

GIANT STRIDE IN ATTAINING SDG-6: ACCESS TO SAFE WATER FOR SOCIO- ECONOMIC DEVELOPMENT OF BANGLADESH

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“.....that the heavens and the earth were joined and we separated them and created from water every living thing” -The Noble Qur’an 21: 30

Introduction

Water scarcity affects more than 40 percent of people around the world and declining supplies of safe drinking water is a major problem impacting every continent.¹ Sustainable Development Goal (SDG) 2030 pronounces 17 Goals with 169 associated Targets where SDG-6 denotes “Ensure availability and sustainable management of water and sanitation for all”. SDG-6 sets 8 targets where the Target 6.1 pronounces “By 2030, achieve universal and equitable access to safe and affordable drinking water for all”.

According to World Bank report, drinking water access in Bangladesh is widespread, but half of the drinking water consumed fails to meet water safety standards, waterborne diseases are widespread, which have disastrous impact on health and nutrition.² Lack of access to safe water can create a heavy cost burden on nation’s economy, potentially hindering growth. The economic impact and social implications of such a situation are enormous. Thus, it is necessary to correlate effects of unsafe water and safe water and it is also necessary to figure out these effects to the socio-economic development of Bangladesh.

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1. UNDP, 2016. SDG Goal 6 Clean water and sanitation. Available at: <http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-6-clean-water-and-sanitation.html> [Accessed 30 April 2017].
 2. World Bank, IBRD.IDA, 2016. Bangladesh: Improving Water Supply and Sanitation. [Online] (1.5) Available at: <http://www.worldbank.org/en/results/2016/10/07/bangladesh-improving-water-supply-and-sanitation> [Accessed 16 March 2017].

In this backdrop, this study firstly seeks to overview SDG-6 and present status of safe water in Bangladesh. Thereafter, it analyses the impact of access to safe water in socio-economic development in the context of Bangladesh. An endeavor is made for the opportunity cost analysis in social and economic aspects of the access to safe water. The study also tries to critically analyse the existing policies and proposes ways forward.

Overview: SDG-6 and Role of Safe Water in Socio-Economic Development

Sustainable Development Goal 2030

“Sustainable Development Goal 2030 agenda is a plan of action for people, planet and prosperity. The 17 Goals and 169 targets are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental. The Goals and targets will stimulate action over the next fifteen years for humanity and the planet: People, Planet, Prosperity, Peace and Partnership.”³ SDG-6 denotes “Ensure availability and sustainable management of water and sanitation for all”. SDG-6 contains eight targets and the scope of this study remains within SDG Target 6.1 “By 2030, achieve universal and equitable access to safe and affordable drinking water for all”.

Defining Safe Water

United Nations defines “Access to safe water is measured by the proportion of population with access to an adequate amount of safe drinking water located within a convenient distance from the user’s dwelling.⁴ Under the WHO/ UNICEF Joint Monitoring Programme (JMP), ‘Access’, ‘Adequate Amount’, ‘Safe’ and ‘Convenient Distance’ are defined at the country level. However, when no definition is available at country level, following definition from WHO (1996b) may be used.

3. United Nations, 2016. Sustainable Development Goals 2030. Available at: <http://www.un.org/sustainabledevelopment/development-agenda/>.

4. UNDP, 2002. UN Human Development Report. Available at: <http://www.un.org/esa/population/pubsarchive>.

Access to Water

In urban areas a distance of not more than 200 meters from a home to a public stand post may be considered reasonable access. In rural areas, reasonable access implies that a person does not have to spend a disproportionate part of the day fetching water for the family's needs.

Adequate Amount of Water

Adequate amount of water is considered as 20 liters of safe water per person per day.

Safe Water

Water that does not contain biological or chemical agents directly detrimental to health is considered safe. It includes treated surface water and untreated but uncontaminated water from protected springs, bore-holes, sanitary well etc.

Convenient Distance

In urban areas, to fetch 20 liters of safe water per person per day, 200 meters would be a reasonable distance from the home.

