Analysis of Allocation of Hand Pump Technology for Procurement as a Safe Drinking Water Source installed by DPHE.

Dissertation submitted in partial fulfillment of the requirements
for the Degree of
Masters in Procurement and Supply Management

Submitted by
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MASTERS IN PROCUREMENT AND SUPPLY MANAGEMENT

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Analysis of Allocation of Hand Pump Technology for Procurement as a Safe Drinking Water Source installed by DPHE.

A DISSERTATION
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CERTIFICATE

This is to certify that the Dissertation entitled " Analysis of Allocation of Hand Pump Technology for Procurement as a Safe Drinking Water Source installed by DPHE " is a bonafide record of research work done by **Md. Rashidul Alom** during 2014-2015 submitted to the **BRAC Institute of Governance and Development (BIGD), BRAC University** in partial fulfillment of the requirements for the award of the Degree of **Masters in Procurement and Supply Management** and that the dissertation has not previously formed the basis for the award of any other Degree/Diploma/Associateship/fellowship or other title and the dissertation represents independent and original work on the part of the candidate under my guidance.

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DECLARATION

I hereby declare that the dissertation titled **"**Analysis of Allocation of Hand Pump Technology for Procurement as a Safe Drinking Water Source installed by DPHE.

" has been performed by me and neither this dissertation nor any part thereof has been submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

The study area contain two marginal Union of Daulatpur Upazilla under Kushtia District of south-western part of Bangladesh. This research work tries to find out the status of drinking water supply system of Department of Public Health Engineering (DPHE).

Department of Public Health Engineering (DPHE) is the public sector lead agency in providing safe drinking water to the people of Bangladesh. This report tries to understand the responsibilities performed to the people of the Doulatpur Upazilla which is a remote Upazilla of Kushtia District. Pragpur Union and Chilmari Union are two union of Doulatpur Upazilla. Pragpur Union is situated at the border line of India which is 60 km away from the District Head Quarter. Another Chilmary Union is situated at flood plain of mighty Padma River. This Union became totally disconnected from the Upazilla and District Head Quarter. Drinking water availability in this Union is frequently disturbed during the rainy season. This area is hard to reach for providing safe drinking water to the people of this Union. The researcher tries to find the safe drinking availability status of these two remote Union. Safe drinking water availability status of these two Union may reflect the most of the Union in Bangladesh. If the safe drinking water supply status is satisfactory then it can be inferred that DPHE is performing its due roles in providing safe drinking water to the people of Bangladesh and vice versa.

As a leading public sector organization, DPHE must have play its role as centre of excellence in providing safe drinking water source. DPHE should be used as benchmark organization for other organization working in the safe drinking water supply. But unfortunately, the service standard of DPHE is not up to the

expectation of users. Though the DPHE have government mandate and wide network of organizational infrastructure even in Union Council level, there is a strong shortage of manpower deployment in these offices. Due to shortage of relevant manpower and proper budgetary allocation to DPHE, required service delivery could not be given to the people of Bangladesh.

For smooth supply of drinking water in rural areas of Bangladesh, DPHE should continue more allocation of #6 Hand Pump as safe drinking water source in the rural area. DPHE need proper measures for giving instruction to the users regarding maintenance of drinking water sources. DPHE should design standard service delivery system especially in the field level. Proper measures should be taken for regular water quality monitoring in the field level. Piped water supply project should be implemented in the rural areas where electricity is available. Sufficient technical and administrative manpower should be appointed in the field level office. Sufficient budgetary allocation should be ensured from the Government. Research and Development work should be continued to match the changing situation of Hydro-geology.

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Abbreviations

ADP : Annual Development Programme

BIGD : BRAC Institute of Governance and Development

CIPS : The Chartered Institute of Purchasing and Supply

CSA : Community Situation Analysis

CBO : Community Based Organization

CAP : Community Action Plan

CPTU : Central Procurement Technical Unit

DPHE : Department of Public Health Engineering

GoB : Government of Bangladesh

HPT : Hand Pump Technology

LGED : Local Government Engineering Department

MDG : Millennium Development Goals

MoP : Ministry of Planning

NGO : Non Government Organization

R&D : Research and Development

PSF : Pond Sand Filter

UP : Union Parishad

UNICEF : United Nation Children Emergency Fund

UNDP : United Nation Development Programme

WHO : World Health Organization

WASH : Water Sanitation and Hygiene

WASA : Water and Sewerage Authority

WATSAN : Water and Sanitation

Chapter 1

Introduction

1.1 INTRODUCTION

A safe, reliable, affordable, easily accessible and sustainable water supply is essential for good health and improved life. An inadequate water supply also prevents good sanitation and hygiene practices (Hunter *et al.* 2010). Thus, implementation of proper water safety measures can improve health status (WHO 2005). While Bangladesh has made significant progress in supplying safe water to its people, regional and socioeconomic disparity in access to quality water exists across the country. Tube-wells as the primary source of safe drinking water in rural Bangladesh, higher sanitation coverage, and improved primary healthcare have contributed to a significant drop in the mortality rate from diarrheal diseases (GoB and UNDP 2009).

However, the discovery of the widespread arsenic contamination of groundwater has effectively lowered safe drinking water coverage from 97% to 74% in 2006 (GoB and UNDP 2009). Moreover, presence of arsenic in drinking water increased the mortality rate in Bangladesh (Tan *et al.* 2010). The Joint Monitoring Programme (JMP) of WHO and UNICEF (2010) reported that the world is on track to meet or even exceed the safe drinking-water target 10 of the Millennium Development Goal (MDG) 7. Although Bangladesh is on track to achieve the MDG target for access to safe drinking water13% of its population are still drinking arsenic contaminated water (UNICEF 2010)and most respondents are unaware of the serious health consequences of consuming arsenic contaminated water (Ahmad *et al.* 2003). Besides, the country has not been able to achieve 100% coverage of safe water supply till date. Different agency reports show variability in national coverage of safe water supply, i.e. GoB(2008) shows 97% whereas WHO and UNICEF (2010) shows 80%. Therefore, access to safe water is hindered by a

number of factors such as arsenic contamination, increased salinity in groundwater in the coastal belt, declining groundwater levels, urban and industrial pollution, anticipated increase of human excreta load, natural disasters, etc. (UNICEF 2010; Dey*et al.* 2010a).

A key target of MDG 7, which aims to ensure environmental sustainability, is "To reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015" (UN 2007). This water supply target underpins several other MDGs, including those relating to poverty (MDG 1), education (MDG 2),and gender (MDG 3). In particular, it underpins MDG 4, the reduction of child mortality. It is estimated that about 3,900 children die from waterborne diseases every day in Bangladesh (WHO and UNICEF 2005). Recent study findings reveal that prevalence of waterborne diseases reduced from 10% to 7% by the combined effect of water, sanitation and hygiene (WASH) after 2 years of intervention in rural Bangladesh (Rana 2009). WHO estimates that 94% of the diarrheal diseases are preventable through modifications to the environment, including access to safe water(WHO 2007). However, availability of safe water as well as hygienic management of household water is crucial for prevention of waterborne diseases. Proper hygiene education makes the community members aware about the correct use, storage and disposal of water, and general hygiene (Duncker 2000).

Water safety measures also include installation of tube-well considering safe distance from latrines. However, proper design and construction, sound platform without cracks, and firmly attached of hand pump and maintenance of the headwork are identified as the sanitary indicators (Luby*et al.* 2008). Previous study identified that most of the households were not accustomed to clean or purify tube-well water or water from any other sources for drinking (WASH Research Team 2008). Besides, several studies have noted that tube-wells in the low lying areas of Bangladesh are commonly contaminated with fecal organisms (Hoque 1999; Islam *et al.* 2001, Luby*et al.* 2006) and nearly 29% of

the tube-wells are contaminated with bacteria, which are mainly due to poor maintenance of the tube-well surroundings (GoB and UNDP2009).

1.2 OBJECTIVE OF THE REPORT

Department of Public Health Engineering (DPHE) is the public sector lead agency in providing safe drinking water to the people of Bangladesh. This report tries to understand the responsibilities performed for thepeople the Doulatpur Upazilla which is a remote Upazilla of Kushtia District. Pragpur Union and Chilmari Union are two union of Doulatpur Upazilla. Pragpur Union is situated at the border line of India which is 60 km away from the District Head Quarter. Another Chilmary Union is situated at flood plain of mighty Padma River. This Union became totally disconnected from the Upazilla and District Head Quarter. Drinking water availability in this Union is frequently disturbed during the rainy season. This area is hard to reach for providing safe drinking water to the people of this Union. The researcher tries to find the safe drinking availability status of these two remote Union. Safe drinking water availability status of these two Union may reflect the most of the Union in Bangladesh. If the safe drinking water supply status is satisfactory then it can be inferred that DPHE is performing its due roles in providing safe drinking water to the people of Bangladesh and vice versa.

