to supplement the Act.</p> <p>2.a. Create exclusion zones to avoid extensive withdrawal of groundwater using tube wells in areas with low groundwater levels and/or high groundwater depletion risk. (WWFm 2015)</p> <p>2.b. Investigate, assess and monitor the availability and use of groundwater in water-stressed areas and in the deep aquifer.</p>

	<p>3. One of the significant gaps of the Water Act 2013 is the issue of participation of women in decision making during planning, operations and maintenance of water projects.</p> <p>4. In Water Act 2013, there are several mechanisms available for enforcement, such as compliance orders, protection orders etc, but there is a lack of information on how these can be enforced. (Water Governance in Bangladesh, 2015)</p>	<p>2.c. Reduce reliance on groundwater and shift towards surface water for irrigation in groundwater-stressed areas introducing water efficient technologies in agriculture.</p> <p>2.d. Consider artificial recharge of groundwater and other technical measures in the water-stressed areas.</p> <p>All these measures will address the SDG sub-goal 6.5.</p> <p>3. Make formation of Water Management Group at local level mandatory where certain percentage members will be female. (SDG sub-goal 6b)</p> <p>4. Disseminate information regarding enforcement procedures in the websites, through booklets and local level gatherings.</p>
<p>Coastal Zone Policy 2005</p>	<p>The Coastal Zone Policy, formulated by the Ministry of Water Resources (MoWR), intends to provide a general guidance 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. In this very important national policy, the issue of ‘sanitation’ was not addressed with appropriate attention.</p>	<p>1. Develop supplementary policies for coastal zone areas emphasizing on the following issues</p> <ul style="list-style-type: none"> a. Different ‘sanitation options’ and ‘hygienic practices’ b. Local best practices related to water management and water treatment. c. Proactive measures based on climate change impact.
<p>Bangladesh Climate Change Strategy and Action Plan (BCCSAP)</p>	<p>In the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), the issue of water and sanitation was discussed for climate vulnerable areas with the objectives to ensure adequate water supplies and improved sanitation by 1) monitoring changes in water quality and quantity available for drinking and forecast future changes due to climate change, and 2) planning for and invest in additional water supply and sanitation facilities. However, in this plan, IWRM has not been considered as an important tool for water management</p>	<p>1. Incorporate the structured approach of IWRM to climate change adaptation policy that could promote water policy integration both vertically (policies that achieve multiple goals across sectors) and horizontally (policies that support consolidation of resources and effort) and thus could serve to coordinate fragmented institutional capacity and organizational resources aimed at sustainable water development.</p>

<p>The National Water Policy 1999</p>	<p>The National Water Policy 1999, almost 20 years back. With increasing number of population, decreasing water flows in the rivers, declining ground water table, and uncontrolled land development activities – revisiting the national water policy is a must. The policy talks about integrated river basin management, however there have been outstanding issues regarding ineffective co-operation among the river sharing countries, and insufficient co-operation among the different entities. The issue of analyzing Water and Sanitation at basin scale or catchment scale is absent in the policy. The policy also lacks guidelines in attaining proper control over the Transboundary Rivers.</p>	<p>1. Develop new strategies focusing on the following issues:</p> <ul style="list-style-type: none"> ▪ Comprehensive and sustainable water quality management ▪ Water and sanitation situation analysis in basin scale ▪ Mass awareness on 'sustainability' and 'best hygiene practices' to reduce human induced water contamination ▪ Program specific MOUs with the regional partners
<p>Master Plan of Haor Area</p>	<p>The Master Plan of the haor area is an “integrated development plan” developed following the IWRM principles that optimizes available resources for future development potentials, incorporating all relevant social and environmental considerations. In the Master Plan, two proposed programs related to sustainable water supply system and flood proof sanitation system require comprehensive baseline survey on haor and its resources that will provide reliable quality data to promote research and development.</p>	<p>1. Increase cooperation among the academic institutions, government and non-government agencies that will bring better results within short period of time.</p> <p>2. Develop capacity building programs for the local people. This is critical for sustainability of any development measures.</p> <p>3. Take new measures to uplift economic condition if we want to observe long term benefits of the Master Plan. There can be a separate economic plan or a supplementary economic plan can be added with the Master Plan.</p>
<p>Delta Plan 2100</p>	<p>In the Delta Plan, water and sanitation strategies were discussed individually for the 6 different hotspots considering present (2015) condition and future condition (2050). Only strategies related to Water Supply and Sanitation are given below:</p> <p>Freshwater strategies: a. Ensure Water Availability by Balancing Supply and Demand for Sustainable and Inclusive</p>	<p>In terms of water management strategies, the Delta Plan 2100 mostly follows structural or engineered approaches. Nonstructural approaches which are more cost effective and sustainable could have been emphasized. Some nonstructural approaches are land use planning, increasing public awareness, development of early warning system, evacuation planning, and emergency preparedness.</p> <p>As Delta Plan 2100 is the most recent, comprehensive and forward</p>

<p>Growth, b. Maintaining Water Quality for Health, Livelihoods and Ecosystems</p> <p>Barind and Drought Prone Areas Strategies a. Balancing Supply and Demand for Sustainable and Inclusive Growth, b. Minimizing losses due to floods and drainage congestion, c. Ensuring water supply and sanitation.</p> <p>Coastal Zone Strategies: a. Not much discussion was found in this section. Only under ‘freshwater availability’ part, water supply and sanitation was mentioned briefly.</p> <p>Urban Area Strategies: a. Enhance urban water security and water use efficiency, b. Water and sanitation issues were covered in this section in an elaborative manner. Metered water supply system, fecal sludge management system etc. were mentioned as probable solutions.</p> <p>Haor and Flash Flood Areas Strategies: a. Achieving Water Security, b. Water supply systems giving emphasis on the use of surface water should be introduced. Piped water supply system with regular monitoring and water quality surveillance, Waste water treatment, sustainable and community based haor friendly flood proof hygienic sanitation are proposed in this strategy.</p> <p>Water Strategy for Chittagong Hill Tracts: a. Ensure water security and sustainable sanitation, b. Local water supply and sanitation (spring restoration and protection, water harvesting, gravity flow system, cesspools) and partial cost recovery (cost of maintenance recovered in kind) are the preferred strategy for the short and midterm in the Hills. Piped water and sewage system, priced for full cost recovery of service, are the</p>	<p>looking document for water management sector in Bangladesh, measures such as development of ‘Integrated Water Management Plan (IWMP)’ at watershed scale would have given a better direction to the engineers, planners, architects, regulatory bodies and NGOs. Integrated Watershed Plans provide clear guideline and sustainable and cost effective solutions and ensure both water quantity and quality. For a developing country like Bangladesh, where population growth is a major concern and water and sanitation sector has not reached satisfactory standard, IWMPs are critical for achieving the SDG goals.</p> <p>For rapidly urbanized cities like Dhaka, Neighborhood Plans (NPs) could be a better planning approach for addressing overall water and sanitation issues at local scale.</p>
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	<p>preferred strategy for the longer term depending on the scenario (under high population pressure, GDP and climate change).</p>	
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Water Governance Planning Mechanism

<p>Most of the water governance project evolve from a single line ministry. Therefore, lot of the projects are isolated and often does not align well with addressing the bigger picture in line with SDG6. WARPO has initiated regional watershed characterization report through IWM but there is no specific requirement on Regional scale watershed planning to address the water management project. Thus a co-ordinated approach to develop projects for different ministry to address the regional water management needs is missing.</p>	
<p>All water-related projects currently need to be approved by two different organizations - WARPO and the Planning Commission. This causes delays in project approvals and implementation. The Planning Commission approves hundreds of projects every year and due to limited WAPRO resources it is difficult for them to be part of every project approval meeting (whether the implementer is BWDB, LGED or DPHE). A more practical mechanism is needed to streamline the project approval process. (WWF. 2015)</p>	<p>The existing approval procedure for water projects needs to be improved. WARPO should be involved at the project development stage, which will reduce work pressure on both WARPO and the Planning Commission. The organizations can also clearly split tasks, so that the Planning Commission would manage project planning while WARPO would approve specific technical issues. Finding a workable solution should significantly reduce project approval time. (WWF, 2015)</p>
<p>Some water-sector stakeholders report that the Planning Commission closely coordinates with the ministries and their departments in developing project proposals and at times organizes and conducts public consultation on water-related projects of special importance. It is also reported that the Planning Commission holds meetings with ministries and departments to motivate them to formulate innovative policies, and that it provides expert support on project proposals. There are suggestions that the Planning Commission is keen to support implementation of good water</p>	<p>Further review is needed into the role of the Planning Commission. It can exert positive coordination and extend planning support to the ministries and departments to improve on their capacity to prepare project proposals as per the country's needs, but concerns about its approach and mandate should not be ignored.</p>

governance countrywide.	
Most of the water management projects have to demonstrate substantial cost benefit ratio and internal rate of return to be approved. Thus in terms of water governance flood control, agricultural water improvement and drinking water supply projects have received priority, there is less of an emphasis by government and donor agencies on watershed water quality improvement, groundwater recharge and fecal sludge management projects. Often these projects have been implemented by NGO's.	In addition to traditional water management and water supply project the government should also prioritize water quality improvement for point and non-point pollution sources aligning with SDG6.

