



Assessing Return on Investment (RoI)

OF

**Promoting Environmental Health
for Urban Poor Project**



Final Report

**Assessing Return on
Investment (RoI)**

OF

**Promoting Environmental Health
for Urban Poor Project**

October, 2018

Conducted by



Acknowledgement

The study team of DevResonance expresses deepest appreciation to WaterAid Bangladesh for providing us with the opportunity to conduct this study.

We are immensely grateful to all the relevant officials of WaterAid Bangladesh for their professional support at all stages of the study. We are especially indebted to Dr Imrul Kayes Muniruzzaman, Director, Fundraising and Learning; Mr Aftab Opel, Head of Programme; Ms Mirza Manbira Sultana, Manager, M&E, and Mr. Muktadirul Islam Khan, Programme Officer, Monitoring for their thought-provoking ideas and constructive suggestions at various stages of the study. Their whole-hearted support has enabled us to look at various issues from less obvious perspectives.

We gratefully acknowledge project staff of partner NGOs for their collaboration during data collection. The study would not have been successful without the keen interest and profound support of primary respondents namely, the mothers of under five children; adolescent girls; school pupils and teachers; community based organizations; members of NBUS (Nagar Basti Unnayan Shangshtha); users, caretakers, and operators of public and mobile toilets and water points; pit cleaners; water bill collectors and all key informants. We particularly acknowledge research assistants and all the enumerators involved in the fieldwork and data management for their hard work and team spirit.

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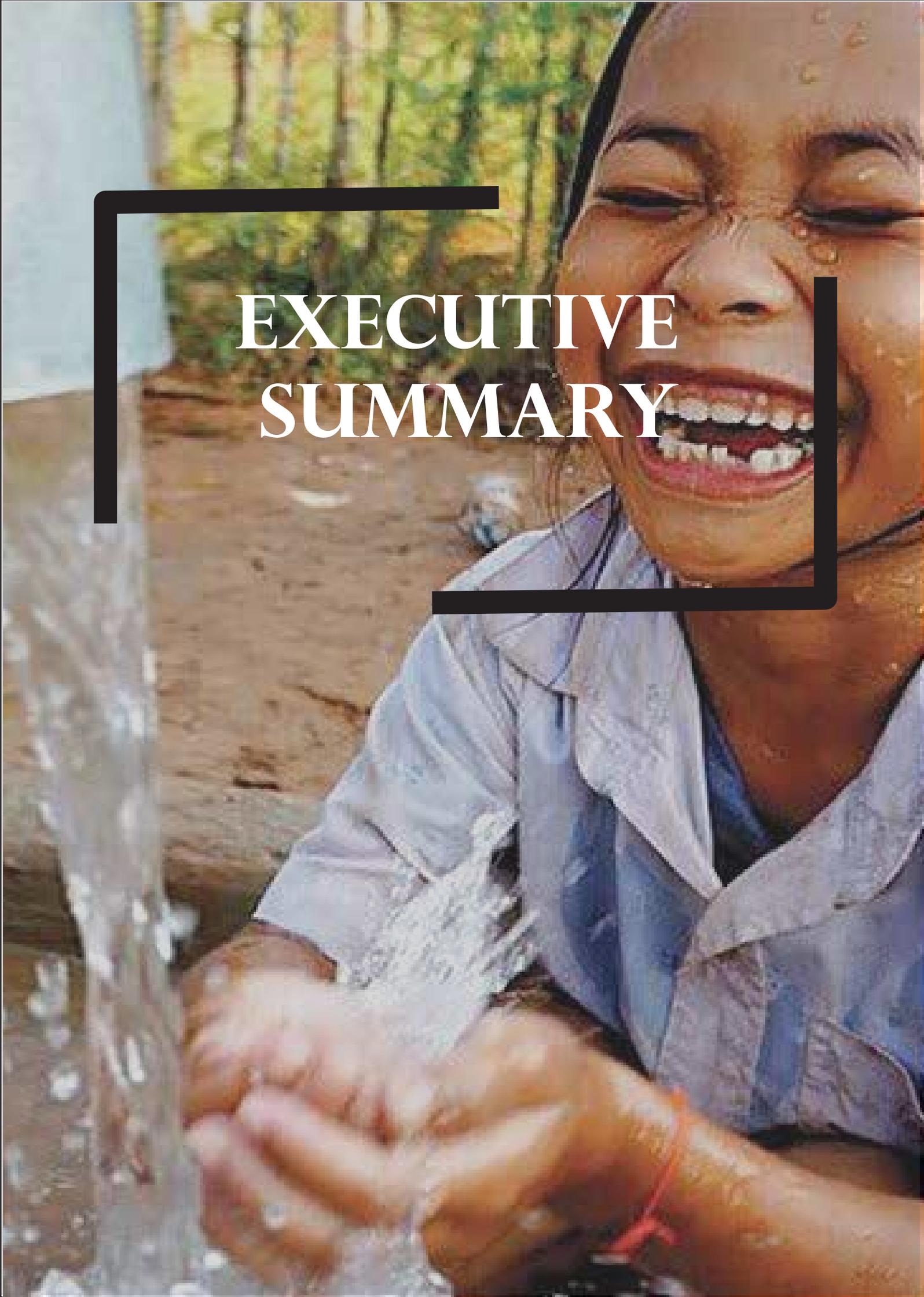
Annex: Illustration of outcome value estimation

References:



Abbreviations

ARBAN	Association for Realisation of Basic Needs
CBO	Community Based Organisation
CWFD	Concerned Women for Family Development
DSK	Dustha Shasthya Kendra
ECA	Extra curricular activities
LIC	Low Income Connections
MHM	Menstrual Hygiene Management
NBUS	Nagar Basti Unnayan Shanstha (Urban Slum Development Organisation)
NPV	Net Present Value
PEHUP	Promoting Environmental Health for the Urban Poor
SGD	Structured Group Discussion
SIDA	Swedish International Development Cooperation Agency
ROI	Return on Investment
ToC	Theory of Change
UNICEF	United Nations Children Fund
WAB	WaterAid Bangladesh
WASA	Water Supply and Sewerage Authority
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
WtP	Willingness to Pay
WtAC	Willingness to Accept Compensation

A close-up photograph of a woman with a joyful expression, splashing water on her hands at a public water tap. She is wearing a light blue button-down shirt. The background shows a dirt area and some greenery. The text 'EXECUTIVE SUMMARY' is overlaid in white, serif font, framed by a black L-shaped graphic.

