



Fourth Primary Education Development Program (PEDP-4)

Semi-Annual Social Monitoring Report

DEPARTMENT OF PUBLIC HEALTH ENGINEERING

Jan 2023 - June 2023

[A report on WASH facilities and its social impact under PEDP-4]



Primary Education Unit, DPHE, Dhaka

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ABBREVIATIONS & ACRONYMS

ADB	:	Asian Development Bank
DLI	:	Disbursement Linked Indicator
DP	:	Development Partner
DPEO	:	District Primary Education Officer
DPE	:	Directorate of Primary Education
DPHE	:	Department of Public Health Engineering
DTW	:	Deep Tube Well
EFA	:	Education For All
EMF	:	Environmental Management Framework
EU	:	European Union
GOB	:	Government of Bangladesh
GPE	:	Global Partnership for Education
IDA	:	International Development Association
IPG	:	Infrastructure Plan and Planning Guidelines
JARM	:	Joint Annual Review Mission
JCM	:	Joint Consultation Meeting
JICA	:	Japan International Cooperation Agency
LGD	:	Local Government Division
MLGRD&C	:	Ministry of Local Government, Rural Development and Cooperatives
MoPME	:	Ministry of Primary and Mass Education
MOU	:	Memorandum of Understanding
PEDP-4	:	Fourth Primary Education Development Program
QLEAP	:	Quality Learning for Education Access and Participation
RDPP	:	Revised Development Project Proforma
SDTW	:	Semi Deep Tube Well
SEC	:	Small Ethnic Community
STW	:	Shallow Tube Well
TSP	:	Tube Well with Submersible Pump
UNICEF	:	United Nations International Children's Emergency Fund
WB	:	World Bank



EXECUTIVE SUMMARY

The prime objective of PEDP-4 is to ensure an efficient, inclusive, and equitable primary education system by constructing climate-resilient infrastructure for a children-friendly physical learning environment. Infrastructural development in terms of construction of class rooms and wash blocks, installation of safe drinking water points plays an important role in achieving the sustainable physical learning environment as well as ensuring holistic development of children. Department of Public Health Engineering (DPHE) is solely responsible to provide the water supply and sanitation facilities in the primary schools of Bangladesh. As per the approved revised DPP (RDPP) of PEDP-4 DPHE will install 20,000 new water points and construct 58,000 Wash Blocks in the primary schools of Bangladesh throughout the program tenure (July/2018 to June/2025) of 7 years. In addition, DPHE will conduct water quality tests of earlier installed 65,000 water points and undertake major maintenance of wash blocks constructed during PEDP-4. From the beginning of the project until June'2023 DPHE installed a total of 12,944 new water points and constructed 19,216 Wash Blocks. Of them 3,608 water sources and 5,706 wash blocks were constructed during the reporting tenure. In addition, DPHE conducted major maintenance of 7,392 wash blocks from the beginning of the project.

The sole purpose of this study is to identify any concern or issue related to the social safeguard due to the installation of water points, major maintenance of existing wash blocks and construction of new two storied wash blocks from Jan'2023 to June'2023. The study is based on the social safeguard screening conducted during pre-construction, construction and post implementation stages. The screening format is prepared based on the MoPME approved SMF guidelines for PEDP-4. The screening included different social safeguard indicators such as displacement of people due to land acquisition, threat on cultural tradition/ way of life, restriction in access to common properties, effect on places/objects of cultural/religious significance, provision of toilet for disabled student, accessibility and easiness of disabled student to toilets, provision of safe drinking water to children etc.

The screening was conducted by DPHE officials at the Upazilla level which was duly verified in district level and compiled in DPHE headquarter. It is the fact that the pandemic COVID-19 situation slowed down the overall construction and implementation progress. However, the social monitoring screening confirmed no significant instances or issues that may hamper or influence the social safety during the reporting tenure. Being an implementing agency, DPHE would like to uphold this status in its ongoing and upcoming works related to infrastructural development.



1. Introduction

Children-friendly physical learning environment is present days' demand for an efficient, inclusive, and equitable primary education system. It is of utmost importance to ensure adequate infrastructure as well as improved water supply and sanitation facilities in the primary schools of Bangladesh based on actual needs. The Primary Education Development Program (PEDP-4) is committed to improving the physical learning environment and reducing the dropout rate through a gender-friendly inclusive education system. All activities of the fourth PEDP-4 go to the development of primary education in line with children's well-being to develop sustainable human resources. PEDP-4 is the continued contribution of the Government's approach in thriving the excellence of children through the fulfillment of several distinct milestones including the construction of need-based infrastructures for sanitation and water supply. The program is supported by significant contributions from Government as well as Development Partners (DPs). Department of Public Health Engineering (DPHE) under Local Government Division (LGD) of Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C) is solely responsible to provide the facilities for quality water supply and sanitation in the primary schools of Bangladesh. As per MoU signed in between DPE and DPHE and as per revised DPP (RDPP) of PEDP-4, DPHE will perform the following activities with an aim to provide safe drinking water and sanitation services in the primary schools under PEDP-4.

- Install 20,000 new drinking water sources in the primary schools.
- Conduct water quality testing of 65,000 water points installed earlier.
- Construction of 58,000 new Wash Blocks in 29,000 primary schools.
- Major maintenance of approximately 10,000 wash blocks constructed in PEDP-3.
- Water supply and sanitation facilities in 650 DD, DPEO, URC, PTI offices.
- Operation and maintenance (O/M) of water points.

With the continuous support of the Bangladesh government and development partners, the 4th Primary Education Development Program (PEDP-4) has accelerated considerable progress in the installation of water sources and environment-friendly wash blocks in the primary schools of Bangladesh through DPHE.

2. Purpose of current report

The basic intent of this report is to identify and resolve any anticipated social safeguard issues related to the land use and impacts that may arise during the installation of water sources and construction of Wash Blocks in the primary schools of Bangladesh. This report will encompass and summarize the findings of the social screening conducted during the installation of water points and



construction of Wash Blocks in the primary schools of Bangladesh from the tenure of January'23 to June'23. During implementation of the project, social monitoring screening was conducted based on the Social Management Framework (SMF) of PEDP-4.

3. Indicators of social safeguard as per SMF under PEDP-4

Ensuring an environment of collective participation is crucial to establishing a sustainable and secure social environment by eliminating religion, color, and ethnic discrimination. The Primary Education Development Program (PEDP-4) is playing an important role in improving the environment and social protection. This report covers different distinct social monitoring indicators based on the approved SMF of PEDP-4. Followings are some of major indicators (not limited though) which were considered.

- To investigate whether physical facilities in the school causes any adverse impact on indigenous people, as well as private land owners and public land users.
- To identify if the implementation of new infrastructures causes any threats on cultural tradition or way of life.
- To assess whether the access to common property resources and livelihood activities are severely restricted due to the installation of water sources and construction of Wash Blocks.
- To explore whether the places/objects of cultural and religious significance are affected due to the infrastructural development.
- To examine whether the Wash Blocks are accessible to disabled people and imparts separate private access to male teachers & boys and female teachers & girls.
- To ensure that the installed water sources provide safe and adequate water and does not create any social nuisance in terms of drainage congestion.
- To address any grievances originated from the implementation of the project.

A thorough screening on the above indicators were carried out during the reporting tenure.

4. Methodology

With an aim to investigate the impact of infrastructural development on social safeguard, a thorough screening was carried out in the respective primary schools by the concerned sub-assistant engineers of DPHE. The screening results were duly verified by the respective assistant engineers and a database was prepared at Upazilla level. Executive engineers at district level compiled the verified database obtained from Upazilla level and sent them to DPHE Head Quarter at the MIS (Management Information System) unit, where the database was finally compiled and report was prepared under the supervision of focal point of PEDP-4.



Data for social safeguard screening during the installation of water sources and maintenance of existing Wash Blocks and construction of new two-storied was blocks have been collected from the schools through DPHE official sources using the structured format (copy enclosed in Appendix 1 of this report). Data collected from grass root level have been entered into ‘Master Social Survey Outcome’ Spreadsheet by DPHE MIS UNIT and kept structured for database and reporting. A flow diagram of the screening method is depicted in Fig. 1.

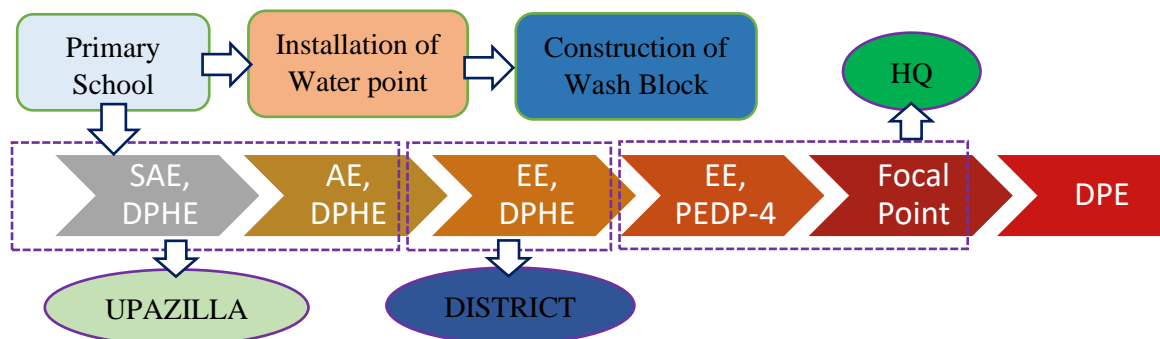


Fig. 1 Method of social safeguard screening

5. Role of DPHE in comprehensive monitoring

The subcomponents (sub component 2.3 and 2.4) of PEDP-4 especially the infrastructural implementation is comprehensively monitored by several parties from commencement to operational phase. Fig.2 shows the monitoring scheme in PEDP-4 operated by different agencies. Being an implementing agency, DPHE is involved significantly from construction till post-construction monitoring. Role of DPHE is depicted in Fig.3. It can be noted that the defect liability period for installed water points and constructed wash blocks are 02 and 01 year respectively. This implies that contractor is responsible to rectify any sort of defects within this time frame counting from the date of handover of tube well and wash block. In order to get a clear picture of ongoing and completed works, DPHE district office arranges monthly monitoring meeting with all concerned officers and staffs of that district. Executive Engineers thus address the issues of monitoring to the assistant/ sub assistant engineers monthly. Officers of concerned district along with newly appointed supervision consultant used to visit the sites frequently in order to monitor the ongoing and completed works and also focus on the environmental safeguard aspect. Visit of senior supervision consultant from Focal Point’s Office and DPHE Head quarter happens frequently.