Institutional function and empowerment within polices

WARPO	<p>In the water rules 2018 Warpo has been empowered with the licensing of groundwater abstraction including in groundwater stressed areas. However, WARPO historically has been a planning organization rather than a monitoring organization, thus in terms of capacity and human resource to implement the licensing program for WARPO would be challenging</p> <p>Gaps</p> <p>According to the Water Act 2013, WARPO is the main implementing body under the MoWR. Other ministries are working independently on water-related issues, and WARPO is not empowered enough to ensure inter-ministerial co-ordination for water related matters. Under the present arrangement, other relevant ministries considered themselves to be senior to WARPO and therefore ignore WARPO even though it should be the approval body for water projects. There is a lack of awareness raising activities among the ministries to correct this issue.</p> <p>WARPO (as with past bodies) is heavily dependent on donor support. This poses a risk to the institutional sustainability of WARPO. WARPO was consciously designed to house a broad range of relevant water experts. However, under the present practice, a large part of its expert work is being carried out through the private sector and NGOs</p>	<p>The mechanisms for empowering WARPO could be reconsidered in the Water Act 2013. More institutional power and formal collaboration is required for WARPO to ensure inter-ministerial co-ordination. The institutional status of WARPO should be clearly recognized and an inter-ministerial communication mechanism should be used to create a network of collaboration (particularly for MoWR, MoS, and MoL). If specific activities are not appropriate for WARPO to carry out, this should be reviewed and clearly defined.</p> <p>Technical and enforcement capability of WARPO will have to be improved to carry out the functional responsibility empowered to WARPO by the Water Act 2013</p>
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	rather than through inhouse capacity.(WWF, 2015	
BWDB	<p>Among them the conflicting of power exercise between BWDB and Ministry; shortage of manpower; constraining of operational budget for emergency work such as river erosion mitigation; lack of communication skill; slow rate of internal management system; lack of upzilla level office for local water resources development; Lack of manpower for implementing and monitoring participatory water management, inadequate service role for BWDB; absence of trained personnel inappropriate place, lack of proper management Information system (MIS) are mentionable.</p> <p>The BWDB continues to follow a response-based approach rather than seeking a long-term, sustainable solution to floods and erosion. The effectiveness has been limited by inadequate designs, insufficient maintenance, failure to address river erosion, and limited long-term planning. Current management practices are also inflexible in dealing with the dynamic nature of the river system and adapting to climate change. (Delta Plan 2100)</p> <p>Though currently BWDB has adopted a new approach in the level of flood level of 200 and 100 years for major and interior embankments recently, it is impractical in many cases due to the complexity and lengthy process of land acquisition.</p> <p>Further, most BWDB projects have been evolved and continued from previous project, focused on reconstruction of embankments and canal dredging, so out of the box concept for IWRM is mostly missing. Other than few projects, integrated water resources planning concept in line with SDG6 and co-ordination with other agencies have not evolved.</p> <p>The LGED (Local Government Engineering Department) implements a large number of projects in the water sector, mostly to strike a balance between water use for small scale and large-scale water-related projects. The small scale projects are implemented mainly by LGED, and the large-scale projects are implemented exclusively by BWDB. Given that the demand for small- projects greater than for large-scale projects scale water related.</p> <p>LGED is facing a lack of skilled manpower, appropriate scientific and technical</p>	<p>Rather than a reactive planning approach in flood control BWDB would have to look into more sustainable approach in flood mitigation planning.</p> <p>BWDB also requires to improve its data management capability that can be used in decision making.</p> <p>The decision making process with the Ministry will have to be more effective and BWDB will have to be more empowered regarding technical decisions.</p> <p>BWDB will require more understanding the principles of SDG6 how their projects can be more aligned with the principles of SDG6</p> <p>More capacity building for BWDB is required in terms of environmental protection and how environmental protection measures can be implemented more effectively in BWDB Projects</p> <p>Priorities should be predetermined based on community consultation, since successful implementation of these projects largely depends on participation of the target beneficiaries in the process.</p>

	knowledge alongside insufficient allocation of funds, an inadequate research base and low access to modern technologies.	
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Interactions between water governance institutions

<p>Based on review and performance and field level evaluation of the CDSP it has been determined that coordinated approach in water management is better in addressing the needs of the community. However, based on key expert interview the feedback is that to initiate a multi-agency project is time consuming and to facilitate the interagency agreements are complex. Further, the inter-ministerial meetings take a long time due to the availability of key staff members.</p>	<p>The formal facilitation process of inter-agency water governance projects will have to be reviewed how they could be fast tracked as national priority Further, there should be more efficient co-ordination with the planning commission for facilitation these projects.</p>
<p>WARPO does not have sufficient institutional capacity to initiate the collaboration between diverse stakeholders (such as LGED, DPHE, WASAs, NGOs, CBOs and the private sectors) required for developing the technical packages within the Water Act. WARPO will also need data and information from these institutions in order to develop effective regulations.</p>	<p>Measures can be taken to strengthen WARPO in its capacity to facilitate collaboration with all other departments for implementation of the Water Act 2013. Alternatively, the MoWR or other relevant institutions need to formally take over the responsibility of this inter-agency coordination function.</p>
<p>The MoWR was responsible for developing the Water Act 2013, and other ministries do not necessarily understand their connection to the Act or role within its implementation.</p>	<p>Mapping of cross-ministry connections and implementation responsibilities will help identify common scopes and start a dialogue on strengthening institutional ownership. Discussion is also needed on which institutions should be part of the Executive Committee of the Water Act.</p> <p>Greater related policies. Institutions could conduct a scope analysis across different departments to identify and reconcile contradictions and collaboration and outreach between institutions would support much stronger enforcement of the present water- assess potential opportunities for closer collaboration and support.</p> <p>Particularly much more effective permitting process can be implemented</p>

	<p>if MOE is involved as MOE typically deals with new development application process and the requirement for water permitting can be flagged and referred to WARPO</p>
<p>The DoE is suffering from lack of manpower to monitor EIAs and low familiarity of staff with non-chemical pollution components. Staff technical capacity will have to be increased to review the EIA application and the services of individual consultant or a company can be employed.</p>	<p>The DoE can explore options for building staff capacity in EIA monitoring. The DOE can be an affective coordinator to deal with EIA applications with other agencies such as WARPO, BWDB, BIWTA, DPHE, WASA, LGED The DoE can also review the effectiveness of its monitoring and explore options for strengthening its impact.</p>
<p>There is no coordination and cooperation mechanism among different stakeholders of WASH and IWRM. Community based organizations are the vital agent of sustainable WASH and IWRM. Though several community groups like TUG, WMO, WMA, WMF are formed. Based on reviews it has been determined that TUG's t due to lack of legal status, financial solvency; these community groups are not working properly.</p>	<p>In the management paradigm, an apex body should be formed to ensure sustainable WASH and IWRM all over the country. The members should be deployed from relevant ministries, line agencies, non-government organization, development partners, private actors etc. Shifting to a new sustainable organizational and management paradigm that will operate at a local, regional and national scale will also require collaboration of political entities working within WASH and IWRM system. Updating previous solutions to solve present problems will require continuous development of new rules that will allow sustainable practices to be implemented.</p>
<p>It was noted based on field evaluation that there are challenges with the sustainability ensuring operation and maintenance of TUG. In terms of Water Management Groups (WMG), there is no coordination with catchment area water management groups as well as Water Management Federations.</p>	<p>To ensure sustainability and effectiveness of the Tube Well User Groups, the groups should be linked with GO-NGO financial mechanism and legal status should be ensured during the project period. As per the legislative status empowered with the Participatory Water Management Guidelines 2014 for Water Management Group, similar registration for TUG and community sanitation management can be considered for ensuring continuous operation of the tube well infrastructures.</p>

Potential IWRM and WASH Model

Potential WASH Model

Community Led Total Sanitation (CLTS) would be an innovative model for IWRM and WASH model to mobilize communities in completely eliminating open defecation. In this model users are facilitator to manage the social and environmental compliance and also conduct their own appraisal and analysis of open defecation and take their own action to become open defecation free.

CLTS focuses on the behavioral change needed to ensure real and sustainable improvements in community mobilization instead of hardware, and shifting the focus from toilet construction for individual households to the creation of open defecation free villages.

A WASH System would be comprised of all actors (users, public institutions, private sector, and civil society) and factors (financial, institutional, social, regulatory, asset management, service delivery models) and the dynamic interrelationships among them, all of which influence WASH service delivery.

Risk-Based Approach would be applied in rural areas. In this approach, flood, tidal surge, water logging should be considered in consultation with different stakeholders and scenario development for the previous risks.

Potential Watershed Management Model

Sustainable watershed management should be ensured to protect existing high quality resources before they become degraded which is the keen interest of IWRM and also to maintain the high quality water resources. In line with WASH, in Bangladesh watershed management is marginalized. From the experience of CDSP and Blue Gold Project, social and environmental compliance management were not put in the priority issue of IWRM. In sustainable IWRM, the following issues should be prioritized:

People: Survival & fulfillment of minimum needs of dependent people, deprivation, poverty, hunger, thirst, malnutrition, and unemployment, lack of hygiene-sanitation, health, migration, rehabilitation & resettlement, disaster risk reduction should be considered.