Correlation between Access to Safe Water and Socio-economic Development

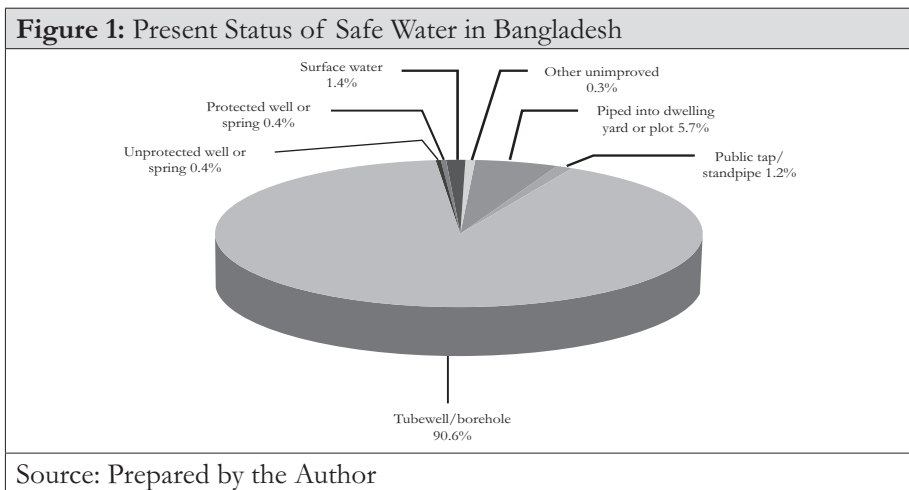
The term “socio-economic development” refers to general advancement of a given society to a higher level of welfare or well-being. While the “economic” part of the term refers to goods and services related to material welfare, the “socio” part of the term includes the full range of socio-cultural characteristics fundamental to welfare.⁵ The following correlation between access to safe water and socio-economic development has been considered for this study:

5. UNESCO, 1987. The Role of Water in Socio-economic Development. Project Report. Paris: UNESCO Studies and Report in Hydrology.

Access to Safe Water and Socio-Economic Development Correlation

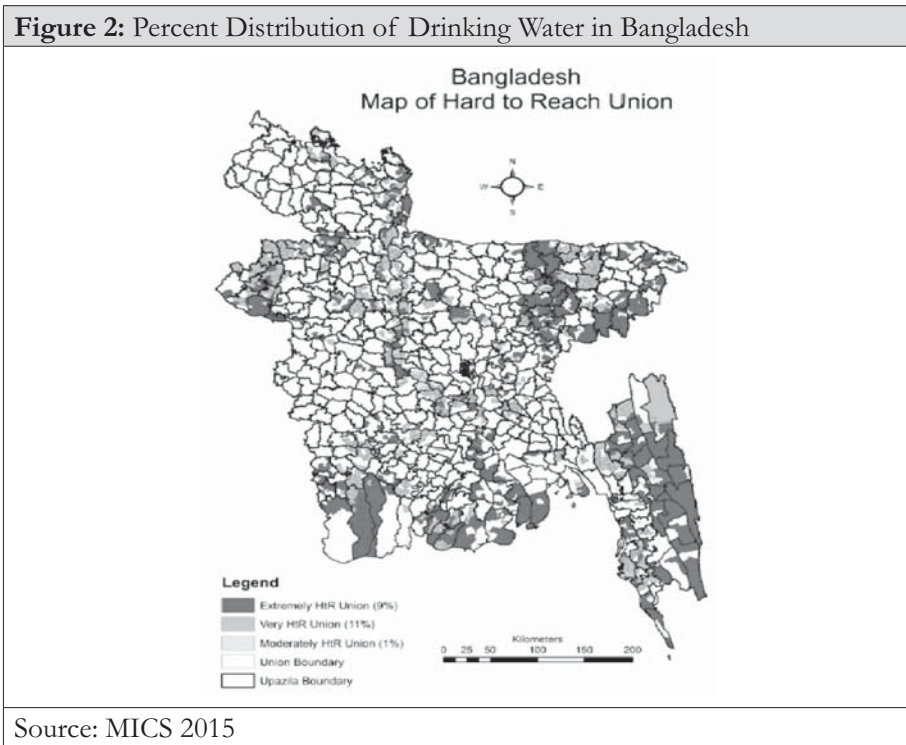
	Development Sectors	Impact
Access to Safe Water	Social	<p>Health</p> <ol style="list-style-type: none"> 1. Less personnel falling sick. 2. Healthy population. <p>Water</p> <ol style="list-style-type: none"> 1. Sense of increased social security. <p>Productivity</p> <p>More time for work, education and entertainment</p>
	Economic	<p>Health</p> <ol style="list-style-type: none"> 1. Saving treatment costs. 2. Value of falling sick and value of loss of death saved. <p>Water</p> <ol style="list-style-type: none"> 1. Water treatment costs saved. <p>Productivity</p> <ol style="list-style-type: none"> 1. Costs of time for water treatment saved. 2. Cost of time and labour saved from fetching water.