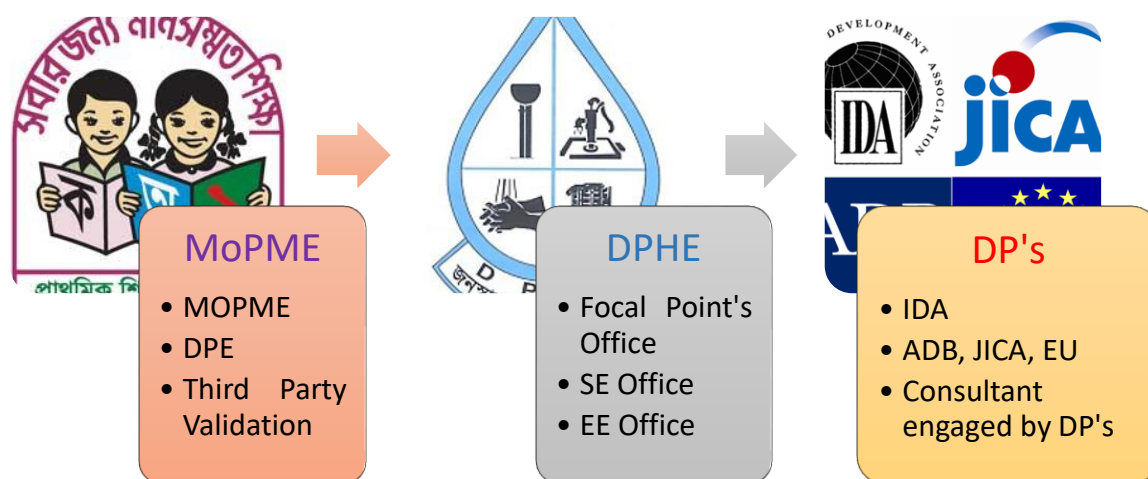


Fig. 2 Monitoring scheme in PEDP-4

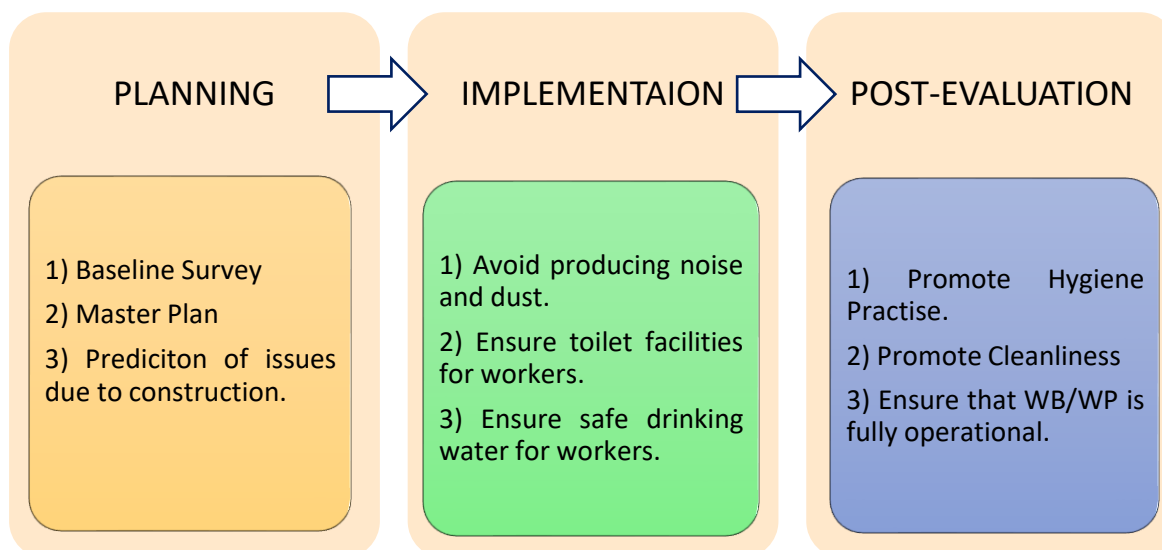


Fig. 3 Role of DPHE in environmental monitoring

DPHE district office arranges coordination meeting between DPHE (EE, AE, and SAE) and DPE officials (DPEO, UEO) in every 3 months. A glimpse of such meeting is shown in Fig. 4. In this meeting, officers from directorate of primary education point out the necessity of monitoring of particular school which are immediately addressed by DPHE officials. Besides these, to get better insight and ensure quick action, DPHE has introduced a new system of arranging monthly meeting between DPHE officials and Headmasters of Primary School during this reporting tenure as a part of routine monitoring process. Photo of such meeting is depicted in Fig.5. Recently, DPE started an initiative known as ‘Divisional Co-ordination Meeting’ where officials from DPE, DPHE and LGED attend. This arrangement has been proven to be an efficient monitoring tool in mitigating construction related issues. A photo of such meeting is depicted in Fig. 6 where DG, DPE is chairing a co-ordination meeting at Rangpur division. DPHE arranges caretaker training and provides MoPME approved ‘Maintenance Manual’ to the concerned schools during the handover of water points and wash blocks

which covers post construction issues. Contact numbers of DPHE officials (mechanics and assistant/sub-assistant engineers) are provided to the concerned schools so that any relevant issues can be addressed accordingly. Moreover, DPHE looks after the tube wells which have already passed the defect liability period of 02 (two) years. Mechanics of DPHE upazilla headquarters repair the tube wells on an urgent basis when they are called for doing so from the concerned school in order to ensure that the running water supply are fully operational.



Fig. 4 Co-ordination meeting between DPE & DPHE Officials at Gazipur district



Fig. 5 Co-ordination meeting between AE/SAE, DPHE and Head Teachers



Fig. 6 Divisional Co-ordination Meeting at Rangpur Division chaired by DG, DPE

6. Capacity building

During the implementation of PEDP-4, a ToT (Training of the Trainers) was conducted by the World Bank among DPE, DPHE and LGED officials. The purpose was to introduce the proposed framework for environmental and social safeguard under PEDP-4 along with the importance of conducting rigorous monitoring. In addition, screening method was agreed and confirmed based on targeted outcomes. DPHE officials (Executive Engineers, Senior Assistant Engineers and Assistant Engineers) who received ToT provided trainings to the sub-assistant engineers and mechanics in the district and upazilla level who eventually filled in the environmental screening forms in the grass root level. In PEDP-4, a revised framework is adopted for both environmental and social safeguard. The basic changes are little but elaborate in comparison to that of PEDP-4.

On May 31, 2022, a meeting on the revision of the latest EMF and SMF was held virtually. The meeting was arranged by DPE and presided over by ADG (PEDP4), DPE. Members from DP's consortium and government officials attended the meeting. The meeting came up with several modification decisions on the existing EMF and SMF which is expected to be included in the revised EMF and SMF. In order to identify the key differences of revised EMF and SMF to that of original EMF and SMF of PEDP-4, newly designed training should be carried out by the experts (from both GoB and DP's) who had inputs during the preparation of revised EMF and SMF. Recently importance of training of the trainees were discussed in a meeting regarding EMF and SMF. It was decided that the



existing environmental and social safeguard framework will be revised with an agreed setup by DPE and TA support from the development partners.

During the reporting tenure, DPHE master trainers from Head Quarter and circle Head Quarter (who received ToT during PEDP-4) conducted day long circle level meetings to expedite the works related

Table 1 Training and capacity building activities during January/2023-June/2023

Training Title	Date	Venue	Training Details	No. of Participants	
				Male	Female
Supervision and Construction Quality Control under PEDP4/GPS/NNGPS Project	01/04/2023	DPHE Chittagong Division office	Training on on-job issues such as Civil / Water Supply / Sanitary / Plumbing related issues in accordance with revised EMF, SMF	28	10
	15/04/2023	DPHE Sylhet Division office		20	8
	27/04/2023	DPHE Rangpur Division office		26	9
	02/05/2023	DPHE Dhaka Division office		21	11
	15/05/2023	DPHE Khulna Division office.		35	12
	20/05/2023	DPHE Rajshahi Division office.		31	15
Total =				161	65
<i>Cumulative Number of Training from the beginning of the project till date =</i>				46	

to the construction of wash blocks and installation of water sources and for the smooth implementation of construction work by adhering the guidelines of both revised EMF and SMF. Thus, the trained engineers try and function as peer educators to educate the site workers and contractors. A summary of training and capacity building activities during the reporting tenure is tabulated below.

7. Social safeguard screening by DPHE (January'2023 – June'2023)

It cannot be denied that COVID-19 situation slowed down the overall construction and implementation progress. But with restrictions being lessened, DPHE has quickly adapted to the new normal by developing a comprehensive COVID-19 Site Operating Procedure (SOP) alongside several site and task specific risk assessments. DPHE constructed and installed a total of 19,216 wash blocks and 12,944 water points till date from the beginning of this project. Among these, a total of 5,706 wash blocks and 3,608 water points were installed and handed over during the reporting tenure of January'2023 to June'2023. Needless to note that, the water points which are installed for drinking water purposes are tested in DPHE zonal laboratories for different chemical (Arsenic, Iron and Chloride), Physical (Turbidity, P^H) and Bacteriological (e-Coli) contamination. In addition, DPHE finished the routine monitoring of 30,921 water points (installed in PEDP-3) out of 40,000 water points by field arsenic test kit and currently undertaking the monitoring of rest 9,079 water points for arsenic contamination. In this tenure, 15,921 water points were tested by field arsenic kit in order to identify any new contamination of water sources due to arsenic. All these works were monitored based on



approved Social Monitoring Framework (SMF) for PEDP-4. Table-2 summarizes the list of DPHE implemented works where screening for social safeguard was carried out.

Table 2 Progress of Work under PEDP-4, DPHE

Scope of Work	FY 19-20	FY 20-21	FY 21-22	July'22- Dec'22	Jan'23- June'23	Total
Construction of Wash Block	-	6,760	4,722	2,028	5,706	19,216
Installation of Water Sources	240	4,401	3,027	1,668	3,608	12,944
Maintenance of Wash Block	689	4,010	1,663	790	240	7,392
Water Quality Monitoring	-	-	15,000	-	15,921	30,921

This report focuses on the construction work from the tenure of January'2023 to June'2023. During this period, not only new wash blocks were constructed and water points were installed, major maintenance of 240 wash blocks which were constructed during PEDP-3 were carried out. Furthermore, monitoring of 25,000 water points installed during PEDP-3 were undertaken for arsenic contamination screening, of which 15,921 were completed and the rest 9,079 are under testing. The status of the water points and wash blocks received through the monitoring survey is given in following subsections. A list of random monitoring visit from DPHE Head Quarter is listed in Table below.

Table 3 Monitoring visits from DPHE Head Quarter during the reporting period

Sl. No.	Name of subproject	Location	No. of WB/WS	Date of Inspection
1	Construction of Wash Block (WB)	Khulna	34	28/03/2023-30/03/2023
2	Installation of Water Supply (WS)	Rangpur	26	25/04/2023 - 27/04/2023
3	Construction of Wash Block (WB)	Barishal	35	26/04/2023 - 27/04/2023
4	Construction of Wash Block (WB)	Mymensingh	18	08/05/2023 - 10/05/2023
5	Installation of Water Supply (WS)	Pirojpur	26	17/05/2023 - 18/05/2023
6	Construction of Wash Block (WB)	Rajshahi	20	22/05/2023 - 23/05/2023
7	Installation of Water Supply (WS)	Sylhet	25	23/05/2023 - 25/05/2023
8	Construction of Wash Block (WB)	Chittagong	45	04/06/2023 – 07/06/2023
9	Construction of Wash Block (WB)	Panchagar	23	05/06/2023 – 08/06/2023

** In addition, frequent monitoring visit from respective EE Office and AE/SAE offices happen during the reporting tenure.