Water: Loss of storage due to siltation; fall of groundwater table; incidence of drought and floods, quality degradation, salinity ingress, recycling and reuse, drying of rivers should be considered.

Land: Water logging & salinity, wetlands-marshes-mangroves, drainage and reclamation, desilting of waterbodies & canals, protection for watersheds, erosion, inundation and sea-level rise, submergence, fertility, productivity of land, reclamation should be considered.

Facilities: Dams, canals, pumps, embankments with their repairs, safety, longevity and serviceability should be considered in IWRM. Biomass issues: Conservation of bio-diversity, plantations, forestry etc. should be incorporated.

CHAPTER 07

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7 REFERENCES

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ANNEX 01

**SUMMARY TABLE FOR DIFFERENT ACTS,
PLANS, POLICIES AND STRATEGIES ON
IWRM AND WASH**

ANNEX 01: SUMMARY TABLE FOR DIFFERENT ACTS AND PLANS ON IWRM AND WASH

Policy Name	Type of Policy (IWRM/WASH)	Summary
<p>Bangladesh Water Act 2013</p>		<p>The Bangladesh Water Act 2013 has been developed by the Ministry of Water Resources (MoWR) within their scope as water regulator. The legal framework for water management is provided by the Water Act 2013. This is a comprehensive Act and covers well all aspects of water management as an integrated resource. According to the Act, the main objective is to “make provisions for integrated development, management, abstraction, distribution, use, protection and conservation of water resources”. Since the Act is of recent origin, the associated regulatory policies and institutions have not fully taken shape. But the Act provides a strong basis for moving forward. The Water Act 2013 currently operates through the use of a number of operating principles defined by the National Water Policy of 1999 and the National Water Resource Management document of 2001(adopted in 2004). The institutional responsibilities are as follows:</p> <ul style="list-style-type: none"> □ The National Water Resources Council (NWRC) coordinates all water resources management activities in the country. □ The Executive Committee of the National Water Resources Council (ECNWRC) will guide water management institutions at the national, regional, and local levels in the formulation and implementation of policies and plans for improved water management and investment. □ The MoWR will formulate a framework for institutional reforms to guide all water sector related activities. It will periodically review the mandates of all water sector institutions and redefine their respective roles, as necessary, to ensure efficient and effective institutions commensurate with changing needs and priorities. □ The WARPO will be the exclusive government institution for macro-level water resource planning. It will act as a clearing house for all water sector projects. It will also serve as the

		<p>Executive Secretariat of the ECNWRC.</p> <ul style="list-style-type: none"> □ The BWDB will implement all major surface water development projects and other Flood Management, Drainage and Irrigation (FMDI) projects with command area above 1,000 hectares. □ The LGED will implement FCDI projects having a command area of 1,000 hectares or less after identification and appraisal through an interagency Project Appraisal Committee. Local Governments (Parishads) will be the principal agencies for coordinating these efforts. □ The BIWTA will be responsible for river transport including river dredging to maintain river navigation. <p>Progress with water (ref: delta plan)</p>
<p>Environmental Conservation Act (ECA)1995</p>		<p>This Act was passed in 1995 for the conservation, improvement of environmental standard and control through mitigation of the pollution in the environment in Bangladesh. Later on, this Act has been amended for several times. This Act is closely related to the pollution, environment, pollutant, environment conservation, ecosystems, and hazardous material. The Act contains important rules on environmental impact assessment, issuance of necessary clearance certificates, and provision of rigorous penalty for those violating the Act. The environmental law plays a crucial role in promoting environmental protection through the sustainable use of natural resources, prevention of pollution and integration of environment and development. It provides an important framework for regulating social behavior and transforming sustainable development policies into enforceable norms. The environmental law assists governments in adhering to international regimes and building national capabilities to address major global, regional and national environmental issues and problems in the context of sustainable development in Bangladesh. (Ref: Bangladesh Journal of Legal Studies, ISSN 2415-136X (online))</p>
<p>The Environment</p>		<p>The Department of Environment has circulated the Environment Conservation Rules 1997</p>

<p>Conservation Rules 1997</p>		<p>under the ECA 1995 to evaluate, and review the Environmental Impact Assessment (EIA) of various projects and activities, and procedures be established for approval. The Rules contain</p> <ol style="list-style-type: none"> 1. categorization of industries while giving environmental permits. The categories are Green, Orange -A, Orange-B, and Red . 2. application format for Environmental clearance 3. 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.
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Plan Name	Type of Plan (IWRM/WASH)	Summary
<p>Sector Development Plan for Water and Sanitation Sector (WSS) (2011-25)</p>	<p>IWRM</p>	<p>The Sector Development Plan (2011-25) of Bangladesh is considered as the strategic and planning document for the sectors to achieve their national goals and targets. In this revised plan for the WSS, a broader consensus has been built through a series of stakeholder consultation on a set of principles related to cost recovery, which include: a) operation and maintenance of the water supply and sanitation systems, b) adoption of cost recovery measures for WSS services in the shortest possible time, c) ensuring fairness and social justice among the customers and service providers, d) providing safety net for the poor and address the needs of women, children and people with disability. Ref: Delta Plan 2100</p>
<p>Master Plan for Haor Areas 2010</p>	<p>IWRM</p>	<p>The Bangladesh Haor and Wetland Development Board (BHWDB) has taken the initiative to prepare a comprehensive Master Plan with a view to preserve, protect and restore the ecosystem as well as to protect the people of this area from natural disasters and improve the livelihood of poor people. The objectives of the Master Plan are to develop the resources of the area as rapidly as possible so as to promote the welfare of the people, provide adequate living standards, social services, and opportunity, and aim at the widest and most equitable distribution of income and resources without degradation of the haor ecology and biodiversity.</p>

		<p>Implicit in the plan is an increase in production and distribution of all kinds of goods and services which together generate and sustain healthy growth towards a modern economy. The outcome of this planning exercise is in harmony with the Vision 2021, the 6th Five Year Plan and other relevant policies and plans of the Government of Bangladesh (GoB). The Plan will be implemented in three phases and implementation will begin conceptually in the financial year 2012-2013 and will be completed at the end of the financial year 2031-2032. The three phases of the Plan are:</p> <p>Short Term: 1-5 years (from FY 2012-13 to FY 2016-17) Medium Term: 6-10 years (from FY 2017-18 to FY 2021-22) Long Term: 11-20 years (from FY 2022-23 to FY 2031-32)</p> <p>Implementation of the Master Plan projects will be mainly financed through the government's own resources and with external support that may be available from development partners.</p>
Flood Action Plan	IWRM	<p>Flood Action Plan, 1990-95 was prepared with the help of the World Bank. The FAP involved 26 studies and pilot projects to be supported by 17 donors. The project was the first attempt to have a coordinated approach to flood management involving the government and the donor community. However, the project came under strong scrutiny and criticism on a number of weak links including weak institutional capacity and coordination, lack of involvement of stakeholders, inadequate impact assessment with possible negative effects on fisheries and the natural environment, and inadequate attention to operations and maintenance arrangements including financing. Consequently, the project was only partially implemented with the main focus on the studies. Ref: Delta plan 2100</p>
National Water Management Plan (NWMP)	IWRM	<p>Coordination of water investments have been attempted through a number of national water plans (NWMP 1986, NWMP 1991 and NWMP 2004). The NWMP is meant as an operationalization of the National Water Policy. It is a comprehensive water resources plan in which 13 ministries and more than 30 agencies are involved. The National Water Management Plan has three central objectives consistent with National Water Policy aims and national goals.</p>

These objectives are:

- Rational management and wise-use of Bangladesh’s water resources
- People’s quality of life improved by the equitable, safe and reliable access to water for production, health and hygiene
- Clean water in sufficient and timely quantities for multi-purpose use and preservation of the aquatic and water dependent eco-systems.

The Plan is structured in a manner that the objectives of 84 different programs planned for the next 25 years contribute individually and collectively to attainment of both the overall objectives as well as to intermediate sub-sectoral goals. The programs are grouped into eight sub-sectoral clusters and spatially distributed across eight planning regions of the country. Information on each, together with a wide range of planning data, is held on the National Water Resources Database, accessible through a Management Information System. The three main categories of programs are Cross-Cutting Programs, National-level Programs and Regional Programs. It is primarily a management plan. Within the existing institutional context, however, the **NWMP** shows many implementation issues, which are important to analyze and to consider as “lessons learnt”.

A common feature of these plans has been the development of ambitious investments plans that is not based on a realistic assessment of available resources and implementation arrangements. Additionally, these plans were all prepared by the MoWR and did not have the buy-in of all line ministries dealing with water resources. In the absence of a coordinating mechanism, the programs have remained on the shelves and did not have much impact on actual investments by line ministries done through the Annual Development Programme (**ADP**) process. Inadequate coordination between water policies and programs prepared by the MoWR and actual decisions in other water-related line ministries has been a perennial concern that led to the Water Act, 2013 and the establishment of the NWRC and ECNWRC.