Present Status of Safe Water in Bangladesh



In Bangladesh, 97.9 per cent and 97.8 percent of the population in 2015 and 2014 respectively used drinking water from the improved drinking water sources where,. Among those who do not use improved drinking water sources, one fourth (25.6 per cent) use an appropriate water treatment method. About 74.2 percent of users of improved drinking water sources have a water source directly on their premises.⁶

Figure 2: Percent Distribution of Drinking Water in Bangladesh



Source: MICS 2015

About 28 million Bangladeshis, or just over 20% of the population, are living in harsh conditions in the “Hard-to-Reach Areas” that make up a quarter of the country’s landmass.⁷ Estimated population of Bangladesh living in slums is more than 7 million and often lack access to safe drinking water.⁸ About 24.8 per cent of the population had drinking water with arsenic above the WHO provisional guideline value of 10 parts per billion (ppb), and 12.4 per cent of the population exceeded the Bangladesh standard of 50 ppb (MICS 2015).

6. MICS, 2015. MICS 2012-13. Cluster Survey. Dhaka: BBS BBS.

7. UN Water, 2012. Glass Report 2012. Water Report. Geneva: UN Water UN.

8. THE DIPLOMAT, 2016. Water Crisis in Bangladesh Urban Slums. THE DIPLOMAT, Available at: <http://www.diplomat.com/2016/12>.

The Impact of Inadequate Access to Safe Water in Socio-Economic Development

Health Effects from Inadequate Access to Safe Water

Morbidity Status of Water-borne Diseases

For the purpose of this study, four top water-borne diseases of Bangladesh (according to the statistics of BBS) have been considered.

Table 1: Annual Cases of Top 4 Water-borne Diseases					
	Diseases (%) Both Sex	Prevalence per 1000 Population	Population Affected (%)	Total Population Affected	Percentage
1. Diarrhoea	4.02	9.06	0.906	1420608	50%
2. Typhoid	2.15	4.85	0.485	760480	27%
3. Hepatitis	1.59	3.59	0.359	562912	20%
4. Arsenicosis	0.29	0.65	0.065	10192	3%
Total				2845920	100%

Source: HMSS 2014, BBS, Considering total population 156.8 million

Mortality Status of Water-borne Diseases

Estimated Yearly Deaths from Selected Water-borne Diseases are shown below:

Table 2: Estimated Yearly Deaths from Selected Water-borne Diseases		
	Both Sex	Percentage (%)
Estimated total deaths	Adult: 1150700 Children: 221700	100
Diarrhoeal Disease	Adult: 31700 Children: 46362	5.68
Typhoid	Adult: Data not available Children: 37670	2.74
Hepatitis B & C	Adult: 3800 Children: Data not available	0.28
Arsenicosis (Melanoma and other skin cancer)	Adult: 300 Children: 100	0.03
Other Water-borne diseases	Data not available	Total: 8.73

Source: WHO, Department of Measurement and Health Information, BSVS 2015 and Author's Estimation.

For the purpose of this study, the Economic and Social Benefits from Access to Safe Water are summarised below. The concept of Guy Hutton was considered while preparing the following table.⁹

Economic and Social Benefits from Access to Safe Water

Table 3: Economic and Social Benefits from Access to Safe Water			
Sector	Direct Economic Benefits	Indirect Economic Benefits	Social Benefits
Health	Saving treatment costs (Costs of medicine, diagnostic test, doctor's fee, transportation) from Water-borne diseases	Value of not falling sick from Water-borne diseases (Value of time saved, value of loss of death avoided)	Less personnel falling sick, Healthy society sepecially with healthy mother and children
Water	Saving Water treatment costs	Value of time and labour saved for fetching safe water	Psychological welfare and improved social value
Agriculture and Industrial Sectors	Less expenditure on treatment of employee	Less productivity impact of workers being off sick	Benefits to agriculture and industry of improved water supply
Consumers	Saving costs related to health, water and agriculture	Saving time	More attendance in work and school, more leisure time
Source: Prepared by the Author			

9. Hutton, G., 2012. Global Costs and Benefits from Drinking water supply and sanitation. Available at: http://www.who.int/water_sanitation_health/publications/2012/globalcosts.pdf.