8. Outcomes of social safeguard screening

8.1 Influence of type of water point

Planning from the lessons learnt in PEDP-3

It is fact that, DPHE installed water points of different options such as Deep Tube Well (DTW), Shallow Tube Well (STW), Tara Tube well, Ring Well (RW), Pond Sand Filter (PSF), Rain Water Harvesting (RHW) in PEDP-4 based on the variation in geological formation, position of aquifer /water



table, saline water intrusion etc. However, all those options have certain advantages as well as multiple drawbacks. The common of which is the ease of availability of water from source and their familiarization and user friendliness to the young users.

In order to mitigate the concerns and to make the water sources more popular and user friendly, DPHE started installing Tube well with Submersible Pump (TSP) in all the primary schools under PEDP-4. This option has special features such as-

- Running water supply with storage facility.
- Multiple users can access at the same time.
- Promote hygiene practice through safe hand washing.

Comment:

Installation of tube well with submersible pump added values to its users especially young users which eventually increases the easy access to safe drinking water result in health benefit along with improved social safeguard.

8.2 Is there any discrepancy in the distribution of construction facilities?

Countrywide distribution of water sources and wash blocks were analyzed and division wise categorization for water sources and wash blocks is depicted in Figs. 7 and 8 respectively. It is fact that, tube well ensures safe drinking water for the school children as well as for the teachers. Fig. 7 shows the equity in distribution of water sources. Among the total installed water points, the highest number was installed in Chattogram division followed by Rajshahi and Sylhet division while the minimum number of water points was installed in Mymensingh division. This is as per need assessment criteria and approved list issued by DPE based on approved IPG.

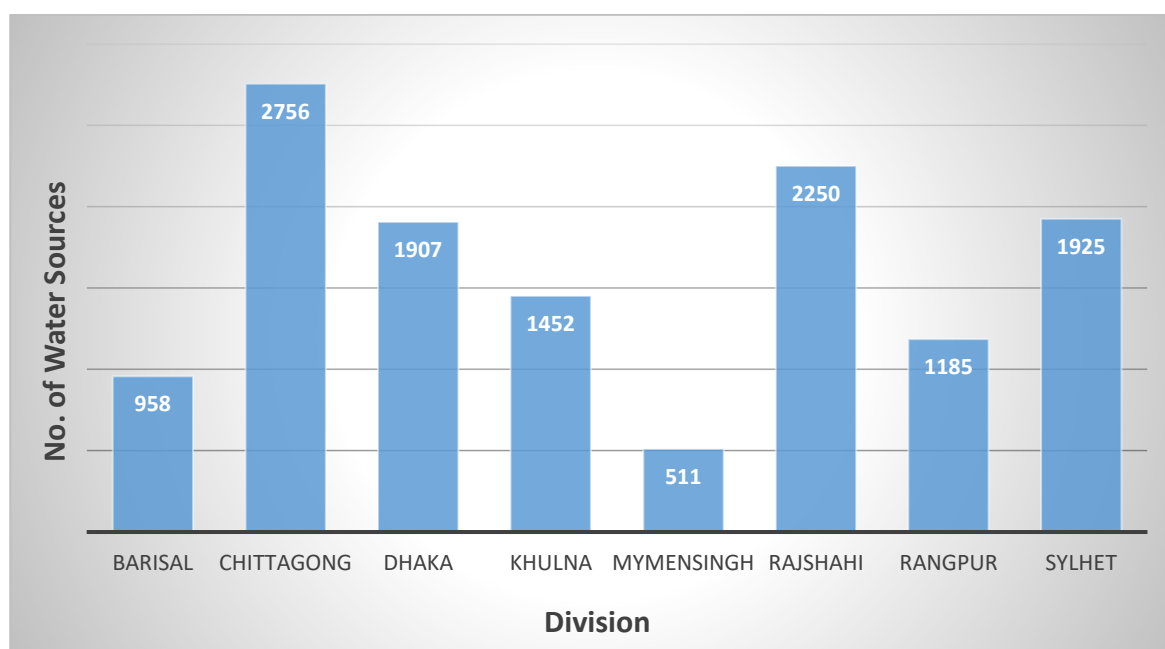


Fig. 7 Countrywide distribution of Water Sources



Wash Block is serving as a unique unit of hygiene practice for the school children as well as for teachers. Its impact on environment is high as it helps to promote hygiene as well as safe and clean school environment. Open defecations and urination practices decreases through the utilization of wash blocks and they confirm better health through improved washing facilities. Fig. 8 reflects the countrywide distribution of wash blocks depending on the number of districts and upazillas in each division. The maximum number of wash blocks were constructed in the Chattogram, Dhaka, Rangpur, and Khulna division as these divisions cover maximum districts. The lowest number of wash blocks (1480) was constructed in Mymensingh division as it is the smallest division of Bangladesh and thus, equity in distribution is justified.

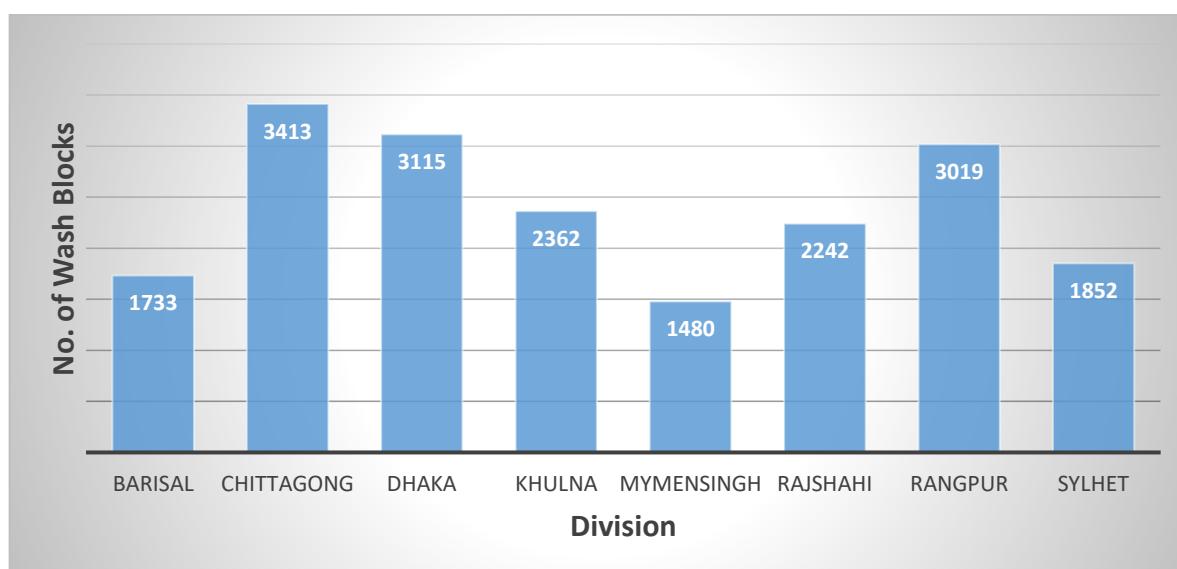


Fig. 8 Countrywide distribution of Wash Blocks

8.3 Is there any discrimination in the distribution of facilities for ethnic communities?

According to Bangladesh Population and Housing Census, 2022, approximately 1.00 per cent of the population are indigenous 'Adivasis', amounting to around 1.65 million. Of them 60.05% ethnic population resides in Chattogram division, majorly in Rangamati, Khagrachari, Bandarban districts. In addition, there are indigenous people residing in areas like Rajshahi, Sylhet, Mymensingh. As depicted in Fig. 9, among the total 19,216 wash blocks constructed all over in Bangladesh, 14% were in the ethnic community driven areas so that they can be directly benefitted from those facilities. This should minimize the open defecation and urination practices and promote good hygiene practice among children. Similarly, 17% of the newly installed water points were in the ethnic community areas which confirmed their access to safe drinking water. Therefore, special consideration and priority is given for the under-privileged people instead of discrepancy.

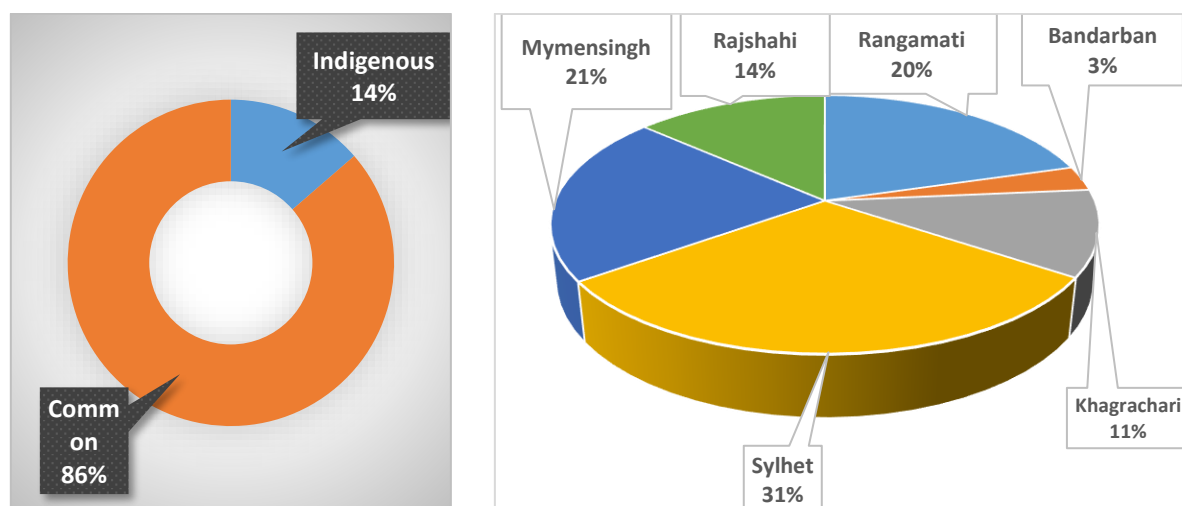


Fig. 9 Distribution of wash blocks in areas of having indigenous community

8.4 Is there displacement of people due to land acquisition?

During the construction of 5,706 wash blocks in the reporting tenure, no issues were encountered regarding displacement of people due to land acquisition since all those wash blocks were constructed in the school owned land. In addition, major maintenance of previously constructed wash blocks did not cause any dislocation. Furthermore, during planning and implementation of works related to the installation of water points, it was confirmed that all 3,608 water points were installed in the land owned by respective school.

Comment:

The activity related to the installation of water points and construction of new wash block did not require any land acquisition. As such, no displacement of people as well as no adverse impact on livelihood happen.

8.5 Is there any threat on cultural tradition?

Construction of 5,706 new wash blocks having provision of running water supply brought a positive vibe in surrounding society as children could get easy access to safe sanitation. In addition, installation of 3,608 safe drinking water sources ensured reduction of water borne diseases which eventually decreased the rate of absence of students from the school. The screening result confirmed that the construction of wash blocks, installation of water sources and major maintenance of wash blocks did not create any obstruction to the places/objects of cultural/religious significance.

Comment:

The activity related to the installation of water points and major maintenance of existing wash blocks and construction of new wash blocks did not create any threat on cultural tradition. In contrary,

the activity improved the way of life as the facilities confirmed access to safe drinking water and safe sanitation.

8.6 Is there any sign of improvement of way of life?

Along with the installation of tube well with submersible pump, DPHE constructed 5 outlet hand washing basins in all 3,608 new water points with the provision of running water supply. Construction of hand washing basin has a positive impact on the way of life as it improves the habit of hand washing among the children which is an essential part of our everyday life and a learning in the current COVID-19 context. Construction of 5,706 Wash blocks confirmed the access to safe sanitation facilities which in turns improves the way of life. Fig. 10 depicts the constructed wash block and 5 outlet water collection basin. The screening result confirmed that the installation of water points with provision for hand washing basin and construction of wash blocks improved the way of life.

