Semi-Annual Report

June 2021

Fourth Primary Education Development Program (PEDP-4)

Semi-Annual Environmental Monitoring Report

DEPARTMENT OF PUBLIC HEALTH ENGINEERING

January 2021 – May 2021

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

Primary Education Unit, DPHE, Dhaka

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ABBREVIATIONS & ACRONYMS

ADB	:	Asian Development Bank
AusAID	:	Australian Agency for International Development
CIDA	:	Canadian International Development Agency
DFID	:	Department for International Development (of the United Kingdom)
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
IDA	:	International Development Association
JARM	:	Joint Annual Review Mission
JCM	:	Joint Consultation Meeting
JICA	:	Japan International Cooperation Agency
LGD	:	Local Government Division
MIS	:	Management Information System
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
SDTW	:	Semi Deep Tube Well
SEC	:	Small Ethnic Community
STW	:	Shallow Tube Well
SIDA	:	Swedish International Development Agency
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 through a child 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 facilities of quality water supply and sanitation in the primary schools of Bangladesh. As per MoU signed in between DPE and DPHE in September 15, 2019. DPHE will install 15,000 new water points and construct 58,000 Wash Blocks in the primary schools of Bangladesh throughout the program tenure of 5 years. Furthermore, DPHE will conduct water quality tests of earlier installed 65,000 water points and major maintenance of wash blocks constructed during PEDP-3. From the beginning of the project until May'2021 DPHE installed 3300 new water points and constructed 3708 Wash Blocks. In this tenure, DPHE conducted major maintenance of 4661 wash blocks as well.

The sole purpose of this study is to identify any concern or issue related to the environmental safeguard due to the installation of wash blocks, water points and major maintenance of wash blocks from January' 21 to May'21. The study is based on the environmental safeguard screening conducted during construction and post implementation stages. The screening format is prepared after the approved EMF guidelines of DPE for PEDP-4. The screening included different environmental safeguard indicators such as loss of agricultural land, blockage in the drainage system, provision to access safe drinking water, provision of hand washing and hygiene facility 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 cannot be denied that COVID-19 situation slowed down the overall construction and implementation progress. However, the environmental monitoring screening confirmed no significant instances or issues that may hamper or influence the environmental 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

Bangladesh, a rapidly developing country with its astonishing economic boom has cherished the golden jubilee of its independence. To ensure true development, it is utmost important to ensure holistic development of the children of a nation which includes both intellectual and emotional development in such a manner that they can uphold the nation from all aspect. This has been eloquently articulated in the Constitution of Bangladesh as well. Fourth Primary Education Development Program (PEDP-4) is the continuation of Government's approach in thriving the excellence of children through the fulfillment of several distinct milestones including 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 in September 15, 2019, DPHE will perform the following activities in the next five years with an aim to provide safe drinking water and sanitation services in the primary schools under PEDP-4.

- Install 15,000 new drinking water sources.
- Replace/repair drinking water sources (if necessary).
- Water quality testing of 65,000 water points installed earlier by DPHE.
- Construction of 58,000 new Wash Blocks.
- Major maintenance of wash blocks.
- Operation and maintenance (O/M) of water points.

2. Purpose of current report

The basic intent of this report is to identify and resolve any anticipated environmental safeguard issues that may arise during the installation of water sources or construction of Wash Blocks in the primary schools of Bangladesh. This report will encompass and summarize the findings of the environmental screening conducted during the installation of water points and construction of Wash Blocks in the primary schools of Bangladesh from the tenure of January'21 to May'21. During implementation of the project, environmental monitoring screening was conducted based on the Environmental Management Framework (EMF) of PEDP-4. The purpose of this report is listed below.

- To modify some of the tools based on the experiences gained from PEDP-3 to ensure that neither the infrastructure both in terms of needs and quality at primary schools, nor the environment is compromised through the program intervention.

- To ensure that envisaged purpose of PEDP-4 is achieved and result in desired benefits without adversely affecting the environmental resources.
- To avoid potentially adverse environmental impacts and enhance environmental outcomes so that the program is expected to have limited and minimum adverse environmental impacts.
- To establish the mechanism to determine and assess future potential environmental impacts of WASH infrastructure that are to be identified and cleared based on a community demand driven process and to set out mitigation, monitoring and institutional measures to be taken during implementation and operation of the WASH infrastructure to eliminate adverse environmental impacts or to reduce them to acceptable limits.

3. Indicators of environmental safeguard as per EMF under PEDP-4

This report covers different distinct environmental monitoring indicators based on the approved EMF of PEDP-4. Principles relevant to the environmental management of WASH (Water Supply, Sanitation and Hygiene) in PEDP-4 are mentioned below.

- Annual water quality monitoring of all the installed tube-wells under PEDP-4 will be carried out to ensure safe drinking water facilities to the students and teachers.
- Provision for adequate sanitation facilities for the teachers and students will be made and the mechanism for regular cleaning, routine and major maintenance will be implemented.
- To solve the drinking water problem in remote hilly areas and coastal areas, rainwater harvesting and other feasible options will be explored.
- To address the post COVID crisis for adaptation to the new normal.

In general, the following indicators require to be monitored during the planning, construction and post-implementation phases.

i) Losses of agricultural lands
ii) Drainage congestion/water logging
iii) Surface water pollution
iv) Dust and noise pollution
v) Safe distance between tube-wells and sanitary latrines
vi) Occupational health hazards and safety practices
vii) Maintenance of water supply and sanitation facilities
viii) Maintenance of air and water quality
ix) Management of surrounding ecosystem and biodiversity (if any) etc.

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 environmental safeguard, a through 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 complied 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 environmental safeguard screening during the installation of water sources and maintenance of Wash 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 Environmental Survey Outcome' Spreadsheet by MIS UNIT and kept structured for database and reporting. A flow diagram of the screening method is depicted in Fig. 1.

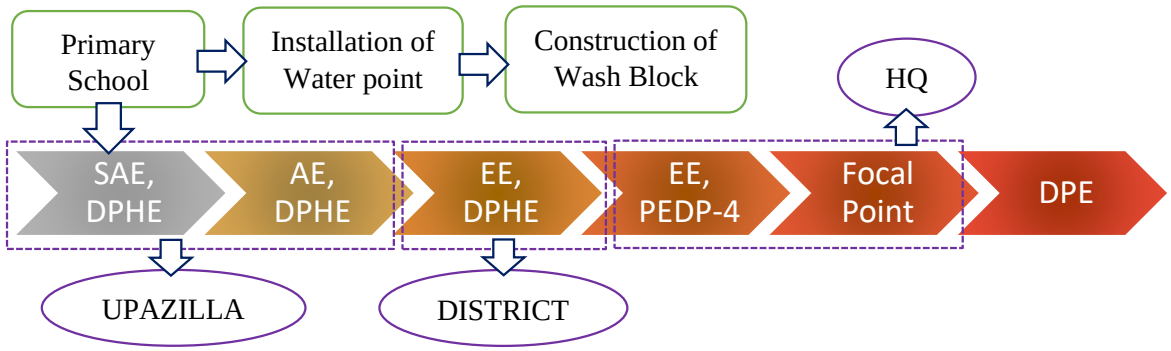


Fig. 1 Method of environmental safeguard screening

5. Role of DPHE in comprehensive monitoring

The subcomponents 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 used to visit the site frequently in order to monitor the ongoing and completed works and also focus on

the environmental safeguard aspect. Visit from Focal Point's Office and DPHE Head quarter happens frequently.

DPHE district office arranges coordination meeting between DPHE (EE, AE, and SAE) and DPE officials (DPEO, UEO) in every 3 months. A glimpse of the co-ordination meeting is depicted in Fig. 4. In this meeting, officers from department 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 (Fig 17). In addition, mechanics of DPHE upazilla headquarters repair the tube wells in an urgent basis when they are called for doing from the concerned school in order to ensure that the running water supply are fully operational.

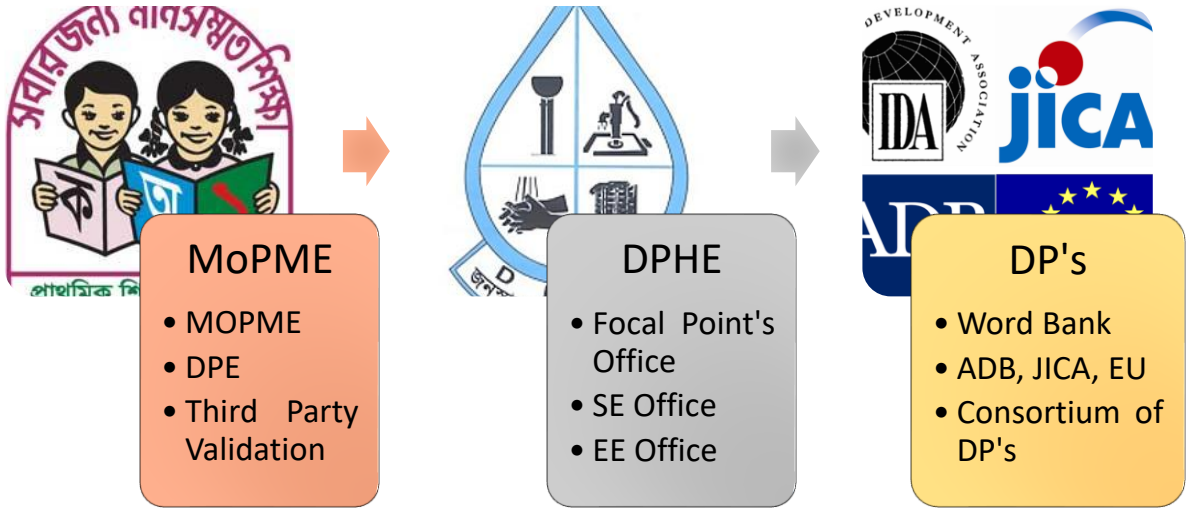


Fig. 2 Monitoring scheme in PEDP-4

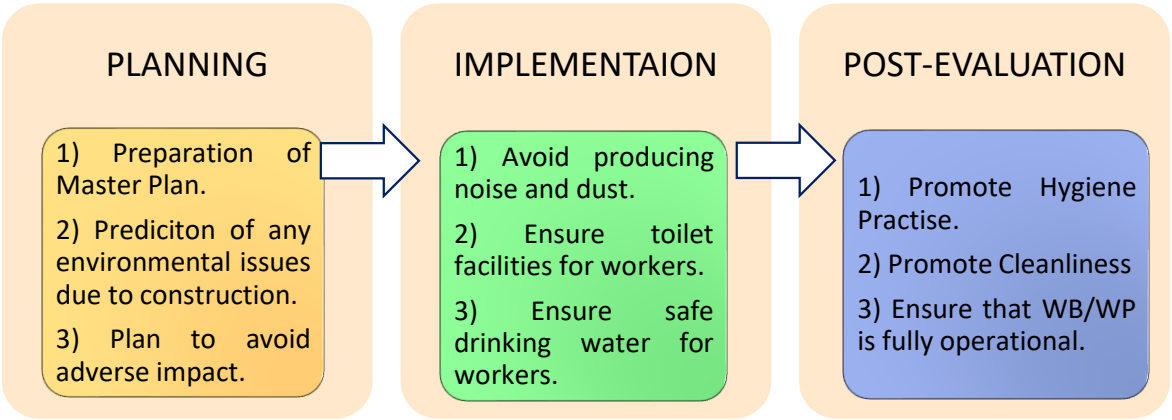


Fig. 3 Role of DPHE in environmental monitoring

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

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. Moreover, DPHE looks after the tube wells which have already passed the defect liability period of 02 (two) years. According to the order of Chief Engineer, DPHE (memo no. 1066, dated: 16/09/2013), the packages where the defects liability period is over, DPHE will still repair the tube wells within 72 hours of receiving information provided that the concerned school bears the expense of spare parts from routine maintenance.