1.3 Origin of the Report

The study was conducted as a fulfillment of internship program requirements (part of MPSM curriculum) of Bangladesh Institute of Governance and Development (BIGD), BRAC University. The dissertation report program was hosted by DPHE. Within the dissertation report period at DPHE, the task of preparing a comprehensive analysis of allocation of Hand Pump Technology as a safe drinking water source was assigned. Dr, Suntu Kumar Ghosh, Assistant Professor, BRAC Business School of BRAC University kindly accepted the proposal to supervise the report as guide on behalf of BIGD, BRAC University.

1.4 Scope

This research work comprises the site visit and gathering feedback from the people those got the allocation of Hand Pump Technology as safe drinking water source in the Pragpur Union and Chilmary Union of Doulatpur Upazilla under Kushtia District. This research work aims to measure the suitability of the Hand Pump Technology and the satisfaction of the users. This research work will give the researcher the opportunity to assess the present service delivery standard of Department of Public Health Engineering (DPHE) and to find solution to minimize the gap of present service delivery standard and required service delivery standard.

Chapter 2

LITERATURE REVIEW: SAFE DRINKING WATER SOURCES

2.1 **Introduction:**

DPHE is responsible to provide the facilities of drinking water supplies in rural and urban areas of Bangladesh. In rural areas, water supplies are generally provided by hand pump tube wells which tap water from underground. But in many places, water supplying with hand pump tube wells are facing severe problems due to various reasons. The major reasons are;

a) Lowering of Water Table.
b) Problem in Quality of Water
c) Absence of Suitable Water Bearing Formation.
d) Arsenic Contamination Problem

DPHE is therefore, has been conducting Research and Development activities to improve existing technologies, develop cost effective alternatives and develop alternative technological option to provide water in the problematic areas.

2.1 Purpose

Safe water and sanitation are essential for the development of public health. The Government's goal is to ensure that all people have access to safe water and sanitation services at an affordable cost. To achieve this goal and to ensure that development in the water supply and sanitation sector is equitable and sustainable, formulation of National Policy for Safe Water Supply and Sanitation is essential.

2.3 Background

The Government started its initial intervention in the water supply and sanitation sector with the objective of gradually building an effective service delivery mechanism about 78 years ago (DPHE Annual Report-2011). After independence, the Government laid emphasis on rehabilitation of damaged water supply and sanitation services and installation of new facilities in rural and urban areas through the Department of Public Health Engineering (DPHE). Services were provided mostly free of charge. The role of the users in decision-making, cost sharing and operations and maintenance was negligible. However, subsequently user participation increased significantly. Rural communities are now responsible for operation and maintenance of hand-pump tube-wells and receive training for the purpose. The responsibility for installation, operation and maintenance of urban water supply (excepting Dhaka, Narayangonj and Chittagong) was initially with DPHE only.

But now it is shared with the Paurashavas. Recent project-based activities in the Paurashavas and their involvement in planning, implementation and management have had a positive impact on improvement of Paurashavas capacity. Most of the Paurashavas and the Union Parishads now have Water Supply and Sanitation Committees (WATSAN) comprising of the user communities for supervising water and sanitation related activities. In addition to DPHE, the Local Government Engineering Department (LGED) is also involved in planning and implementation of water and sanitation services in certain Paurashavas and growth centers identified by the Planning Commission under selected projects. In 1963 Water Supply and Sewerage Authorities (WASA)were established in Dhaka and Chittagong cities. The responsibility of water supply, sewerage and drainage in Dhaka city and water supply in Chittagong city now rests with the respective WASAs. In the year 1990 Narayanganj town was brought under the jurisdiction of Dhaka WASA.

In Dhaka city water supply coverage is only 65% and sanitation coverage is around 72%, of which 30% may be assigned to water borne sewerage. But the average coverage conceals the intra- and inter-regional disparities. The ratio of tube-well to persons is around 70 in the shallow water table area; and 200 and 300 in the coastal and low water table areas respectively. Pollution of surface water is increasing because of imperfect water management and environmental pollution. The recent detection of arsenic in ground water is an issue of grave concern. To preserve environmental quality and to mitigate arsenic contamination research and field surveys are being carried out.

The government is encouraging and supporting the involvement of other partners, such as non-governmental organizations (NGOs) market oriented business organizations and similar private organizations in water and sanitation development. This combined promotional campaign for better health and hygiene has increased the demand for tube-wells and sanitary latrines. Due to increase of private sector its capacity for production, installation and maintenance of tube-wells and sanitary latrines has also increased. Materials for installing tube-wells and spares for maintenance are produced by private manufacturers and are available in the market in abundance. The materials which were imported before are now mostly manufactured in the country. A number of NGOs have devised and implemented innovative and effective approaches for service delivery.(Source: According to DPHE Website)

2.4 Historical Background:

Considering the problem encountered in rural water supply a technical committee comprising experts from different organizations started their work on Research and Development activities before 1982. Because of water table depletion, hand pump other than No.6 was very essential to be introduced in Bangladesh. After a series of

discussions, workshop and field verification, TARA hand pump technology for has been developed in Bangladesh in the year of 1984 for low water table area.

Considering the importance and the magnitude of the R&D activities, it was felt necessary to establish a separate setup of manpower to be engaged in Research & Development activities. Accordingly, DPHE Research and Development Division was created in 1989 under GOB-Unicef project. The R&D committee headed by Superintending Engineer, DPHE Ground Water Circle comprising members from academic institutions, development partner has been playing advisory role on R&D activities since 1992.

In early nineties, detection of arsenic in ground water has caused a threat for ground water based water supply system in Bangladesh. On growing concern over arsenic contamination, a number of studies has been fielded to identify the causes of arsenic contamination, its magnitude and to find out the ways of arsenic mitigating technologies. Apart from this, a number of alternate water options are being explored in the field. (Source: *According to DPHE Website*)

2.5 Major Activities:

Implication of Declining Water Table: Since 1986, DPHE has been monitoring the fluctuations of groundwater table using a measuring network having one tube-well in each union of the country. Measurements are taken once annually during peak dry season. The data indicates the area where the water table has fallen beyond the suction limit has increased from 12% in 1986 to 20% in 1990. As a result a large number of tube-wells fitted with no 6 suction pump become non-functioning during dry season. During 1992-

95 an in depth study had been carried out to assess more preciously the area of the country where the water table would be beyond the suction limit in the year 2000. Findings of water table monitoring show that water table has fallen beyond suction limit about 27% in 2004. However, declination of water table should be analyzed for deep and shallow aquifer separately.

Development of TARA Pump: Due to declination of water table, a large number of no 6 suction pump started to be inoperative particularly in dry season in different parts of the country. To cope up the problem, Tara pump has been developed based on principle of displacement pump. The pump is submerged in water connected with handle through piston rod. It can yield water within 15meter water table.

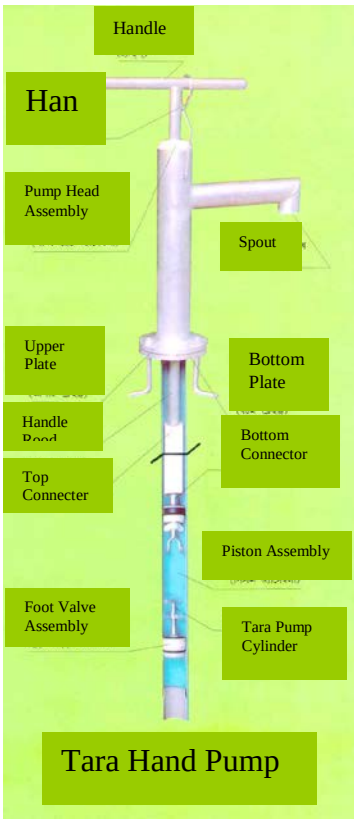


Figure : 2.1- Tara Hand Pump

Introduction of MINI TARA & Extended piston in 1.5 inch dia shallow well: It was estimated that some of 360,000 public tube-wells would be inoperative in near future due

to gradual declination of water table. To replace these wells by 2-inch dia TARA tube-wells was considered to be expensive. In that context, with the support of UNICEF, R&D Division had initiated in 1991 to come up with modified TARA pump that can fit in the existing diameter of No 6 pump shallow tube-well with minimum modification. The conversions were named as MINI TARA. Initially a test of MINI TARA was performed and 23 such wells were installed. But due to some fault in the design the work was discontinued. However, some development had been made on 10 such wells and tested in the field. 100 Mini Tara were installed in Joydevpur of Gazipur District. Intensive monitoring related to installation technique, performance, maintenance and user's reaction were done.