EXECUTIVE SUMMARY

Executive Summary

With ever increasing urbanisation, the slums in Bangladesh's urban areas are growing rapidly. Dhaka, Chattogram and Khulna experience rapid growth slum population stretching the already thin WASH provisions. The people settling in slums are typically the poorer migrants from areas where economic opportunities are limited. WaterAid Bangladesh, in partnership with DSK, Nabolok, CWFD and ARBAN; undertook the 'Promoting Environmental Health for Urban Poor' project in the slums of the three city corporations, with the goal of improving the well-being, dignity and WASH deprivation of the urban poor. Implemented with SIDA support, the project commenced in 2011 and ended at the end of 2017.

Various researches already indicate high return on WASH investment. A WHO (2015) study indicates that an investment in WASH can have the impact of reducing just the cost of treatment for related diseases at a ratio of 1:4.13. There is growing notion among the WASH community that the impact of WASH interventions is likely to comprise of a lot more than the purely economic benefits. There is a realisation that much more impact is accrued through the social and environmental outcomes of the interventions. This affects the demonstration of value for money, cost efficiency and benefit and thus overall accountability of relevant interventions.

This study – conducted by DevResonance Ltd., was undertaken to estimate the broader return on investment – comprising of both economic and social outcomes, of the PEHUP project. The study followed a social accounting principle, where subjective valuations of outcomes by the stakeholders are accounted for.

Estimated ROIs

The study indicates an estimated ROI of 18.21 for WASH interventions, i.e. for each Taka investment in water, sanitation and hygiene – including menstrual hygiene, yields a return of Taka 18.21 to the stakeholders included in the study.

The stakeholder outcomes were separated into economic and social outcomes. The economic outcomes, included in the model, generated about 3.2% of the total outcome value to the stakeholders.

The study estimated ROIs for water, sanitation and hygiene components of the project separately.

A test of robustness of the economic model was carried out following the estimation of ROI. A number of factors – financial proxy value, attribution, deadweight and drop off ratio; were varied to test the model's sensitivity to these changes. The test results

Component-ROI



13.20



13.20



13.20

indicate that the estimated ROI is robust to the changes for each of the factors and for aggregated changes.

The ROIs are robust to changes in the variables in an unlikely scenario of substantial measurement error in the study or variations in the outcome values, deadweight, attribution, financial proxy values and drop off rates. The combination of changes that retains a net positive ROI (i.e. $ROI \geq 1.00$) indicates that deadweight and drop off ratios have to increase, and attrition and financial proxy values have to decrease, by 67.9% simultaneously for the ROI to reach 1.

Discussions during the SGDs and interviews shed light into how the lives of the stakeholders have transformed as a result of the interventions by the PEHUP project. Households are getting water from safe and regularly available sources, and are saving time in water collection. The school students and teachers also indicated availability of water throughout the day. This has increased the stakeholders' expenditure on water, but has also enhanced the convenience and comfort in their day to day life.

Structurally improved toilets have enhanced the stakeholders' hygiene and comfort, they are more secure for use of the children, disabled and the elderly. They feel that it would be more convenient for the less able people, if the ramps had railings. The slum dwellers thought that the environment has also improved substantially as a result of the improved latrines. Girl students and female teachers mentioned that improved latrines with adequate water in schools have made it easier for them to maintain hygiene during menstruation.

The stakeholders, including the mothers when caring for their children, mentioned of being more aware about basic hygiene and behavioural practice improvements – like in handwashing, cleanliness. The slum dwellers particularly mentioned solid waste

management to have contributed to improvements in their surrounding environment. The adolescent girls mentioned improvements in their management of menstrual hygiene.

The stakeholders, especially the younger people, appear to value outcomes like improved relationship with peers, neighbours, participation in social activities, their own dignity in the society very highly.

Community based WASH service providers mentioned enhanced family and social respect. They, however, mentioned that their service users sometime misbehave with them, as their occupations are seen as very lowly in the society in their opinion. Many of them reported to have found employment – some of them had been unemployed due to inability to do heavy work, through their current occupations; others reported increased income. The slum house owners mentioned that the improvements in water supply, availability of improved toilets, improved environment have had a positive effect on their rental incomes.

Mobile and public toilets have earned appreciation of their users – particularly of pedestrians and floating people. They have also earned the appreciation of the City Corporation officials. These toilets also help keep the surrounding environment clean. The City Corporation officials are of the view that improved waste management has effected improvements in the slum and surrounding environment.

Effectiveness of the CBOs-NBUSs work – both their role and that of participation, were appreciated by both the beneficiaries of the WASH interventions and by the members of the CBOs.

ARBAN, the partner organisation which was managing the mobile toilet intervention, has found a new means of increasing organisational revenue.

Stakeholder

Households living in city slums in PEHUP project area (with special emphasis on reproductive age girls and women for improved MHM practices)

Schools (Students and teachers – with special emphasis on girl students and female teachers for outcomes relevant to MHM practices)

Outcomes

Availability of safe water in adequate quantity

Increased availability of time for non-water collection related activities (may be family work, leisure etc.)

Improved relationship with and care of children

Increased participation in family and social activities

Household savings due to reduced cost for consumption of water

Enhanced security from harassment as a result of having legal access to water

Enhanced security from harassment as a result of having legal access to water

Improved relationship with neighbours

Enhanced safety and security of using toilets by elderly, physically challenged and young children

Reduced expenditure for treatment of water and hygiene related diseases

Increased income for households

Enhanced comfort and convenience (physical and mental) from living in clean and odour free environment

Enhanced physical and mental comfort as a result of improved MHM practices

Increased social dignity for being clean

Attendance of students in school increased

Students' enhanced ability to put in quality effort in their studies

Increased participation in ECA

Enhanced privacy and safety for females (separate, more secured toilets, MHM etc.)

Stakeholder	Outcomes
	<p>Enhanced wellbeing and satisfaction from using safe water, hygienic sanitation and environment</p> <hr/> <p>Enhanced leadership and advocacy skills of students and teachers</p> <hr/> <p>Enhanced dignity for being a teacher/ student/ staff of the school</p> <hr/>
Users of mobile and public toilets	<p>Convenience arising out of access to safe water and hygienic sanitation</p> <hr/>
CBO and NBUS members	<p>Enhanced leadership, management and fund raising skills among CBO/NBUS members</p> <hr/> <p>Increased participation in social and development activities</p> <hr/> <p>ICBO/NBUS members' enhanced dignity and acceptance in the community</p> <hr/> <p>CBO/NBUS members' enhanced acceptance among service providers, duty bearers and public representatives</p> <hr/>
Community based WASH service providers	<p>Enhanced income opportunities</p> <hr/> <p>Increased confidence and interaction ability as a result of enhanced management skills</p> <hr/> <p>Enhanced status in the family</p> <hr/> <p>Enhanced social dignity and acceptance</p> <hr/>
Partner organisation - ARBAN	<p>Enhanced institutional income</p> <hr/>
WASA (Dhaka)	<p>Increased water revenue for WASA</p> <hr/>

Besides these included stakeholders, the study team also considered stakeholders such as; City Corporation, traders of WASH and waste materials, non-slum dwellers and relevant government ministries and departments. These stakeholders were, however, excluded from the study as the benefits (or adverse effects) to them from the project were deemed insignificant.