Social and Economic Aspect of Safe Water

Social Aspects of Inadequate Access to Safe Water: Coping Strategy of Victims

In Bangladesh, 65.4% people lack safe drinking water due to contamination while fetching from improved source to the place of consumption, 21% population with extreme poverty receive less attention due to geo-political and socioeconomic reason, 1144 Unions under 50 Districts like coastal belt and char areas people live with poor WASH infrastructure and services.¹⁰

Coping with the Impact of Inadequate Access to Safe Water

Families have to cope with various social impacts for collecting safe water as well as illness caused by unsafe water. Due to water-borne disease, once family members become ill, various coping mechanisms come into play, depending upon the status of the afflicted person. A significant amount of attention is paid to the effects of illness of the wage earner, usually the father. Coping with the burden of treatment costs constitutes the first important issue for the family. For Bangladesh, it was found that “large” medical expenditure would be paid out of the sale of assets (J, 1989). These assets are factors of production, such as land, that affect future income, or are smaller assets like beds, tables, chairs, fan or radio. It has also been found that intra-household labour substitution takes place to preserve income.

Social Impacts in Getting Access to Safe Water

Significant inequalities exist at national and local levels in getting access to safe drinking water. For example, within communities, particular households and individuals who must physically collect and carry their own water can face barriers to accessing sufficient safe water due to poverty, disability, ethnicity or age. Piped water services are simply unaffordable in many communities of low-income areas, particularly in remote rural areas and in the densely populated slums in the major cities of Bangladesh.

10. Shahid, S., 2016. Gender and IWRM & Technology. Project Report. Dhaka: Bangladesh University of Engineering and Technology Gender and Water Alliance Programme Bangladesh.

Economic Aspect of Safe Water

In an attempt to estimate the costs, the nonmonetary and financial costs of inadequate access to safe water in the areas of health, drinking water collection and productivity loss are considered and shown in the table below:

Financial Costs and Nonmonetary Cost of Inadequate Access to Safe Water to the Population

Table 4: Financial Costs and Nonmonetary Cost of Inadequate Access to Safe Water to the Population			
Impact Categories	Sub-impacts	Financial Costs	Nonmonetary Costs
Health – Water-borne Diseases	Premature deaths	Present Value of future income (Minimum Wage considered)	-
	Treatment Cost	Doctor’s fee, medicine, transport and diagnostic test cost	
Water Treatment and Fetching	Water Treatment Cost	Fuel Consumption cost	-
	Fetching cost	-	Time for fetching safe water
Productivity Loss	Health Care	-	Patient time loss due to illness Time spent for accompanying patient to seek health care
Source: Prepared by the Author			

Health Related Costs from Water-borne Diseases

This study estimates the costs of Premature Deaths, Treatment costs and Productivity loss costs from water-borne diseases due to inadequate access to safe water for the population of Bangladesh. Due to scarcity of data, only four top water-borne diseases (Diarrhoea, Typhoid, Hepatitis and Arsenicosis) have been considered for this study.

Estimated Cost of Premature Deaths

It is difficult to attach an economic value to any death. This study uses a simple technique for valuation of death in Bangladesh in finding out the present value of future income and calculated average minimum economic value of each premature death as Tk.1621800/00. (Author's calculation, data source: World Bank, BBS).

Disease	Cost of per premature death (Tk.)	Total premature death	Total Cost(Tk.)	Percentage
Diarrhoea	1621800	78062	126600951600	65%
Typhoid		37670	61093206000	32%
Hepatitis		3800	6162840000	3%
Arsenicosis (Melanoma and other Cancer)		400	648720000	0%
Total			19450,57,17,600	100%

Estimated Treatment Costs of Four Water-borne Diseases

Costs of treatment have been divided into four categories which are Doctor's Fee, Medical Tests, Attendant Cost and Transportation Costs. There are other costs like Hospital/Clinic Fees, Medicine costs etc which are not included due to non-availability of data from authenticated sources. Treatment costs shown below are considered as minimum average treatment costs per person against the disease.