		Ref: Delta Plan 2100
Bangladesh Delta Plan 2100		<p>The objective of the 'Bangladesh Delta Plan 2100' was to develop a long term strategic plan for the entire Bangladeshi Delta in order to tackle safety issues and structure the available water in relation to sudden climate changes and economic developments. The government of Bangladesh, in cooperation with the government of the Netherlands, aims to create the Bangladesh Delta Plan 2100. Since natural hazard and climate change risks affect almost the entire Bangladesh owing to its Deltaic formation and since integrated water management in the context of its interaction with climate change, environment, ecology, bio-diversity, agriculture and land management is an integral part of the BDP 2100, the Plan has adopted the most expansive definition of the Delta Region. For water resource planning purposes, Bangladesh has been divided into 8 hydrological regions, which are the Northwest (NW), Northeast (NE), North-central (NC), Southeast (SE), South-central (SC), Southwest (SW), Eastern Hills (EH) and the main Rivers and Estuaries (RE). Using the 8 hydrological zones as the starting point, the BDP 2100 sharpens the focus on the magnitude of the natural hazard vulnerabilities facing each of the hydrological regions. This has led to a modified grouping of districts and areas facing similar risks of natural hazards. These groups are called "Hotspots". The six Hotspots are:</p> <ol style="list-style-type: none"> 1. The Barind and Drought Prone Areas. 2. The Chittagong Hill Tracts (CHT). 3. The Coastal Zone. 4. The Haor and Flash Flood Areas. 5. The River Systems and Estuaries. 6. The Urban Areas.
Bangladesh Climate Change Strategy and Action Plan		<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 – food security, social protection and health; comprehensive disaster management; infrastructure;</p>

		research and knowledge management; mitigation and low carbon development; and capacity building and institutional strengthening. 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.
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Policy Name		Type of Policy (IWRM/WASH)	Summary
National Policy (1999)	Water	IWRM	The National Water Policy, formulated by the Ministry of Water Resources (MoWR), aims to provide direction to all agencies and institutions relevant to the water sector in Bangladesh, to achieve targeted objectives of the sector. Objectives including addressing issues related to development of all forms of surface water and ground water and management of these resources in an efficient and equitable manner, and ensuring water availability to all elements of society, particularly the poor, women and children. The policy intends to expedite the development of sustainable public and private water delivery systems with appropriate legal and financial measures and incentives, including delineation of water rights and water pricing. The need to bring about institutional changes, and develop a legal and regulatory environment for decentralized and sound management of water resources is delineated. The objectives also include developing a state of knowledge and capability that will enable the country to design future water resources management plans by itself with economic efficiency, gender equity, social justice and environmental awareness to facilitate achievement of the water management objectives through broad public participation.
Coastal Zone Policy (2005)		IWRM	The Coastal Zone Policy, formulated by the Ministry of Water Resources (MoWR), intends to provide 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. Amongst several objectives it identifies

		<p>the following: the creation of sustainable livelihoods; intensifying the coverage of safe drinking water facilities; reducing vulnerabilities (including to climate change) and closing the gender gap. Under sustainable management of natural resources section, sub-section 4.4.2 talks about conservation and supply of safe water and management of ground water. It also talks about rainwater harvesting, water conservation and treatment technologies and preservation of coastal estuary eco-system that has been threatened by the intrusion of salinity. No specific WASH practices were discussed.</p>
<p>National Agriculture Policy (1999)</p>	<p>IWRM</p>	<p>The Ministry of Agriculture (MoA) of Bangladesh prepared this policy statement in 1999. This is the first comprehensive document prepared by Ministry since the country's independence in 1971. NAP has an overall objective, 18 subsidiary objectives and 18 program areas. The overall objective is "to make the nation self-sufficient in food through increasing production of all crops, including cereals, and ensure a dependable food security system for all. The 18 specific objectives give general guidelines about how the crop sector is to evolve to achieve the overall objective of food self-sufficiency and food security. NAP also identifies 18 program areas where actions or policies might be undertaken for achieving these goals: crop production, seeds, fertilizer, minor irrigation, pest management, agricultural mechanization, agricultural research, agricultural marketing, land use, agricultural education and training, agricultural credit, government support for production and contingency plan, food-based nutrition, environmental protection, women in agriculture, coordination among government agencies, NGOs and the private sector and reliable database. The list of program areas shows that NAP underlines all input and support sectors involved with crop production and identifies issues that need to be addressed to improve their efficiency. NAP emphasizes that the goal of food self-sufficiency and dependable food security can be achieved only through efficient delivery of inputs and support services.</p>

<p>National Agriculture Extension Policy (2012)</p>	<p>IWRM</p>	<p>This document presents a revised National Agricultural Extension Policy (NAEP) which sets extension policy directions for transferring technologies to crop, fisheries and livestock sector development. Here, key elements of lesson learnt from existing policy, macroeconomic scenario, agro ecology /bio-ecological zones and current issues in agriculture such as natural disaster, production stagnation, land ownership and tenancy, poor soil health status, decreasing agricultural land, irrigation water scarcity, lack of good agricultural practices, high demand of quality seeds/planting materials etc., livestock and fishery issues including emerging challenges and perspectives have been pointed out for strong consideration. In light of these elements, this policy document has been formulated. The mission of this NAEP is to provide efficient and effective decentralized demand responsive integrated extension services to all categories of farmers, producers and small & medium entrepreneur (SME) in agriculture through farmers group (FG) and their federations at union, upazila, district and national level, to enable them to optimize their use of resources, in order to promote sustainable agricultural, agri-business and socio-economic development.</p>
<p>National Policy for Safe Water Supply and Sanitation (1998)</p>	<p>WASH</p>	<p>The National Policy for Safe Water Supply and Sanitation was prepared by the Ministry of Local Government, Rural Developments and Cooperatives (LGRD) in 1998. The objective of the 'National Policy for Safe Water Supply and Sanitation' is to improve the standard of public health and to ensure improved environment. For achieving this objective, steps will be taken for a) facilitating access of all citizens to basic level of services in water supply and sanitation; b) bringing about behavioral changes regarding use of water and sanitation; c) reducing incidence of water borne diseases; d) building capacity in local governments and communities to be effectively with problems relating to water supply and sanitation; e) promoting sustainable water and sanitation services; f) ensuring proper storage, management and use of surface water and preventing its contamination; g) taking necessary measures for storage and use of rain water; and last but not least h)ensuring storm-water drainage in urban areas.</p> <p>Drinking water supply and sanitation is a sub sector within the broader sector of health,</p>

		<p>environment and water and as such the National Policy in this sub sector shall be made consistent with the national policy for health, environment and water. Future investment projects in the public sector shall be made within the framework of this policy as far as practicable. Endeavors will be made to coordinate the activities of private sector and NGOs through the Policy. Projects or activities undertaken at the level of the individual, community or organization will be coordinated by the Local Government Division within the framework of the Policy.</p>
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Strategy Name	Type of Strategies (IWRM/WASH)	Summary
<p>NWMP Development Strategy 2004</p>	<p>IWRM</p>	<p>The Ministry of Water Resources published the National Water Policy (NWPo) for Bangladesh in early 1999. The Policy lays down the broad principles of development of water resources and their rational utilisation under these constraints. It is intended to help guide both public and private actions in the future for ensuring optimal development and management of water that benefits both individuals and the society at large. This Development Strategy sets out a framework for action within which the NWMP is to be formulated. It makes clear the steps that Government intends to take to ensure development of effective institutions and legal and regulatory measures and to enable efficient and equitable management of the sector as a whole. It further sets out the main aims and focus of activities within each sub-sector, such that these may proceed in a coordinated manner consistent with achieving policy objectives. The NWMP will be reviewed and updated every five years and set in the context of development indicators up to 50 years ahead. It will be a firm plan for the next five years, an indicative plan for the subsequent five years, and a perspective plan to 2025. Sector agencies of the Government and local bodies will prepare and implement sub-regional and local water-management plans in conformance with the NWMP and</p>

		<p>approved Government guidelines. Section 7.3 talks about Water Supply and Sanitation. Among the 4 major cities in Bangladesh (Dhaka, Khulna, Rajshahi, Chittagong), Dhaka is expected to see population rising from nearly 9 million in 2000 to 27 million by 2025. Major efforts will be needed to develop bulk water supplies and efficient delivery systems. These may include Local Area Systems (FM hand pumps and small piped systems) to meet water demands in localized and peri-urban areas, particularly poor and disadvantaged communities, and Main Water Supply Systems (i.e. a combination of DTWs, well-fields and major surface water development) that would be progressively developed to serve an increasing proportion of each city's population. The growth in urban water demand will stimulate the need for expansion and improvement in the full range of sanitation options that may include individual and local community facilities i.e. pit latrines, household latrines with septic tanks, community sanitation facilities and small bore sewerage systems. These will satisfy hygienic sanitation requirements in localized and peri-urban areas, particularly poor and disadvantaged areas, with conventional waterborne sewerage systems with wastewater treatment offering then main long-term solution for effluent disposal in the four major cities.</p>
<p>Coastal Development Policy 2006</p>	<p>IWRM</p>	<p>The Coastal Zone Policy was developed in 2005. The policy provides the directives and the framework for the development and implementation of integrated coastal zone management plan. It also gives direction for management of the coastal development process. The Coastal Development Strategy (CDS) focuses on the implementation of the coastal zone policy. This strategy is an attempt to unlock the potentials of the coastal zone along with strategies to mitigate natural and man-made hazards and to preserve, restore and enhance coastal ecosystems. The strategic priorities are to be implemented through three strategic routes: mainstreaming, investment and governance. It focuses on participation and partnership. This strategy will lead to an integrated management of the coastal zone.</p> <p>Nine strategic priorities, evolved through a consultation process, guides interventions and investments in the coastal zone which are 1) ensuring fresh and safe water availability, 2) safety</p>