PHASE-03

The study team then developed the economic model for the study. The model comprised of the outcomes, relevant indicators and financial proxy description. This step also involved assigning values for drop-off values and present value discounting rates in the model.

PHASE-04

The study team developed the instruments to collect data on outcome indicator values, financial proxy values, relevant stakeholder expenditures and; deadweight and attribution estimates. Data was collected, from the three City Corporation slums a, using individual and structured group interviews from –

- 143 households – interviewing mothers of children aged less than 5 years, men, adolescent girls and boys,
- 73 school students and teachers,
- 12 mobile and public toilet users,
- 46 CBO and NBUS members, and;
- 26 community based WASH service providers.

Data were also collected from three schools, partner organisations and WASA officials and city corporations. The study team also obtained project expenditure data from WAB Finance department.

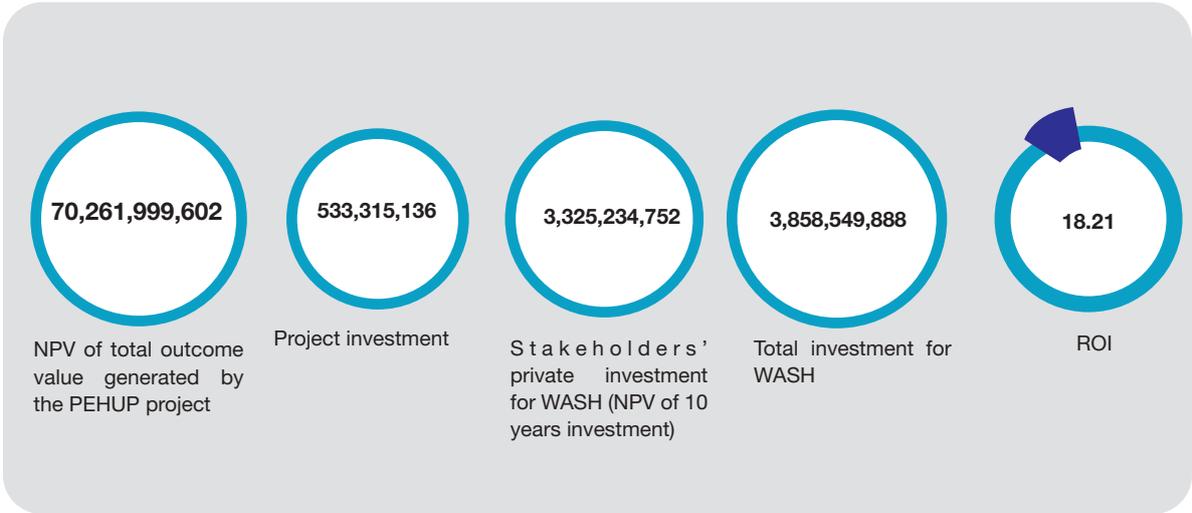
PHASE-05

Following the collection and entering of the data, parameters for all the variables in the model were calculated and entered into the model. The entered data gave values of outcome indicator incidences – net of deadweight, attribution and displacement; and financial proxy values; which together gave the outcome values of the model for a year. The annual outcome values were turned into ten years' value using the pre-assigned drop off rate. The ten year values were accumulated into NPV using average inflation rate as discount rate.

PHASE-06

A sensitivity analysis of the model to changes in deadweight, attribution, financial proxy values and drop off rate was done to assess the robustness of the model to such changes.

Some challenges and limitations of the study:



1

The stakeholders listed a large number of overlapping outcomes. The outcomes to be measured needed to be streamlined down to material ones, which was a challenging exercise with the stakeholders. The research team engaged in extensive consultation with the stakeholders to avoid overlapping outcomes and chose the material ones.

2

Some of the participants in the SGDs were illiterate, hence could not fill in the respondents' data sheet on their own. While the enumerators themselves filled in the data sheet in case of interviews, the more literate participants assisted the illiterate participants during the SGDs, which might have meant the latter being influenced by the opinion and valuation of the former.

3

Many of the SGD participating stakeholders appeared to have quite strong feeling about some outcomes. This was exacerbated by the Willingness to Accept Compensation questions for financial proxy values. Although some of the valuations deviated by a lot from the mean or the median. The research team converted the demand for one off pay offs as compensation into monthly pay offs over the rest of their expected life.

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- ii. Some of the participants in the SGDs were illiterate, hence could not fill in the respondents' data sheet on their own. While the enumerators themselves filled in the data sheet in case of interviews, the more literate participants assisted the illiterate participants during the SGDs, which might have meant the latter being influenced by the opinion and valuation of the former.
- iii. Many of the SGD participating stakeholders appeared to have quite strong feeling about some outcomes. This was exacerbated by the Willingness to Accept Compensation questions for financial proxy values. Although some of the valuations deviated by a lot from the mean or the median. The research team converted the demand for one off pay offs as compensation into monthly pay offs over the rest of their expected life.

The background of the slide is a composite image. On the right side, there is a close-up of a globe showing latitude and longitude lines. On the left and bottom, there are several US dollar bills, including a \$10 bill and a \$1 bill, which are slightly out of focus. The text is centered in the upper half of the image, enclosed in a blue L-shaped frame.

INTRODUCTION & BACKGROUND

Introduction

With ever increasing urbanisation, the slums in Bangladesh's urban areas are growing rapidly. Most of the migration takes place into the slums of Dhaka and Chattogram, due to the concentration of economic opportunities in these two cities. Khulna being a hub of climate vulnerable south-west region of the country also experiences substantial migration into its slums. The people settling in slums are typically the poorer migrants from rural and urban areas where economic opportunities are limited. As a result the slum population is increasing much more rapidly compared to the non-slum population even in the urban areas, which are experiencing faster growth of population compared to the rest of the country due to this migration phenomenon.

The slums typically are underserved in terms of WASH provisions – with even rudimentary amenities being shared by many families. The available facilities are under stress due to already high density of population, which is exacerbated by the continuous new in-migration.