Comment: The activity related to the installation of water points with hand washing basin *improved the way of life as the facilities confirmed the access to safe drinking water and promote hygiene.*



Fig. 10 (L): Constructed Wash Block (R): 5 outlet water collection basin

8.7 Do the installed water points provide safe drinking water?

Water testing facilities in DPHE zonal laboratory:

It is fact that DPHE has a permanent set up of 13 laboratory buildings including a central laboratory at Mahakhali, Dhaka. Recently, DPHE completed the set-up of 52 laboratory buildings in 52 districts which confirmed the establishment of zonal laboratories in all districts to expedite the water quality monitoring. These newly established laboratories are equipped with modern machineries so that all relevant water quality parameters can be monitored.

It can be noted that water samples of all the installed water sources (3,608) were taken by lab technicians during the reporting tenure and water was tested for different chemical and physical contamination such as arsenic (As), Chloride (Cl), Iron (Fe) and e-coli. The water quality test results

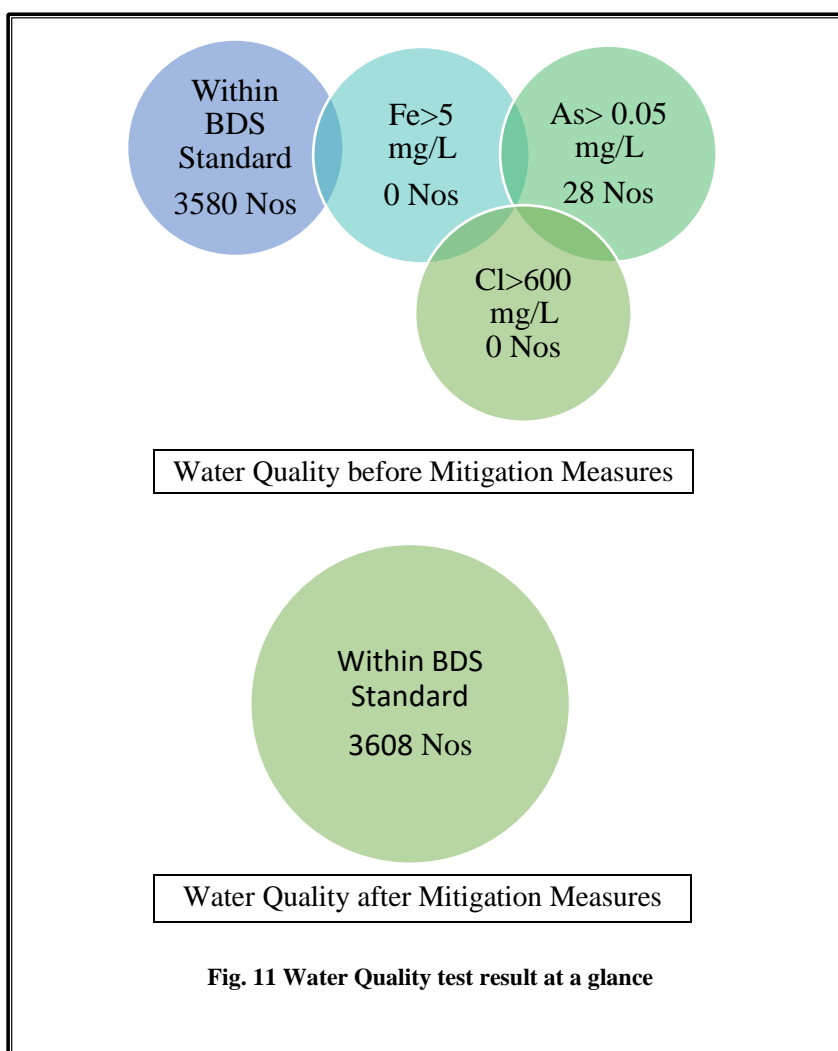


are shown in Fig. 11. A sample copy of water test result is provided in Appendix-2. It can be seen from Fig. 11 that a total of 28 water sources were found to have high arsenic concentration water. 07 of which are located in Jhenaidah and the rest 21 are located in Sunamganj district. Water quality test report for all 28 unacceptable water sources is shown in Appendix-4. A summary of water quality monitoring report is provided in Table 4.

Table 4 Summary of Water Quality Monitoring Result

Sl. No.	District	Water Quality not Satisfactory				Remarks
		Fe > 5mg/L	Cl > 600mg/L	As > 0.05mg/L	Total	
1.	Jhenaidah	0	0	07	07	List of 'Not Satisfactory' water sources are given in Appendix-4 and Actions taken for the water sources where water quality is not satisfactory are listed in Table 1 of Appendix-4.
2.	Sunamganj	0	0	21	21	
Total =		0	0	28	28	

* 28 water sources have been found to be contaminated with Arsenic [For details please refer to Appendix 4].



Mitigation Measures suggested for water sources having unsatisfactory water quality results:

In cases where arsenic/iron/chloride is found beyond allowable BDS standard in installed water sources, DPHE adopts other approved alternate water options. DPHE goes for options like deep tube well of greater depth, ring well, pond sand filter, rain water harvesting, Reverse Osmosis Filter, AIRP, Small box type AIRP etc. whichever is feasible. In some cases, if all the options in hand fails, i.e., boring in greater depth becomes impossible, arsenic is found even in deep tube well and none other option is feasible, DPHE has started implementing ‘SONO Filter’ as well. DPHE upazilla offices will arrange and install the said filter in those water sources whichever is feasible, convenient and justified. In addition, water from those sources will be further tested and declared safe if found well below the BDS standard of drinking water. Fig. 12 shows some of the suggested filtration technologies.



Fig. 12 Different Suggested Improved Filtration Technologies

It is fact that, in the reporting tenure a total of 28 water sources were found to have water quality concerns with excessive arsenic. For all the said 28 water points, Reverse Osmosis (RO) were installed and filtered water was tested in DPHE zonal Laboratories. The water sources were handed over to the respective schools once the water quality results were found satisfactory. Water quality test results are summarized in Table 1 of Appendix 4.

8.8 Routine Water Quality Monitoring

As per MoU signed in between DPE and DPHE in September 15, 2019, DPHE will conduct water quality monitoring of 65,000 water points installed earlier in PEDP-4 with an aim to provide arsenic free safe drinking water in the primary schools of Bangladesh. It has been decided that 90% of the tests will be conducted in field by utilizing field test kits for arsenic and the rest 10% will be conducted in DPHE zonal laboratory. In this respect, DPHE received two sperate list of 40,000 (15,000+25,000) water points from DPE for water quality monitoring. Due to COVID-19 pandemic, schools were closed which is why the field tests could not be conducted in the financial year 2020-2021. However, all the test kits were bought and well preserved by DPHE in order to conduct the field tests as soon as the schools re-open.

Soon after the re-opening of the schools, steps were taken to conduct water quality screening. In the first phase water quality screening of 15,000 water points were completed. The results were reported in the previous EMR. It was found that out of 15,000 water points 1.44% had new arsenic contamination. In addition, it was confirmed that water of 98.56% of 15,000 installed tube wells in PEDP-3 are drinkable. DPHE officials immediately took steps in stopping the water intake from the contaminated water points. In the second phase, water quality screening of 25,000 water points has started. Of them 15,921 were completed till date and the rest 9,079 are currently under testing. The detail results are expected to be presented in next SMR.

8.9 Are the constructed toilets accessible for disable people?

The state-of-the-art design of wash block includes the provision for 1(one) toilet for disabled people. This special toilet has high commode along with hand rail facility. In addition, all the wash blocks have ramp provision which facilitates easy access for the disabled people (Fig. 13). DPHE constructed 5,706 new wash blocks in the reporting tenure. Moreover, out of 7,392 wash blocks which were screened for major maintenance, toilet for disabled people in all wash blocks were found to be accessible for disabled student.

Comments: All disabled toilets were found to be operational and accessible during the post monitoring phase.



Fig. 13 Toilet for disabled teachers and student

8.10 COVID-19 Reality, School Re-Opening and New Normal

Countries all over the world are trying new ways of softening or partially lifting COVID-19 related restrictions while keeping the virus progression in check. In this challenging time, the future of education depends on the provision of water, sanitation and hygiene services. So, Hygiene Promotion has been emerged as an issue of particular concern when considering reopening of schools.



In order to confirm adequate hygiene practise, DPHE district and upazilla level officers monthly conduct sessions related to hygiene promotion activities with TEO, ATEO and Primary School Headmasters in the schools or DPHE district offices. All these activities put positive sign to the improvement of total environment. Prior to the re-opening of the schools DPHE district offices and Upazilla offices conducted disinfection of school premises and maintenance of wash blocks and water sources as and where required. Besides these all the construction activities regarding construction of wash blocks, maintenance of wash blocks and installation of water sources are constructed following the guidelines by Ministry of Local Government, Rural Development and Cooperatives.

9 Grievance redressal status

A comprehensive grievance redressal system has been developed to address any issues generated due to the construction of wash blocks and installation of water sources in the primary schools. To address such issues, there is a designated GR committee in the DPHE Headquarter, the detail of which is given in Appendix-3. In addition, DG, DPE issued a letter Vide Memo. 18; dated March 18, 2022 to follow the instructions as stated in revised SMF. Since, no complain were raised from the concerned community, there was no issue of grievance redressal during the reporting tenure.

10. Compliance Status to ADB Loan Covenants

The compliance status to ADB loan covenants relevant to social safeguards is listed in Table 5.

Table 5 Compliance with ADB Loan Covenants

Serial no. as per Loan Agreement	Program Specific Covenants	Compliance Status	Remarks	
Schedule 4	10	To ensure that all program actions in the area of environmental and social safeguards are implemented in a timely and efficient manner	Complied	Semi-Annual environmental and social safeguards are implemented based on revised EMF/SMF.
	12	To ensure that the program does not involve any resettlement risks.	Complied	No resettlement risks were involved since the construction of wash blocks and water sources were conducted in the location owned by the primary schools as described in section 8.4.
	13	To ensure that the program does not involve any negative risks or impacts on tribes or minor races, ethnic sects and communities.	Complied	No negative risks or impacts on tribes or minor races, ethnic sects and communities were reported through the comprehensive social safeguard screening as reported in section 8.5.

11. Implementation Status of CAP recommended in aide memoire

The implementation status of CAP recommended in comprehensive aide memoire is listed in Table 6.

Table 6 Implementation Status of CAP recommended in aide memoire

Sl. No.	Recommended Corrective Action Measures	Implementation Status
1	All tube wells that have been built for more than one year are to be screened annually by DPHE for water quality and physical status of tube wells to ensure fixture damaged/choked up tube wells and water quality parameters.	DPHE completed the screening of 30,921 water points by June/2023 and currently undertaking the screening of another 9,079 water points. Please refer to section 8.8 for details.



Sl. No.	Recommended Corrective Action Measures	Implementation Status
2	The mission advised DPHE to take initiative for water treatment if deep tube wells are found contaminated with arsenic.	As mentioned in Table 4 of section 8.7, 28 water sources were found to have arsenic contamination during the reporting tenure. It can be seen from Table 1 of Appendix 4 that water treatment facilities were provided in those arsenic contaminated water sources.