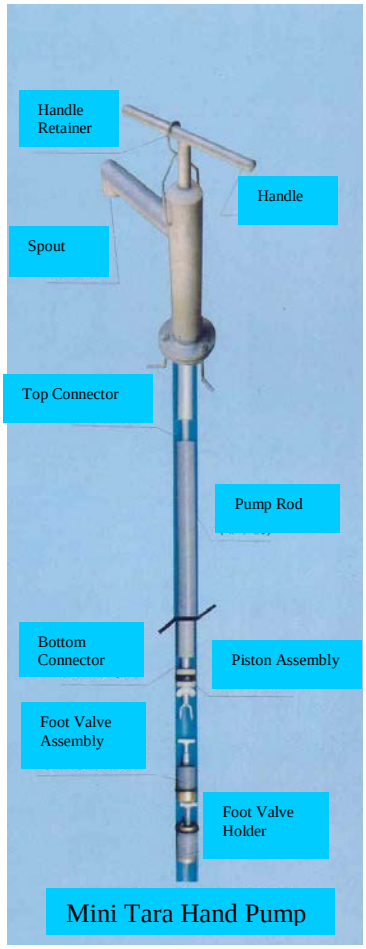


Figure : 2.2-Mini Tara Hand Pump

Development of TARA-II and TARA DEV Hand Pump: TARA hand pumps were installed at 15m depths in low water table areas. In some parts of North Bengal the water table was declining beyond the capacity of Tara pump. To cope up the situation TARA II had been developed and conducted field-test in the year of 1988 to lift water from 30 meters depth. An evaluation by the R&D Committee in early 1992 was indicated that Tara-II fitted with No 6 pump head could be used as an interim solution. Accordingly 150 TARA-II tube-wells had been installed in later part of 1992-1993 fiscal year. However, further study on these pumps fitted with No 6 head had been carried out to improve the vertical movement of the pump rod. Tara technology having lever action pump is termed as TARA Dev.

Conversion of DSP into TARA: The conventional deep-set pumps were becoming obsolete due to difficulties & expensive maintenance. These wells could easily be converted into TARA, provided the upper well casing remains within water level. 10 such conversion had been made in Ghatail thana of Tangail district. It was proposed to install further 40 such wells to observe the performance; maintenance and construction defect if any to standardize the design.

Water Quality Problem:

Coastal Belt MappingUpdating: In coastal belt areas the major problem encountered in tube-well was salinity of excess concentration. Besides this, in some places no suitable aquifer was available. In 1990-91 a detailed map of the coastal belt was prepared showing

different problem areas on it. After that, extensive work to find out suitable water bearing layer was done. By this time some areas were found successful, some areas found unsuccessful for normal hand pump well, where alternate technologies were being applied and some new areas with different problem were identified. All these changes were incorporated in the maps and the coastal belt mapping were updated. The exercise was started in 1993 by conducting 4 workshops in this regard. The activities continued up to 1995 and the maps were again updated.

Exploratory Drilling in Saline Problem Areas: In coastal belt areas exploratory drilling under DPHE normal programme is still going on. In the last 15 years a total of 870 test drillings were done successfully all over the country. The drilling borehole is tested by electric logger to locate suitable aquifer. Due to shortage of electric logger the number of exploratory drillings could not be increased. The programme of exploratory drilling under DPHE normal programme is limited.

Danida Supported R & D activities under DPHE- R & D Division

With Danida assistance DPHE – R & D Division has been conducting study, action research and piloting of following issues:

- Exploring alternative safe water supply options for Arsenic affected area,
- Study on Hygiene promotion approaches,
- Sanitation aspects
- Piloting direct fund flow to Union Parishad for executing the water supply and sanitation works with fund management by UP under HYSAWA Program.

Under the exploration of alternative water supply options following options are piloted.

Pond Sand filters (PSF):

Pond sand filters are very conventional treatment process to treat surface water. There are different models designed by different program. With Danida support four types of models developed and piloted with in the program areas. The said models are ITN Model, DPHE R & D model and Bank filtration System.

ITN Model PSF:

It was designed by ITN Centre another Danida supported program. It has been piloted and assesses performance by R & D Division. Total nine unites were constructed in different geographical locations. Performance and efficiency of the treatment units monitored for about nine months and found satisfactory results. The management, O & M and social aspects monitored simultaneously.

Figure: 2.3 Pond Sand Filter

R & D Model PSF:

From the assessment of ITN model PSF it has been revealed that it costly to accommodate by poor household, construction and O & M seems a bit difficult by local private sector and users. Then R & D division has taken initiative to develop a new design. Accordingly the designed has been made and piloted. The design capacity is for about 40 families ie about for 200 users. The estimated cost is about Tk 30000/. The user contribution is 20 % of the estimated cost. The findings are satisfactory to be replicated.

Rehabilitation of DPHE – UNICEF Model:

Within the DPHE – Danida program area there were found some abundant PSFs constructed earlier from DPHE- UNICEF program. Due to improper O & M these were out of order. DPHE – R & D Division took initiative to rehabilitate some of the units on pilot basis with new design having easier O & M. Four of such units reradiated and monitoring is underway. So far the results found satisfactory.

Bank Filtration System:

It is another type of Pond sand filter designed to make easier operation and less construction cost. The piloting is under way. It has also been designed for about 200 users. The construction cost is about Tk 20000/. The user contribution is 20 % of the estimated cost.

Rain water Harvesting System:

R & D division has designed and piloted community based Rain Water Harvesting System (RWHS) to serve 3 to 5 families ie about 25 to 30 users for drinking and cooking purpose. The storage tank volume is 2500litre. The construction cost is about Tk 11000/. The user contribution in construction is 20 % of the estimated cost. The models designed to ensure 7 months water security. It has been monitored for about 7 months for technical, socioeconomic, management and O & M aspects. The findings are satisfactory to be replicated.

Figure: 2.4-Rain Water Harvesting

Current Status of Rural Water Supply:

The most widely used water supply technology in rural Bangladesh is the shallow Tube-well. Other available technologies include deep tube-well, dug well, rain water harvesting system, Pond Sand Filter (PSF) and arsenic removal filter. Piped water supply is still uncommon in rural Bangladesh. Shallow tube-well was widely popularized in the 1970s when the DPHE installed them free-of-charge for the low income rural population. The relatively low price of the technology attracted the rural population to install shallow tube-well in their own premises, helping further popularization of the technology. Popularization of shallow tube-well contributed to significant reduction of diarrheal disease. However, it is becoming difficult to promote the use of shallow tube-well because of the existence of arsenic in shallow aquifer. The DPHE recommends the use of deep tube-wells to replace shallow tube-wells.

However, deep tube-well is expensive and most rural households cannot afford to install it on their own. The DPHE has so far been installing deep tube-wells as a communal facility in public places such as schools. The rural population who are now used to the convenience of accessing water through a shallow tube-well installed in its own premises are experiencing great difficulties in getting used to traveling to a public water point which may be of some distance from the house. Dug wells, rain water harvesting systems and PSFs are also introduced as a public facility due to its high cost. In addition to the inconvenience of having have to travel to obtain water, difficulty in maintaining the facilities and contamination by pathogens are casting shadows over popularization of these technologies. As for arsenic removal filters, although the unit cost of a filter is not unreasonable, the sum quickly builds up as it needs to be replaced frequently. Furthermore, it is difficult to judge the correct timing of replacement, leaving the danger of consuming contaminated water.

So far, many latest Hand Pump Technology have been allocated to the people of Bangladesh as safe drinking water sources to ensure availability of safe drinking water. But very little measures have been taken to understand the users' response after allocation. After allocation of safe drinking water sources, there should be a process to measure the effectiveness of the allocated water sources. As ground water condition differ frequently on the basis of different hydro-geological condition it is necessary to monitor the effectiveness of allocated water source to the users. So a close loop feedback mechanism should be present in the regular safe drinking water source allocation. To provide help to establish a feedback collection mechanism from the users, the researcher endeavor to perform the analysis of allocation of Hand Pump Technology as a safe drinking water sources under DPHE.

CHAPTER 3

RESEARCH METHODOLOGY

3. METHODOLOGY

The essential purpose of analyzing the allocation system to provide the raters is to be aware of the drawback of the system. The purpose was to find out the feelings of the users especially of the marginal people.

In this study, exploratory research was undertaken. The study was conducted mainly with primary data collected through field visits (through questionnaire). For the sake of simplicity and ease of operation, a convenience sampling procedure was pursued for the research. Questionnaires were used in the survey to elicit responses from conveniently selected sample. A set of fixed close-ended questionnaire guided the discussions with the users.

3.1 Data source

Primary data source: the data was collected by direct contract with the users on site visit on respected Hand Pump Technology allocation. All the users presented during site visit in two remote Union areas. The researcher visited 16 sites and talked with almost 16 users and a questionnaire form was given to them to fill up the questions.

3.2 Sampling plan

Sample unit: The sample population comprised different academic level, gender, income level, age level and different locality.

.*Sample size*: the sample size was calculated for normal distribution of the sample.

The actual size calculated is 16.