WaterAid Bangladesh, in partnership with DSK, Nabolok, CWFD and ARBAN; undertook the 'Promoting Environmental Health for Urban Poor' project in the slums of the three city corporation, with the goal of improving the well-being, dignity and WASH deprivation of the urban poor. Implemented with SIDA support, the project commenced in 2011 and ended at the end of 2017.

Various researches already indicate high return on WASH investment. A WHO (2015) study indicates that an investment in WASH can have the impact of reducing just the cost of treatment for related diseases at a ratio of 1:4.13. Another study of WHO (Saachs, 2002) indicate that comprehensive WASH interventions may lead to about 2% higher GDP growth in similarly endowed low income countries. The notion is confirmed by a UNICEF study (2015), which indicates that a comprehensive WASH intervention has the potential to increase the life-cycle income by nearly 13%

There is growing notion among the WASH community that the impact of WASH interventions is likely to comprise of a lot more than the purely economic benefits described in these studies. There is a realisation that much more impact is accrued through the social and environmental outcomes of the interventions. This affects the demonstration of value for money, cost efficiency and benefit and thus overall accountability of relevant interventions.

This study – conducted by DevResonance Ltd., was undertaken to estimate the broader return on investment – comprising of both economic and social outcomes, of the PEHUP project. The study followed a social accounting principle, where subjective valuations of outcomes by the stakeholders are accounted for. The study

attempted to capture and put value on returns on which financial value cannot be placed directly.

This report is an outcome of the study which documents the process, the learning - challenges and limitations; and an analysis of the estimated ROI of the PEHUP project.

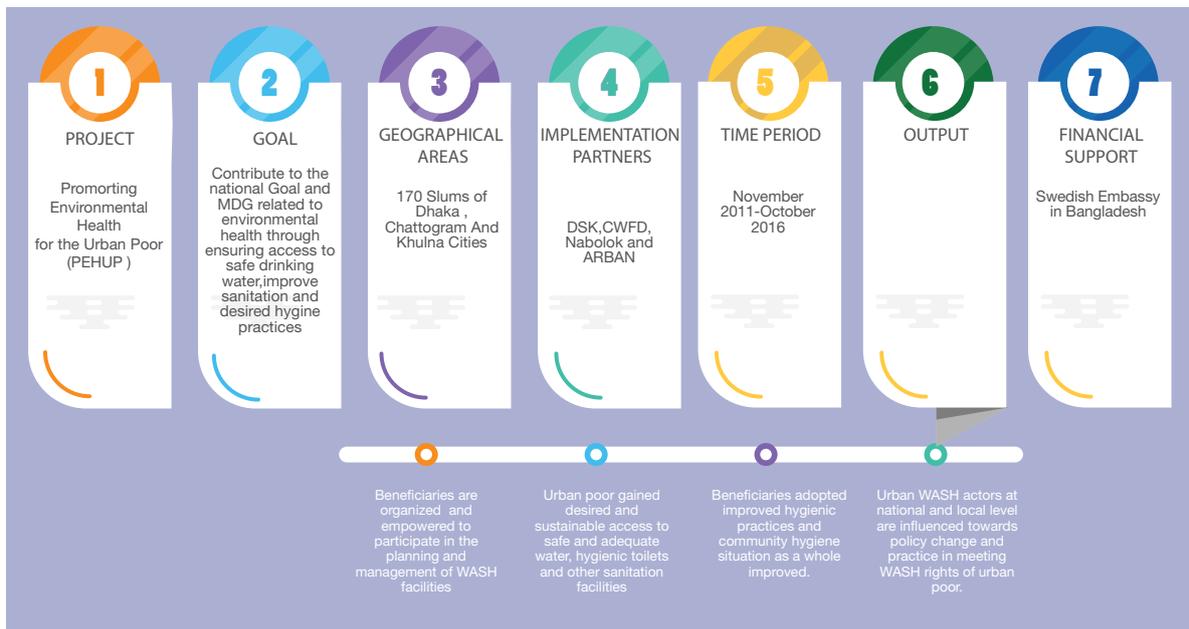
A brief description of the project

Inadequate access to WASH lead to an undesirable environment in slums and affect socio-economic well being and dignity of the slum dwellers. To reduce sufferings and vulnerability of the people living in urban slums, WaterAid implemented the project “Promoting Environmental Health for the Urban Poor (PEHUP)” over a period of 5 years (November 2011 - October 2016) with financial support from Sida. The project implemented in three major cities (Dhaka, Chittagong and Khulna) in Bangladesh in partnership with four national NGOs (DSK, CWFD, Nabolok and ARBAN). A total of 170 slums were targeted to serve in three cities. Slums were selected based on the population density, low WASH coverage, high levels of poverty; exclusion for many years and less eviction threat. The project aimed to serve 339,210 direct beneficiaries with WASH services. In addition, nearly 1.7 million pedestrians and commuters will be served through promotion of mobile and public sanitation facilities in Dhaka City.

The goal of the project was to contribute to the national goal and MDG related to environmental health through ensuring access to safe drinking water, improved sanitation and desired hygiene practices. The outcome was WASH deprivation (vulnerabilities) of the urban poor living in slums and low-income communities reduced. The four outputs were:



Four Outputs



The background features a collage of financial data visualizations. At the top left, there is a horizontal bar chart with bars in red, blue, and green. Below it, a magnifying glass is positioned over a line chart with multiple colored lines (red, blue, green) and square markers. To the right, a large orange and white arrow points towards the right. At the bottom, there is a vertical bar chart with orange bars and a line chart with green lines. The text 'RETURN ON INVESTMENT' is centered in a bold, black, serif font, enclosed within a blue L-shaped frame.