12 Conclusions

This study investigates the social safeguard concerns during the implementation of water points and construction of wash blocks based on the approved SMF guidelines for PEDP-4. The social monitoring screening confirmed *no significant instances or issues* that may hamper or influence the social safety during the reporting tenure. Being an implementing agency, DPHE would like to uphold this status in its ongoing and upcoming works related to infrastructure development.

Appendix-1: Social Screening Format for Wash Block

Social screening Format for Wash Block/Water Source

District : Sherpur
 Upazilla : Sadar
 Name of School : ১৫নং চরখারচর সাতানীপাড়া সঃ প্রাঃ বিঃ
 School ID : ৯১৩০২০৫১৭০০
 Type of Wash Block/Water Source : Water Source

Screening Questions	Base Line		Impact without Intervention			Impact during Implementation			Impact After Implementation			Remarks
	Yes	No	+	-	N/A	+	-	N/A	+	-	N/A	
Is the land owned by school? If not, Put remarks.	Yes		+		N/A			N/A	+			Yes
Any loss of Agricultural Land?		No			N/A			N/A			N/A	
Are the types of water Points satisfactory?		No		-				N/A	+			
Is there displacement of people due to land acquisition?		No			N/A			N/A			N/A	
Is there any threat on cultural tradition/way of life?		No			N/A			N/A			N/A	
Are the water Points installed?		No		-				N/A	+			
Was the Water quality tested?		No		-				N/A	+			
Do the installed Water points provide safe drinking water?		No		-				N/A	+			
Is there any conflict with water Supply right?	Yes			-				N/A	+			
Are there provisions of toilet for disabled students?	Yes				N/A			N/A			+	
Are the constructed toilets accessible for disable students?	Yes				N/A			N/A			+	

Signature of SAE
 মোঃ মাহমুদুল হাসান
 উপ-সহকারী প্রকৌশলী
 জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
 শেরপুর সদর উপজেলা, শেরপুর।

Signature of AE

Signature of Executive Engineer
 মুহাম্মদ হামিদুল হক
 নির্বাহী প্রকৌশলী
 জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
 শেরপুর জেলা, শেরপুর।



Social Screening Format for Wash Block/Water Sources

District: Panchagarh

Upazilla: Tetulia

Name of School: Amjuani Govt. PS

School ID: 101020702

Type of WASH Block/Water Sources: Both

Screening Questions	Base Line		Impact Without Intervention			Impact During Implementation			Impact after Implementation			Remarks
	Yes	No	+	-	N/A	+	-	N/A	+	-	N/A	
Is the land owned by school? If not, Put remarks	Yes				✓		✓				✓	
Any loss of Agricultural Land?		No			✓		✓				✓	
Are the types of Water Points satisfactory?		No			✓		✓				✓	
Is there displacement of people due to land acquisition?		No			✓		✓				✓	
Is there any threat on cultural tradition/way of life?		No			✓		✓				✓	
Are the Water Points installed?		No			✓		✓		✓			
Was the Water quality tested?		No			✓		✓					✓
Do the installed water points provide safe drinking water?		No			✓		✓					✓
Is there any conflict with Water Supply right?		No			✓			✓				✓
Are there provisions of toilet for disabled students?		No			✓			✓			✓	
Are the constructed toilets accessible for disable students?		No			✓			✓			✓	

[Signature]
 SDC, পঞ্চগড় জেলা
 উপ-সহকারী প্রকৌশলী
 জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
 চেরুলিয়া উপজেলা, পঞ্চগড়।

[Signature]
 ৪/১০/১৬
 প্রকৌশলী মোঃ সামসুল আলী
 উপ-সহকারী প্রকৌশলী
 জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
 পঞ্চগড় জেলা, পঞ্চগড়



Appendix-2: Sample Water Quality Test Report (Laboratory)

Government of the People's Republic of Bangladesh
Department of Public Health Engineering (DPHE)
Office of the Senior Chemist, Zonal Lab, Sylhet.
Telephone No: 02987700537; e-mail: wqmsc_sylhet@zonalab@yahoo.com
Primary Education Development Program (PEDP-4)

Laboratory Test Result

Sl No	District	Upzilla	Village	ID	School Type	Depth (m)	Name of School	GPS		Water Quality Test Result			Remarks	
								Latitude	Longitude	Sand	Clear	As (mg/L)		Unit: ml/L
1	2	3	4	5	6	7	8	10	11	12	13	14	15	
1	Sunamganj	Jamalganj	Sharifpur	99601060213	1	1	Alipur Asraipur GPS	25°01'09"	91°12'59"	1	1	1	0.041	
2	Sunamganj	Jamalganj	Bishmupur	91601060111	1	1	Bishmupur GPS	24°48'34"	91°07'45"	1	1	1	0.048	
3	Sunamganj	Jamalganj	Durgapur	91601060318	1	1	Durgapur GPS	25°03'19"	91°07'41"	1	1	1	0.042	
4	Sunamganj	Jamalganj	Hauria Alipur	91601060505	1	1	Hauria Alipur GPS	25°01'39"	91°10'11"	1	1	1	0.037	
5	Sunamganj	Jamalganj	Horekandi	99601060505	1	1	Horekandi GPS	24°54'19"	91°16'11"	1	1	1	0.031	
6	Sunamganj	Jamalganj	Horinagar	91601060110	1	1	Horinagar GPS	25°02'00"	91°13'25"	1	1	1	0.005	
7	Sunamganj	Jamalganj	Horinakandi	91601060105	1	1	Horinakandi GPS	25°01'56"	91°08'35"	1	1	1	0.011	
8	Sunamganj	Jamalganj	Hijal	99601060108	1	1	Hijal GPS	25°03'19"	91°07'40"	1	1	1	0.013	
9	Sunamganj	Jamalganj	Horipur	99601060113	1	1	Horipur GPS	25°03'19"	91°07'41"	1	1	1	0.021	
10	Sunamganj	Jamalganj	Hugli	99601069009	1	1	Hugli GPS	24°54'24"	91°17'12"	1	1	1	0.013	RO Filter
11	Sunamganj	Jamalganj	Koloktoka	91601060511	1	1	Koloktoka GPS	24°55'40"	91°17'14"	1	1	1	0.015	
12	Sunamganj	Jamalganj	Kalipur	99601060507	1	1	Kalipur GPS	24°57'20"	91°16'46"	1	1	1	0.018	
13	Sunamganj	Jamalganj	Kandagson	99601069005	1	1	Kandagson GPS	24°58'23"	91°14'57"	1	1	1	0.029	
14	Sunamganj	Jamalganj	Mollikpur	90601050512	1	1	Mollikpur GPS	24°54'38"	91°15'54"	1	1	1	0.022	
15	Sunamganj	Jamalganj	Nidhipur	91601060306	1	1	Nidhipur GPS	24°49'13"	91°08'11"	1	1	1	0.019	
16	Sunamganj	Jamalganj	Sunapur	99601060211	1	1	Sunapur GPS	24°58'05"	91°11'32"	1	1	1	0.023	
17	Sunamganj	Jamalganj	Sukdebpur Josmanpur	99601060307	1	1	Sukdebpur Josmanpur GPS	24°52'59"	91°08'45"	1	1	1	0.011	
18	Sunamganj	Jamalganj	Kaminipur	99601060202	1	1	Kaminipur GPS	24°58'36"	91°11'38"	1	1	1	0.017	

Md. Abdul Latif
Sample Analyzer
DPHE Zonal Laboratory Sylhet.




Dhonojoy Kumar Das
Sample Analyzer
DPHE Zonal Laboratory Sylhet.

Sharmin Sultana
Junior Chemist
DPHE Zonal Laboratory Sylhet.



(Field Test)

EE, DPHE

		
Government of the People's Republic of Bangladesh Arsenic Test at School by Field Kit under Water Quality Monitoring of Fourth Primary Education Development Program (PEDP4)		

ARSENIC TEST RESULT BY FIELD KIT

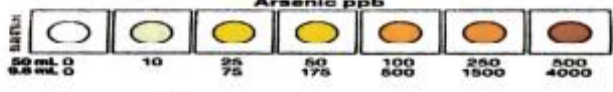
(A) Information of Primary School:

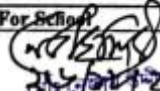
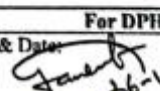
1. Name of School	: pachim Dhemushia Reg: primary school										
2. EMIS Code	: 4	: 1	: 2	: 0	: 5	: 1	: 2	: 0	: 3	: 0	: 2
3. District	: Cox bazar					4. Upazilla :	chakarua				

(B) Information of Drinking Water Source:

1. Provision of Water Sources	: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Project	: <input checked="" type="checkbox"/> PEDP3 <input type="checkbox"/> GPS-1 <input type="checkbox"/> NNGPS-1 <input type="checkbox"/> PEDP-4 <input type="checkbox"/> Others
3. Installed By	: <input checked="" type="checkbox"/> DPHE <input type="checkbox"/> Others
4. Year of Installation	: 2017
5. Type of Tube Well	: <input type="checkbox"/> Deep <input checked="" type="checkbox"/> Shallow <input type="checkbox"/> Tara <input type="checkbox"/> Ring Well <input type="checkbox"/> TSP <input type="checkbox"/> Others
6. Present Condition	: <input checked="" type="checkbox"/> Running <input type="checkbox"/> Temporary Choked up <input type="checkbox"/> Permanently Choked up
7. Platform/Collection Basin Condition	: <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad <input type="checkbox"/> No Platform/Collection Basin.

(C) Water quality & Present status:

Field Observation: (Please ✓)	Arsenic ppb  50 mL O / 5.0 mL O 10 25 50 100 250 500
	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Arsenic test Result	: 10 ppb (approx.)
BDS Standard	: 50 ppb (0.05mg/l)
	TEST KIT HACH EZ Arsenic Test Kit Cat. No. 28228-00

For School	For DPHE
Signature & Date: 	Signature & Date: 
Name: মোঃ আব্দুল হক চকরিয়া	Name: মোঃ আবু ইউসুফ
Designation: প্রধান শিক্ষক (চ: দা:) পশ্চিম ডেমুশিয়া সরঃ প্রাঃ বিদ্যালয় চকরিয়া, কক্সবাজার।	Designation: জি.সহকারী প্রকৌশলী জনস্বাস্থ্য প্রকৌশল অধিদপ্তর চকরিয়া, কক্সবাজার।
Phone: 01814-111299	Phone: 01814-111299

[এই পরীক্ষার সাথে বিদ্যালয় কর্তৃপক্ষের কোন আর্থিক সংশ্লিষ্টতা নেই। আর্সেনিক পরীক্ষার জন্য সকল খরচ সরকারী প্রতিষ্ঠান কর্তৃক বহন করা হবে]