Sampling procedure: This is basically a quantitative data analysis report. Since lots of quantitative information is needed, questionnaire method has been used for collecting information. The questions were structured as yes/no or on the basis of Likert scale ranges from 1 to 5

Contact method: The information was collected by face to face interviews and discussions, studying the previous report and also discussion with the trainer.

3.3 Analysis Framework

The analysis was structured around the sample response collected. The accumulated data was analyzed with various statistical and analytical tools, along with judgmental methods. During the analysis various aspects of the allocation system and its effectiveness was measured.

3.4 Time Budget

The period allotted for the study was approximately two months (August – September 2014), or a little over ten (10) weeks.

3.5 Questionnaire Manuel

Question No.: 1 – 2

Focus: Present Practice of the users to get safe drinking water.

Objective: From these questions, the present practice of the users on getting safe drinking water, their perception about the history of drinking water sources and on the working environment was found out. Question no 1 was the most important one. This question focuses on the users' preference about what they feel to use as source of water for drinking purpose. Their feelings and respect about their drinking water source was identified through this question. Question no two identified the evolution of the relevant drinking water sources in his life span available and to understand users adaptation to the technological development for the safe drinking water source provided by the DPHE.

Question No.: 3 -8 User's perception about the service delivery system of DPHE:

Objective: this set of questions focus on the present allocation system and the users perception and satisfaction. How well the users do accepted the present allocation system was focused. Question no three & four was based on the site selection procedure and instruction for drinking water source. Whether the users were consulted to select the drinking water source or imposed by the DPHE personnel. Question no five was regarding users preference to available Hand Pump Technology as safe drinking water source. Question no six was about users perception about DPHE regarding technical capacity and standard of service delivery system, both the appraisees and the appraisers understand the system was focused thorough this question. Question no seven was focused on the getting suggestion about the change of the present appraisal system.

Opinion of the employees was collected. Finally question no eight focused on the employee satisfaction level.

3.6 Outline Of The Report

The study is organized into three chapters and an appendix. Chapter 1 offers introduction to the research study, and entails report's origin, objectives, scope.

Chapter 2 gives an insight about the literature review of development safe drinking water sources and latest status of research work in the safe drinking water sector.

Chapter 3 deals with the methodology, limitation and analysis framework and manuals of the questionnaires used in the survey.

Chapter 4 deals with the allocation of Hand Pump Technology as safe drinking water source in past ten fiscal years from DPHE and regarding drinking water source allocation procedure of DPHE.

Chapter 5 is the heart of the report - presentation of research findings and its analysis. In the appendix the questionnaires used to interview doctors and chemists are provided, along with recorded responses.

3.7 LIMITATIONS

In this research diversified people such as farmers, technical, engineers, medical personnel, business people and teacher etc have been contacted. As the whole Bangladesh is working area of DPHE, simply two remote villages may not be representative village for study. Movement from one site to other site was time consuming and getting users present on the site is very difficult as village people are busy with their field work. Some users were non- cooperative and non-responsive. Many people did not want to give interviews for fear of negative consequence. Few people were indifferent because they have not got any service free of cost for a long time. Maximum people thought that the survey was a futile effort as it would not brought any change in getting better service; therefore, they did not want to discuss.

CHAPTER 4

ALLOCATION PROCEDURE OF SAFE DRINKING WATER SOURCES

4.0 Allocation of Hand Pump Technology as Safe Drinking Water Source in Doulatpur Upazilla under Kushtia District from FY 2003/04 to FY 2012/13. (Source: Special Rural Water Supply Project, DPHE)

Financial Year (FY)	Safe Drinking Water Source Type						
	#6 DTW	#6 STW	SST/VSST	Ring Well	Tara (Deep)	Tara (Shallow)	PSF
2003-2004	4	0	0	6	0	0	0
2004-2005	16	52	0	8	0	0	0
2005-2006	22	23	0	12	0	0	0
2006-2007	10	15	0	14	0	0	0
2007-2008	50	5	0	4	0	0	0
2008-2009	19	15	13	5	0	0	0
2009-2010	28	80	35	25	0	0	0
2010-2011	0	0	0	15	0	102	0
2011-2012	0	0	0	6	15	60	0
2012-2013	0	0	0	0	20	105	0

Table-01

The typical Guideline which is practiced particularly dealing with the following tube-well options in **Rural** areas:

SUCTION Mode pump:

1. Shallow hand tube well

2. Half-Cylinder hand pump tube-well

3. Deep hand tube well

FORCE Mode pump: (different types of Deep-set hand tube wells)

1. Tara II / Tara super hand pump

2. Tara Dev hand pump,

1.1 Purpose and Use of this Guideline

This Guidelines has been prepared to implement good governance in water source implementation by gathering experience over the last year of implementation under DPHE and reviewing the documents available from other organizations (like DPHE-Danida Project, Unicef etc.) to meet the following purposes:

• This Guidelines has been prepared as a tool to keep standard procedures for installation of different types of tube wells under the programme of DPHE uniformly by all Partner Organizations.

• It was attempted to reflect the National Policies as well as DPHE's policies through the Guidelines in an operational manner and mainstream the policies.

• This Guidelines will be used a Handbook for the frontline staff as well as professionals.

• Ensure involvement of community, LGIs and other concerned stakeholders as relevant through promotion of transparent, accountable, gender sensitive and pro-poor implementation of water supply facilities.

• This Guideline will guide the Partner Organizations to implement the installation with a certain level of flexibility allowing addressing local context in consultation and approval from the authority.

2. Implementation of Tube-wells

• The type of tube well option will be selected based on the hydro-geological situation of the area concerned as well as communities' preference and ability to pay etc.

• Implementation of tube well options will take place at house hold level in the community, schools, institutions, public places of rural areas.

Step 1: Need Identification

In order to identify the need of water supply facilities for a particular community and proceed for installation of suitable water options (different types of tube-wells), the following activities have to be undertaken.

• **Community Situation Analysis (CSA):** CSA must be conducted at cluster/community with facilitation by the respective frontline staff of Partner Organization following the CSA guidelines (pls. see the Guidelines on Community Situation Analyses).

• The status of existing water supply facilities, besides other relevant information of the particular cluster/community should be documented during CSA. The cluster/community identification should be marked by writing a number or note on top right corner of the same format).

• The summary information of the water supply situation in the community obtained from the overall situation analysis may be presented.

• **CBO formation:** During the analyses of WatSan status for a particular community, frontline staff of Partner Organization ignites the people towards promoting access to safe water, safe sanitation and improve hygiene practices. Then the community people feel to take initiatives collectively for overcoming the adverse WatSan situation. Thus the CBO is formed.

• **Community Action Plan (CAP)**: Once the situation is analyzed and orientation is conducted to CBO on how to develop action plan, the CBO will sit together with community people to prepare a **Community Action Plan (CAP)** with assistance from the frontline staff. During preparation of the CAP, the above summary matrix should be analyzed carefully to assess the need new/ rehabilitation of water supply facilities for the community.

Accordingly, the CAP should be prepared including required number of new or rehabilitation water supply options mentioning their types, budget, number of users, timeframe for installation, responsibilities and budget etc. and later on documented by the frontline staff as the matrix titled **CAP: Installation of Water Supply Options** given below.

• During determining present situation, average number of households per water supply facilities having access* to safe water needed to be calculated.

• The frontline staff during assisting for preparation by the above CAP by the community should ensure that the policies of Govt. of Bangladesh as well as WAB are reflected (as per Govt. policy one water supply facilities per 50 persons or 10 hhs is targeted). Preference must be given to poor households and households of undeserved and underserved pockets.

• The CAP including proposed water supply options has to be carefully reviewed by respective frontline staff of Partner Organizations considering National Water Supply policy /principles and endorsed by the CBO preferably in a CBO meeting.

Step 2: Application for Water Supply Facilities

• Based on the priority determined in CAP, respective frontline staff along with CBO members will have meeting(s) with the users to determine list of applicant households for each proposed water supply option along with number of users and preferred option.

• The respective frontline staff must explain the conditions of applying for a particular water supply option (e.g., estimated total cost, users' contribution, cost-recovery mechanism, caretakers' selection process, caretakers' roles & responsibilities, use and O&M of the facilities etc.) to the applicants in details.

• Upon discussion, each applicant group will separately fill-in an Application Form.

for a particular type of water supply option.

• The respective frontline staff will assist the applicants to select the site for installation of proposed water supply option properly considering the **site selection criteria** in consultation with both male and female members from the applicant households.

• The frontline staff must ensure that signatures areobtained in the Application Form from both male and female members of the applicant households.

• The representative from the applicant households will submit the filled-in Application Form to Partner Organization on their behalf through respective front line staff.

Step 3: Site Verification for Water Supply Facilities

• The front line staff will forward the Application Form to respective Partner Organization's office to be visited by the supervisory staff and/or Engineer preferably with LGI representative/ member of Ward Sanitation Task Force Committee (WSTFC).