6. Capacity building

During the implementation of PEDP-3, 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-3 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, although a revised framework is adopted for both environmental and social safeguard, the basic changes are little but elaborate in comparison to that of PEDP-3. During the reporting tenure, no new ToT was organized by either DPE or development partners, although necessity is there for the proper implementation of revised EMF and SMF. During the reporting tenure, DPHE master trainers from Head Quarter (who received ToT during PEDP-3) conduct day long circle level meetings to expedite the works related 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. A real picture of one such circle level meeting from Dinajpur is depicted in Fig.5

Fig. 5 DPHE HQ & Field Official meeting at Dinajpur

Thus, the newly trained engineers will function as peer educators to educate the site workers and contractors. In order to identify the key differences of revised EMF and SMF to that of original EMF and SMF of PEDP-3, more newly designed training to be carried out by the experts who had inputs during the preparation of revised EMF and SMF.

7. Environmental safeguard screening by DPHE (January'21 – May'21)

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 3708 wash blocks and 3300 water points till date from the beginning of this project. Among these, a total of 3036 wash blocks and 915 water points were installed and handed over during the reporting tenure of January'2021 to May'2021. All these works were monitored based on approved Environmental Monitoring Framework (EMF) for PEDP-4. Table-1 summarizes the list of DPHE implemented works where screening for environmental safeguard was carried out.

Table 1 Progress of work under PEDP-4, DPHE

Installation/Maintenance	July'19 - December'19	Jan'20 - June'20	Jul'20- Dec'20	Jan'21 - May'21	Total
Wash Block	-	-	**672**	**3036**	**3708**
Water Sources	**57**	**183**	**2145**	**915**	**3300**
Maintenance of Wash Block	**91**	**598**	**3200**	**772**	**4661**

This report focuses on the construction work from the tenure of January, 2021 to May, 2021. During this period, not only new wash blocks were constructed, major maintenance of 772 wash blocks which were constructed during PEDP-3 were carried out as well. The status of the water points and wash blocks received through the monitoring survey is given in following subsections.

8. Outcomes of environmental 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-3 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.

Mitigation Measures Suggested (MMS):

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.

Fig. 6 shows the previous and improved water supply facilities in primary schools under PEDP-4.

Comment:

Installation of tube well with submersible pump added values to its user especially young user which eventually *increases the easy access to safe drinking water result in health benefit* as well as diminishes water logging and drainage problem.

Fig. 6 Improved water sources by TSP from hand tube well

8.2 Distribution of water points based on installed depth

DPHE installed tube wells of varying depth in different primary schools of Bangladesh considering the geological formation of respective district. Although the depth of tube well depends on the suitable water layer, all the tube wells installed in the reporting tenure can be broadly categorized into five distinct types based on the depth of tube well. Fig. 7 depicts the classification of tube wells based on depth. It is clear that 18.4% tube wells were installed at a greater depth of 200m or more. Number of tube wells were in the range of 81.6% where the depth is less or equal to 200m.

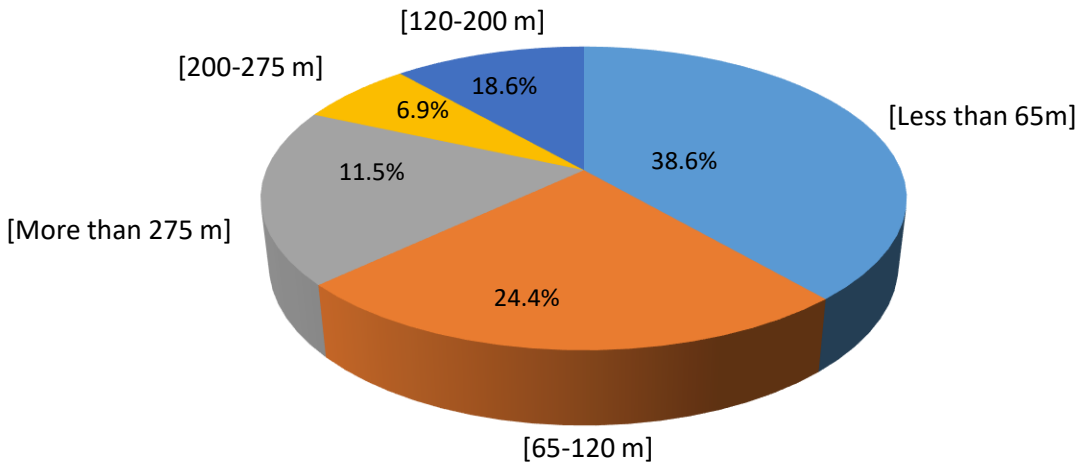


Fig. 7 Distribution of water points based on depth

Wash Block is serving as a unique unit of hygiene practice for the school children as well as for teachers. Its impact on environment as it helps to promote hygiene as well as safe and clean school environment. Open defecations and urination practices will be stopped and the washing facilities will

ensure better health. On the other hand, Tube Well ensures safe drinking for the school children as well as for teachers.

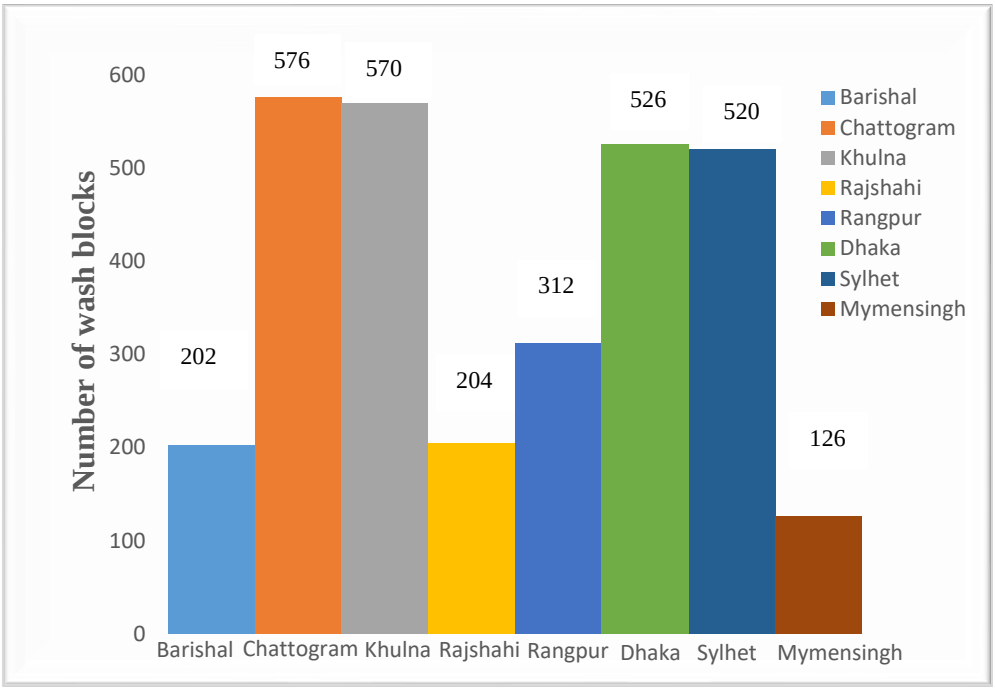


Fig. 8. Countrywide Wash Block distribution

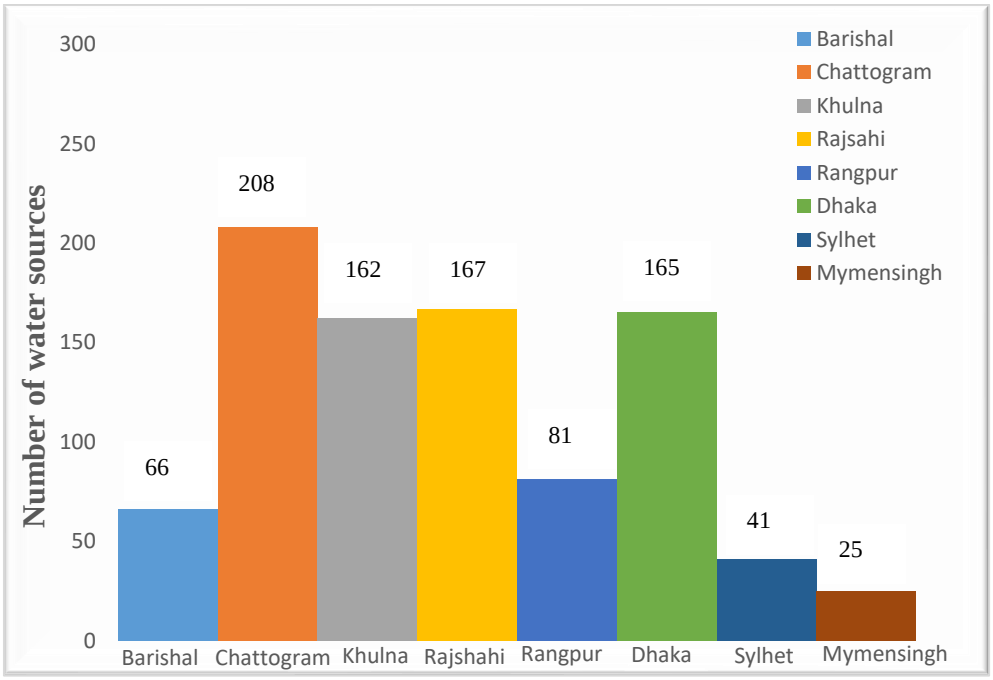


Fig. 9. Countrywide Water Source distribution

Countrywide distribution of Wash Blocks and Tube wells were surveyed and categorized division wise. 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,

Khulna, Dhaka and Sylhet division as these divisions cover maximum districts. The lowest number of wash blocks (126) were constructed in Mymensingh division as it is the smallest division of Bangladesh and thus, equity in distribution is justified. Fig. 9 also depicts the equity in distribution of water sources. Among the 915 water points, the highest number was installed in the Chattogram division and least proportion was in the Mymensingh division. This is also justified as per need assessment criteria based on approved IPG.