		<p>from man-made and natural hazards, 3) optimizing use of coastal lands,4) promoting economic growth emphasizing non-farm rural employment,5) sustainable management of natural resources: exploiting untapped and less explored opportunities, 6) improving livelihood conditions of people; especially women, 7) environmental conservation, 8) empowerment through knowledge management and 9) creating an enabling institutional environment.</p> <p>Section 3.1.1 discusses ensuring fresh and safe water availability. The availability of fresh and safe water is considered as the most critical issue in the coastal zone. The only reliable source of fresh water in the coastal areas is the deep-water aquifer, which is under high risk of being mined or becoming infiltrated with salt or arsenic contaminated water. In this context, project has been developed on “Strengthening Sanitation and Safe Water Supply Programs in Arsenic and Salinity Affected Areas (in selected 10 upazilas of the coastal zone). The overall goal of this project is supplying convenient arsenic and salinity free water for the people in the coastal zone, and providing sanitation facility to reach at 100% sanitation coverage specially one hygienic sanitary latrine for each family by 2010 as per plan of Government of Bangladesh.</p>
<p>The National strategy for Water Supply and Sanitation 2014</p>	<p>WASH</p>	<p>This strategy 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 expertise from concerned organizations like representatives from DPHE, UNICEF, WHO, WSP-WB, WaterAid, BRAC, NGO Forum for Public Health etc. The water supply and sanitation strategy suggests 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.</p>

National Sanitation Strategy 2005	WASH	<p>The primary goal of the National Sanitation Strategy 2005 is to achieve 100% sanitation coverage by 2010. 100% sanitation includes no open defecation, hygienic latrine available for all, use of hygienic latrines, regular maintenance of hygienic latrines and improved hygienic practices. The primary objective of this strategy is to delineate the ways and means of achieving the national target through providing a uniform guideline for both rural and urban communities. The scope of the strategy is to address issues related to unhygienic defecation only. However, strategies for addressing the issues of solid waste management, and disposal of household waste water and storm water will be considered separately as a matter of priority. There are several guiding principles of this strategy and some of the relevant ones are 1) sanitation is a human right, 2) sanitation is primarily about health, 3) sanitation is also about privacy, convenience, dignity, safety and security, 4) creating and sustaining demand, 5) hygiene promotion and behavior change, 6) gender sensitive approach and 7) environmental integrity.</p>
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ANNEX 02

KEY EXPERT INTERVIEW

ANNEX 02: KEY EXPERT INTERVIEW



Figure: Interview with the PD of BLUE GOLD Project



Figure: Interview with the XEN of BLUE GOLD Project



Figure: Interview with the Executive Engineer, DPHE



O.CREEDS

ONUSONDHANI CREEDS

CONSENT FORM

“Landscape of WASH in IWRM in Bangladesh” by Water Aid

I have been fully informed about the objectives and expected outcome of the study and my answer is to the best of my knowledge and information available to me.

I acknowledge that my participation in this study is solely for research and to develop an understanding that will generate valuable policy and plan gap that will be used for the interest of the national WASH (Water Sanitation and Hygiene) & Integrated Water Resources Management (IWRM), I further understand that, I my organization or any other staff will not be held responsible or be quoted for any adverse consequence, error or misinformation.

I Mr./Ms. Borshan Uddin..... hereby provide my consent to willingly participate in the study conducted by Water Aid and O.CREEDS as the representative on behalf of Water Aid for the study titled “**Landscape of WASH in IWRM in Bangladesh.**”

I further understand that I hold the right to withdraw my reference to this study at any time for any purpose what so ever.

Key Expert's Name: Borshan Uddin -
Designation: - program officer -
Organization: SSUS
Contact No.: 01865041336
Email:

.....
Signature of the Expert

Date:

.....
Signature of researcher

Name:

Date:



O.CREEDS

ONUSONDHANI CREEDS

CONSENT FORM

“Landscape of WASH in IWRM in Bangladesh” by Water Aid

I have been fully informed about the objectives and expected outcome of the study and my answer is to the best of my knowledge and information available to me.

I acknowledge that my participation in this study is solely for research and to develop an understanding that will generate valuable policy and plan gap that will be used for the interest of the national WASH (Water Sanitation and Hygiene) & Integrated Water Resources Management (IWRM), I further understand that, I my organization or any other staff will not be held responsible or be quoted for any adverse consequence, error or misinformation.

I Mr./Ms. Motaher Hossain hereby provide my consent to willingly participate in the study conducted by Water Aid and O.CREEDS as the representative on behalf of Water Aid for the study titled “Landscape of WASH in IWRM in Bangladesh.”

I further understand that I hold the right to withdraw my reference to this study at any time for any purpose what so ever.

Key Expert's Name: Motaher Hossain
Designation: Sector Specialist (WASH)
Organization: COSP-BU
Contact No.: 01731886359
Email: motaherhossain@gmail.com

[Signature]
Signature of the Expert
Date: 10.11.2019

.....
Signature of researcher
Name:
Date:



O.CREEDS

ONUSONDHANI CREEDS

CONSENT FORM

“Landscape of WASH in IWRM in Bangladesh” by Water Aid

I have been fully informed about the objectives and expected outcome of the study and my answer is to the best of my knowledge and information available to me.

I acknowledge that my participation in this study is solely for research and to develop an understanding that will generate valuable policy and plan gap that will be used for the interest of the national WASH (Water Sanitation and Hygiene) & Integrated Water Resources Management (IWRM), I further understand that, I my organization or any other staff will not be held responsible or be quoted for any adverse consequence, error or misinformation.

I Mr./Ms. Md. Waliullah hereby provide my consent to willingly participate in the study conducted by Water Aid and O.CREEDS as the representative on behalf of Water Aid for the study titled “Landscape of WASH in IWRM in Bangladesh.”

I further understand that I hold the right to withdraw my reference to this study at any time for any purpose what so ever.

Key Expert's Name: Md. Waliullah
Designation: Assistant Engineer, Noakhali
Organization: DPHE
Contact No.: 01711974274
Email:

.....
Signature of the Expert
Date: 10.01.19

.....
Signature of researcher
Name:
Date:



O.CREEDS

ONUSONDHANI CREEDS

CONSENT FORM

“Landscape of WASH in IWRM in Bangladesh” by Water Aid

I have been fully informed about the objectives and expected outcome of the study and my answer is to the best of my knowledge and information available to me.

I acknowledge that my participation in this study is solely for research and to develop an understanding that will generate valuable policy and plan gap that will be used for the interest of the national WASH (Water Sanitation and Hygiene) & Integrated Water Resources Management (IWRM), I further understand that, I my organization or any other staff will not be held responsible or be quoted for any adverse consequence, error or misinformation.

I Mr./Ms. Swapan Mozumder hereby provide my consent to willingly participate in the study conducted by Water Aid and O.CREEDS as the representative on behalf of Water Aid for the study titled “Landscape of WASH in IWRM in Bangladesh.”

I further understand that I hold the right to withdraw my reference to this study at any time for any purpose what so ever.

Key Expert's Name: Swapan Mozumder
Designation: Coordinator
Organization: BRAC
Contact No.: 01729070501
Email: swapan.mozumder@brac.net

[Signature]
Signature of the Expert
Date: 09/01/18

.....
Signature of researcher
Name:
Date:



O.CREEDS

ONUSONDHANI CREEDS

CONSENT FORM

“Landscape of WASH in IWRM in Bangladesh” by Water Aid

I have been fully informed about the objectives and expected outcome of the study and my answer is to the best of my knowledge and information available to me.

I acknowledge that my participation in this study is solely for research and to develop an understanding that will generate valuable policy and plan gap that will be used for the interest of the national WASH (Water Sanitation and Hygiene) & Integrated Water Resources Management (IWRM), I further understand that, I my organization or any other staff will not be held responsible or be quoted for any adverse consequence, error or misinformation.

I Mr./Ms. Md. Babul Akter..... hereby provide my consent to willingly participate in the study conducted by Water Aid and O.CREEDS as the representative on behalf of Water Aid for the study titled “Landscape of WASH in IWRM in Bangladesh.”

I further understand that I hold the right to withdraw my reference to this study at any time for any purpose what so ever.