Appendix-3: Grievance Redressal Committee of DPHE

অনিক ও আপিল কর্মকর্তা

<p>নাম : জনাব এহতেশামুল রাসেল খান পদবী: তত্ত্বাবধায়ক প্রকৌশলী ফিজিবিরিটি স্টাডি এন্ড ডিজাইন সার্কেল জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, ঢাকা। মোবাইল : +৮৮০১৫৫৬-৩৭৭৩২০ ইমেইলঃ se.fsdc@dphe.gov.bd</p>	<p>অভিযোগ নিষ্পত্তি কর্মকর্তা (অনিক)</p>
<p>নাম: জনাব মাহমুদ কবির চৌধুরী পদবী: তত্ত্বাবধায়ক প্রকৌশলী ভান্ডার সার্কেল, ঢাকা ফোনঃ +৮৮ ০২ ৯৩৩০৮০২ মোবাইল :+৮৮ ০১৭১৫০৬১০১৫ ইমেইলঃ se.store@dphe.gov.bd</p>	<p>বিকল্প অভিযোগ নিষ্পত্তি কর্মকর্তা (বিকল্প অনিক)</p>
<p>নামঃ মোঃ এমদাদুল হক চৌধুরী পদবিঃ যুগ্মসচিব (পলিসি সাপোর্ট অধিশাখা) ই-মেইলঃ psbr@lgd.gov.bd মোবাইলঃ ০১৭১১১৫২৩২৮ ফোন (অফিস) ০২৫৫১০০৮৭২</p>	<p>আপিল কর্মকর্তা</p>



Appendix-4: Water Quality Report of Unacceptable Water Sources

Government of the People's Republic of Bangladesh
 Department of Public Health Engineering (DPHE)
 Office of the Senior Chemist, Zonal Lab, Sylhet.
 e-mail: wqmac_sylhetzonal@dphe.gov.bd
 Primary Education Development Program (PEDP-4)
Laboratory Test Result

Sl No	District	Upazila	Village	ID	Type of Water Point			Name of School	GPS		Water Quality					Remarks
					School	Depth (m)	Type		Latitude	Longitude	Band	Clear	TS	mg/L	15	
1	Sunmaganj	Suffa	Chakua	91001070303	1	1	1	Chakua GPS	24°45'07"	91°10'37"	1	1	0.018	17	Unit (mg/L)	
2	Sunmaganj	Dharmapasa	Lompapatharia	91001070309	1	1	1	Lompapatharia GPS	24°55'34"	91°01'48"	1	1	0.022			
3	Sunmaganj	Dharmapasa	Noyabando	00001070108	1	1	1	Noyabando GPS	24°55'12"	91°02'32"	1	1	0.018			
4	Sunmaganj	Dharmapasa	Deshdheri	00001070018	1	1	1	Ga'runnasa Deshdheri	24°53'44"	91°01'03"	1	1	0.007			
5	Sunmaganj	Dharmapasa	Dharmapasa	91001070301	1	1	1	Dharmapasa 1 no Model GP	24°53'57"	91°05'06"	1	1	0.011			
6	Sunmaganj	Dharmapasa	Nurpur	91001070507	1	1	1	Nurpur GPS	24°55'22"	91°09'32"	1	1	0.011			
7	Sunmaganj	Dharmapasa	Begbari	91001070809	1	1	1	Begbari GPS	24°57'23"	91°07'18"	1	1	0.014			
8	Sunmaganj	Dharmapasa	Dijlan	91001070604	1	1	1	Dijlan GPS	24°59'05"	91°08'33"	1	1	0.003			
9	Sunmaganj	Dharmapasa	Patarikanda	91601070502	1	1	1	Patarikanda GPS	24°57'38"	91°08'19"	1	1	0.015			
10	Sunmaganj	Dharmapasa	Berikandi	99601070602	1	1	1	Berikandi GPS	24°58'10"	91°09'49"	1	1	0.019			
11	Sunmaganj	Dharmapasa	Nizampur	99601070015	1	1	1	Nizampur GPS	24°59'34"	90°58'41"	1	1	0.022			
12	Sunmaganj	Dharmapasa	Maskanda	99601070209	1	1	1	Maskanda GPS	24°59'12"	91°08'31"	1	1	0.025			
13	Sunmaganj	Dharmapasa	Raypur	99601070210	1	1	1	Raypur GPS	24°59'18"	91°02'28"	1	1	0.035			
14	Sunmaganj	Dharmapasa	Hizla	99601070009	1	1	1	Hizla GPS	25°00'33"	91°02'22"	1	1	0.029			
15	Sunmaganj	Dharmapasa	Doulatpur	99601070802	1	1	1	Doulatpur GPS	25°02'38"	91°01'16"	1	1	0.018			
16	Sunmaganj	Dharmapasa	Abidinagar	91601071001	1	1	1	Abidinagar GPS	25°02'28"	91°02'52"	1	1	0.015			
17	Sunmaganj	Dharmapasa	Rajapur	91601070601	1	1	1	Rajapur GPS	24°53'07"	91°08'16"	1	1	0.019			
18	Sunmaganj	Dharmapasa	Doulatpur	91601070603	1	1	1	Doulatpur GPS	24°54'44"	91°06'18"	1	1	0.039			
19	Sunmaganj	Dharmapasa	Joyree Dakshin	99601070410	1	1	1	Joyree Dakshin GPS	24°54'13"	91°08'12"	1	1	0.022			
20	Sunmaganj	Dharmapasa	Dattapara	91601070809	1	1	1	Dattapara GPS	25°09'44"	90°58'32"	1	1	0.009			
21	Sunmaganj	Dharmapasa	Satur	91601070806	1	1	1	Satur GPS	25°05'31"	91°02'14"	1	1	0.019			

30.01.2023
 Md. Abdul Latif
 Sample Analyzer
 DPHE Zonal Laboratory Sylhet.

30.01.2023
 Dhondjoy Kumar Das
 Sample Analyzer
 DPHE Zonal Laboratory Sylhet.

30.01.23
 Sharmin Sultana
 Junior Chemist
 DPHE Zonal Laboratory Sylhet.



Sl No	District	Upzilla	Village	ID	Type of School	School Type	Depth (m)	Name of School	GPS			Water Quality				Remarks
									Latitude	Longitude	Altitude	Clear	Sand	Fe (mg/l)	14	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	
21	Sunamgonj	Dharmapasa	Longkapataria	91601070309	1	1	1	Longkapataria GPS	24°56'34"	91°01'48"	1	1	0.097	0.9		
22	Sunamgonj	Dharmapasa	Noyabando	99601070108	1	1	1	Noyabando GPS	24°56'12"	91°02'32"	1	1	0.091	0.8		
23	Sunamgonj	Dharmapasa	Doshdihari	99601079016	1	1	1	Gufurnumesa Doshdihari GPS	24°53'44"	91°01'03"	1	1	0.092	1.8		
24	Sunamgonj	Dharmapasa	Dharmapasha	91601070301	1	1	1	Dharmapasha GPS	24°53'57"	91°05'06"	1	1	0.068	0.8		
25	Sunamgonj	Dharmapasa	Nurpur	91601070509	1	1	1	Nurpur GPS	24°55'22"	91°08'32"	1	1	0.111	1.2		
26	Sunamgonj	Dharmapasa	Bagbari	91601070509	1	1	1	Bagbari GPS	24°57'23"	91°07'18"	1	1	0.032	0.6		
27	Sunamgonj	Dharmapasa	Digjan	916070504	1	1	1	Digjan GPS	24°58'05"	91°08'33"	1	1	0.103	1.4		
28	Sunamgonj	Dharmapasa	Patharia kanda	91601070502	1	1	1	Patharia kanda GPS	24°57'36"	91°08'119"	1	1	0.12	3.4		
29	Sunamgonj	Dharmapasa	Berikandi	99601070602	1	1	1	Berikandi GPS	24°58'16"	91°08'49"	1	1	0.068	0.8		
30	Sunamgonj	Dharmapasa	Nizampur	99601079015	1	1	1	Nizampur GPS	24°58'34"	90°58'41"	1	1	0.022	0.9		
31	Sunamgonj	Dharmapasa	Maskanda	99601070209	1	1	1	Maskanda GPS	24°59'12"	91°08'31"	1	1	0.126	1.8		
32	Sunamgonj	Dharmapasa	Raypur	99601070210	1	1	1	Raypur GPS	24°59'16"	91°02'28"	1	1	0.088	2.8		
33	Sunamgonj	Dharmapasa	Hilla	99601079009	1	1	1	Hilla GPS	25°00'33"	91°02'22"	1	1	0.044	1.2		
34	Sunamgonj	Dharmapasa	Doulapur	99601070802	1	1	1	Doulapur GPS	25°02'38"	91°01'16"	1	1	0.111	0.9		
35	Sunamgonj	Dharmapasa	Abidnagar	91601071601	1	1	1	Abidnagar GPS	25°02'28"	91°02'52"	1	1	0.093	1.4		
36	Sunamgonj	Dharmapasa	Rajapur	91601070501	1	1	1	Rajapur GPS	24°53'07"	91°06'16"	1	1	0.113	1.3		
37	Sunamgonj	Dharmapasa	Doulapur	91601070603	1	1	1	Doulapur GPS	24°54'44"	91°06'16"	1	1	0.068	3.8		
38	Sunamgonj	Dharmapasa	Joysee Dakshin	99601070410	1	1	1	Joysee Dakshin GPS	24°54'13"	91°08'12"	1	1	0.023	3.5		
39	Sunamgonj	Dharmapasa	Calipurata	91601070803	1	1	1	Calipurata GPS	25°09'44"	90°53'32"	1	1	0.061	1.6		
40	Sunamgonj	Dharmapasa	Satur	91601070806	1	1	1	Satur GPS	25°05'31"	91°02'14"	1	1	0.059	1.2		

Md. Abdul Latif
 Sample Analyzer
 Dept. Zonal Laboratory Sylhet

Md. Zahidul Islam Akash
 Senior Chemist
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27/11/2022
 27/11/2022



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Primary Education Development Program (DEDP-4)