Average Per Person Treatment Cost (in Tk.) of Selected Water-borne Diseases

Table 6: Average Per Person Treatment Cost (in Tk.) of Selected Water-borne Diseases					
Disease	Doctor's Fee	Medical Test	Attendant Cost	Transport Cost	Total
Diarrhoea	323	899	217	339	1778
Typhoid	188	653	164	258	1264
Hepatitis	175	720	81	134	1110
Arsenicosis	365	1141	251	269	2026

Source: Health and Morbidity Status Survey 2014 (BBS, 2014).

Treatment Costs of Affected Population from Selected Water-borne Diseases (2014)

Table 7: Treatment Costs of Affected Population from Selected Water-borne Diseases (2014)					
S.No	Disease	Average Per-person Treatment Costs (Tk)	Total Pop Affected	Total Costs of Treatment (Tk)	Percentage
1	Diarrhoea	1778	14,20,608	252,58,41,024	62%
2	Typhoid	1264	760480	96,12,46,720	23%
3	Hepatitis	1110	562912	62,48,32,320	15%
4	Arsenicosis	2026	101920	20,64,89,920	0%
Total				431,84,09,984	100%

Source: Health and Morbidity Status Survey 2014 (BBS, 2014).

Average Work Days Lost Due to Selected Water-borne Diseases

Table 8: Average Work Days Lost Due to Selected Water-borne Diseases			
Disease	Average days lost		
	Total	Male	Female
Transmitted Disease (Diarrhoea)	6.3	6.4	6.2
Hepatitis	12.9	14.2	11.1
Skin Cancer (Arsenicosis)	11.7	9.6	13.3
Typhoid	Data not available		
Source: HMSS, BBS.			

Average Work Days Lost Due to Morbidity by Activities and Sex

Table 9: Average Work Days Lost Due to Morbidity by Activities and Sex		
Average Work days lost	Male	Female
10.2	10.6	9.9
Source: HMSS, BBS.		

Nonmonetary Cost (Costs of Work Days Lost) Due to Illness from Selected Water-borne Diseases

Table 10: Nonmonetary Cost (Costs of Work Days Lost) Due to Illness from Selected Water-borne Diseases				
Disease	Average Work days lost	Cost of Each Work day (Tk)	Total Pop Affected	Total Cost (Tk)
Diarrhoea	10.2	176.67	1420608	250978815
Typhoid	10.2	176.67	760480	134354002
Hepatitis	10.2	176.67	562912	99449663
Arsenicosis	10.2	176.67	101920	18006206
Total			2845920	502788686
Source: Prepared by the Author				

Due to non-availability of data for all diseases, average work days as calculated by HMSS, BBS was considered. Daily minimum wages according to Comparative Wages in Selected Countries was considered.¹¹

Cost of Time Spent for Accompanying Hospitalised Patient

Table 11: Cost of Time Spent for Accompanying Hospitalised Patient				
Disease	Average days lost in hospital per patient	Cost of each work day Tk. (minimum wage)	Total Affected population/ accompanying Hospitalised Patient	Total Costs (Tk.)
Diarrhoea	8.5	176.67	45535 (1.6 percent of persons reported illness needed to be hospitalised)	68379682
Hepatitis				
Typhoid				
Arsenicosis				

Note: One person is considered for each hospitalized patient. Data source is HMSS, BBS.

Drinking Water Treatment Cost

Boiling of water is the most common method of drinking water treatment in Bangladesh. Therefore, boiling cost of drinking water treatment has been considered for this study. Drinking water requirement per day per person is considered 3 liters (WHO, 2013). Calculating average cost of water treatment by boiling as Tk.0.136, the total costs of treatment by boiling for the year 2014 was calculated as Tk.131510656 only (Data sources are MICS 2015, BBS).

From the above calculation, following important findings are revealed for the year 2014:

- Minimum direct treatment cost from only 4 Water-borne diseases is Tk.4318.41 million.