8.4 Loss of agricultural land

During the preparation of site plan/ master plan it was the prime focus that the adoption of the new water supply facility does not preclude the use of existing agricultural lands. No loss of agricultural lands was received from the environmental screening survey conducted for the water points installed from January'21 to May'21. Furthermore, it was confirmed that installation of water points was carried out in the land owned by the respective school.

8.5 Environment of water supply facility

In case of water points 'Clean Environment' refers to the surrounding of the installed water option. If the surrounding environment is not dirty and/or not covered with algae then it would be referred to as 'Clean'. Post installation monitoring of all 915 water points have been conducted. Clean environment was found in 903 water points which is 98.7% of the total water points as depicted in Fig. 10. As the schools were closed due to the COVID-19 situation, there was lack of maintenance and blocked drainage due to waste dumping near the outlet was observed. It can be noted that due to the provision of basin type water points, water logging and or other problems related to dirty environment have been dramatically reduced than that observed during the environmental screening of other types of tube well installed in PEDP-3 program.

Mitigation Measures Suggested (MMS):

During the monitoring phase, mitigation measures were suggested to the concerned school such as cleaning of basin, removal of leaves and other utensils that causes blockage of the drains etc. Because of taking mitigation measures, caretakers' training and routine maintenance during monitoring phase, environment of water supply facility improves to 100% from 98.7%.

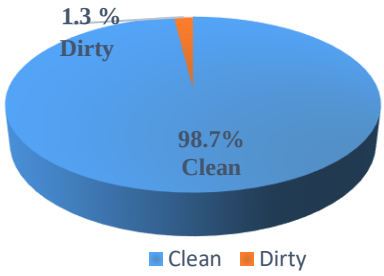


Fig. 10 Environment of water supply facility

8.6 Surface Water Pollution:

Both the water sources and wash blocks were installed in such a manner that they do not adversely pollute the surface water. The environmental screening of all 3036 Wash Block and 915 Water Points installed from January'21 up to May'21 revealed that they did not pollute any surrounding water bodies.

8.7 Facilities for draining out of water

From the lessons learnt during the environmental screening in PEDP-3, DPHE took initiative in solving the water logging problem by adopting different measures.

1) Pipe out used water to the existing drains.
2) Construction of 5 user water collection basin having 50mm dia. PVC washout pipe. Fig. 11. shows a newly constructed 5 outlet hand washing basins under PEDP-4.
3) Use of 8 ring soaks well to drain out basin water where surface drain is absent.

Fig. 11 Tube Well with Submersible Pump having 05 running water outlets

As because, DPHE local office took initiative in solving the drainage issue, it has been observed that, the water logging problem is insignificant compared to that in PEDP-3. However, it is revealed that out of 915 water sources about 1% had the problem of water logging. The reasons observed are mainly because of current COVID-19 situation schools are closed and hence the lack of cleanliness program was observed which created blockage of drainage pipe by wastes like paper, tree leaves, mud etc. It is hence suggested that, SMC needs to look after this issue and run regular cleanliness program in the water collection basin and drains.

8.8 Source of Existing Water Supply

During preliminary survey it was found that (Fig.12), out of 915 schools 98.5% did not have their own water option. 46.29% of them used the facility of their neighborhood. Though 1.5% schools have their own tube wells, yet those tube wells were found as non-functional or did not provide sufficient water during dry season. From the lessons learnt during the environmental screening in PEDP-3, DPHE took initiative in solving the above problem by installing new tube wells with submersible pump but at different depth as appropriate to the site geology.

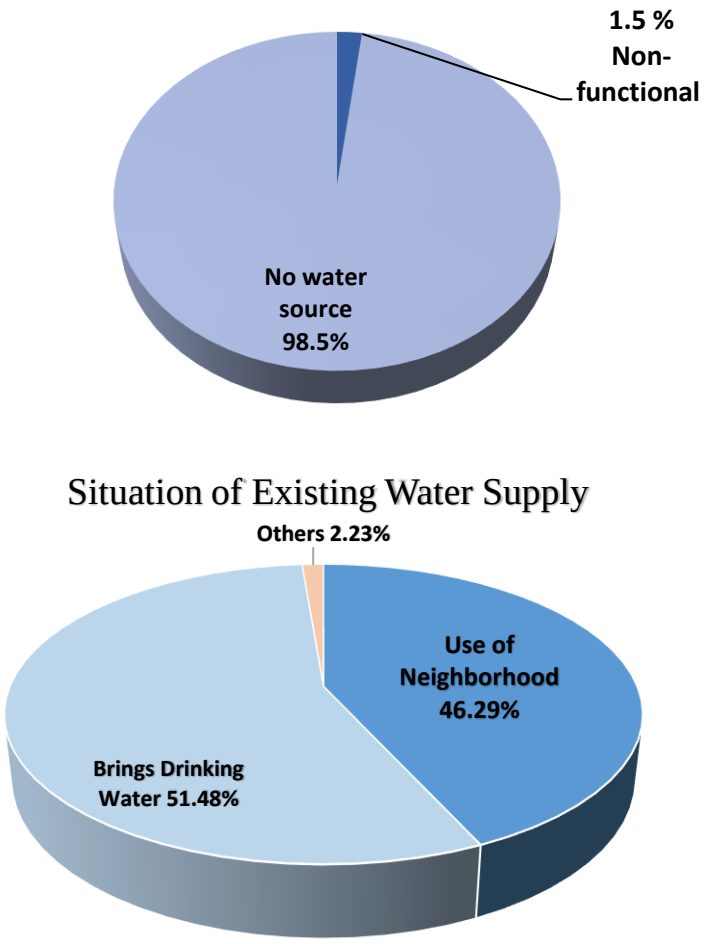


Fig. 12 Assessment of schools where new water points were installed

8.9 Water Quality Screening

As per MoU signed in between DPE and DPHE in September 15, 2019, DPHE will perform the testing of 65000 water points installed earlier in PEDP-3 project by DPHE in the next five years with an aim to provide safe drinking water and sanitation services in the primary schools under PEDP-4. Among those tests, 90% of the tests will be conducted in field and 10% will be conducted in Laboratory. But due to the COVID-19 pandemic schools are closed and so the field tests cannot be conducted. But

all the test kits are bought and well preserved by DPHE in order to conduct the field tests as soon as the schools will be re-open.

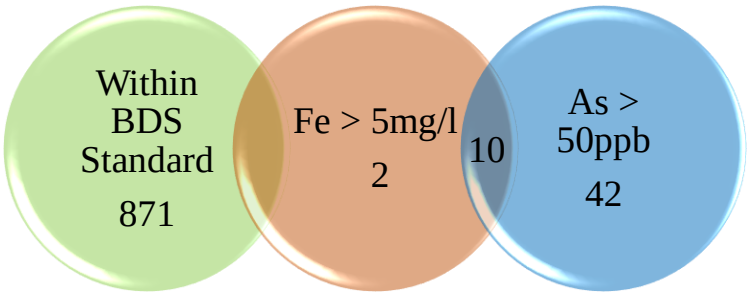
8.10 Water test in Laboratory

Water testing facilities in DPHE zonal laboratory:

During installation of water points, suitable water layers are generally selected based on the DPHE's experience and geographic location. After installation of new water points in the said 915 schools, laboratory tests were conducted to identify potential hazards of Arsenic, Iron and Chloride in water. The tests were done by the laboratory circle of DPHE and the reports are stored in the DPHE MIS database. Figure below shows laboratory testing facilities of DPHE.

Fig. 13 DPHE Zonal Laboratory setup for water testing

From the screening of 915 tube wells, it was found that 44 of them had the concern of excess arsenic (As) and/or, Iron (Fe) beyond the Bangladesh standard (arsenic, iron and chloride content below 50ppb, 5mg/l and 600mg/l respectively) of safe drinking water. For the rest of the cases arsenic, iron and chloride content were found satisfactory during laboratory tests. Water Quality report of those 44 unacceptable water sources and suggested alternative option along with retest result is summarized in Table 3 attached as Appendix-6. Fig. 14 shows the diagrammatic presentation of water quality test results. In addition, ample field tests were conducted in those schools during post monitoring phase by DPHE by using field kit which re-confirmed the DPHE laboratory test results. A sample copy of water test result is provided in Appendix-2 and water quality test report for 44 unacceptable water sources have been presented in Appendix-6.



Water Quality before Mitigation Measures

Water Quality after Mitigation Measures

Fig. 14 Water Quality at a glance

Mitigation Measures suggested:

In cases where arsenic/iron/chloride is found beyond allowable limit in installed water source, 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 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 zonal offices arrange and install the said filter in those water sources and water from those sources is further tested and the results were found to be satisfactory.

Fig. 15 AIRP & Other Filter Options executed in PEDP-3

8.11 Hand washing facility and Hygiene Promotion:

Prior to the installation of water sources, hand washing of students before and after meal especially mid-day meal and after using toilet was a matter of concern. As a result, students were more susceptible to diseases which triggered the absence of students from school. Besides these, newly constructed wash blocks with modern interior facility will surely create enthusiasm among children for the best utilization of wash blocks. A glimpse of wash block interior is shown in Fig 16.