Laboratory Test Result

Sl No	District	Upazila	Village	ID	Type of School	Name of School	GPS		Water Quality			Test Result			Remarks
							Latitude	Longitude	Clear	Sand	Fe (ppm)	As (ppm)	13	14	
1	2	3	4	6	6	6	7	8	10	11	12	13	14	15	17
1	Sunamgonj	Sulla	Saraspur	99601080210	1	Saraspur GPS	24°42'08"	91°20'01"	1	1	1	1	1.9	0.031	
2	Sunamgonj	Sulla	Shaskhal	91601080310	1	Shaskhal GPS	24°41'48"	91°19'47"	1	1	1	1	4.9	0.024	
3	Sunamgonj	Sulla	Chakus	91601080303	1	Chakus GPS	24°45'07"	91°16'37"	1	1	1	1	2.3	0.061	*
4	Sunamgonj	Sulla	Anandapur	91601080302	1	Anandapur GPS	24°42'42"	91°16'35"	1	1	1	1	1.1	0.033	
5	Sunamgonj	Sulla	Tukchampur	99601080202	1	Darul Islam Chow GPS	24°42'02"	91°22'28"	1	1	1	1	1.4	0.012	
6	Sunamgonj	Sulla	Bhulanagar	99601080214	1	Bhulanagar GPS	24°43'12"	91°17'35"	1	1	1	1	1.1	0.045	
7	Sunamgonj	Sulla	Narikhala	91601080311	1	Narikhala GPS	24°42'25"	91°21'05"	1	1	1	1	1.5	0.027	
8	Sunamgonj	Sulla	Noopara	99601080311	1	Noopara GPS	24°39'13"	91°18'55"	1	1	1	1	3.6	0.046	
9	Sunamgonj	Sulla	Mecca	99601080316	1	Mecca GPS	24°37'24"	91°17'24"	1	1	1	1	1.6	0.031	
10	Sunamgonj	Sulla	Pretapur	91601080203	1	Pretapur GPS	24°39'22"	91°18'57"	1	1	1	1	1.3	0.013	
11	Sunamgonj	Sulla	Kashpur	91601080111	1	Kashpur GPS	24°43'20"	91°12'43"	1	1	1	1	1.9	0.046	
12	Sunamgonj	Sulla	Shohalin	99601080207	1	Shohalin GPS	24°42'58"	91°13'37"	1	1	1	1	1.6	0.045	
13	Sunamgonj	Sulla	Kandhali	99601080301	1	Kandhali GPS	24°39'49"	91°15'02"	1	1	1	1	1	0.015	
14	Sunamgonj	Sulla	Dakka Manandpur	91601080333	1	Dakka Manandpur GPS	24°41'43"	91°13'43"	1	1	1	1	2.8	0.023	
15	Sunamgonj	Sulla	Foua	91601080406	1	Foua GPS	24°37'58"	91°13'34"	1	1	1	1	1.9	0.014	
16	Sunamgonj	Sulla	Simerkanda	99601080403	1	Simerkanda GPS	24°35'15"	91°13'31"	1	1	1	1	0.4	0.007	
17	Sunamgonj	Sulla	Mahmudnagar	91601080109	1	Mahmudnagar GPS	24°42'09"	91°13'35"	1	1	1	1	0.6	0.023	
18	Sunamgonj	Sulla	Shantipur	91601080582	1	Shantipur GPS	24°43'38"	91°15'34"	1	1	1	1	0.6	0.041	
19	Sunamgonj	Sulla	Keruzia	99601080401	1	Keruzia GPS	24°38'18"	91°12'34"	1	1	1	1	1.5	0.041	
20	Sunamgonj	Sulla	Mukterpur	91601080208	1	Mukterpur GPS	24°39'48"	91°15'27"	1	1	1	1	0.36	0.024	

Almas

Almas



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Water Test Report for PEDP-4 Project

Work order No. 565, date : 20/12/2021

Package No. : TW-296

Contractor : M/S. Shabin Enterprise, Jhenaidah.

Sl. No.	District	Upazilla	Village	School ID	Water Point		Name of School	GPS Reading		Water Quality				Remarks
					Type	Depth (M)		Latitude	Longitude	Sand	Clear	As (mg/L)		
1	Jhenaidah	Maheshpur	Bhabonagar	204049009	RO Filter	7	Bhabonagar Govt. Primary School	N: 23°21'11.85"	E: 88°46'13.53"	Free	Clear	As 0.009	14	
2	Jhenaidah	Maheshpur	Gurdah	204040701	RO Filter		Gurdah Govt. Primary School	N: 23°20'45.76"	E: 88°47'08.93"	Free	Clear	0.018		
3	Jhenaidah	Maheshpur	Sekhargari	204041007	RO Filter		Sekhargari Govt. Primary School	N: 23°17'29.54"	E: 88°54'44.77"	Free	Clear	0.020		
4	Jhenaidah	Maheshpur	Bathangachi	204049021	RO Filter		Bathangachi Adarsha Govt. Primary School	N: 23°19'11.63"	E: 88°56'56.35"	Free	Clear	0.001		
5	Jhenaidah	Maheshpur	Babla Mathavanga	204049042	RO Filter		Babla Mathavanga Govt. Primary School	N: 23°19'02.16"	E: 88°55'06.39"	Free	Clear	0.008		
5	Jhenaidah	Maheshpur	Ramchandrapur	204041201	RO Filter		Ramchandrapur Govt. Primary School	N: 23°21'17.85"	E: 88°56'34.47"	Free	Clear	0.012		
7	Jhenaidah	Maheshpur	Makor-Buchpur	204049027	RO Filter		Makordhachpur Govt. Primary School	N: 23°14'57.17"	E: 88°49'38.89"	Free	Clear	0.025		

Note :- BDS (Bangladesh Drinking Standard) : As = 0.05 mg/L

Sample Collected by:

 Md. Nazrul Islam
 Junior Chemist
 DPHE, Zonal Lab, Jhenaidah.

Sample Analyzed by:

 Md. Moniruzzaman
 Sample Analyzer
 DPHE, Zonal Lab, Jhenaidah.

Counterchecked/Approved by:

 Md. Nazrul Islam
 Junior Chemist
 DPHE, Zonal Lab, Jhenaidah.

Public Health Engineering
 Zonal Laboratory, Shahid Masiur Rahman Road,
 Jhenaidah, Bangladesh.
 (Cell: 02477746036)



Water Test Report for PEDP-4 Project

Work order No. 565, date : 20/12/2021

Package No. : TW-296

Contacto : M/S. Shahin Enterprise, Jhenaidah.

Sl. No.	District	Upazilla	Village	School ID	Water Point		Name of School	GPS Reading		Water Quality						Remarks
					Type	Depth (M)		Latitude	Longitude	Sand	Clear	As (mg/L)	Fe (mg/L)	Cl (mg/L)		
13	Jhenaidah	Maheshpur	Babhangachi	204049021	DTSP	✓	Babhangachi Adarsha Govt. Primary School	N: 23°19'11.63"	E: 88°56'56.35"	Free	Clear	0.052	2.82	20	✓	
14	Jhenaidah	Maheshpur	Babila Mathavanga	204049042	DTSP	✓	Babila Mathavanga Govt. Primary School	N: 23°19'02.16"	E: 88°55'06.39"	Free	Clear	0.115	2.71	15		
15	Jhenaidah	Maheshpur	Ramchandrapur	204041201	DTSP	✓	Ramchandrapur Govt. Primary School	N: 23°21'17.85"	E: 88°56'34.47"	Free	Clear	0.071	1.80	15		
16	Jhenaidah	Maheshpur	Makorchachpur	204049027	DTSP	✓	Makorchachpur Govt. Primary School	N: 23°14'57.17"	E: 88°49'38.89"	Free	Clear	0.069	1.66	15	✓	

Note :- BDS (Bangladesh Drinking Standard) : As = 0.05 mg/L, Fe = 0.3-1.0 mg/L, Cl⁻ = 150-600 mg/L.

Sample Collected by:

(Signature)

Md. Nazrul Islam
Junior Chemist
DPHE, Zonal Lab, Jhenaidah.

Sample Analyzed by:

(Signature)
13.11.2022

Md. Moniruzzaman
Sample Analyzer
DPHE, Zonal Lab, Jhenaidah.

Counter signed/Approved by:

(Signature)

Md. Nazrul Islam
Junior Chemist
DPHE, Zonal Lab, Jhenaidah.

(CPE DPHE Zonal Lab, Jhenaidah)
13.11.2022



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Water Test Report for PEDP-4 Project

Work order No. 565, date: 20/12/2021

Package No.: TVV-296

Sl. No.	District	Upazilla	Village	School ID	Water Point Type	Depth (M)	Name Of School	GPS Reading		Water Quality							Remarks	
								Latitude	Longitude	Sand	Clear	As (mg/L)	Fe (mg/L)	Cl (mg/L)	12	13		14
1	Jhenaidah	Maheshpur	Laraihat	204049058	DTSP		Laraihat Govt. Primary School	N: 23°20'32.93"	E: 88°44'27.04"	Free	Clear	0.028	4.32	20				
2	Jhenaidah	Maheshpur	Bhabonagar	204049009	DTSP		Bhabonagar Govt. Primary School	N: 23°21'11.85"	E: 88°46'13.53"	Free	Clear	0.053	0.73	15				✓
3	Jhenaidah	Maheshpur	Nepa	204049006	DTSP		Nepa Govt. Primary School	N: 23°17'40.21"	E: 88°45'11.20"	Free	Clear	0.028	2.22	15				
4	Jhenaidah	Maheshpur	Kanchionpur	204040602	DTSP		Kanchionpur Govt. Primary School	N: 23°17'05.92"	E: 88°43'46.08"	Free	Clear	0.030	4.07	15				
5	Jhenaidah	Maheshpur	Solemanpur	204040603	DTSP		Solemanpur Govt. Primary School	N: 23°17'11.21"	E: 88°44'33.14"	Free	Clear	0.024	1.54	15				
6	Jhenaidah	Maheshpur	Baull Mohamnadpur	204049033	DTSP		Baull Mohamnadpur Govt. Primary School	N: 23°16'30.41"	E: 88°46'16.41"	Free	Clear	0.026	2.39	15				
7	Jhenaidah	Maheshpur	Bagadanga	204040604	DTSP		Bagadanga Govt. Primary School	N: 23°17'23.80"	E: 88°42'46.91"	Free	Clear	0.024	2.51	40				
8	Jhenaidah	Maheshpur	Gurdah	204040701	DTSP		Gurdah Govt. Primary School	N: 23°20'45.76"	E: 88°47'08.93"	Free	Clear	0.070	2.19	30				
9	Jhenaidah	Maheshpur	Talsar	204040703	DTSP		Talsar Govt. Primary School	N: 23°18'35.69"	E: 88°47'15.63"	Free	Clear	0.040	3.43	15				
10	Jhenaidah	Maheshpur	Padmapukur	204040704	DTSP		Padmapukur Govt. Primary School	N: 23°19'25.42"	E: 88°46'17.41"	Free	Clear	0.019	1.81	30				
11	Jhenaidah	Maheshpur	Sekharhari	204041007	DTSP		Sekharhari Govt. Primary School	N: 23°17'29.54"	E: 88°54'44.77"	Free	Clear	0.139	3.67	10				
12	Jhenaidah	Maheshpur	Nalpatua	204049054	DTSP		Nalpatua-2 Govt. Primary School	N: 23°17'13.13"	E: 88°50'51.30"	Free	Clear	0.044	1.53	35				

Note :- BDS (Bangladesh Drinking Standard) : As = 0.05 mg/L, Fe = 0.3-1.0 mg/L, Cl = 150-600 mg/L

Sample Collected by: Md. Nazrul Islam
 Junior Chemist
 DPHE, Zonal Lab, Jhenaidah.

Sample Analyzed by: Md. Moniruzzaman
 Sample Analyzer
 DPHE, Zonal Lab, Jhenaidah.

Countersigned/Approved by: Md. Nazrul Islam
 Junior Chemist
 DPHE, Zonal Lab, Jhenaidah.