Site selection criteria:

• A common, agreed and suitable place.

• Easy access can be ensured by users, especially women.

• Reasonable distance from each of the applicant households.

• Safe distance from nearby latrine.

• Not in front of comparatively well-off household among the applicants.

• Usual annual flood level to be considered.

• During site verification by the Supervisory staff/ Engineer, the following aspects to be Critically observed.

o Reliability of information as mentioned in the Application Form

o Social, technical and legal feasibility of the proposed site for the particular water supply option.

• Recommendation should be made by the Supervisory staff/ Engineer if all the conditions are full-filled.

Step 4: Approval for Water Supply Facilities

• Once the Application Form is recommended, it will be forwarded to Union Sanitation Taskforce/ Union WatSan Committee / respective PO office for review and approval.

• In order to ensure formal involvement of local bodies, the respective Partner Organization will give emphasis and promote a mechanism to get the approval by Union Sanitation Taskforce or Union WatSan Committee. Until the mechanism is established, Partner Organization may approve the site in consultation with UP representatives.

• The competent approving authority (as decided by respective Partner Organization) will review and approve/ not approve the Application preferably in a formal meeting.

• In case of approved application, a simple approval letter should be issued by the approving authority to the applicant households to acknowledge their demand and proceed for next step.

• If the Application is rejected, the applicant households will be informed with reasons for not being accepted by the authority (say, due to not meeting the criteria).

Step 5: Calculation of Cost Recovery

• The concerned front line staff as per the **Cost Sharing and Recovery Strategy** will perform 'ability to pay analyses' of the applicants house holds and determine the amount of upfront contribution and/or number of installments applicable for each house hold for the rest.

• The applicant households will be informed about the upfront contribution and/or amount and number of installments by the respective Partner Organization's staff.

Step 6: Installation of Tube-well

6.1 Procurement of materials

6.1.1 Local Procurement

Procurement will be made by a Purchase Committee to be formed with two representatives from the applicant house holds nominated by the applicant group and one from Partner Organization, preferably by Engineer.

The Purchase Committee will purchase the required materials as per the approved design, specification and estimate.

The respective Engineer of Partner Organization will be responsible for ensuring the quality of materials procured.

6.1.2 Central Procurement

In case of Central procurement, the Central Procurement/ Purchase Committee of the Partner Organization will procure the materials as per **Specification of Tender.**

6.2 Selection of Boring Group/ Contractor

6.2.1 Selection of Boring Group Locally

The Purchase Committee will identify locally available boring groups and select one boring group on the basis of experience for installation of tube well. Each Partner Organization will develop and adopt a systematic procedure for selection of boring group in a transparent manner.

A **Contract Agreement** between boring group and Purchase Committee/ Partner Organization will be signed.

6.2.2 Selection of Boring Group Centrally

The Contractor will be selected by the respective Partner Organization as per PPR. Each Partner Organization will develop and adopt a systematic procedure for selection of Contractor in a transparent manner.

A **Contract Agreement** between Contractor and Purchase Committee/ Partner Organization will be signed.

6.3 Installation of Tube-well

The tube-well will be installed by the assigned boring group/ contactor as per the **Contract Agreement**, **'Tube well Manual'** and **'Arsenic Testing Protocol'** of DPHE.

During installation, quality assurance will be made by the Partner Organization's staff, preferably by Engineer and the following issues to be taken into considerations:

• Installation is done at the site approved earlier.

• The materials purchased are properly used during installation.

• Installation follows the approved design and specification.

• Well development is done properly.

6.4 Water Quality Test

6.4.1 Pre-installation testing

Pre-installation testing aims at assessing whether arsenic is present in existing water installations in the particular area prior to making decision to go for installation of new tube-wells. Therefore, pre-installation testing involves 2 stages.

a. confirming whether existing water sources are safe in terms of arsenic level, and

b. making a decision whether to install new tube-well.

The procedures should be followed as stated in the **Arsenic Testing Protocol**.

6.4.2 Installation testing

Once the tube well is installed, before platform construction, Arsenic and other water quality parameters to be tested as per **'Arsenic Testing Protocol'** and **'Water Quality Standard &Testing Policy'**.

Parameter as per Bangladesh acceptable standard limit as follows-

Arsenic 0.05 mg/l (50 ppb) Arsenic level of water is tested by test-kit and if the result confirms that 'no arsenic' is present in the newly installed option, platform is constructed.

If Arsenic in water exceeds the allowable limit, the installation will be treated as unsuccessful and re-installation should be done.

If the water appears to have bacteriological contamination, disinfection to be done.

6.4.3 Re-testing/ Monitoring testing

The retesting applies to all DPHE program funded and Non-DPHE program funded tube-wells. Sample re-testing of all tube-wells should be undertaken to cover at least 10% of the partner's Tube-wells in each 6 months' period. Sample testing should include representative samples from each union covered and should be carried out on a rotational basis to eventually cover all tube-wells.

6.4.4 Record keeping

Partner Organizations must keep records of all arsenic tests. A standard sheet should be completed in the field and kept for each installed tube-well. Information of arsenic test during installation and pre-installation tests for that tube-well for each installed tube-well should include its unique identification number and geo-reference in a systematic manner.

6.5 Platform Construction (including drainage)

If the water quality parameters are within allowable ranges, the tube-well will be treated as a successful one. Then the platform including drainage will be constructed as per standard design &specification.

The following aspects should be looked into during construction of platform:

• DPHE Identification mark with date of installation to be made on the platform boundary.

• Outlet of drain is maintained with proper slope and length.

• Soak-pit may be used for management of waste water.

• Utilization of waste water can be made for homestead gardening.

Step 7: Completion Report

A '**Completion Report**' containing detail information including tube-well identification, Contract information, date of start and completion of installation, depth of tube-well, test results of water quality parameters at the time of commissioning, platform's size & date of construction and other technical information of the tube-well as attached should be filled-in by Partner Organization's staff and to be acknowledged by the Representative of applicant households.

The '**Completion Report**' must be kept at Partner Organization's Office as a proof of completion of task and acceptance by respective users.

Step 8: Caretakers' Training and Tools Distribution

A total of two (one male and one female) caretakers from each of the installed tube well as proposed in the application form will be trained.

The Engineer will be responsible to train the caretakers at site preferably within one week of construction of platform. During training, the caretakers will be given a set of tools for repair and maintenance.

The set of tools shall contain the following instruments in a box:

• Slide wrench 12”- (1 piece)

• Pipe wrench 14” – (1 piece)

• Screw driver - (1 piece)

• Pliers - (1 piece)

It should be noted that the toolbox should be given at the disposal of the female caretaker.

After the caretakers’ training will be followed by a simple formal handing over ceremony in the presence of applicant households including the representative of applicant group.

Step 9: Handing Over

A ‘**Handing Over Note’** along with users’ acknowledgement should also be prepared and signed by all parties mentioned**.**

At the end of caretakers’ training, a simple formal **Handing Over Ceremony** will be organized in the presence of applicant households, when the water supply facility will be formally handed over to the users.

During hand over, the photocopy of ‘Hand Over Note’ must be handed over to the **Representative of applicant group** while the original copy will be kept at Partner Organization’s Office as a record for handing over the facility to the respective users.

Step 10: Cost Recovery

As soon as the water supply facility is handed over and subsequently formally taken over by the users, cost recovery will be started in cases where the total contribution money has not been deposited by users as upfront.

The concerned front line staff already fixed up **(Step-5)** the amount and number of installments applicable for each applicant household as per the **Cost Sharing and Recovery Strategy**.

A register should be introduced mentioning names and amount of cost recovery for each of the applicant households. This should be updated at every month.

The following aspects should be taken into consideration during cost recovery exercise.

• The frequency of installment may be monthly and preferably within maximum of 12 months except for the last year installations.

• The Caretakers will be responsible in association with Sub-Assistant Engineer of respective Upazilla to collect the cost recovery money from applicant households and deposit the same to the designated frontline staff of the Partner Organization regularly.

• The respective frontline staff will deposit the cost recovery money to Partner Organization's office within maximum of one week time from collection by Caretakers. Proper documentation should be kept at register to ensure transparency of this process.

• The Partner Organization's office will deposit the money to Bank within maximum of one week.

Step 11: Monitoring & Follow-up

After installation of tube well, respective Partner Organization's staff will monitor the water quality as per **'Arsenic Testing Protocol'** and **'Water Quality Standard & Testing Policy'**.

Other than water quality monitoring, respective Partner Organization will also monitor functionality, use and cleanliness of the water supply facilities for at least six months after the handing over of the facility.

The following aspects should be considered during monitoring by Partner Organization's staff.