Fig. 16 Modern Interior of Wash Blocks

Mitigation Measures Suggested (MMS):

Working with the moto of 'clean hand, safe hand' DPHE confirmed the installation of tube wells with running water supply by provision of submersible pump in all the above-mentioned schools during the reporting tenure. Construction of wash basin for drinking as well as hand washing (Fig.13) ensured total hand washing facilities in the school. Due to the global pandemic situation, although regular hygiene promotion activities could not be conducted yet monthly coordination meeting with DPE officials, TEO, ATEO and Primary School Headmasters is the indication of intensity of preparation for hygiene activities.

8.12 COVID-19 Reality & Responsive Action

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. Fig. 17 shows a real time photo of hygiene promotion that was conducted by the Assistant Engineer, DPHE, at Birganj Upazilla, Dinajpur. 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 (Appendix-5).

Fig. 17 Executive Engineer, DPHE conducting Hygiene promotion at school with TEO, ATEO & Head Masters

8.13 Miscellaneous observations

During the implementation phase, two basic standards were maintained.

1) Ensure at least a distance of 10m between water points and leach pit/soak well/ septic tank etc.
2) Ensure that the water collection basin is not clogged by paper, dry leaves, mud etc.

During monitoring phase, these options were found to be maintained properly.

8.14 Summary of observations

The post installation monitoring of all 3036 Wash Blocks and 915 water points confirmed no major concern or significant issues that can cause adverse environmental impact. Table 3 summarizes some other environmental issues observed during survey of Water points/ Wash Blocks.

Table 2 Important environmental issues observed

Issues/Environment Criteria	Findings from the Survey for all TWs	Findings from the Survey for all WBs
Is the TW installed?	Yes	Yes
Is the existing TW working?	Yes	Yes
Was the installed TW water tested?	Yes	Yes
Is Arsenic < 50ppb?	Yes	Yes
Is Iron <1mg/l, for iron prone area up to 5 mg/l [Based on Water Quality Monitoring and Surveillance Protocol for Running Water Supply System in Bangladesh by DPHE, Appendix-7]	Yes	Yes
Is Cl ≤ 600 mg/l, for coastal area up to 1000 mg/l [Based on Water Quality Monitoring and Surveillance Protocol for Running Water Supply System in Bangladesh by DPHE, Appendix-7]	Yes	Yes
Loss of agricultural land?	No	No
Negative effect on flora/fauna?	No	No
Conflicts with water supply, right?	No	No
Any potential health risks?	No	No
Is there provision of separate toilet for male and female?	N/A	Yes
Is there provision for adequate ventilation?	N/A	Yes
Is there provision for disabled children?	N/A	Yes

Note: Only the particular water source that met the drinking water quality in the laboratory test is handed over to the primary school authority. DPHE preserves all the testing report in the MIS cell.

8.15 Positive environmental impact

The outcomes of the environmental screening as discussed in the previous subsections pointed out the achievement of following positive impacts through the implementation of revised EMF and SMF during the construction works under PEDP-4.

1) Regular WASH related programs such as hygiene promotion through hand washing campaign not only increased the personal safety of students but also spread the positive vibe in the surrounding society which is now the key lessons for the inhabitants to fight against COVID-19.

2) Through the assurance of contamination free safe water sources in the said primary schools during the reporting tenure, a long-awaited demand was fulfilled which not only improved health potential of users but also reduced the dropout rate.
3) Lessons learnt from PEDP-3 helped in designing the type and structure of water sources with provision of running water free from bacteriological contamination. This initiative dramatically reduced the problem of water logging and drainage which was encountered in PEDP-3.

9. Health and Safety Guidelines against COVID-19

COVID-19 has disrupted day to day operations in construction work but as the time progresses, our understanding of how the virus spreads has also evolved. In these uncertain times, worksite safety and health are more important than ever before. DPHE follows the rules and regulations proclaimed by the Ministry of Local Government, Rural Development and Co-operatives (MLGRD&C). On 7th May'2020, the MLGRD&C provided some instructions on a basis of emergency for the safety considerations during the pandemic situation (Attached in Appandix-5) vide memo No. 1629 on 07/05/2020. Specific COVID-19 safety guidelines which is recommended for construction workers include-

i) The workers in construction sites have to maintain safe distance (i.e., 1m) from each other and have to wear the mask, hand gloves, gumboot, helmet etc. and no worker will be permitted in the project site without these equipments.
ii) There should be a proper arrangement of soap and hand sanitizer in worksite and all the workers must wash hand with antiseptic soap in an interval of 1 hour and also wash their faces and hands before taking meals and after using meals.
iii) The officials from DPHE headquarter should arrange cautionary meetings on covid-19 safety issues at district level and upazilla level with the Executive Engineer, Assistant Engineer, Sub-Assistant Engineer, and collect the updates from the construction sites about precautionary affairs through proper channel.
iv) In addition to the district level, DPHE officials should arrange meeting with School Head Masters at Upazilla level to make them informed about the safety issues for workers in the construction sites of schools as well as the special affairs due to corona pandemic.

10. 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. Office of the Assistant Engineer at upazilla level use to receive any grievance originated regarding the

construction activities. Since, no complain were raised from the concerned community, there was no issue of grievance redressal during the reporting tenure.

11.Monitoring progress report

It is fact that environmental screening report is related to the monitoring of implementation progress of environmental and social management plan. During the planning stage, all possible environmental and social safeguard issues are forecasted and related mitigation plans are included in the related contract packages. Issues related to EMP and SMP are clearly indicated in the 'Particular Conditions of Tender and Contract for Water Sources/ Wash Blocks' which is provided by default as a part of tender and contract. Following table shows the monitoring progress report of EMP during the reporting tenure.

Table 4 EMP progress monitoring

Monitoring Criteria	Progress Detail						
	July'18 – June'19	July'19-Dec'19	Jan'20-June'20	Jul'20-Dec'20	Jan'21-May'21	Cumulative	Compliance Status
No. of contracts that incorporated environmental clause	73/73	11/11	17/17	329/329	922/922	1352/1352	Complied
Funds utilized for addressing safeguards	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No of schools having dirty environment around water source	6/331	2/57	2/183	42/2145	12/915	64/3631	Complied
Schools with drainage congestion identified and solved	2/331	1/57	1/183	19/2145	9/915	32/3631	Complied
No. of water points having problem with quality of water	0/331	0/57	8/183	13/2145	44/915	52/3631	Complied

12. Conclusions

This study investigates the environmental safeguard concerns during the implementation of wash blocks, water points and major maintenance of wash blocks based on the approved EMF guidelines for PEDP-4. This report has presented potential environmental impacts associated with the pre-construction, construction and operation phases of the project. The environmental monitoring screening confirmed ***no significant instances or issues*** that may hamper or influence the environmental 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: Sample Environmental Screening

Environmental Screening Report for Wash Block

District: Mymensingh
Upazilla: Fulbaria
Name of School: Bashdi Govt. Primary School
School ID: 939303091101
Type of Wash Block: Isolated / Attached

Screening Question	Does it Exist		Impact Without Intervention			Impact During Implementation			Impact after Implementation			Remarks
	Yes	No	High	Low	No	High	Low	N/A	High	Low	No	
Condition of existing toilets Good/Usable?		✓		✓				✓	✓			
Are there provisions for safe solid & liquid waste disposal?		✓		✓				✓	✓			
Are there provisions for hand washing ?		✓		✓		✓			✓			
Are there provisions for foot washing?		✓		✓				✓	✓			
Does the existing toilets have running water supply?		✓		✓				✓	✓			
Is there provision for disabled children?		✓		✓				✓	✓			
Are there provisions of adequate urinals in male compartment?		✓		✓				✓	✓			
Is there provision for menstrual hygiene in the female compartment?		✓		✓				✓	✓			
Are there provisions of separate toilets for male & female users?		✓		✓				✓	✓			
Are the existing toilets have adequate ventillation?		✓		✓				✓	✓			
Distance of Existing water Source from Soak Pit > 10m		✓		✓				✓	✓			
Is there any reported events of sickness?	✓			✓				✓		✓		
Any Loss of Agricultural Land?		✓			✓			✓		✓		
Any Negative effect on flora/fauna?	✓			✓				✓			✓	
Are the existing toilets clean and hygienic?		✓		✓				✓	✓			

Signature of AE 03-2021 Signature of AE Signature of Executive Engineer 29/09/2020

Environmental Screening Report for Water Sources

District: Lakshmipur
Upazilla: Sadar
Name of School: Dakkin Shakshore Govt. Primary School
School ID: 914080417111
Type of Water Source: TSP/Ring well/ No. 6 Hand Pump/Others

Screening Questions	Base Line		Impact Without Intervention			Impact During Implementation			Impact after Implementation			Remarks
	Yes	No	+	-	N/A	+	-	N/A	+	-	N/A	
Any Source of existing drinking water?		✓			✓	✓			✓			
Environment of water supply facility good?		✓		✓				✓	✓			
Facilities for draining out of water proper?		✓		✓				✓	✓			
Any reported event of sickness?	✓			✓				✓		✓	✓	
Is the existing TW working?		✓		✓				✓	✓			
Was the water quality tested?		✓			✓			✓	✓			
Are there provisions for water collection basin?		✓			✓			✓	✓			
Any concern about water quality?	✓			✓				✓			✓	
Is there provisions for RO filter?		✓			✓			✓			✓	
Any health risk associated?	✓			✓				✓	✓			
Distance of existing water source from Soak Well > 10m		✓			✓			✓			✓	
Height & location of new water source appropriate?	✓				✓	✓		✓	✓			
Any loss of agricultural land?		✓			✓			✓	✓			
Any negative effect on flora/fauna?	✓			✓				✓			✓	
Any conflicts with water supply right?		✓			✓			✓	✓			

10.03.2021
Signature of SAE

Signature of AE

19/3/2021
Signature of Executive Engineer

Appendix-2: Sample water quality monitoring report

Government of the People's Republic of Bangladesh
Office of the Senior Chemist,
Department of Public Health Engineering
Barisal Zonal Lab C&B Road, Barisal.
Phone: 0431-2176153, E-mail : wqmsc_barishalzonallab@yahoo.com

Memo No: 46.03.0600.106.16.057.20- 18

Date: 19/07/2020.