RETURN ON INVESTMENT

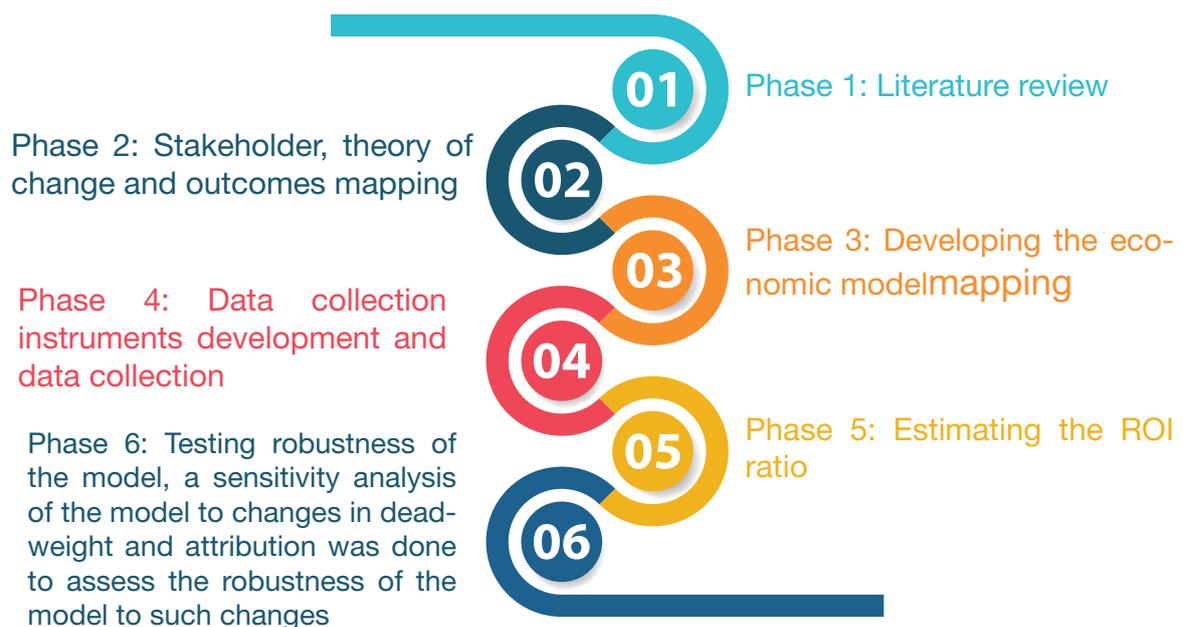
Return on Investment Estimation Methodology

The purpose of the research was to quantify the social, environmental and economic outcomes of the PEHUP project implemented in three city corporations – Chattogram, Dhaka and Khulna in Bangladesh. It would compare the total value created by the project with investments by the project and private expenditures by the stakeholders relevant to these values and generate a ratio as the rate of return on the investment.

Estimation of RoI of the PEHUP project followed an eclectic methodology that combines social return and cost-benefit analysis approaches. It mapped out the ‘material’ stakeholders and, the pecuniary and non-pecuniary outcomes accrued to the stakeholders through the project. The return on investment has been calculated by aggregating the values the stakeholders assign to relevant outcomes. The principle of **materiality** often guides judgement and inclusion of outcomes in such models, hence it employs extensive use of assumptions and subjective judgements.

It made use high level of engagement with the project stakeholders and focused on understanding the value of the change to the stakeholders themselves.

The exercise was broken down into several phases:



Literature Review

The first step of the exercise comprised of a review of primary and secondary literature. The primary literature – i.e. relevant to the project itself, consisted of project documents including project proposal and logframe, baseline and endline studies and various project reports. The secondary literature included reports of similar studies. A list of the materials reviewed is appended at the end of this report.

The literature provided guidance for the development of research frame and methodology. They, particularly the baseline and endline studies, also provided some of the outcome values that were used in estimating the model.

Based on the insights from the literature and DevResonance's own experiences of similar studies, a step by step research plan was developed, ensuring extensive involvement of the stakeholders, WAB and partners in various stages. The plan was finalised incorporating feedback from WAB and partners.

Stakeholders, theory of change and outcomes-mapping

In this phase the study team conducted two sets of workshops. The first workshop was conducted with WAB and partner organisation representatives. The research team took the opportunity to share the final research frame and facilitated identification of stakeholders and a broad list of potential outcomes that accrued to these stakeholders. The participants analysed project components, implemented activities and observed change results for identification of the stakeholders who were deemed to have made significant contributions (time, resources and other investments) and were potentially significant beneficiaries of the project. The workshop also made a judgement call on which of the stakeholders identified would have materially significant outcome – for the estimation of ROI, accrued to them.

In the next step the research team organised workshops and consultations with the stakeholders identified in the partners' workshop in all three project locations. These workshops and consultations served to identify the outcomes that were material to the stakeholders themselves. The processes resulted in validation of most of the outcomes identified in the partners' workshop, with some adaptations, inclusions and exclusions. The process also resulted in elimination of some of the stakeholders deemed significant in the partners' workshop, the rationale for their exclusion is explained in the table below, which lists the stakeholders considered, included and excluded.

A. Stakeholders relevant to the PEHUP project:

Stakeholder	Materiality to analysis	Inclusion / Exclusion rationale
Households in the slums in PEHUP project areas (with an emphasis on girls and women in reproductive age for improved MHM hygiene)	Improved WASH facilities, more convenient outreach and awareness would have a positive impact on the WASH behaviours – use of safe water, hygienic sanitation, improved hygiene practices etc. The household members in general would benefit from reduced morbidity and cost savings on their treatment, reduced time and cost for collecting water, enhanced convenience of using water connections, hygienic, safe and secured toilets, improved relationships within the families – particularly with children, between neighbours etc.	Included – deemed significant and direct beneficiary of the project.
Schools – their students and teachers (with emphasis on girl students and female teachers for improved MHM hygiene)	Improved and more convenient WASH facilities and enhanced awareness would have a positive impact on the WASH behaviours – use of safe water, hygienic sanitation, improved hygiene	Included – deemed significant and direct beneficiary of the project.

Stakeholder	Materiality to analysis	Inclusion / Exclusion rationale
Schools – their students and teachers (with emphasis on girl students and female teachers for improved MHM hygiene)	practices etc. The students and teachers in general would benefit from reduced morbidity and increased attendance, improved ability to study, increased participation in ECA etc. Being part of schools with improved WASH the students and teachers would feel more dignified in the society, their overall convenience in school would improve, girls and female teachers would benefit from improved privacy, security and hygiene for their menstrual health.	Included – deemed significant and direct beneficiary of the project.
CBO, NBUS leaders and members	Having gone through training and campaign activities CBO and NBUS leaders and members would have increased their ability to lead, to advocate and their ability to work collaboratively would be enhanced. They would enjoy higher respect and standing in their communities and among officials of local government offices and service providers.	Included – deemed material beneficiary of the project.
Users of mobile and public toilets	Having the facility would enhance convenience of the pedestrians.	Included – deemed material beneficiary of the project and a stakeholder of particular interest for being a new initiative.