1. Functionality of the tube well;

2. Functionality of the platform and drains;

3. Cleanliness of the platform and drains;

4. Water use pattern by the user groups;

5. Status of repair and maintenance;

6. Caretakers role and responsibilities;

7. Availability and condition of tools and tool box; and

8. Other matters related to use and maintenance

Partner Organization's staff will intensively monitor the functionality of the tube well during ***Defect Liability Period*** (6 months after commissioning). If the tube well performs satisfactorily, the contractor/ private tube well boring group will be refunded with the security deposit aftercertification from Partner Organization's Engineer. In case of unsatisfactory performance, the Contractor/ private tube well boring group will be obliged to do the rectification as required in consultation with Partner Organization's Engineer.

Step 12: Documentation

The information related to water supply option should be recorded in the Union Register**.** It is expected that the union registers will be supplied to each Partner Organization.

(Source: *www.wateraid.org/~/media/Publications/tube**well-guidelines**-rural*)

CHAPTER 5

ANALYSIS, FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 ANALYSIS OF PRESENT SERVICE PROVIDED BY DPHE

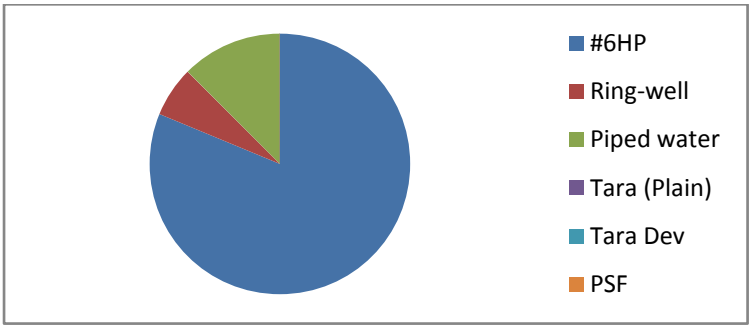
The present study is aimed to analyze& improve the service delivery system of DPHE. This section of the report analyses performance of service delivery system.

Field survey was conducted by the researcher in Pragpur Union and Chilmary Union of Doulatpur Upazilla under Kushtia District. Sample information was collected from the DPHE Doulatpur Upazilla Office. The sample includes the users who got allocation of safe drinking water sources in the past five years from 2013 to backward. A questionnaire comprising 12 (twelve) questions was prepared by the researcher which was approved by the Supervisor. Among those users 16 (sixteen) representative users was successfully approached to collect feedback through questionnaire. Following are summary of data collected:

1) Which type of Drinking Water Source you have at present in your premise ?
   eZ©gv‡b Avcbvi evox‡Z †Kvb ai‡bi LvIqvi cvwbi Drm we`¨gvb?

No.6 HP	Tara (Plain)	Tara Dev	PSF	Ring-Well	Piped Water

For this question, users' response for a) #6 HP= 13 ; b) Ring-well=1 ; c) Piped Water=2

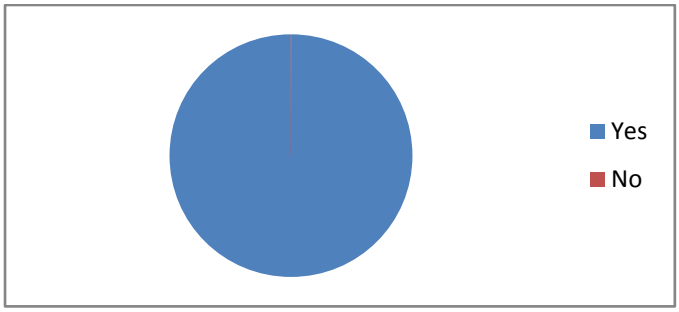


2 Have you migrated from one type of drinking water source to other improved water sources in your life? (Eg. From River water to Pond water to Ring-well to Tube-well)

Avcwb wK Avcbvi RxeÏmvq LvIqvi cvwbi Drm e`j Kwiqv‡Qb ?

Yes	No

For this question, users' response for a) Yes= 16 ; b) No=0

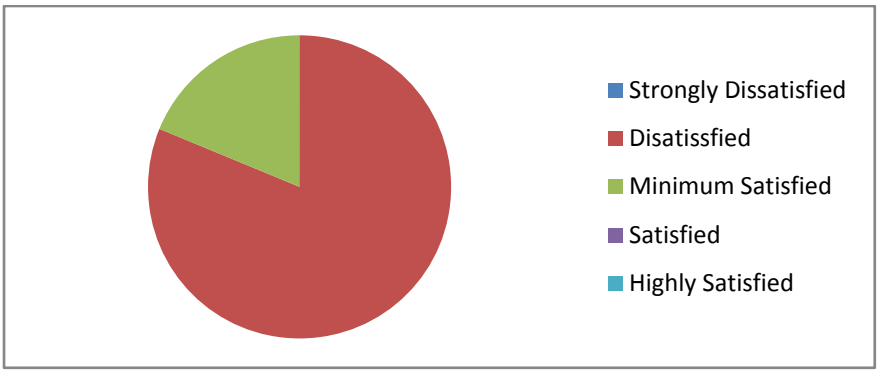


3 Do you feel satisfied with the site selection procedure of DPHE?

How much (1 for least to 5 for maximum) Avcwb wK wWwcGBPB- Gi cvwbi Dr‡mi ¯'vb wba©vib cÖwµqvq mš'ó?

1	2	3	4	5

For this question, users' response for a) 3=3; b) 2=13

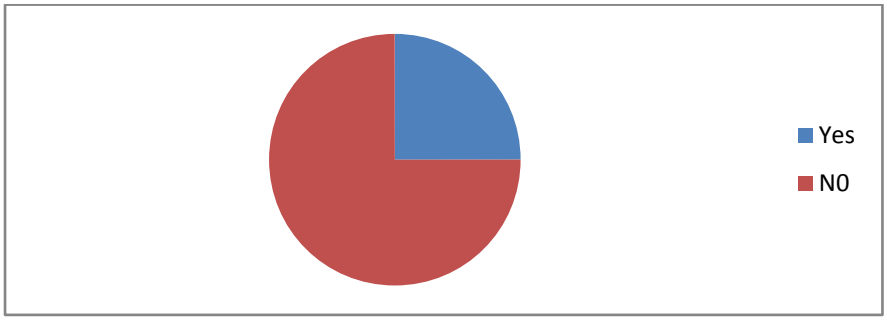


4 Have you got any instruction regarding maintenance of Tube-Well given from DPHE Personnel?

Avcwb wK wWwcGBPB †_‡K wUDeI‡qj iÿYv‡eÿY m¤úwK©Z †Kvb ai‡bi wb‡`©kbv †c‡q‡Qb?

Yes	No

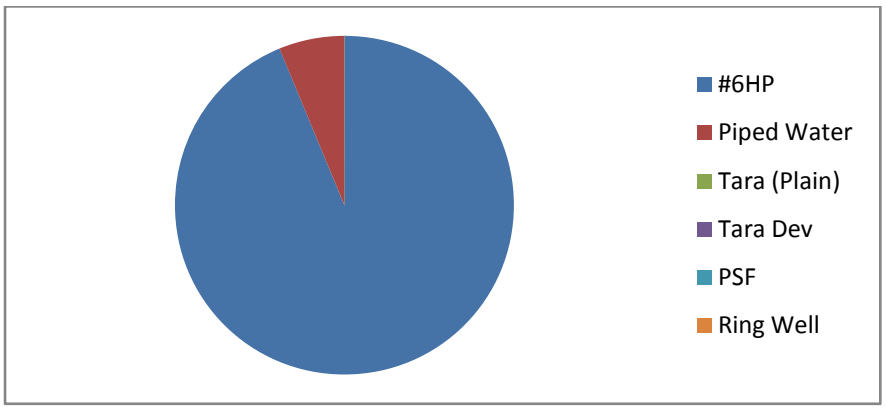
For this question, users' response for a) Yes=4 ; b) No=12



5 Which type of Water Sources you feel comfortable in your premise for operational purpose?-wb‡Pi †Kvb ai‡bi cvwbi Drm Avcbvi evoxi Av½xbvq cwiPvjbvMZ D‡Ï‡k¨ myweavRbK g‡b K‡ib?