Physical/Chemical/Bacteriological Analysis of Water Sample

Sample ID: BAR2020070478 To BAR2020070507, Total: 30	District: Jhalokathi.
Sent by: Executive Engineer, DPHE, Jhalokathi District, Jhalokathi.	Sample Source: DTW 06
Ref. Memo No: 46.03.4200.061.16.001.19-17 Date: 15/07/2020	Date of testing: 06/07/2020-17/07/2020
Collection date: 03/07/2020-14/07/2020	Received date: 06/07/2020-15/07/2020

LABORATORY TEST RESULTS:

Sample ID	District	Upazila	Village	School ID	Type of school	water point		Name of School	GPS	Water Quality					Remarks
						Type	Depth (m)			Sand	Clear	Fe(mg/l) LOQ:0.1 BDS: 0.3- 1.00	As (mg/l) LOQ:0.001 BDS: 0.05	Cl- (mg/l) BDS: 150-600	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
BAR2020070478	Jhalokathi	Sadar	Berkathi	503021109	1	1	Not Given	Berkathi GPS	22°41' 17 " N 90°14' 17 " E	No	Clear	0.426	<0.001	155	
BAR2020070479	Jhalokathi	Sadar	Chachoyr	503021108	1	1	Not Given	Chachoyr GPS	22°40' 58 " N 90°15' 20 " E	No	Clear	1.709	0.00405	20	
BAR2020070480	Jhalokathi	Sadar	Dewri	503020703	1	1	Not Given	Dewri GPS	22°36' 28 " N 90°11' 36 " E	No	Clear	0.615	<0.001	85	
BAR2020070481	Jhalokathi	Sadar	Baydarapur	503020803	1	1	Not Given	Baydarapur GPS	22°38'02 " N 90°10'17 " E	No	Clear	0.293	<0.001	140	
BAR2020070482	Jhalokathi	Sadar	Kandargati	501020202	1	1	Not Given	Kandargati GPS	22°43' 28 " N 90°13' 54 " E	No	Clear	1.237	0.00373	20	
BAR2020070483	Jhalokathi	Sadar	Khadaykhira	503020305	1	1	Not Given	Nabagram GPS	22°43' 41 " N 90°12' 34 " E	No	Clear	0.525	<0.001	120	
BAR2020070484	Jhalokathi	Sadar	Chamta	503020602	1	1	Not Given	Chamta GPS	22°41' 03 " N 90°12' 02 " E	No	Clear	0.942	<0.001	251	
BAR2020070485	Jhalokathi	Sadar	Ward-01	503029001	1		Not Given	Paschim Chandkathi Paurashava GPS	22°38' 03 " N 90°11' 47 " E	No	Clear	2.34	0.0027	150	

(Kazi ...)
Sample Analyzer, DPHE
Zonal Laboratory, Barisal

(Shamsuddin Ahmad)
Senior Chemist, DPHE

Appendix-3: WASH Block Case Study

CASE STUDY-01:

Project	Fourth Primary Education Development Program (PEDP-4)
Name of School	Bashdi Govt. Primary School
District	Mymensingh
Upazilla	Fulbaria
Handed Over Date	March,2021
Caretaker Training	March,2021
Monitoring from DPHE Local Office	Frequently during construction and twice after construction
Post Construction Monitoring from Focal Point's Office	March,2021

Wash Blocks was constructed in the above-mentioned school during January to May, 2021. After the wash block was handed over on March, 2021 to SMC, Care taker training and hygiene education was provided by the Sub-Assistant Engineer Md. Anwar Hossain, DPHE. At the time of handover to SMC, Sub-Assistant Engineer took initiative in giving caretaker training to the school. During caretaker training, following issues were covered:

i. Proper Use of Wash Block
ii. Hygiene Practice
iii. Cleanliness and maintenance aspect
iv. Emergency Contact to DPHE Local Office shortly
v.

Fig. 18 Handover of Wash block in presence of school authority

The post monitoring visit by SAE shows that the school is following the maintenance scheme properly.

Appendix-4: Tube Well Case Study

CASE STUDY-02:

Project	Fourth Primary Education Development Program (PEDP-4)
Name of School	Dakkhin Shaksor Government Primary School
District	Lakshmipur
Upazilla	Lakshmipur Sadar
Handed Over Date	March,2021
Caretaker Training	March,2021
Monitoring from DPHE Local Office	Frequently during construction and twice after construction
Post Construction Monitoring from Focal Point's Office	March,2021

Tube well was installed in the above-mentioned school on March,2021. At the time of installation of the tubewell, local DPHE Sub-Assistant engineer Md. Nasir Uddin, mechanics along with school SMC were present. Figure below shows this fact during lowering of the said tube well.

During handover to SMC, Sub-Assistant Engineer, Lakshmipur Sadar took initiative in giving caretaker training to the school. During caretaker training, following issues were covered:

i. Cleanliness & maintenance aspect
ii. Drainage of Water
iii. Emergency contact to DPHE local office shortly

Fig. 19 Monitoring of Tube well installation in presence of Executive engineer, DPHE

During post evaluation phase in the findings were found satisfactory and the water source was found functional.

Appendix-5: Construction Guidelines by MoLGRD during COVID-19

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
স্থানীয় সরকার, পল্লী উন্নয়ন ও সমবায় মন্ত্রণালয়
স্থানীয় সরকার বিভাগ
পাস-১ অধিশাখা।
www.lgd.gov.bd

শেখ হাসিনার মূলনীতি
গ্রাম শহরের উন্নতি

স্মারক নং-৪৬.০০.০০০০.০৮৩.১২.০০২.১৭(অংশ-১)-১৬২৯

তারিখঃ ২৪ বৈশাখ ১৪২৭ / ০৭ মে ২০২০

বিষয়ঃ জনস্বাস্থ্য প্রকৌশল অধিদপ্তর কর্তৃক বাস্তবায়নাধীন প্রকল্পের কাজ সম্পাদনের জন্য অনুসরণীয় নির্দেশনা।

সূত্রঃ জনপ্রশাসন মন্ত্রণালয়ের প্রজ্ঞাপন নং- ০৫.০০.০০০০.১৭৩.০৮.০১৪.০৭-১৩৫, তারিখ: ০৪ মে ২০২০।

উপর্যুক্ত বিষয় ও সূত্রোস্থ পত্রের প্রেক্ষিতে নির্দেশক্রমে জানানো যাচ্ছে যে, জনস্বাস্থ্য প্রকৌশল অধিদপ্তর কর্তৃক বাস্তবায়নাধীন প্রকল্পের কাজ সম্পাদনের জন্য নিম্নবর্ণিত নির্দেশনা অনুসরণ করতে হবেঃ

০১) প্রকল্প এলাকায় করোনা ভাইরাস (কভিড-১৯) বিষয়ক স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয় কর্তৃক জারিকৃত নির্দেশনা সম্বলিত সাইনবোর্ড স্থাপন করতে হবে;

০২) স্বাস্থ্য বিধি অনুসরণ ও সামাজিক দূরত্ব রক্ষা করে প্রকল্পের কাজ সম্পাদন করতে হবে। প্রকল্প কাজে যে সকল শ্রমিক কাজ করবে তারা শারীরিকভাবে সুস্থ কি-না তা নির্ণয়ের জন্য থার্মাল স্ক্যানারের মাধ্যমে তাদের শরীরের তাপমাত্রা পরীক্ষা করতে হবে;

০৩) ট্রাকে করে নির্মাণ সামগ্রী পরিবহন/সরবরাহের সময় ট্রাকের সামনে ব্যানারে জনস্বাস্থ্য প্রকৌশল অধিদপ্তর কর্তৃক বাস্তবায়নাধীন সুনির্দিষ্ট প্রকল্পের নাম উল্লেখ থাকতে হবে;

০৪) প্রকল্প কাজ সম্পাদনের জন্য শ্রমিকদের নির্দিষ্ট পোশাক পরিধান করতে হবে এবং প্রযোজ্য ক্ষেত্রে মাস্ক, হ্যান্ডগ্লোভস, গামবুট, হেলমেট ব্যবহার করতে হবে;

০৫) প্রকল্প এলাকায় নির্মাণ শ্রমিকদের জন্য সাবান পানি দিয়ে হাত ধোয়ার ব্যবস্থা থাকতে হবে। প্রয়োজনে হ্যান্ড স্যানিটাইজার সরবরাহ করতে হবে;

০৬) চলমান প্রকল্প এলাকায় কার্যক্রম চলাকালীন কাজের বিবরণ সম্বলিত সাইনবোর্ড স্থাপন করতে হবে;

০৭) প্রকল্প কাজে নির্মাণ সংশ্লিষ্ট যন্ত্রপাতি ব্যবহারের ক্ষেত্রে স্বাস্থ্য সুরক্ষার বিষয়টি নিশ্চিত করতে হবে;

০৮) প্রকল্প কাজে নিয়োজিত নির্মাণ শ্রমিকদের স্বাস্থ্য বিধি অনুসরণপূর্বক সামাজিক দূরত্ব বজায় রেখে নির্ধারিত নির্মাণ শেডে অবস্থান করতে হবে;

০৯) পাথর, সিমেন্ট বা অন্যান্য নির্মাণ সামগ্রী এক জেলা হতে অন্য জেলায় পরিবহনের প্রয়োজন হলে সংশ্লিষ্ট জেলা প্রশাসকগণকে অবহিত করতে হবে;

১০) প্রযোজ্য ক্ষেত্রে প্রকল্পের কাজ চালানোর জন্য সংশ্লিষ্ট জেলা প্রশাসক/উপজেলা নির্বাহী অফিসারের অনুমতি গ্রহণ করতে হবে;

অপর পৃষ্ঠায় দ্রষ্টব্য-

-০২-

১১) উল্লিখিত নির্দেশনা যথাযথভাবে অনুসরণ করা হচ্ছে কিনা তা মাঠ পর্যায়ে তদারকির জন্য জনস্বাস্থ্য প্রকৌশল অধিদপ্তর একটি কমিটি গঠন করবে। কমিটি প্রতি মাসে স্থানীয় সরকার বিভাগ বরাবর প্রতিবেদন দাখিল করবে।

১২) ঈদ-উল-ফিতরের সরকারি ছুটিতে সকল কর্মকর্তা-কর্মচারীকে তার স্ব-স্ব কর্মস্থলে অবস্থান করতে হবে।

মো: খাইরুল ইসলাম
যুগ্মসচিব
ফোন: ৯৫৭৫৫৬২

প্রধান প্রকৌশলী
জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
কাকরাইল, ঢাকা।