Stakeholder	Materiality to analysis	Inclusion / Exclusion rationale
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<p>Community based WASH service providers - caretakers & operators of water-points, latrines, mobile & public toilets, waste collectors, pit cleaners & bill collectors</p>	<p>The service providers would benefit from the opportunity of regular and increased income opportunities, enhanced skills – including problem solving skills and enhanced standing in the family and among the neighbours.</p>	<p>Included – deemed direct and material beneficiary of the project.</p>
<p>Dhaka WASA</p>	<p>Dhaka WASA benefited from establishment of LICs – thus increasing the number of legal water connection holders. It was expected that this would enhance WASA's relationship with its customers and also with the line ministry and other relevant agencies resulting from enhanced operational efficiency.</p>	<p>Stakeholder was included, but only for the outcome relevant to increased income through LICs. Reputational and relationship outcomes for the customers were captured in outcomes relevant to safety and security relevant to legal water connections, enhanced convenience for having water connection within easy reach. Reputation and relationship with other government appeared to be dependent on a lot many factors, where LICs play an insignificant part and hence was excluded.</p>

Stakeholder

Materiality to analysis

Inclusion / Exclusion rationale

Local partner organisations of PEHUP

PEHUP project initiated sustained income earning opportunities for partner organisation – ARBAN in Dhaka through management of mobile toilets. It was expected also that the initiative would contribute to enhanced relationship of the partners with their beneficiaries and with other organisations, including donors.

ARBAN was included but only for the organisational income and potential contribution towards sustainability related outcome. Relationship outcomes for ARBAN were excluded both as it was still only a very small part of overall organisational activities and it was a challenge to consult the beneficiaries – some of them institutional and some individuals. However, the user benefit has been captured in the relevant stakeholder (mobile and public toilet users) mentioned above.

City Corporations

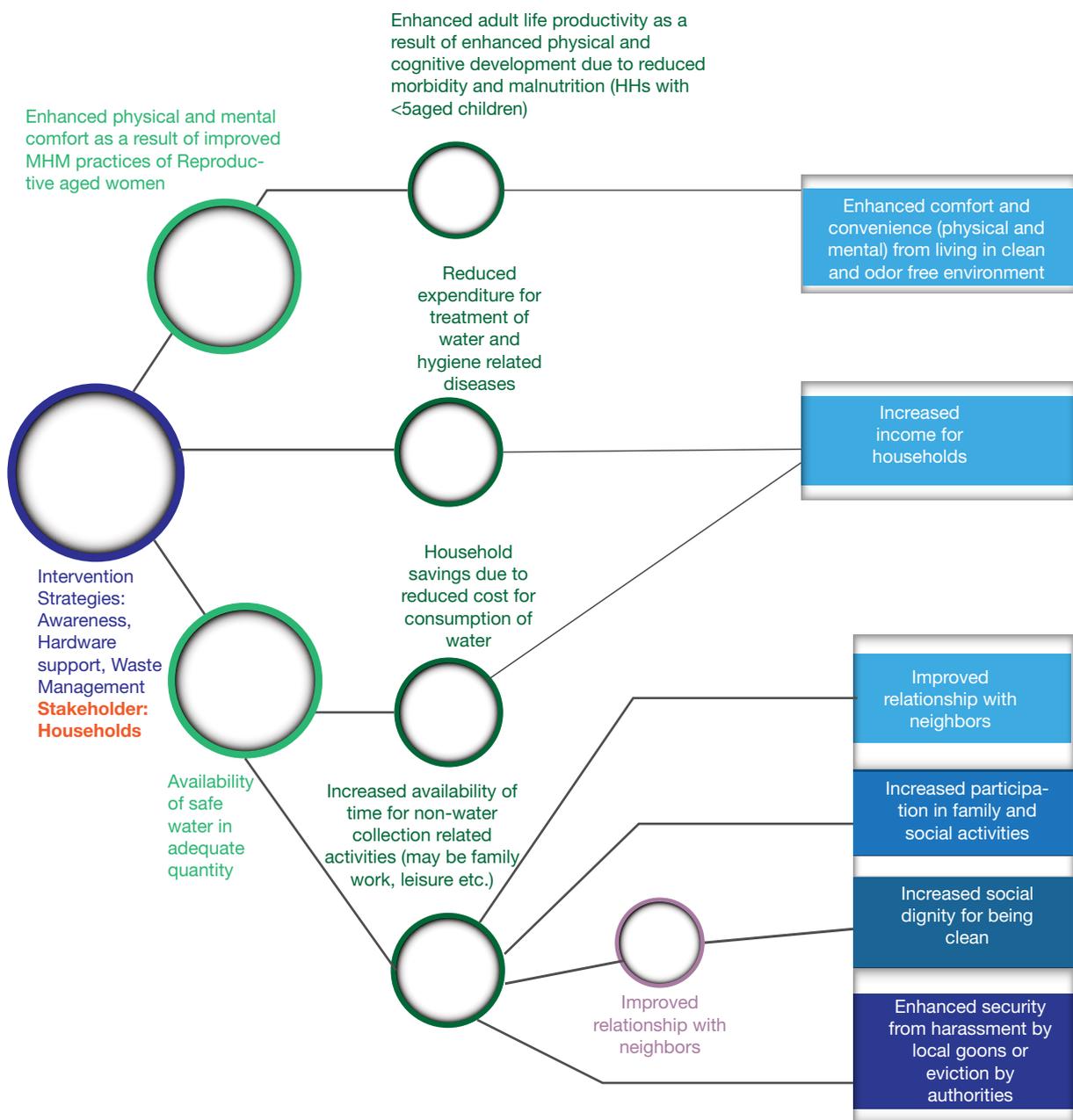
The outcomes relevant to the project were expected to be enhanced reputation and improved relationships with slum dwellers, enhanced reputation among relevant ministries and development partners and increased income through leasing out and better monitoring of public toilets.