11. Labour standards in global supply chains, 2015. Minimum Wages in Global Industry. International Labour Organisation Available at: http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/publication/wcms_436867.pdf.

- Cost of drinking water purification by boiling is estimated to be Tk.131.51 million and Tk.513.7 million for 25.6% and 100% population respectively who use drinking water from unimproved sources.
- So, by providing the total water purification cost as subsidy to the affected population, Government of Bangladesh (GOB) can still save Tk.3804.71 million from the expenditure of water-borne diseases.

Cost of Fetching Safe Water

Cost of fetching safe water is calculated and yearly cost of fetching safe water was found as Tk.137406.56 million only. Data sources are MICS 2015, BBS.

Summary of economic impact from inadequate access to safe water is shown below:

Table 12: Economic Impact of Inadequate Access to Safe Water – 2014				
Impact Categories	Sub-impacts	Financial Costs (Million Tk.)	Nonmonetary Costs (Million Tk.)	Percentage
Health (Selected four water-borne diseases)	Premature deaths	194505.71	-	59%
	Treatment Cost	4318.41	-	
Treatment and collection of Safe Water	Water Treatment cost	131.51	-	41%
	Costs of time to Fetch safe water	-	137406.56	
Productivity Cost	Costs for Loss of time absent from work due to illness	-	502.79	0%
	Costs of time for accompanying patient in Hospital	-	68.38	
	Total	336933.41 million		100%

Source: Prepared by the Author

From the above data, the health-related economic impacts of inadequate access to safe water due to mortality and health care from only four water-borne diseases are Tk.198824.17 million, which is 59 percent of the total economic impact and equivalent to 1.47 percent of GDP in 2014. Economic impacts of fetching safe water and treatment of water are Tk.137538.07 million or 41 percent of the total economic impact and equivalent to 1.02 percent of GDP in 2014. Costs for the loss of productivity due to time losses from illness are Tk.571.17 million and equivalent to 0.004 percent of GDP.

Per-Capita Impacts

Per Capita impact due to inadequate access to safe water is shown in the table below:

Per Capita Impacts due to Inadequate Access to Safe Water

Impact Type	Economic Impact		Percentage
	Tk.	USD	
Health	1268	16.25	59%
Water Access	877	11.25	41%
Productivity Loss	3.64	0.05	0%

From the above Table it is found that the per-capita impacts are low due to the huge population of the country (156.8 million in 2014, source: BBS). However, the national impacts from inadequate access to safe water are enormous.

Policies, Strategies and Interventions for Safe Water in Bangladesh

Policies and Strategies

The Water Act 2013 of the GOB provides a legal framework for the sector. The Perspective Plan (2010–21) of the GOB prioritizes interventions for ensuring access to drinking water, sanitation, and good hygiene practices for all. The Sector Development Plan (SDP) 2011–25 highlighted the need for having an integrated strategy for the water and sanitation sector (LGD 2012). The GOB has drafted

the National Water Supply and Sanitation Strategy 2014 to ensure “safe and sustainable water supply, sanitation, and hygiene services for all, leading to better health and wellbeing.”

SDG Action Plan for Safe Water through Mid and Long Term Development Plan

In realizing SDG 6 Target 6.1, Ministry of LGRD&C has developed action plan through mid and long term development plan. Important features of SDG Action Plan are appended below.¹²

Table 13: SDG Action Plan for Safe Water through Mid and Long Term Development Plan			
Ser	SDG Action Plan Project/ Programme	Total Project/ Programme	Estimated Cost (Million Tk.)
1	7FYP Goals /Targets related to SDG6, Target 6.1	11 in no	NA
2	Ongoing programme /projects to achieve 7FYP Goals/Targets	29 in no	340738.6
3	Requirement of new Project/ programmes upto 2020	27 in no	134575.67
4	Requirement of new Project/ programmes beyond 2020 (2021- 2030)	27 in no	Not yet estimated
5	Total Estimated Budget Requires for 7FYP (2016-2020)		475314.27
6	Average yearly Budget requirement		95062.85
Source: Prepared by the Author			

Analysis of Plans, Policies and Budget

Yearly average budget allocation for water supply within 2016-2020 is calculated to be Tk.40000 million which is 42% of estimated budget required and average budget expenditure in last five years for water supply is about 70% of allocated budget (Interview with Chief Engineer, DPHE). So the average yearly budget