Key Expert’s Name: Md. Babul Akter

Designation: Executive Engineer

Organization: Bangladesh Water Development Board, Bhola

Contact No.: 01711452916

Email:

[Signature]
.....

Signature of the Expert

Date: 14.01.19

.....

Signature of researcher

Name:

Date:

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ANNEX 03

**FINDINGS FROM KEY EXPERT
INTERVIEWS**

ANNEX 03: FINDINGS FROM KEY EXPERT INTERVIEWS

Excerpts and Findings from Key Expert Interviews

The synopsis of discussion with the experts are summarized as follows-

❖ Summary of Interview with Mr. Wadud Bhuiya

Mr. Wadud Bhuiya summarized his experience during his tenure at the Bangladesh Water Development Board and Joint Rivers Commission. He discussed the evolution of key water resources policies and projects from the inception of IBRD 1972, IECO Master plan 1964. Further he discussed his role as the Additional Director General and his involvement in the 6th 5-year plan. He also briefed the key elements of National Water Resources Management Plan that was drafted in 2001 and finalized in 2004. He also discussed his involvement in the work that were the stepping stone for the Delta Plan 2100.

Further, he discussed his role as the Project Director of CDSP-1 Project which is one of the key water resources development project that included a WASH component administered by DPHE and implantation monitored by BRAC as the supervising NGO. He described the mechanism and implantation of the WASH infrastructures and working of the Tube Well User Groups.

According to Mr. Wadud Bhuiya –CDSP 1-IV are ideal model of Integrated Water Resources Management project that included WASH and some of the goals of SDG-6. He recommended that the pros and cons of this model can be studied to develop different models for different needs catering to needs of various regions in the country. Further, he recommends that FGD's can be performed at the CDSP project area to develop a field level understanding from the WASH beneficiaries. From the insight of the FGD feasibility of applying this model to different geographical needs of the country can be applied. The different stakeholder government departments and NGO's will have to work together to implement a project and make it a reality. He further mentioned there are some administrative challenges with project with different working government organizations in terms of formal communication, mutual agreements and project administration. However, his position has been as CDSP projects have been successful implemented in the past, newer working models with different needs I,e., other than land allocation for example, flood control, infrastructure rehabilitation, employment creation, climate resilience technologies etc.

❖ Summary of Interview with Mr. Amirul Hossain, and Ms. Nasrin Akhter Khan:

Mr. Amirul Islam and Ms. Nasrin Akhter Khan discussed the objective, stakeholders and the goals of the Blue Gold Project. He explained, Blue Gold is a collaboration program between the Government of the Netherlands (donor) and the Government

of Bangladesh. The program is implemented by the Ministry of Water Resources, through Bangladesh Water Development Board (BWDB, lead agency) and the Department of Agricultural Extension (DAE).

A number of government agencies implement the program. The Bangladesh Water Development Board (BWDB) is the lead agency, responsible inter alia for protecting the communities from flooding and surges by ensuring the integrity of the embankments and associated structures, and for forming and registering water management organizations (WMOs). There are three different members in the WMO that include the land owners, the land less and female. There are currently 514 registered WMO's with 21 lakh registered members.

The Department of Agricultural Extension (DAE) works alongside farmers to encourage the selection and cultivation of crops and varieties that are well-suited to the coastal environment and which, as part of an interlinked annual cropping system, form the basis for profitable business. In addition, the Department of Livestock Services (DLS) and Department of Fisheries (DoF) provide specialist advice for the development of training modules to farmer field schools, and contribute to other project interventions.

He mentioned that the Royal Dutch Embassy has initiated an Innovation Fund for the Blue Gold project to support and implement innovative technologies to improve the living and the livelihood of the project beneficiaries. With the support of the innovation fund piped water supply system has been installed and currently operating in Khulna polder 26 and Golachipa polder 55. Though WASH is not a component of the Blue Gold project, such innovation has provided the opportunity for WASH.

In conclusion he mentioned that integrated approach with different government organizations including WASH with DPHE, LGED and NGO's to provide better results for the needs of the community. Thus, he is supporting of integrated project with BWDB and different government stakeholders. He would support such projects in the future and continue to look forward to work with different government organizations. Ms. Nasrin Akhter Khan, mentioned though there are some great end results there are challenges in managing and decision making with projects with multiple government stakeholders, primarily with the availability of officials of arranging interministerial meeting. Additionally, the formal chain of communication and concurrence of inter ministry and departments is time consuming for key decisions.

ANNEX 04

FOCUSED GROUP DISCUSSION

ANNEX 04: FOCUSED GROUP DISCUSSION**Location:** M. N. Mashjid Market, Kearing Char, Noakhali**Latitude:** 22.493414**Longitude:** 91.130682

SI	Date	Name	Address	Contact Number
1	09-01-2019	Md. Rohim	Chowdhuri gram, Kearing char, Noakhali	01832590255
2	09-01-2019	Md. Robiul hussen	Rosulpur, bathankhali, Kearing char, Noakhali	01860797557
3	09-01-2019	Md. Sohedul haque	2 no, Charundi, carring char, Noakhali	01834455309
4	09-01-2019	Hilton Chandra das	Jogonnathpur, Kearing char, Noakhali	01830464361
5	09-01-2019	Md. Akter	Adarsha gram, sahib ali bazar, Noakhali	01645356119
6	09-01-2019	Md. Nizam uddin	2 no, Charundi, mosjiz market, Noakhali	0135259582
7	09-01-2019	Md. Ashraf Uddin	2 no, Charundi, mosjiz market, Noakhali	01866956631
8	09-01-2019	Md. Zahed Uddin	Uttar adarsha gram, Kearing char, Noakhali	01863772197
9	09-01-2019	Md. Haque saheb	Mohammadpur, carring char, Noakhali	
10	09-01-2019	Md. Josim	Mohammadpur, Kearing char, Noakhali	0182226633
11	09-01-2019	Md. Hannan	Adarsha gram, Kearing char, Noakhali	01879092403
12	09-01-2019	Md. Kamruzzaman	M, ali market, Kearing char, Noakhali	01813223105
13	09-01-2019	Md. Sakib	M, ali market Kearing char	01875575206



FIGURE: FGD at M. N. Mashjid Market, Kearing Char, Noakhali



FIGURE: FGD at Motipur, Kearing Char, Noakhali

Location: Motipur, Kearing Char, Noakhali

Latitude: 22.488909

Longitude: 91.116188

SI	Name	Address	Contact Number
1	Md. Afsar Uddin	Motipur, Kearing char, Noakhali	0181641450
2	Md. Belal	Shantipur Kearing char, Noakhali	01843147570
3	Md. ashraf	Motipur, Kearing char, Noakhali	01828590329
4	Md. Shamim	Motipur, Kearing char, Noakhali	01822111433
5	Md. Eshrak	Motipur, Kearing char, Noakhali	01881942447
6	Md. Asghar	Motipur, Kearing char, Noakhali	01837373987
7	Nurul haque	Motipur, Kearing char, Noakhali	
8	Md. Dulal	Motipur, Kearing char, Noakhali	
9	Md. Saruar	Motipur, Kearing char, Noakhali	01878962853
10	Md. Jahanghir	Motipur, Kearing char, Noakhali	01832791147
11	Md. Kama Uddin	Motipur, Kearing char, Noakhali	01882464213
12	Toufiq	Motipur, Kearing char, Noakhali	01840292816
13	Burhan Uddin	Motipur, Kearing char, Noakhali	01748920794
14	Sahabuddin	Motipur, Kearing char, Noakhali	01884182557
25	Md. Farhan Uddin	Motipur, Kearing char, Noakhali	01845107783
16	Md. Foyzul ali	Motipur, Kearing char, Noakhali	01867450454
17	Md. Iraq	Motipur, Kearing char, Noakhali	01859154037
18	Md. Farid	Motipur, Kearing char, Noakhali	01843834950
19	Md. Iraq Uddin	Motipur, Kearing char, Noakhali	01881256729



FIGURE: FGD at North Veduriya, BholaSadar Upazila



FIGURE: FGD at Suilis, Lalmohon Upazila

Location: North Veduriya, Bhola Sadar, Bhola

Latitude: 22.701348

Longitude: 90.575186

SI	Date	Name	Address	Contact Number
1	13.01.2019	Raton Kerani	Veduia(North), Bhola Sadar	0178779928
2	13.01.2019	Md. Shahid	Veduia(North) , Bhola Sadar	01730904983
3	13.01.2019	Altaf Hossain	Veduia(North) , Bhola Sadar	
4	13.01.2019	Md. Owaris	Veduia(North) , Bhola Sadar	01837554223
5	13.01.2019	Md. Jahangir	Veduia(North) , Bhola Sadar	01751550148
6	13.01.2019	Md. Ibrahim Paloan	Veduia(North) , Bhola Sadar	01770524598
7	13.01.2019	Abdul Rashid	Veduia(North) , Bhola Sadar	01643745624
8	13.01.2019	Md. Jhilon	Veduia(North) , Bhola Sadar	01707984980
9	13.01.2019	Md. Rajib	Veduia(North) , Bhola Sadar	01640206067
10	13.01.2019	Md. Yeasin	Veduia(North) , Bhola Sadar	01862164745
11	13.01.2019	Md. Muminur Ekram	Veduia(North) , Bhola Sadar	01914263811
12	13.01.2019	Md. Rajib	Veduia(North) , Bhola Sadar	01784400328
13	13.01.2019	Md.Rana	Veduia(North) , Bhola Sadar	0190200724