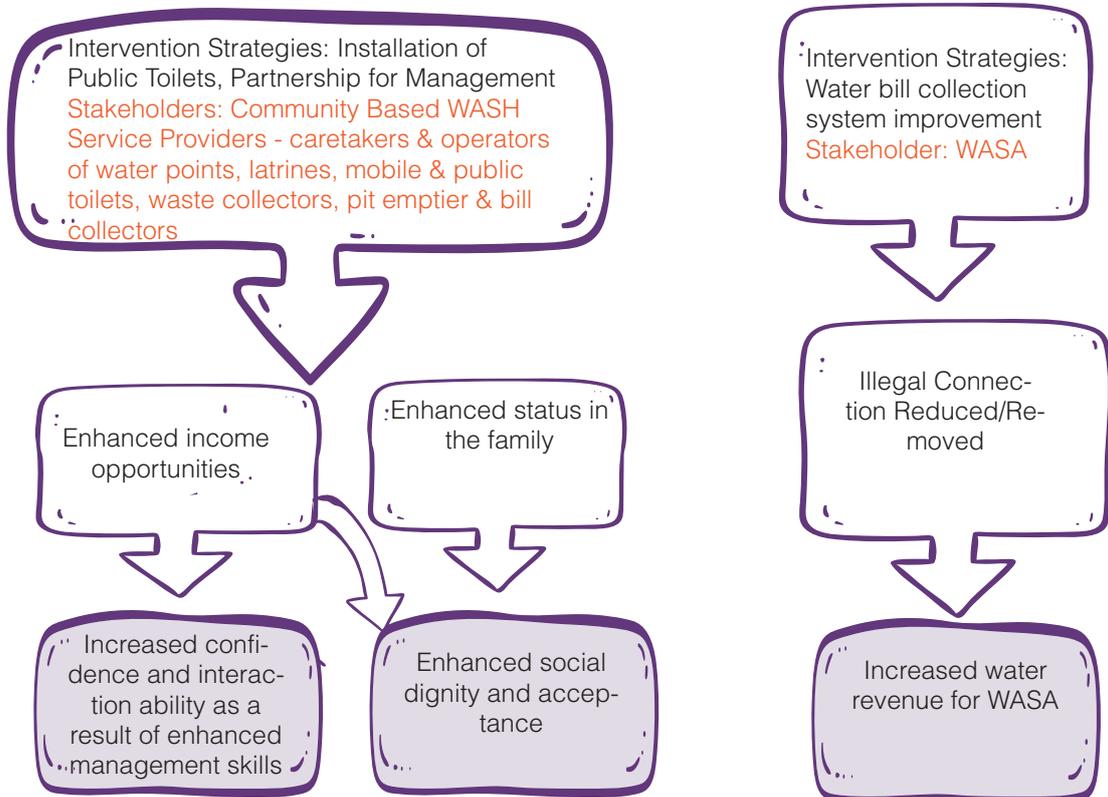
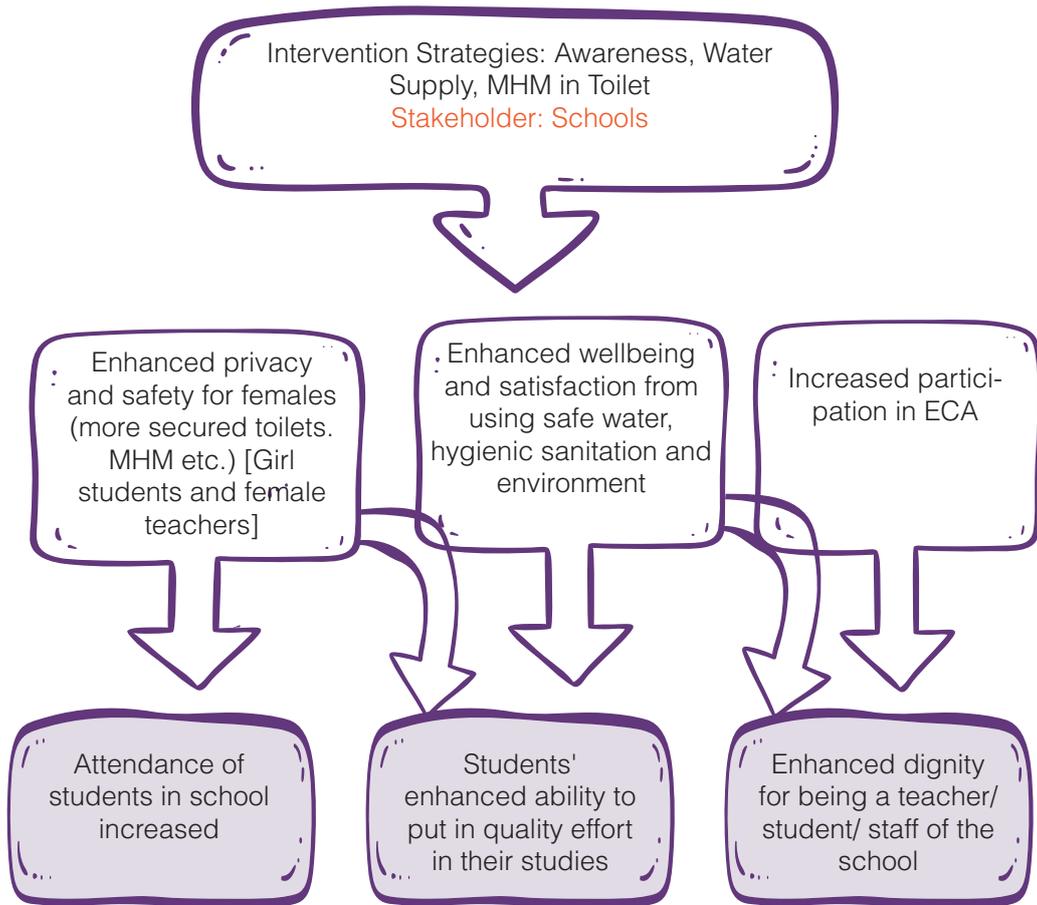
Indirect beneficiary, consultations suggested that WASH itself constitute a very small part of City Corporation activity portfolio, and within that PEHUP induced benefits would be a small part. Hence the stakeholder was deemed to be not material for the study. Not included.