স্মারক নং-৪৬.০০.০০০০.০৮৩.১২.০০২.১৭(অংশ-২)- ১৬২৯/০২(০৮) তারিখঃ ২৪ বৈশাখ ১৪২৭ / ০৭ মে ২০২০

অনুলিপিঃ (সদয় অবগতির জন্য)

১. অতিরিক্ত সচিব (পাস), স্থানীয় সরকার বিভাগ।
২. বিভাগীয় কমিশনার (সকল), ... বিভাগ।
৩. মাননীয় মন্ত্রীর একান্ত সচিব, স্থানীয় সরকার পল্লী উন্নয়ন ও সমবায় মন্ত্রণালয়।
৪. জেলা প্রশাসক (সকল), ... জেলা।
৫. উপসচিব, বিধি-৪ শাখা, জনপ্রশাসন মন্ত্রণালয়, বাংলাদেশ সচিবালয়, ঢাকা।
৬. সিনিয়র সচিবের একান্ত সচিব, স্থানীয় সরকার বিভাগ।
৭. কম্পিউটার প্রোগ্রামার, স্থানীয় সরকার বিভাগ।
৮. অফিস কপি।

মো: খাইরুল ইসলাম
যুগ্মসচিব

Appendix-6: Water Quality Report of Unacceptable Water Sources

4th Primary Education Development Program (PEDP-4)

Progress Report for Water Sources

Reporting Date 09-03-2021

Sl No	District	Upazilla	Name of School	EMIS CODE	Package Number	No of TSP in a Package	Date of contract sign (dd.mm/yy)	Name of contractor	Contract amount (lac)	Physical Progress (%)	Bill Paid Amount (lac)	Completion Due Date (dd.mm.yy)	Actual Completion Date (dd.mm.yy)	Lab Test Data		
														AS	Fe	Cl
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHAK-JHOGRU	91112030201						100		31-12-20	13-11-20	0.021	2.1	45
2	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHAR ANUP NAGAR 2 N0 RPS	99112031202						100		31-12-20	12-11-20	0.027	1.8	15
3	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHAR RAJARAMPUR RPS	99112031601						100		31-12-20	14-11-20	0.48	3.8	80
4	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHARBAGDANGA-2 GOVT. PRY.	91112031503						100		31-12-20	13-11-20	0.016	1.3	15
5	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHARBAGDANGGA	99112031905						100		31-12-20	13-11-20	0.024	2.4	12
6	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHARJOTPROTAP GOVT.	91112030148						100		31-12-20	27-10-20	0.117	10.3	95
7	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHARKALA RPS	99112031414						100		31-12-20	12-11-20	0.078	1.3	15
8	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHARMOHONPUR	99112039301						100		31-12-20	12-11-20	0.125	10.2	35
9	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHORE TERORSIA RPS	99112039002						100		31-12-20	13-11-20	0.067	3.3	30
10	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHUNAKHALI GOVT. PRIMARY	91112030807						100		31-12-20	11-11-20	0.073	0.5	20
11	CHAPAINAWABGANJ	NAWABGONJ SADAR	DABINAGAR BHATOPARA RPS	99112031404						100		31-12-20	12-11-20	0.044	8.6	42
12	CHAPAINAWABGANJ	NAWABGONJ SADAR	DABINAGAR FATAPARA RPS	99112031413						100		31-12-20	02-11-20	0.017	0.7	30
13	CHAPAINAWABGANJ	NAWABGONJ SADAR	GHORAPAKHIA (2) GOVT.	91112030809						100		31-12-20	12-11-20	0.185	11.1	45
14	CHAPAINAWABGANJ	NAWABGONJ SADAR	GOBRATALA GOVT. PRIMARY	91112030507						100		31-12-20	13-11-20	0.053	8.7	15
15	CHAPAINAWABGANJ	NAWABGONJ SADAR	GROKHO NATH PUR	91112030205	PEDP-4-0141	30	19-05-20	Md. Shah Alamgir	68.55	100	42.09	31-12-20	13-11-20	0.004	0.3	16
16	CHAPAINAWABGANJ	NAWABGONJ SADAR	JELA PARA RPS	99112030605						100		31-12-20	13-11-20	0.001	0.5	24
17	CHAPAINAWABGANJ	NAWABGONJ SADAR	JOLAHAR GOVT. PRIMARY	91112031581						100		31-12-20	11-11-20	0.001	0.5	26
18	CHAPAINAWABGANJ	NAWABGONJ SADAR	KALINAGAR	91112031601						100		31-12-20	04-11-20	0.093	3	20
19	CHAPAINAWABGANJ	NAWABGONJ SADAR	KISNE DOHA MOLLAN RPS	99112031808						100		31-12-20	12-11-20	0.142	1.4	18
20	CHAPAINAWABGANJ	NAWABGONJ SADAR	KRISNAGOBINDAPUR-1 GOVT.	91112030803						100		31-12-20	13-11-20	0.125	15.7	16
21	CHAPAINAWABGANJ	NAWABGONJ SADAR	LAXMINARAYANPUR (1)	91112031206						100		31-12-20	14-11-20	0.065	2	30
22	CHAPAINAWABGANJ	NAWABGONJ SADAR	MAHARAJPUR GOVT. PRIMARY	91112030701						100		31-12-20	31-10-20	0.263	9.4	22
23	CHAPAINAWABGANJ	NAWABGONJ SADAR	MOHADANGA	91112030138						100		31-12-20	11-11-20	0.002	0.1	20
24	CHAPAINAWABGANJ	NAWABGONJ SADAR	NABABZAIGIR	91112031411						100		31-12-20	11-11-20	0.037	2.1	10
25	CHAPAINAWABGANJ	NAWABGONJ SADAR	NAMO SURJA NARAYAN PUR	91112031307						100		31-12-20	11-11-20	0.164	0.6	44
26	CHAPAINAWABGANJ	NAWABGONJ SADAR	NAWABGONJ MODEL GOVT.	91112030101						100		31-12-20	11-11-20	0.191	13.8	16
27	CHAPAINAWABGANJ	NAWABGONJ SADAR	NAYAN SUKA	91112030128						100		31-12-20	12-11-20	0.638	16.3	82
28	CHAPAINAWABGANJ	NAWABGONJ SADAR	NORANDRAPUR POSCHIMPARA	99112031504						100		31-12-20	14-11-20	0.029	0.4	15
29	CHAPAINAWABGANJ	NAWABGONJ SADAR	NOSHIPUR RPS	99112030602						100		31-12-20	13-11-20	0.014	0.7	32
30	CHAPAINAWABGANJ	NAWABGONJ SADAR	PALSHA	91112030208						100		31-12-20	05-11-20	0.004	0.3	30

09-03-2021
(Amit Kumar Sarker)
Executive Engineer, DPHE
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Water Test Report of PEDP-04 Project

Work order No. 46.03.1800.061.14.004.15-205: date : 20/08/2020 Package No. : ..... Contactor : Md. Shah Alamgir, Chapainawabgonj.

Sl. No.	District	Upazilla	Village/Ward	ID	Type of School	Water Point		Name Of School	GPS Reading	Water Quality				Remarks
						Type	Depth (M)			Sand	Clear	As (mg/L)	Fe (mg/L)	Cl (mg/L)	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Chuadanga	Chuadanga Sadar	Gabargara	203040201	1	DTW (Sub-Mer.)	108.23	Gabargara Govt. Primary School	N: 23°31'27.10'' E : 88°54'59.60''	Free	Clear	0.145	5.38	20	
2	Chuadanga	Chuadanga Sadar	Horishpur	203040302	1	DTW (Sub-Mer.)	108.23	Horishpur Govt. Primary School	N: 23°31'8.10'' E : 88°50'48.60''	Free	Clear	0.053	2.57	15	
3	Chuadanga	Chuadanga Sadar	Nobinnagar	203040503	1	DTW (Sub-Mer.)	106.71	Nobinnagar Govt. Primary School	N: 23°34'29.50'' E : 88°56'42.30''	Free	Clear	0.030	2.49	15	
4	Chuadanga	Chuadanga Sadar	Begumpur	203040601	1	DTW (Sub-Mer.)	109.76	Begumpur Govt. Primary School	N: 23°31'33.88'' E : 88°52'15.47''	Free	Clear	0.053	2.44	25	
5	Chuadanga	Chuadanga Sadar	Kotali	203040604	1	DTW (Sub-Mer.)	111.28	Kotali Govt. Primary School	N: 23°31'43.64'' E : 88°51'05.44''	Free	Clear	0.091	4.88	20	
6	Chuadanga	Chuadanga Sadar	Sharabaria	203040703	1	DTW (Sub-Mer.)	109.76	Sharabaria Govt. Primary School	N: 23°30'09.44'' E : 88°55'10.63''	Free	Clear	0.027	2.32	10	
7	Chuadanga	Chuadanga Sadar	Kedargonj	203040103	1	DTW (Sub-Mer.)	106.71	Kedargonj Govt. Primary School	N: 23°38'19.30'' E : 88°50'06.90''	Free	Clear	0.114	1.97	15	
8	Chuadanga	Chuadanga Sadar	Nehalpur	203040607	1	DTW (Sub-Mer.)	103.66	Nehalpur Govt. Primary School	N: 23°34'18.01'' E : 88°51'22.09''	Free	Clear	0.082	2.67	10	
9	Chuadanga	Chuadanga Sadar	Ward No.-09	203040112	1	DTW (Sub-Mer.)	106.71	Rejia Khatun Provati Govt. Primary School	N: 23°38'14.80'' E : 88°50'50.80''	Free	Clear	0.021	0.43	40	
10	Chuadanga	Chuadanga Sadar	Sarajgonj	203040501	1	DTW (Sub-Mer.)	108.23	Sarajgonj Govt. Primary School	N: 23°35'25.10'' E : 88°56'16.60''	Free	Clear	0.084	2.62	15	

Sample Collected by:
Md. Nazrul Islam
06.08.21

Sample Analyzed by:
Md. Moniruzzaman
Senior Chemist
06/08/21

Countersigned/Approved by:
Md. Nazrul Islam
Senior Chemist
06/08/2021

Water Test Report of PEDP-4 Project

Work order No: 46.03.1800.061.14.004.15-205: date : 20/08/2020 Package No. : ..... Contactor : Md. Shah Alamgir, Chapainawabgonj.