FIGURE: FGD at Char Kukri Mukri, Charfashion Upazila



FIGURE: FGD at Jhiyaltala, Dumuriya, Khulna

Location: Suilis, Lalmohon, Bhola

Latitude: 22.210486

Longitude: 90.820471

SI	Date	Name	Address	Contact Number
1	14.1.2019	Nur Nabi	Fatemabad, Lalmohon, Bhola	
2	14.1.2019	Md. Kamal	Fatemabad, Lalmohon, Bhola	01761963933
3	14.1.2019	Abdul Halim	Fatemabad, Lalmohon, Bhola	01721652590
4	14.1.2019	Nur Nabi	Fatemabad, Lalmohon, Bhola	01728682305
5	14.1.2019	Alawddin	Fatemabad, Lalmohon, Bhola	01737447890
6	14.1.2019	Md. Shabuj Majhi	Fatemabad, Lalmohon, Bhola	01741733749
7	14.1.2019	Md. Giyas Uddin	Fatemabad, Lalmohon, Bhola	01705532784
8	14.1.2019	Md. Ripon	Fatemabad, Lalmohon, Bhola	01796706012
9	14.1.2019	Md. A. Rab	Fatemabad, Lalmohon, Bhola	01721265244
10	14.1.2019	Md. Shahadat	Fatemabad, Lalmohon, Bhola	01744568872
11	14.1.2019	Md. Alawddin	Fatemabad, Lalmohon, Bhola	01882471711
12	14.1.2019	Md. Arif	Fatemabad, Lalmohon, Bhola	01780180986
13	14.1.2019	Md. Shah Alam	Fatemabad, Lalmohon, Bhola	01727557502
14	14.1.2019	Md. Shaheen	Fatemabad, Lalmohon, Bhola	01799227942
15	14.1.2019	Md. Mosleuddin	Fatemabad, Lalmohon, Bhola	01787999076
16	14.1.2019	Md. Chalauddin	Fatemabad, Lalmohon, Bhola	01790224272
17	14.1.2019	Md. shofiullah	Fatemabad, Lalmohon, Bhola	
18	14.1.2019	Md. Nure Alam	Fatemabad, Lalmohon, Bhola	01722431787
19	14.1.2019	Md. Miraz	Fatemabad, Lalmohon, Bhola	01723457930
20	14.1.2019	Md. Milon Majhi	Fatemabad, Lalmohon, Bhola	01724700773
21	14.1.2019	Md. Kamal Bepari	Fatemabad, Lalmohon, Bhola	01781693296
22	14.1.2019	Md. Robi Alam	Fatemabad, Lalmohon, Bhola	01744416223
23	14.1.2019	Md. Bablu	Fatemabad, Lalmohon, Bhola	01724429918
24	14.1.2019	Md. Mizan	Fatemabad, Lalmohon, Bhola	01716419864
25	14.1.2019	Md. Nirob	Fatemabad, Lalmohon, Bhola	01732761598
26	14.1.2019	Md. Monju	Fatemabad, Lalmohon, Bhola	01728732374
27	14.1.2019	Md. A. Ali	Fatemabad, Lalmohon, Bhola	
28	14.1.2019	Md. Jahangir	Fatemabad, Lalmohon, Bhola	
29	14.1.2019	Md. Murad	Fatemabad, Lalmohon, Bhola	01773136525
30	14.1.2019	Md. Nuruddin	Fatemabad, Lalmohon, Bhola	01718461373
31	14.1.2019	Md. Al. Amin	Fatemabad, Lalmohon, Bhola	01734485746
32	14.1.2019	Md. Chalauddin	Fatemabad, Lalmohon, Bhola	01799227942
33	14.1.2019	Md. A.Mannan	Fatemabad, Lalmohon, Bhola	01738446588
34	14.1.2019	Md. Hannan	Fatemabad, Lalmohon, Bhola	01757207318
35	14.1.2019	Md. Mizan	Fatemabad, Lalmohon, Bhola	01715674099
36	14.1.2019	Md. Milon Miya	Fatemabad, Lalmohon, Bhola	01727953034

Location: Char Kukri Mukri, Charfashion, Bhola

Latitude: 22.940939

Longitude: 90.637068

SI	Date	Name	Address	Contact Number
1	15.01.2019	Md. Emam Hossain	Char Kukri Mukri, Charfashion, Bhola	01747691321
2	15.01.2019	Md. Saiful	Char Kukri Mukri, Charfashion, Bhola	01776446311
3	15.01.2019	Mukta Begum	Char Kukri Mukri, Charfashion, Bhola	01719561061
4	15.01.2019	Md. Sohag	Char Kukri Mukri, Charfashion, Bhola	01723012634
5	15.01.2019	Md. Mijan	Char Kukri Mukri, Charfashion, Bhola	01795734256
6	15.01.2019	Md. Rasel	Char Kukri Mukri, Charfashion, Bhola	01795798705
7	15.01.2019	Md. Riaz	Char Kukri Mukri, Charfashion, Bhola	01734432766
8	15.01.2019	Md. Nijam	Char Kukri Mukri, Charfashion, Bhola	01766971523
9	15.01.2019	Shirin Akter	Char Kukri Mukri, Charfashion, Bhola	01718304067
10	15.01.2019	Md. Mahfuj	Char Kukri Mukri, Charfashion, Bhola	01719570110
11	15.01.2019	Rintu Debnath	Char Kukri Mukri, Charfashion, Bhola	01738288282
12	15.01.2019	Md. Sumon	Char Kukri Mukri, Charfashion, Bhola	01711783048



FIGURE: FGD at Char Kukri Mukri, Charfashion Upazila



FIGURE: FGD at Jhiyaltala, Dumuriya, Khulna

Location: Jhiyaltala, Dumuriya, Khulna

Latitude: 22.768851

Longitude: 89.360971

Sl	Name	Address	Contact Number
1	Md. Robiul Islam	Jiyal tala, Dumuria, Khulna	01767024211
2	Md. Sofiqul Islam	Jiyal tala, Dumuria, Khulna	01740942330
3	Ram Prosad	Jiyal tala, Dumuria, Khulna	
4	Dilip Mondol	Jiyal tala, Dumuria, Khulna	01714597124
5	Purondron Roy	Jiyal tala, Dumuria, Khulna	01734253558
6	Md. Sumon	Jiyal tala, Dumuria, Khulna	01757567431
7	Prodip Sorkar	Jiyal tala, Dumuria, Khulna	01747331302
8	Babu Moldar	Jiyal tala, Dumuria, Khulna	01878444356
9	Rai Das	Jiyal tala, Dumuria, Khulna	01628283972
10	Kartik Talukdar	Jiyal tala, Dumuria, Khulna	
11	Topon Haldar	Jiyal tala, Dumuria, Khulna	01728934131
12	Md. Jamil Hossain	Jiyal tala, Dumuria, Khulna	01998241124
13	Md. Rejaul	Jiyal tala, Dumuria, Khulna	01946540389
14	Md. Lion	Jiyal tala, Dumuria, Khulna	01752222495
15	Md. Kashem	Jiyal tala, Dumuria, Khulna	01307195282
16	Kartik Jordar(Mamber)	Jiyal tala, Dumuria, Khulna	01770106732
17	Onol Kanti Roy	Jiyal tala, Dumuria, Khulna	
18	Torun Sordar	Jiyal tala, Dumuria, Khulna	01731433474



FIGURE: FGD at Satkhira Sadar

ANNEX 05

KEY INFORMANT INTERVIEW

ANNEX 05: KEY INFORMANT INTERVIEW

SI	Name	Organization	Designation	Contact Number
1	Md. Tajul Islam	Government of the People's Republic of Bangladesh	Chairman (Union)	01717349225
2	Abi Abdullah	Banker Hat Co-operative High School	Assistant Teacher (Assistant Head Master)	01920125273
3	Abdul Malek	Veduria Islamia govt. Primary School	Assistant Teacher	01991910530
4	Md. Akmal Hossain	Department of Public Health Engineering, Bhola	Executive Engineer	01718579522
5	Md. Babul Akter	Bangladesh Water Development Board, Bhola	Executive Engineer	01711452916
6	Md Waliullah	Department of Public Health Engineering, Noakhali	Assistant Engineer	01711974274
7	Swapan Mozumder	BRAC	Coordinator	01729070501
8	Motaher Hossain	CDSP-IV	Sector Specialist	01731886359
9	Borhan Uddin	SSUS	Program Officer	01865041336
10	Md. Hannan Molla	Sagarika Samaj Unnayan Sangstha	Administrative Officer	01718830652



Figure: Interview with the Executive Director and Program Officer of Sagarika Samaj Unnayan Sangastha, Noakhali