#6 HP	Tara (Plain)	Tara Dev	PSF	Ring-Well	Piped water

For this question, users response for a) #6HP=15 ; b) Piped Water=1

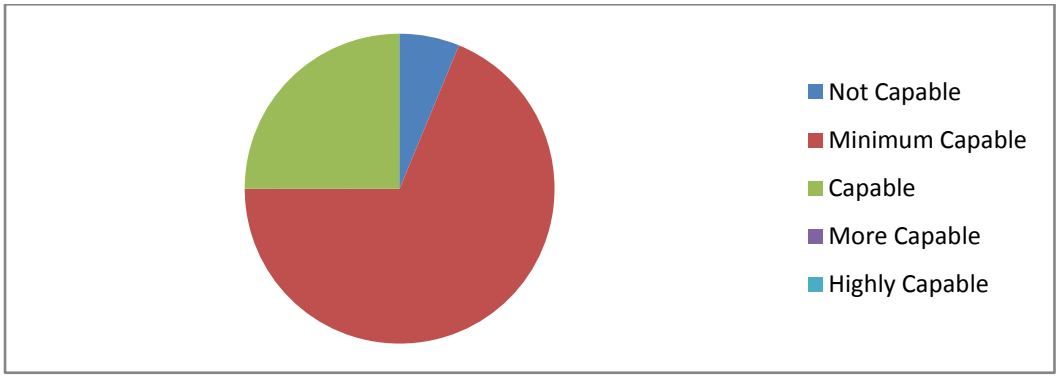


6 Do you think that DPHE has a technical working capability to provide safe drinking water?

How much (1 for least to 5 for maximum) Avcbvi g‡Z wWwcGBPB wK wbivc` cvwb mieiv‡n KvwiMix fv‡e mÿg?

1	2	3	4	5

For this question, users' response for a) 3=4 ; b) 2=11 ; c) 1=1

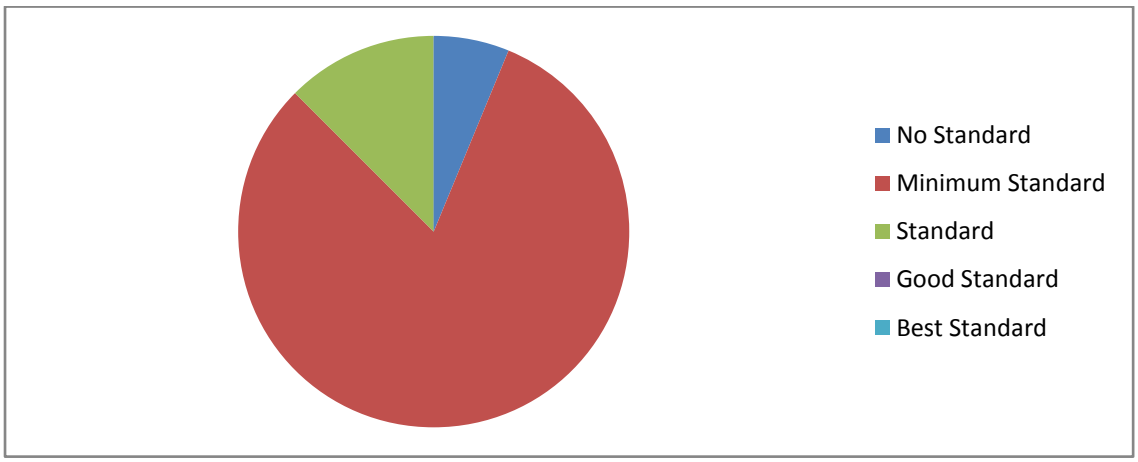


7 Do you think that DPHE has a standard service delivery system?

How much (1 for least to 5 for maximum) Avcwb wK g‡b K‡ib wWwcGBPB Av`k© gvY eRvq †i‡L †mev w`‡"Q?

1	2	3	4	5

For this question, users response for a) 3=2 ; b) 2=13 ; c) 1=1

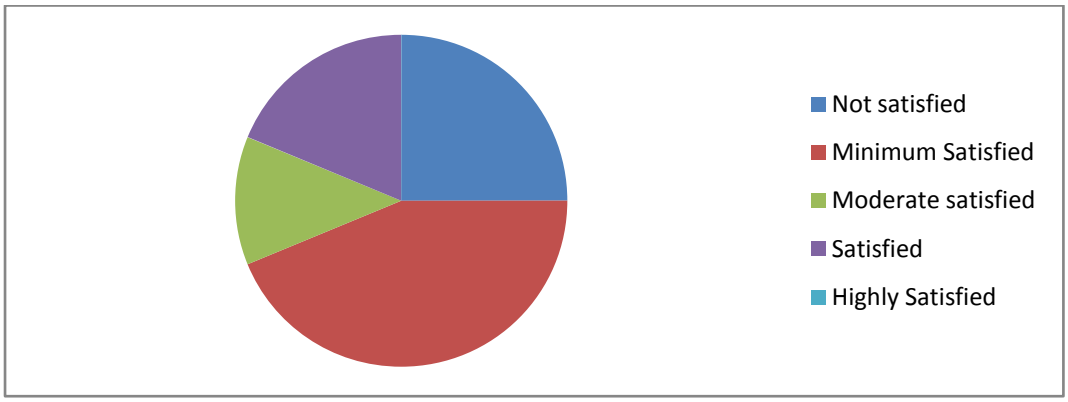


8 Are you satisfied with the performance of Tube-Well given by DPHE?

How much (1 for least to 5 for maximum) wWwcGBPB †_‡K cÖvß cvwbi Dr‡m wK Avcwb mš‘ó?

1	2	3	4	5

For this question, users response for a) 4=3 ; b) 3=2 ; c) 2=7 ; d) 1=4



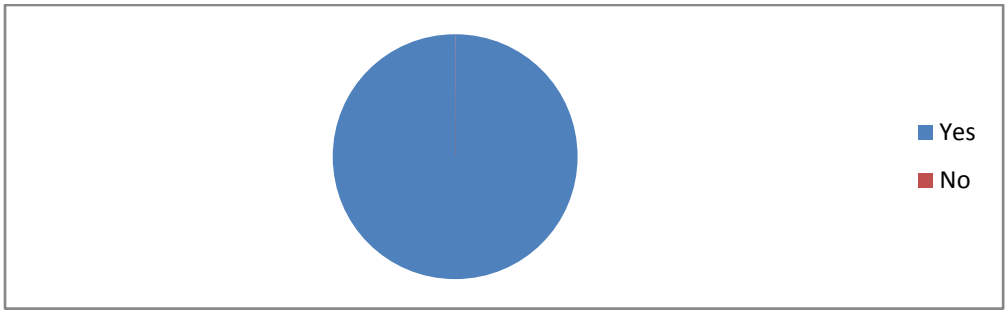
9 Do you think that there should be any change in present service delivery system?

Avcwb wK g‡b K‡ib wWwcGBPB –Gi eZ©gvb †mev cÖ`vb c×wZ‡Z †Kv‡bv cwieZ©b Avbv cÖ‡qvRb?

Yes	No

Suggestion, if any (on behalf of your answer) (Eg. Piped water Supply, Bottled water etc.)

For this question, users response for a) Yes=16 b) No=0

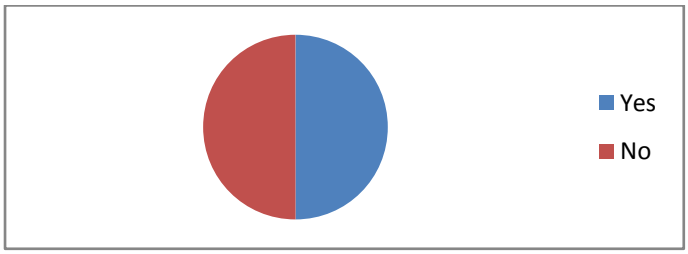


10 Are you satisfied with the contribution money required for Tube-Well from DPHE?

wWwcGBPB cvwbi Dr‡mi Rb¨ †h cwigvb mnvqK A_© wb‡q _v‡K Zv‡Z wK Avcwb mš‘ó ?

Yes	No

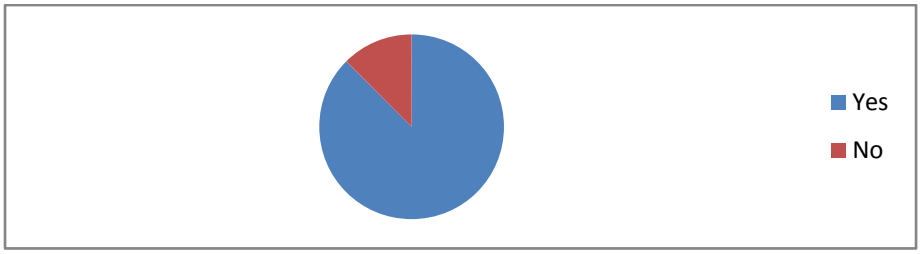
For this question, users response for a) Yes=8 ; b) No=8



11 Do you have experience of drinking bottled water? Avcbvi wK †evZjRvZ cvwb LvIqvi AwfÁZv Av‡Q?

Yes	No

For this question, users response for a) Yes=14 ; b) No=2



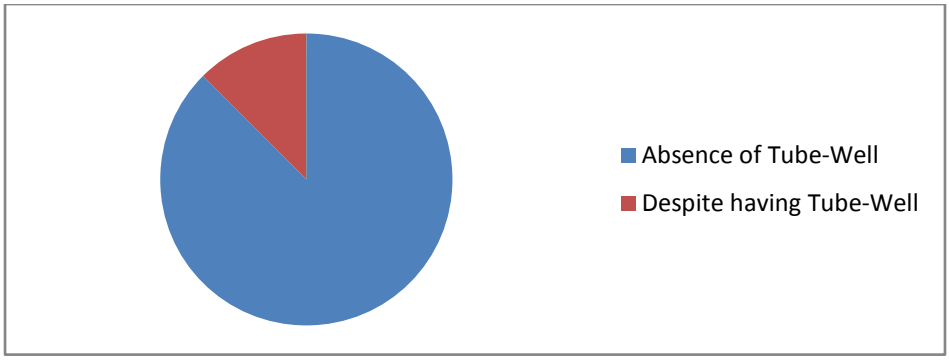
12 In which situation you drink bottled drinking water incase outside of your own residence?

evoxi evB‡i Ae¯’v‡bi mgq †Kvb ai‡bi cwiw¯’wZ‡Z Avcwb †evZjRvZ cvwb ‡L‡q _v‡Kb?