**Table 1 - List of Unacceptable Water Sources where mitigation measures were considered**

SL No	District	Name of School	EMIS Code	Test Result			Remark	Suggested Option	After intervention		
				As	Fe	Cl			As	Fe	Cl
1	Jhenaidah	Bhabonagar GPS.	204049009	0.053	<LOQ	<LOQ	not acceptable	RO Filter	0.009	<LOQ	<LOQ
2	Jhenaidah	Gurdah GPS.	204040701	0.07	<LOQ	<LOQ	not acceptable	RO Filter	0.018	<LOQ	<LOQ
3	Jhenaidah	Sekhargari GPS.	204041007	0.139	<LOQ	<LOQ	not acceptable	RO Filter	0.02	<LOQ	<LOQ
5	Jhenaidah	Babla Mathavanga GPS.	204049042	0.115	<LOQ	<LOQ	not acceptable	RO Filter	0.008	<LOQ	<LOQ
6	Jhenaidah	Ramchandrapur GPS.	204041201	0.071	<LOQ	<LOQ	not acceptable	RO Filter	0.012	<LOQ	<LOQ
7	Jhenaidah	Makordhachpur GPS.	204049027	0.069	<LOQ	<LOQ	not acceptable	RO Filter	0.025	<LOQ	<LOQ
8	Sunamganj	Chakua GPS	91601080303	0.061	<LOQ	<LOQ	not acceptable	RO Filter	0.018	<LOQ	<LOQ
9	Sunamganj	LANKAPATHARIA GPS.	91601070309	0.9	<LOQ	<LOQ	not acceptable	RO Filter	0.022	<LOQ	<LOQ
10	Sunamganj	NOYA BANDHA GPS.	99601070108	0.8	<LOQ	<LOQ	not acceptable	RO Filter	0.016	<LOQ	<LOQ
11	Sunamganj	GOFHURENNESHA DOSDHARY NNGPS.	99601079016	1.8	<LOQ	<LOQ	not acceptable	RO Filter	0.007	<LOQ	<LOQ
12	Sunamganj	DHARMA PASHA NO 1 MODEL GPS.	91601070301	0.8	<LOQ	<LOQ	not acceptable	RO Filter	0.011	<LOQ	<LOQ
13	Sunamganj	NUR PUR	91601070507	1.2	<LOQ	<LOQ	not acceptable	RO Filter	0.011	<LOQ	<LOQ
14	Sunamganj	BAGBARI GPS.	91601070509	0.6	<LOQ	<LOQ	not acceptable	RO Filter	0.014	<LOQ	<LOQ
15	Sunamganj	DIGJAN GPS.	91601070504	1.4	<LOQ	<LOQ	not acceptable	RO Filter	0.005	<LOQ	<LOQ
16	Sunamganj	PATHARIA KANDA	91601070502	3.4	<LOQ	<LOQ	not acceptable	RO Filter	0.015	<LOQ	<LOQ
17	Sunamganj	BARIR KANDI GPS.	99601070602	0.8	<LOQ	<LOQ	not acceptable	RO Filter	0.019	<LOQ	<LOQ
18	Sunamganj	NIZAMPUR NNGPS.	99601079015	0.9	<LOQ	<LOQ	not acceptable	RO Filter	0.022	<LOQ	<LOQ
19	Sunamganj	MASKANDA GPS.	99601070209	1.8	<LOQ	<LOQ	not acceptable	RO Filter	0.025	<LOQ	<LOQ



SL No	District	Name of School	EMIS Code	Test Result			Remark	Suggested Option	After intervention		
				As	Fe	Cl			As	Fe	Cl
20	Sunamganj	RAYPUR GPS.	99601070210	2.8	<LOQ	<LOQ	not acceptable	RO Filter	0.035	<LOQ	<LOQ
21	Sunamganj	HIZLA NNGPS.	99601079009	1.2	<LOQ	<LOQ	not acceptable	RO Filter	0.029	<LOQ	<LOQ
22	Sunamganj	DOWLATPUR GPS.	99601070802	0.9	<LOQ	<LOQ	not acceptable	RO Filter	0.018	<LOQ	<LOQ
23	Sunamganj	ABIDNAGAR GPS.	91601071001	1.4	<LOQ	<LOQ	not acceptable	RO Filter	0.015	<LOQ	<LOQ
24	Sunamganj	RAJAPUR GPS.	91601070601	1.3	<LOQ	<LOQ	not acceptable	RO Filter	0.019	<LOQ	<LOQ
25	Sunamganj	DOULTHPUR GPS.	91601070603	3.8	<LOQ	<LOQ	not acceptable	RO Filter	0.039	<LOQ	<LOQ
26	Sunamganj	JAYSRI DAKKHIN GPS.	99601070410	3.5	<LOQ	<LOQ	not acceptable	RO Filter	0.022	<LOQ	<LOQ
27	Sunamganj	DATIA PARA GPS.	91601070809	1.6	<LOQ	<LOQ	not acceptable	RO Filter	0.009	<LOQ	<LOQ
28	Sunamganj	SATUR GPS.	91601070806	2.2	<LOQ	<LOQ	not acceptable	RO Filter	0.019	<LOQ	<LOQ

Appendix-5: Water Quality Monitoring and Surveillance Protocol by DPHE

বাংলাদেশের পল্লী পানি সরবরাহ ব্যবস্থার
পানির গুণাগুণ মনিটরিং ও সার্ভিল্যান্স

প্রটোকল

(Water Quality Monitoring and Surveillance Protocol for
Rural Water Supply System in Bangladesh)



জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
আগস্ট ২০০৫

পরিশিষ্ট ১-৭ মূলে নির্দেশ করা হয়েছে। নির্বাচিত ক্রিটিক্যাল রাসায়নিক (critical chemical) প্যারামিটারসমূহ নিম্নে বর্ণনা করা হলো।

আর্সেনিক

১৯৯৫ সালে জু-পর্তস্থ পানিতে আর্সেনিক দূষণের বিষয়টি উদ্ঘাটিত হওয়ার পর থেকে বাংলাদেশের ২৭০ টি উপজেলার অগভীর নলকূপসমূহে বিভিন্ন মাধ্যমে আর্সেনিক দূষণসংঘটিত হয়েছে। আর্সেনিক দূষিত পানি ব্যবহারে ফলে জনস্বাস্থ্য ঝুঁকির সম্মুখীন হয়, যা জনগণের মাঝে কয়েক বছরের মধ্যে আর্সেনিকোসিস (arsenicosis) এর লক্ষণ হিসেবে প্রকাশ পাবে, এবং আজন্মরোগ ও চর্ম ক্যান্সারও হতে পারে। বাংলাদেশে আর্সেনিকই একমাত্র রাসায়নিক সৌধ ঘর ফলে স্বাস্থ্যের প্রতি মারাত্মক প্রতিক্রিয়া দেখা দিয়েছে।

নিয়মিত প্যারামিটারী প্রযুক্তি ব্যবহারের মাধ্যমে পানিতে আর্সেনিকের মাত্রার ডিক্রিতে বিশ্ব স্বাস্থ্য সংস্থার গাইড লাইনে (৩য় সংস্করণ) পানীয় জলের সাময়িক গাইড লাইন মান হিসেবে প্রতি লিটার পানীয় জলে ০.০১ মিলিগ্রাম (১০ মাইক্রোগ্রাম/লিটার) আর্সেনিকের উপস্থিতি নির্ধারণ করেছে। বাংলাদেশে বর্তমানে আর্সেনিকের ষ্ট্যান্ডার্ড মান প্রতি লিটারে ০.০৫ মিলিগ্রাম বা ৫০ মাইক্রোগ্রাম।

ক্লোরাইড বা লবণাক্ততা (chloride)

বাংলাদেশের উপকূলীয় অঞ্চলের অগভীর নলকূপসমূহে উচ্চ মাত্রার ক্লোরাইড বা লবণাক্ততা রয়েছে। লবণাক্ততা অনুব্রবেশের কারণে বাংলাদেশে অগভীর পানিস্তরে লবণাক্ততা প্রমশঃ বাড়াচ্ছে। তবে গভীর নলকূপসমূহে সাধারণতঃ কম মানের লবণাক্ততা রয়েছে। পানির গুণাগুণ বিষয়ক বিশ্ব স্বাস্থ্য সংস্থার গাইড লাইনে (৩য় সংস্করণ) স্বাস্থ্যগত কোন গাইড লাইন মান প্রতিষ্ঠা করা হয়নি। তবে লক্ষণীয় যে, প্রতি লিটারে ২৫০ মিলিগ্রাম মাত্রার বেশী লবণাক্ততা পানীয় জলের স্বাদ এবং গ্রহণযোগ্যতার প্রভাব ফেলে। ক্লোরাইড থেকে উদ্ভূত স্বাদ সংযুক্ত কেশনের (cation) উপর নির্ভরশীল এবং সোডিয়াম, পটাশিয়াম এবং ক্যালশিয়াম ক্লোরাইডের মাত্রা প্রতি লিটার পানিতে ২০০ থেকে ৩০০ মিলিগ্রাম। বাংলাদেশে প্রতি লিটার পানিতে ১৫০ থেকে ৩০০ মিলিগ্রাম ক্লোরাইড গ্রহণযোগ্য এবং উপকূলীয় অঞ্চলে ভাল কোন উৎস না থাকলে প্রতি লিটারে ১০০০ মিলিগ্রাম পর্যন্ত গ্রহণ করা যায়।

আয়রন বা লৌহ (iron)

পানীয় জলে সাধারণভাবে লক্ষণীয় আয়রন বা লৌহের উপস্থিতি স্বাস্থ্যের জন্য উদ্বেগের বিষয় নহে। যদিও এর নিম্নতর মাত্রার দূষণে পানির চেহারা ও স্বাদে প্রভাব ফেলে। পানীয় জলের গুণাগুণ বিষয়ক বিশ্ব স্বাস্থ্য সংস্থার গাইড লাইনে (২য় সংস্করণ)-এ প্রতি লিটার পানিতে আয়রনের সাময়িক গাইড লাইন মান ০.৩ মিলিগ্রাম নির্ধারণ করা হয়েছে। তবে এর ৩য় সংস্করণে আয়রনের জন্য কোন গাইড লাইন মান নির্ণয় করা হয়নি।

বাংলাদেশের অনেক অঞ্চলে আয়রনের উপস্থিতি গ্রহণযোগ্য সীমার চেয়ে বেশী। তাই কাস্টিগত উদ্দেশ্যে ক্ষুদ্র আয়রন দূরীকরণ ইউনিট (mini iron removal units, IRU)-এর মাধ্যমে আয়রন দূরীকরণের চেষ্টা করা হয়। বাংলাদেশে ষ্ট্যান্ডার্ড অনুযায়ী পানীয় জলে আয়রনের উপস্থিতি হলো ০.৩-১.০ মিলিগ্রাম / লিটার। পল্টী অঞ্চলে যেখানে পানির বিকল্প কোন উৎস নেই, সেখানে প্রতি লিটারে ৫.০ মিলিগ্রাম পর্যন্ত আয়রনের উপস্থিতিও গ্রহণযোগ্য বলে বিবেচিত হয়। এ সীমা বেড়ে গেলে আয়রন দূরীকরণ ইউনিট (iron removal unit) স্থাপন করা প্রয়োজন।

ম্যাঙ্গানিজ (manganese)

পানীয় জল সংক্রীয় বিশ্ব স্বাস্থ্য সংস্থার গাইড লাইনে (২০০৪) প্রতি লিটারে ০.৪ মিলিগ্রাম ম্যাঙ্গানিজের উপস্থিতি সাময়িকভাবে স্বাস্থ্যগত গাইড লাইন মান হিসেবে গ্রহণ করা হয়েছে। পানি সরবরাহে প্রতি লিটারে ০.১ মিলিগ্রামের অধিক মাত্রায় ম্যাঙ্গানিজের উপস্থিতি থাকলে কেবল পানীয়তে অনাকাঙ্ক্ষিত স্বাদ এবং কাপড় চোপড় ও থালা বাসনে দাগ সৃষ্টি করে। বাংলাদেশে ষ্ট্যান্ডার্ড অনুযায়ী পানীয় জলে ম্যাঙ্গানিজের উপস্থিতি হলো ০.১ মিলিগ্রাম / লিটার।