Sl. No.	District	Upazilla	Village/Ward	ID	Type of School	Water Point		Name Of School	GPS Reading	Water Quality				Remarks
						Type	Depth (M)			Sand	Clear	As (mg/L)	Fe (mg/L)	Cl (mg/L)	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
11	Chuadanga	Chuadanga Sadar	Mohammadzuma	203049301	1	DTW (Sub-Mer.)	108.23	Mohammadzuma Govt. Primary School	N: 23°36'08.00'' E: 88°57'28.80''	Free	Clear	0.007	3.43	10	
12	Chuadanga	Chuadanga Sadar	Krishnapur	204049004	1	DTW (Sub-Mer.)	109.76	Subodpur Boalmary Govt. Primary School	N: 23°33'05.01'' E: 88°49'52.20''	Free	Clear	0.007	0.19	30	
13	Chuadanga	Chuadanga Sadar	Ward No.-05	203040808	1	DTW (Sub-Mer.)	108.23	Motiar Rahman Malik Govt. Primary School	N: 23°39'20.10'' E: 88°51'03.40''	Free	Clear	0.027	2.05	20	
14	Chuadanga	Chuadanga Sadar	Rajapur	203040114	1	DTW (Sub-Mer.)	106.71	Rajapur Govt. Primary School	N: 23°39'28.20'' E: 88°49'20.50''	Free	Clear	0.078	4.28	35	
15	Chuadanga	Chuadanga Sadar	Khejura	203040402	1	DTW (Sub-Mer.)	109.76	Khejura Govt. Primary School	N: 23°36'50.00'' E: 88°53'09.30''	Free	Clear	0.030	3.57	15	
16	Chuadanga	Chuadanga Sadar	Aliarpur	203040502	1	DTW (Sub-Mer.)	105.18	Aliarpur Govt. Primary School	N: 23°33'59.50'' E: 88°58'33.30''	Free	Clear	0.003	2.39	20	
17	Chuadanga	Chuadanga Sadar	Jafarpur	203040802	1	DTW (Sub-Mer.)	108.23	Nurnagar Jafarpur Govt. Primary School	N: 23°37'21.70'' E : 88°51'32.9''	Free	Clear	0.024	2.73	25	
18	Chuadanga	Chuadanga Sadar	Jhajri	203040303	1	DTW (Sub-Mer.)	109.76	Jhajri Govt. Primary School	N: 23°30'55.47'' E: 88°53'12.95''	Free	Clear	0.078	2.74	15	
19	Chuadanga	Chuadanga Sadar	Jafarpur BGB Camp	203040606	1	DTW (Sub-Mer.)	105.18	Shimanto Govt. Primary School	N: 23°37'06.30'' E: 88°52'19.30''	Free	Clear	0.054	4.35	15	
20	Chuadanga	Chuadanga Sadar	Daulatdiar	203040809	1	DTW (Sub-Mer.)	102.13	Shisukallan Govt. Primary School	N: 23°39'09.10'' E: 88°50'24.50''	Free	Clear	0.085	2.02	10	

Sample Collected by

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

06.01.21

Sample Analyzed by:

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Countersigned/Approved by:

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Primary Education Development Program (NNGPS & GPS)

Laboratory Test Result

District	Upzilla	Village	ID	Type of School	Water Point Type	Depth (m)	Name of School	GPS		Water Quality		Test Result			Remarks
								Latitude	Longitude	Sand	Clear	Fe (mg/L)	As (mg/L)	Cl (mg/L	
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Sunmganj	South Sunamganj	Haripur	99601119013	1	1		Haripur GPS	24°55'26"	91°19'48"	1	1	0.8	0.071	24	Unit (mg/l
Sunmganj	South Sunamganj	Chandpur	91601011412	1	1		Chandpur GPS	24°57'37"	91°18'55"	1	1	0.6	0.044	22	
Sunmganj	South Sunamganj	Hasarchar	91601010708	1	1		Hasarchar GPS	24°54'39"	91°20'59"	1	1	1.8	0.011	18	
Sunmganj	South Sunamganj	Kablakhai	91601010207	1	1		Kablakhai GPS	24°51'26"	91°28'51"	1	1	1.9	0.076	16	
Sunmganj	South Sunamganj	Kamrupdulang	91601111582	1	1		Eaquali Kamrupdulang G	24°57'08"	91°25'46"	1	1	1.9	0.108	18	
Sunmganj	South Sunamganj	Patharia	91601010701	1	1		Patharia GPS	24°52'36"	91°21'51"	1	1	1.2	0.114	19	
Sunmganj	South Sunamganj	Asampur	91601011510	1	1		Asampur GPS	24°56'59"	91°26'54"	1	1	2.1	0.12	19	
Sunmganj	South Sunamganj	Pagla	91601010401	1	1		Pagla GPS	24°53'06"	91°25'20"	1	1	2.3	0.121	20	
Sunmganj	South Sunamganj	Birgaon Pachim	99601119020	1	1		Birgaon Pachim GPS	24°55'31"	91°32'40"	1	1	1.4	0.007	21	
Sunmganj	South Sunamganj	Haskuri	91601010602	1	1		Haskuri GPS	24°53'04"	91°24'18"	1	1	3.8	0.111	22	
Sunmganj	South Sunamganj	Cisni	91601010204	1	1		Cisni GPS	24°54'36"	91°27'39"	1	1	2.4	0.111	22	
Sunmganj	South Sunamganj	Ratpara	91601010402	1	1		Ratpara GPS	24°55'18"	91°26'07"	1	1	2.1	0.092	18	
Sunmganj	Jamalganj	Kujargaon	99601060311	1	1		Kujargaon GPS	25°03'06"	91°12'52"	1	1	1	0.038	18	
Sunmganj	Jamalganj	Shapur	99601060203	1	1		Abdur Bari GPS	24°59'19"	91°14'20"	1	1	1.1	0.036	21	
Sunmganj	Jamalganj	Beheli	91601060101	1	1		Beheli GPS	25°02'58"	91°12'54"	1	1	2.3	0.045	21	
Sunmganj	Jamalganj	Madnakandi	99601060104	1	1		Madnakandi GPS	25°02'36"	91°12'51"	1	1	1.3	0.056	19	
Sunmganj	Tahirpur	Khalisapur	99601050201	1	1		Khalisapur GPS	25°09'58"	91°10'05"	1	1	4.1	0.023	18	
Sunmganj	Tahirpur	Shibrampur	99601050305	1	1		Shibrampur GPS	25°08'54"	91°08'11"	1	1	0.6	0.012	20	
Sunmganj	Tahirpur	Monboz	99601050303	1	1		Monboz GPS	25°09'58"	91°07'55"	1	1	1.9	0.022	20	
Sunmganj	Tahirpur	Mandiata	91601050307	1	1		Mandiata GPS	25°09'18"	91°06'45"	1	1	2.9	0.121	19	
Sunmganj	Tahirpur	Joypur	91601050305	1	1		Joypur GPS	25°08'01"	91°06'39"	1	1	3.5	0.036	21	
Sunmganj	Tahirpur	Kalapara	99601050409	1	1		Kalapara GPS	25°06'54"	91°03'41"	1	1	1.5	0.118	22	
Sunmganj	Tahirpur	Manikitla	91601050409	1	1		Manikitla GPS	25°05'28"	91°05'35"	1	1	0.4	0.041	21	
Sunmganj	Tahirpur	Annandanagar Latibpu	99601050402	1	1		Annandanagar Latibpur G	25°05'38"	91°07'17"	1	1	5.6	0.034	19	
Sunmganj	Tahirpur	Matiian	91601050308	1	1		Matiian GPS	25°08'40"	91°08'49"	1	1	4.7	0.057	19	
Sunmganj	Bishambarpur	Anantapur	91601030111	1	1		Anantapur GPS	25°04'42"	91°14'11"	1	1	1.2	0.068	18	
Sunmganj	Bishambarpur	Dulbarchar	99601030108	1	1		Khodadila GPS	25°02'35"	91°16'46"	1	1	0.9	0.049	20	
Sunmganj	Bishambarpur	Bhadertek	91601030404	1	1		Bhadertek GPS	25°07'43"	91°22'09"	1	1	0.4	0.033	20	
Sunmganj	Bishambarpur	Jogonathpur	99601030404	1	1		Jogonathpur GPS	25°06'27"	91°21'59"	1	1	0.5	0.008	21	
Sunmganj	Bishambarpur	Ratargaon	91601030402	1	1		Ratargaon GPS	25°08'01"	91°22'24"	1	1	7.1	0.027	19	

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Sample Analyzer
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24.11.2020
Dhononjoy Kumar Das
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Md. Zahidul Islam Miah
Senior Chemist
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Table 3 - List of Unacceptable Water Sources where mitigation measures were considered