12. LGRD&C, 2016. SDG Action Plan. Development Plan. Dhaka: DPHE, R&D Division DPHE.

allocation is 58% less than the estimated budget in realizing SDG-6 Target 6.1. Again increase of budget may not be effective due to our experiences of utilizing only 70% of allocated budget. These issues were discussed with the senior officials of concerned Ministry, Division, and Department and also with Subject Matter Experts (SME) and following are revealed:

- Due to shortage of required manpower in the concerned Govt authority/organization, implementation is not effective as planned. In DPHE alone, presently appointed posts of 1st Class and 2nd Class is only 45% and 60% of approved posts respectively. The similar situation also prevails in other related sectors.
- Procurement and tendering process is lengthy and complex which delays effective implementation. Budget is allocated in July each year but it takes almost six months to finalize projects and to complete the tender process.
- Political Influence and corruption play vital roles from awarding of a tender up to implementation process.
- Ensuring good governance in all tiers of the implementation process is necessary and the country needs strong political will, leadership and commitment from government, civil society and business leaders.

Ways Forward

This study has identified the impact of inadequate access to safe water in socio-economic development of Bangladesh. For implementation of national action plan and to ensure adequate and affordable access to safe water to all by 2030, following are the proposed ways forward:

- Draft National Water and Sanitation Strategy 2014 may be finalization and implemented and monitoring activities may be strengthened. A high level inter-ministerial committee may be formed to ensure better coordination between the various ministries of the GOB to monitor progress of the implementation of the action plan. Secretary LGRD&C, LGD Division may be the head of the committee with members (not below Joint Secretary) from other concerned ministries.
- The water sector response and related multi-sectoral response may be strengthened for addressing safe water access to all. Following actions are proposed:

- Ensuring sensitization of sector-specific stakeholders and developing SOPs to improve sectoral outcomes in access to safe water.
 - Establishing a system of inter-sectoral coordination and communication network to address the issue of interdependence.
 - Identifying potential avenues from the existing policies and strategies for making the sector-specific interventions more “safe water sensitive”.
- Quality of water is to be improved at source, in storage and at the point of consumption. In doing so, following actions are proposed:
 - Importance of safe drinking water and keeping its quality improved at source, storage and at the point of consumption may be included in the syllabus of primary and secondary education.
 - Awareness-raising campaigns on importance of safe water may be arranged from the grass root level where UNO, UZL Chairman, Headmasters of Primary and Secondary schools, Madrasas, Imam of mosques are to be engaged actively.
 - BUET and other technical institutions may be tasked to invent low cost, user friendly safe water storage facilities and are to be distributed among the most needed and ‘Hard to Reach’ population on priority basis.
 - Investment needs to be increased in the priority sectors as proposed below:
 - In the development of more safe water sources, its maintenance, storage, supply and management.
 - In building awareness about the importance of use of safe water with special emphasis on the poor and ‘Hard to Reach’ communities.
 - In enhancing the Human Resource Development (HRD), system digitalization and to enhance efficiency and capability of the water related service providers.
 - Progress towards achieving the SDG-6, Target 6.1 needs to be closely monitored and intimated to public regularly preferably in every six months.

Conclusion

Sustainable Development Goal-6, Target 6.1 pronounces “By 2030, achieve universal and equitable access to safe and affordable drinking water for all”. In Bangladesh, drinking water access is widespread and 97.8% populations have access to improved drinking water. But, half of the drinking water consumed fails to meet safety standard. Piped water reaches to 28.7% population in urban area and 1.3% in rural area. Among those who do not use improved drinking water sources, only 25.6% use an appropriate water treatment method. More than 7 million people living in city slums often lack reliable access to safe drinking water.