Absence of Tube-Well	Despite having Tube-Well

For this question, users response for a) Absence of Tube-Well=14 ;

b) Despite having Tube-Well=2



5.2 MAJOR FINDINGS

- Around 81% users have No.6 Hand Pump as Safe drinking water source of the research areas.
- 100% of the respondent have switched from one type to other type drinking water source in their life span which indicate their good adaptability to changing situation.
- The respondents are minimally satisfied with the site selection procedure of DPHE.
- About 75% users did not get any instruction regarding maintenance of drinking water source which is very disappointing.
- About 94 % respondents feel comfortable with #6 Hand Pump to be used in their premises for operational purpose.
- About 69% users think that DPHE at present has minimum capability for providing safe drinking water source which is not expected from DPHE as a lead public sector agency for providing safe drinking water to the people of Bangladesh.
- About 81% users think that DPHE has only minimum marginal standard service delivery system at present capacity.
- About 41% users are minimum satisfied while 24% users are dissatisfied with the performance of the tube-well they have got from DPHE.
- 100% respondents expect change in the present service delivery system.
- 50% users express satisfaction on contribution money while rest 50% users express dissatisfaction.
- About 88% respondents have experience of drinking bottled water which is commercially marketed by the private sector. This phenomenon reflects that there is a prospect of private sector investment in safe drinking water sector even in rural area.
- About 88% respondent those have experience of drinking bottled water expresses that they only drink bottled water in the absence of Tube-well. This finding represents that still there is high demand of Hand Pump Tube-Well as a safe drinking water source in the rural area.

5.3 Recommendations

- DPHE should continue more allocation of #6 Hand Pump as safe drinking water source in the rural area.
- DPHE need proper measures for giving instruction to the users regarding maintenance of drinking water sources.
- DPHE should design standard service delivery system especially in the field level.
- Proper measures should be taken for regular water quality monitoring in the field level.
- Piped water supply project should be implemented in the rural areas where electricity is available.
- Sufficient technical and administrative manpower should be appointed in the field level office.
- Sufficient budgetary allocation should be ensured from the Government.
- Research and Development work should be continued to match the changing situation of Hydro-geology.
- DPHE should think strongly on piped water supply project and bottled water supply as future demand to cater the changing taste of people and improved economic development.

5.4 CONCLUSIONS

Department of Public Health Engineering (DPHE) is a leading public sector organization for providing safe drinking water to the people of Bangladesh except WASAs areas. As a leading public sector organization, DPHE must have play its role as centre of excellence in providing safe drinking water source. DPHE should be used as benchmark organization for other organization working in the safe drinking water supply. But unfortunately, the service standard of DPHE is not up to the expectation of users. Though the DPHE have government mandate and wide network of organizational infrastructure even in Union Council level, there is a strong shortage of manpower deployment in these offices. Due to shortage of relevant manpower and proper budgetary allocation to DPHE, required service delivery could not be given to the people of Bangladesh.

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Policy Support Unit : *Sector Development Plan(SDP) 2011-2025*

DPHE Website: *www.dphe.gov.bd*

DPHE: *Research and Development Division*

DPHE: *Special Rural Water Supply Project*

DPHE*: Management Information System (MIS) Unit*.

Water Aid: *Hand Pump Installation Guideline*
*www.wateraid.org/~/media/Publications/tube**well-guidelines**-rural*

CLARIFICATION FROM QUESTIONER

Dear Sir:
I am Md. Rashidul Alom, student of MPSM program, BIGD, BRAC University. As a partial fulfillment of my academic requirement I am doing my Dissertation Paper on "Analysis of Allocation of Hand Pump Technology for Procurement as a Safe DrinkingWater Source installed by DPHE *." The information will be used for research purpose only and confidentiality of your information is guaranteed. Your gracious help is highly appreciated.*

Survey Sheet No:

SECTION A: QUESTIONNAIRE

Q

1 Which type of Drinking Water Source do you have at present in your premise ?
eZ©gv‡b Avcbvi evox‡Z †Kvb ai‡bi LvIqvi cvwbi Drm we¨¨gvb?

#6 HP	Tara (Plain)	Tara Dev	PSF	RingWell	Piped Water

2) Have you migrated from one type of drinking water source to other improved water sources in your life? (Eg. From River water to Pond water to Ring-well to Tube-well)
Avcwb wK Avcbvi RxeÏmvq LvIqvicvwbi Drm e`j Kwiqv‡Qb?

Yes	No

3) Do you feel satisfied with the site selection procedure of DPHE?
How much (1 for least to 5 for maximum) Avcwb wK wWwcGBPB- Gi cvwbi Dr‡mi ¯'vb wba©vib cÖwµqvq mš'ó?

1	2	3	4	5

4) Have you got any instruction regarding maintenance of Tube-Well given from DPHE Personnel?
Avcwb wK wWwcGBPB †_‡K wUDeI‡qj iÿYv‡eÿY m¤úwK©Z †Kvb ai‡bi wb‡`©kbv †c‡q‡Qb?

Yes	No

5) Which type of Water Sources you feel comfortable in your premise for operational purpose?-wb‡Pi †Kvb ai‡bi cvwbi Drm Avcbvi evoxi Av½xbvq cwiPvjbvMZ D‡Ï‡k¨ myweavRbK g‡b K‡ib?

#6 HP	Tara (Plain)	Tara Dev	PSF	Ring-Well

6) Do you think that DPHE has a technical working capability to provide safe drinking water?

How much (1 for least to 5 for maximum) Avcbvi g‡Z wWwcGBPB wK wbivc` cvwb mieiv‡n KvwiMix fv‡e mÿg?

1	2	3	4	5

7) Do you think that DPHE has a standard service delivery system?

How much (1 for least to 5 for maximum) Avcwb wK g‡b K‡ib wWwcGBPB Av`k© gvY eRvq †i‡L †mev w`‡”Q?

1	2	3	4	5

8) Are you satisfied with the performance of Tube-Well given by DPHE?

How much (1 for least to 5 for maximum) wWwcGBPB †_‡K cÖvß cvwbi Dr‡m wK Avcwb mš‘ó?

1	2	3	4	5

9) Do you think that there should be any change in present service delivery system?

Avcwb wK g‡b K‡ib wWwcGBPB –Gi eZ©gvb †mev cÖ`vb c×wZ‡Z †Kv‡bv cwieZ©b Avbv cÖ‡qvRb?

Yes	No

Suggestion, if any (on behalf of your answer) (Eg. Piped water Supply, Bottled water etc.)

10) Are you satisfied with the contribution money required for Tube-Well from DPHE?

wWwcGBPB cvwbi Dr‡mi Rb¨ †h cwigvb mnvqK A_© wb‡q _v‡K Zv‡Z wK Avcwb mš‘ó ?

Yes	No

11) Do you have experience of drinking bottled water? Avcbvi wK †evZjRvZ cvwb LvIqvi AwfÁZv Av‡Q?

Yes	No

12) In which situation you drink bottled drinking water incase outside of your own residence?

evoxi evB‡I Ae¯’v‡bi mgq †Kvb ai‡bi cwiw¯’wZ‡Z Avcwb †evZjRvZ cvwb ‡L‡q _v‡Kb?

Absence of	Despite having

Tube-Well	Tube-Well

SECTION B: GENERAL INFORMATION OF RESPONDENT

1. Name :……
   Vill: Upazilla: District:
2. Gender : Male / Female
3. Age : 20-30 Yrs/ 31-40 Yrs/ 41-50 Yrs/ 51-60 Yrs/ 61+ Yrs
4. Occupation : Farmer/ Teacher/ Imam/ Public Representative/ Businessman/Other Service Holder
5. Education : Below SSC/ SSC/ HSC/ Graduation/ Masters
6. Monthly Income: below 5000/ 5000.00 – 10,000.00/ 10,001.00-15,000.00/ 15,001.00-20,000.00/ Above
   (TK)

The End of Sheet