SL No	District Name	Upazila Name	Name Of School	School ID	Test Result			Remark	Suggested Option	After intervention	
					As	Fe	Cl			As	Fe
1	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHAR RAJARAMPUR RPS	99112031601	0.48	3.8	80	not acceptable	RO Filter	<0.001	N/A
2	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHAR RJOTPROTAP GOVT	99112030148	0.117	10.3	95	not acceptable	RO Filter	<0.001	0.83
3	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHARKALA RPS	99112031414	0.078	1.3	15	not acceptable	RO Filter	<0.001	N/A
4	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHARMOHONPUR DOKHINPARA	99112039301	0.125	10.2	35	not acceptable	RO Filter	<0.001	2.3
5	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHORE TEROROSIA RPS	99112039002	0.067	3.3	30	not acceptable	RO Filter	<0.001	N/A
6	CHAPAINAWABGANJ	NAWABGONJ SADAR	CHUNAKHALI GOVT. PRIMARY SCHOOL	91112030807	0.073	0.5	20	not acceptable	RO Filter	<0.001	N/A
7	CHAPAINAWABGANJ	NAWABGONJ SADAR	DABINAGAR BHATOPARA RPS	99112031404	0.091	8.6	42	not acceptable	RO Filter	<0.001	2.7
8	CHAPAINAWABGANJ	NAWABGONJ SADAR	GHORAPAKHIA (2) GOVT. PRIMARY SCHOOL	91112030809	0.185	11.1	45	not acceptable	RO Filter	<0.001	2.89
9	CHAPAINAWABGANJ	NAWABGONJ SADAR	GOBRATALA GOVT. PRIMARY SCHOOL	91112030507	0.053	8.7	15	not acceptable	RO Filter	<0.001	2.53
10	CHAPAINAWABGANJ	NAWABGONJ SADAR	KALINAGAR	91112031601	0.093	3	20	not acceptable	RO Filter	<0.001	N/A
11	CHAPAINAWABGANJ	NAWABGONJ SADAR	KISNE DOHA MOLLAN RPS	99112031808	0.062	1.4	18	not acceptable	RO Filter	<0.001	N/A
12	CHAPAINAWABGANJ	NAWABGONJ SADAR	KRISNAGOBINDAPUR-1 GOVT. PRIMARY SCHOOL	91112030803	0.175	15.7	16	not acceptable	RO Filter	<0.001	3.2
13	CHAPAINAWABGANJ	NAWABGONJ SADAR	LAXMINARAYANPUR (1)	91112031206	0.065	2	30	not acceptable	RO Filter	<0.001	N/A
14	CHAPAINAWABGANJ	NAWABGONJ SADAR	MAHARAJPUR GOVT. PRIMARY SCHOOL	91112030701	0.203	9.4	22	not acceptable	RO Filter	<0.001	1.7
15	CHAPAINAWABGANJ	NAWABGONJ SADAR	NABABZAIGIR	91112031411	0.087	2.1	10	not acceptable	RO Filter	<0.001	N/A
16	CHAPAINAWABGANJ	NAWABGONJ SADAR	NAMO SURJA NARAYAN PUR	91112031307	0.104	0.6	44	not acceptable	RO Filter	<0.001	N/A
17	CHAPAINAWABGANJ	NAWABGONJ SADAR	NAWABGONJ MODEL GPS	91112030101	0.191	13.8	16	not acceptable	RO Filter	<0.001	3.3

SL No	District Name	Upazila Name	Name Of School	School ID	Test Result			Remark	Suggested Option	After intervention	
					As	Fe	Cl			As	Fe
18	CHAPAINAWABGANJ	NAWABGONJ SADAR	NAYAN SUKA	91112030128	0.638	16.3	82	not acceptable	RO Filter	<0.001	4.3
19	CHUADANGA	CHUADANGA SADAR	GABARGARA	203040210	0.145	5.38	20	not acceptable	RO Filter	<0.001	0.4
20	CHUADANGA	CHUADANGA SADAR	HORISHPUR	203040302	0.053	2.57	15	not acceptable	RO Filter	<0.001	N/A
21	CHUADANGA	CHUADANGA SADAR	BEGUMPUR	203040601	0.053	2.44	25	not acceptable	RO Filter	<0.001	N/A
22	CHUADANGA	CHUADANGA SADAR	KOTALI	203040604	0.091	4.88	20	not acceptable	RO Filter	<0.001	N/A
23	CHUADANGA	CHUADANGA SADAR	KEDARGONJ	203040103	0.114	1.97	15	not acceptable	RO Filter	<0.001	N/A
24	CHUADANGA	CHUADANGA SADAR	NEHALPUR	203040607	0.082	2.67	10	not acceptable	RO Filter	<0.001	N/A
25	CHUADANGA	CHUADANGA SADAR	SARAJGONJ	203040501	0.084	2.62	15	not acceptable	RO Filter	<0.001	N/A
26	CHUADANGA	CHUADANGA SADAR	RAJAPUR	203040114	0.078	4.28	35	not acceptable	RO Filter	<0.001	N/A
27	CHUADANGA	CHUADANGA SADAR	JHAJRI	203040303	0.078	2.74	15	not acceptable	RO Filter	<0.001	N/A
28	CHUADANGA	CHUADANGA SADAR	JAFARPUR BGB CAMP	203040606	0.054	4.35	15	not acceptable	RO Filter	<0.001	N/A
29	CHUADANGA	CHUADANGA SADAR	DAULATDIAR	203040809	0.085	2.02	10	not acceptable	RO Filter	<0.001	N/A
30	CHUADANGA	ALAMDANGA	SONATONPUR	203011581	0.168	0.89	15	not acceptable	RO Filter	<0.001	N/A
31	SUNAMGANJ	South Sunamganj	Hari Pur	99601119013	0.071	0.8	24	not acceptable	Sono Filter	<0.001	N/A
32	SUNAMGANJ	South Sunamganj	Kablakhai	91601010207	0.076	1.9	16	not acceptable	Sono Filter	<0.001	N/A
33	SUNAMGANJ	South Sunamganj	Eaqubali Kamrupdulang	91601111582	0.108	1.9	18	not acceptable	Sono Filter	<0.001	N/A
34	SUNAMGANJ	South Sunamganj	Pataharia	91601010701	0.114	1.2	19	not acceptable	Sono Filter	<0.001	N/A
35	SUNAMGANJ	South Sunamganj	Asampur	91601011510	0.12	2.1	19	not acceptable	Sono Filter	<0.001	N/A
36	SUNAMGANJ	South Sunamganj	Pagla	91601010401	0.121	2.3	20	not acceptable	Sono Filter	<0.001	N/A
37	SUNAMGANJ	South Sunamganj	Haskuri Gps	91601010602	0.111	3.8	22	not acceptable	Sono Filter	<0.001	N/A

SL No	District Name	Upazila Name	Name Of School	School ID	Test Result			Remark	Suggested Option	After intervention	
					As	Fe	Cl			As	Fe
38	SUNAMGANJ	South Sunamganj	Cisni	91601010204	0.111	2.4	22	not acceptable	Sono Filter	<0.001	N/A
39	SUNAMGANJ	South Sunamganj	Ratpara	91601010402	0.092	2.1	18	not acceptable	Sono Filter	<0.001	N/A
40	SUNAMGANJ	Tahirpur	Mandiata	91601050307	0.121	2.9	19	not acceptable	Sono Filter	<0.001	N/A
41	SUNAMGANJ	Tahirpur	Kalapara	99601050409	0.118	1.5	22	not acceptable	Sono Filter	<0.001	N/A
42	SUNAMGANJ	Tahirpur	Annandanager Latippur	99601050402	0.034	5.6	19	not acceptable	Sono Filter	<0.001	0.6
43	SUNAMGANJ	Bishumbarpur	Anantapur	91601030111	0.068	1.2	18	not acceptable	Sono Filter	<0.001	N/A
44	SUNAMGANJ	Bishumbarpur	Ratargaon	91601030402	0.027	7.1	19	not acceptable	Sono Filter	<0.001	1.1

Appendix-7: 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 ১-২ মূলে নির্দেশ করা হয়েছে। নির্বাচিত ক্রিটিক্যাল রাসায়নিক (critical chemical) পারামিটারসমূহ নিম্নে বর্ণনা করা হলো।

আর্সেনিক

১৯৯৩ সালে ভূ-গর্ভস্থ পানিতে আর্সেনিক দূষণের বিষয়টি উদ্ঘাটিত হওয়ার পর থেকে বাংলাদেশের ২৭৫ টি উপজেলার অগভীর নলকূপসমূহে বিভিন্ন মাত্রায় 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 আভ্যন্তরীণ ও চর্ম ক্যানসারও হতে পারে। বাংলাদেশে আর্সেনিকই একমাত্র রাসায়নিক যৌগ যার ফলে স্বাস্থ্যের প্রতি মারাত্মক প্রতিক্রিয়া দেখা দিয়েছে।

নিয়মিত স্যাম্পলিং প্রযুক্তি ব্যবহারের মাধ্যমে পানিতে আর্সেনিকের মাত্রার ভিত্তিতে 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 মিলি গ্রাম বা ৫০ মাইক্রোগ্রাম।

ক্লোরাইড বা লবণাক্ততা (chloride)

বাংলাদেশের উপকূলীয় অঞ্চলের অগভীর নলকূপসমূহে উচ্চ মাত্রায় ক্লোরাইড বা লবণাক্ততা রয়েছে। লবণাক্ততা অনুপ্রবেশের কারণে বাংলাদেশে অগভীর পানিস্তরে লবনাক্ততা ক্রমশঃ বাড়ছে। তবে গভীর নলকূপসমূহে সাধারনতঃ কম মাত্রার লবণাক্ততা রয়েছে। পানির গুণাগুণ বিষয়ক বিশ্ব স্বাস্থ্য সংস্থার গাইড লাইনে (৩য় সংস্করণ) স্বাস্থ্যগত কোন গাইড লাইন মান প্রতিষ্ঠা করা হয়নি তবে লক্ষনীয় যে, প্রতি লিটারে ২৫০ মিলিগ্রাম মাত্রার বেশী লবণাক্ততা পানীয় জলের স্বাদ এবং গ্রহণযোগ্যতায় প্রভাব ফেলে। ক্লোরাইড থেকে উদ্ভূত স্বাদ সংযুক্ত কেশনের (cation) উপর নির্ভরশীল এবং সোডিয়াম, পটাশিয়াম এবং ক্যালশিয়াম ক্লোরাইডের মাত্রা প্রতি লিটার পানিতে ২০০ থেকে ৩০০ মিলি গ্রাম। বাংলাদেশে প্রতি লিটার পানিতে ১৫০ থেকে ৬০০ 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 ০.০৩ মিলিগ্রাম নির্ধারণ করা হয়েছে। তবে এর ৩য় সংস্করণে আয়রনের জন্য কোন গাইড লাইন মান নির্ণয় করা হয়নি।

বাংলাদেশের অনেক অঞ্চলে আয়রনের উপস্থিতি গ্রহনযোগ্য সীমার চেয়ে বেশী। তাই কাঙ্খিত উদ্দেশ্যে ক্ষুদ্র আয়রন দূরীকরণ ইউনিট (mini iron removal units, IRU)-এর মাধ্যমে আয়রন দূরীকরণের চেষ্টা করা হয়। বাংলাদেশ ষ্ট্যান্ডার্ড অনুযায়ী পানীয় জলে আয়রনের উপস্থিতি হলো ০.৩-১.০মিলিগ্রাম / লিটার । পল্লী 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 সম্পর্কীয় 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 কোমল পানীয়তে অনাকাঙ্ক্ষিত স্বাদ এবং কাপড় চোপড়ে ও থালা বাসনে দাগ সৃষ্টি করে। বাংলাদেশ ষ্ট্যান্ডার্ড অনুযায়ী পানীয় জলে ম্যাঙ্গানিজের উপস্থিতি হলো ০.১ মিলিগ্রাম / লিটার।