Calculating direct and indirect health impact of only four water-borne diseases (diarrhoea, hepatitis, typhoid and arsenicosis), water fetching and water treatment cost and cost of productivity loss like costs of time losses from water fetching and illness; the annual economic impact of inadequate access to safe water for the year 2014 is estimated to be Tk.336.93 billion, equivalent to USD4.32 billion. This impact is equivalent to 2.5 percent of Bangladesh’s GDP of 2014. The total health impact of (only four water-borne diseases: Diarrhoea, Hepatitis, Typhoid and Arsenicosis) inadequate access to safe water is estimated to be Tk.198824.17 million, which is 59 percent of the total economic impact and equivalent to 1.47 percent of GDP in 2014. The cost of household water fetching time is Tk.137406.56 million and water treatment is Tk.131.51 million, which is 40.78 percent and 0.04 percent respectively of the total economic impact. Cost of time losses due to illness and accompanying hospitalized patient are Tk.502.79 million and Tk.68.38 million respectively. The value of intangible social cost is much higher which cannot be calculated in terms of monetary value. The findings of this study reveal that the universal and equitable access to safe water contributes to the socio-economic development of Bangladesh. It also justifies that the economic benefits out of adequate access to safe water outweigh investment costs considerably.

Overall, the GOB policies and strategic directions in the water sector are comprehensive and cover the key factors that could have a significant impact on the socio-economic condition of Bangladesh. The challenge, however, is the translation of these policies and strategies into action. To ensure adequate and affordable safe water to all by 2030, this study proposed ways forward which include Finalization and implementation of Draft National Water and Sanitation Strategy 2014, Strengthening the water sector response and related multi-sectoral

response for addressing safe water access to all, Improving the quality of water at source, in storage and at point of consumption, Increasing investment in the priority sectors to ensure adequate access to safe water, Developing Complementary Strategies to Address Adequate and Affordable Access to Safe Water and Close monitoring in achieving the target.

The proposed ways forward along with action plan may be considered by the GOB to ensure adequate and affordable safe water to all by 2030. This is a giant stride in attaining the SDG-6 and will take Bangladesh another step ahead in socio-economic development and in realizing SDG 2030.

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Interview

19. Barrister Anisul Islam Mahmud, MP, Honourable Minister, Ministry of Water Resources, Bangladesh, at NDC on 01 March 2017.
20. Dr. Ainun Nishat, Professor BRAC University and SME on water resource management, at NDC on 14 March 2017.
21. Md. Ameer Hossain, DG, BBS at office on 29 May 2017.
22. Mr. Sudhir Kumar Ghosh, Chief Engineer, DPHE, at DPHE on 13 July 2017.
23. Dr. Ashish Kumar Saha, MBBS, MCPS, MPH, Director MIS, DGHS, at MIS office on 17 July 2017.

Author

Commodore Mohammad Anwar Hossain, (ND), NGP, PCGM, afwc, psc, joined Bangladesh Navy (BN) on 29 August 1985 and underwent the Joint Military Training with 16th Bangladesh Military Academy (BMA) Long Course. On completion of training he was commissioned on 01 January 1988 in the Executive Branch. The officer is a Navigation Specialist and did his Basic Navigation Course from Royal Australian Navy and Navigation Specialisation from Pakistan Navy. In his long carrier at sea for about fifteen years, the officer navigated his ship up to South Korea to the East and up to Turkey to the West in the capacity of Navigating officer and Commanding officer of Frigate. He successfully completed BN Junior Staff Course in 1993 and Staff Course at Defence Services Command and Staff College, Mirpur, in 2002. He is also a graduate of Armed Forces War Course 2010 from National Defence College, Bangladesh. During his long carrier, he served in various highly demanding staff, instructional and command appointments. Commodore Anwar commanded seven ships including a Guided Missile Frigate and also served as Staff Officer Operations and Chief Staff Officer to Fleet Commander and Commander Chittagong Naval Area respectively. In Naval Headquarters, he served as Staff Officer Plans and as Deputy Director in the Directorate of Plans. He served in UN Peace Keeping Operations in 2014-2015 D R Congo as Staff Officer in 2005 and in the only Maritime Task Force of UN in Lebanon where he was the Task Group Commander with ships from three countries including Bangladesh, Indonesia and Turkey. He also served in UN Peace Keeping Operations in D R Congo as Staff Officer in 2005. Prior to joining NDC as a course member, he served in Bangladesh Coast Guard (BCG) as Director Operations at BCG Headquarters and also as Zonal Commander of South Zone. The officer has been awarded with the Navy medal of excellence as well as President Coast Guard Medal. The officer visited a good number of countries for training and other official purposes. He enjoys reading as a passion and contributes to various journals and magazines.