Figure: Interview with the Assistant Engineer of DPHE, Noakhali



Figure: Interview with the Coordinator of BRAC, Noakhali



Figure: Interview with Sector Specialist (WATSAN) of CDSP-IV, Noakhali



Figure: Interview with the Executive Engineer of BWDB, Bhola



Figure: Interview with the Executive Engineer of DPHE, Bhola



Figure: Interview with the Assistant Headmaster of Banker Hat Co-operative High School, Bhola



Figure: Interview with the Assistant Teacher of 11 No. Veduriya Islamia Govt. Primary School, Bhola

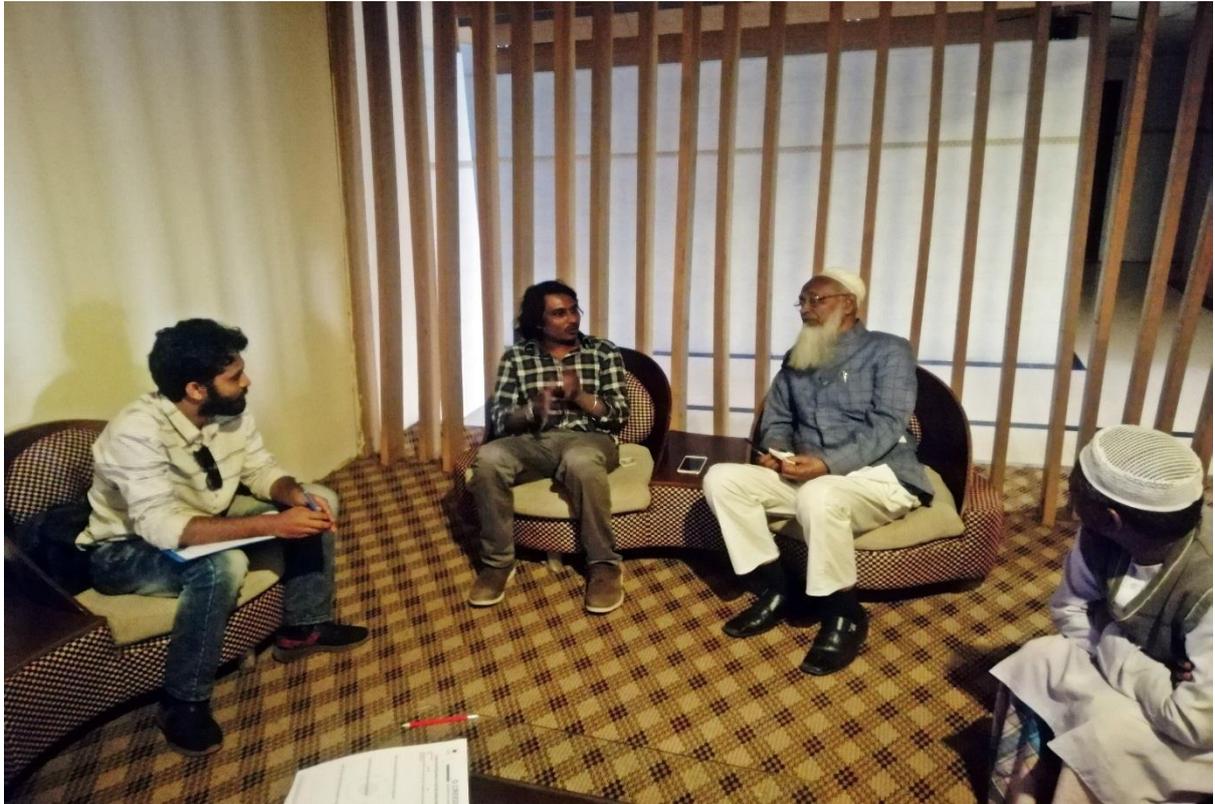


Figure: Interview with the Chairman of Veduriya Union, Bhola

ANNEX 06

PROJECT MATRIX

ANNEX 06: PROJECT MATRIX

Project	Implementing entity	Project period	Status	Project location	Project beneficiaries	Project budget	Project activities						Remark
							Water Supply	Sanitation	Watershed Management	Livelihood intervention	Climate resilient intervention	Health services	
CDS PI	MioWR MoL MoLEDR NGOs	1994-1997	Completed	Sudharam and Companiganj Thana, Noakhali District	5000 landless of which 1000 of cluster villages.	108.1 Cr. BDT	Cluster Village Pond(New) Deep Tube-well Shallow Tube-well	Single Pit Toilet	Sea Dyke (New) Sea Dyke (Resec) Interior Dyke (New) Interior Dyke (Resec) Marginal dyke (Resec) Main Drain (Re-exc) Sec. Drain (Re-exc) Sluice (New) Sluice (Repair) Closure (New)	Homestead Crops/Field Crops Tree Nursery Fish Fry Nursery Fish and prawn production	Embankments and Closures (To Protect Charland against Cyclone related tidal waves, saline water intrusion, and flooding)	Vaccination Training of the existing Traditional Birth Attendants (TBA)	

CDS P II	MioWR BWDB MoL LGED DPHE DAE FD BRAC YPSA Saghorika Upoma N-RAS DUS	1999- 2005	Comple ted	Noakhali Coast, Muhuri Accreted Area and the Islands, South Hatiya (Char Torabali- Gangchil, Nijhum Dwip Bandartila, Char Mora Dona., Char Osman and Char Lakshmi.Bagga r Dona Catchment Area,Boyer Char)	4200 (674 household)	1239.99 Cr. BDT	Community ponds for clustered villages Tube-wells (Constr &Repair) 265 km excavation of drainage Khals.	Single pit latrines.	Sea Dyke Interior Dyke Low Embankment Repair old Embankment Drainage Canals Drainage Sluice Pipe Sluice Repair Sluice Irrigation Inlet	Coastal Agriculture, Cropping pattern and varieties protection to the crops against (saline) water intrusions Protection of homesteads allowing investment in homestead gardening, fish culture and small livestock	Coastal Agriculture, Cropping pattern and varieties protection to the crops against (saline) water intrusions Protection of homesteads allowing investment in homestead gardening, fish culture and small livestock		
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CDS P III	(BWDB, MoL, LGED, DPHE, FD and DAE), DUS, HASI, SSUS, UPOMA and N-RAS coordinated by BRAC	2005-2010	Completed	Noakhali (Boyer Char and Baggar Dona river) and Lakshmipur (Baggar Dona)	8500	121.68	<p>Ponds</p> <p>Fixation of the homesteads around the excavated ponds</p> <p>Deep tube wells</p> <p>Test tube wells</p> <p>Sand filters for ponds</p> <p>Rain water harvesting schemes</p>	<p>Sanitary latrines</p> <p>Public toilets</p>	<p>Embankment-Sea side</p> <p>Sea dyke and interior dyke</p> <p>Sluices</p> <p>Closures</p> <p>Individual guide dyke</p> <p>Excavation/re-excavation of drainage canals</p> <p>Excavation/re-excavation of shortcut channel</p> <p>Re-excavation of river</p> <p>Fixation diluvion lines of Boar Char along the river Meghna</p>	<p>Suitable agricultural technology</p> <p>Distribution of plastic seed drums</p> <p>Crop cut demonstration</p> <p>Distribution of hand sprayer</p> <p>Distribution of paddle threshers-</p> <p>Fisheries and Livestock</p>			
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CDS P IV	BWDB MoL LGED DPHE DAE FD and NGOs	2011- 2018	Running	Char Nangulia, Noler Char and Caring Char, Urir Char and Char Ziauddin	170,000 in 29,000 household s.	121.68	HH access to safe drinking water Water supply points	HH access to hygiene latrine	Sea facing embankment Retired dyke at Noler Char and Char Nangulia Interior dyke construction at Char Nangulia, Noler Char and at Char Ziauddin.	Improved livelihoods Improved agriculture Fish Nurseries Poultry	Climate resilient infrastructure for communication s, markets, cyclone protection, potable water and hygienic sanitation Bridges & culverts built Markets construction ICS	Health workers developm ent Establish ment of clinics Trained women in IGA	
Blue Gold	MoWR BWDB DAE	March 2013 – June 2020	Running	The twenty-two polders selected for interventions through Blue Gold cover around 115,000ha in the districts of Patuakhali, Khulna, Satkhira and Barguna	150,000 household s	EURO 75.9 million			Production well regeneration Deep Tube Well with no 6 shallow tube well Tara Dev Shallow Tube well Overhead tank rehabilitation Water treatment plant				

37	DPHE	2010	On going	Faridpur, Shariatpur, Gopalganj, Rajbari, Munshiganj, Ta ngail, Gazipur, Manikganj, Jamalpur, Cox's Bazar, Feni, Comilla, Chand pur, Hobiganj, S unamganj, Rang pur, Bogra, Kurigram, Dinajpur, Nilphamari, Gaibandha , Thakurgaon, Panchagar, Lalmonirhat, Pabna, Naogaon, Chapainawabg anj, Jalokhati, Bhola, Barguna, Patuakhali, Magura, Narail, Meherpur, Satkhira, Kusthia and Chuadanga	Urban dwellers of 37 Pourashav as		Production tube well Pump house Treatment plant Water pipeline							
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