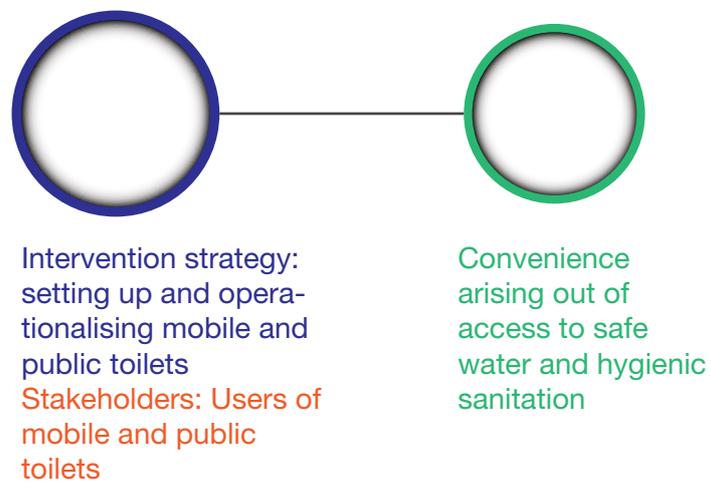
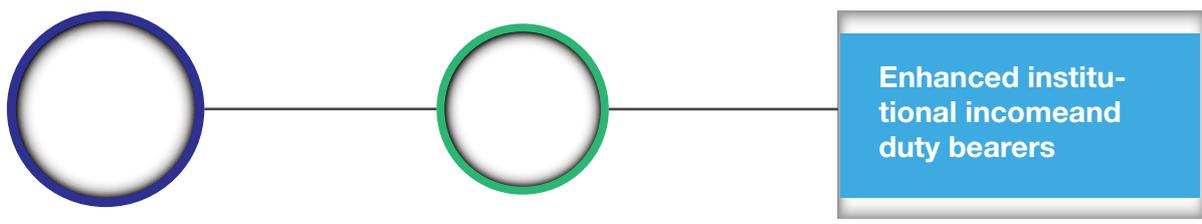
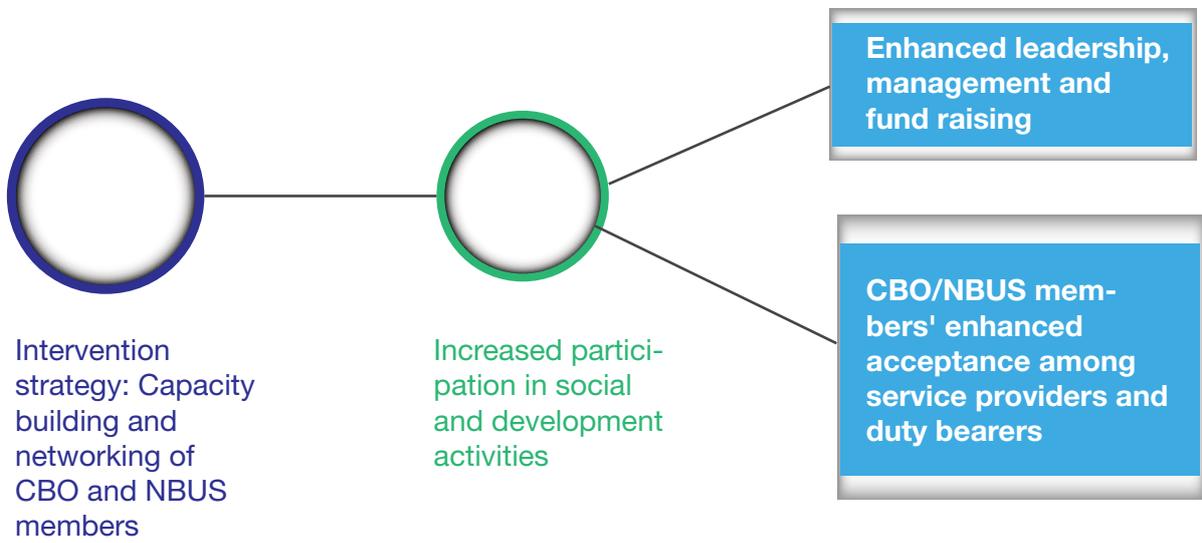
Stakeholder	Materiality to analysis	Inclusion / Exclusion rationale
Traders of WASH and waste materials (included manufacturers), specialised professionals (e.g. masons, plumbers)	Increased volume of trade leading to increased income	Deemed not material, considering the volume attributable to the project being a very insignificant part of their regular volume. Not included.
Traditional Birth Attendants working in the project area	Some of them are engaged in WASH awareness raising and trading of WASH materials.	Deemed not material for the study, not included.
Government bodies, line ministries (Education, Health, Local Government)	Government departments and ministries would have enhanced WASH accountability and improved relationships with the constituents they serve.	Deemed not material for the study, not included.
Non-slum dwellers (living in slum surroundings)	They would benefit from improved surrounding environment (less waste, odour), from less hassle due to reduced conflicts in the slums.	While the environmental benefit could be significant, defining and limiting the materially affected non-slum to a reasonable level appeared difficult. Not included.

B. Mapping of Changes:

Following identification of stakeholders and determination of material outcomes, a mapping of long term changes for each of included stakeholders was developed linking the baseline state through intermediate to long term outcomes. The mapping documented intervention strategies and assumptions associated with the pathway. The mapping of change was designed based on the programme design, log-frame and activity plan. The Outcome mapping diagrams are illustrated below.







Developing the economic model

Following the listing of stakeholders and relevant outcomes, DevResonance team developed the economic model for estimation of ROI. As mentioned earlier, the outcomes listed by the relevant stakeholders were used. The outcomes were separated into short, medium and long term outcomes. Those outcomes which conceptually overlapped with other outcomes were excluded to avoid over estimation. Similarly, in case of one or more outcomes leading to a new outcome, the final outcome was taken for the model. However, the intermediate outcomes were used to construct the indicators and indicator questions. The process involved developing indicator descriptions – for estimating incidence propensity of a particular outcome, financial proxies to assign monetary value for the outcomes. The draft economic model developed by DevResonance was revised and finalised following inputs from WAB and partners. The following table describes the outcomes and financial proxies used to measure them.

Stakeholder	Outcome	Indicator description	Financial Proxy description
Households living in city slums in PEHUP project area (with special emphasis on reproductive age girls and women for improved MHM practices)	Availability of safe water in adequate quantity	Feeling of convenience and satisfaction for having adequate water at homes	Willingness to pay to maintain the enhanced convenience and comfort
	Increased availability of time for non-water collection related activities (may be family work, leisure etc.)	Reduction in time for collecting water for household consumption	Prevailing wage rate for typical work

Stakeholder	Outcome	Indicator description	Financial Proxy description
	Improved relationship with and care of children	Improved relationship with children in the household	Willingness to pay for improved relationship with children
	Increased participation in family and social activities	Increased participation in family and social affairs (may be increased mobility, participation in family and social activities due to having more time, less diseases, more acceptability in family and society for being clean etc.)	Willingness to accept compensation for foregoing participation in family and social activities
	Household savings due to reduced cost for consumption of water	Reduced water related cost (buying, boiling or otherwise purifying water)	By how much the cost of water consumed in the household reduced as a result of having current access

Stakeholder	Outcome	Indicator description	Financial Proxy description
	Enhanced security from harassment as a result of having legal access to water	Reduction in harassment by local goons	Willingness to pay per month for continued relief from harassment
		Reduced fear of eviction by authorities	Willingness to accept compensation for eviction
	Improved relationship with neighbours	Reduced quarrel/harassment among neighbours	Willingness to pay per month for maintaining improved relationship with neighbours
	Enhanced safety and security of using toilets by elderly, physically challenged and young children	Perception of enhanced safety and security of using toilets by elderly, physically challenged and young children	Willingness to pay per month for maintaining structurally improved toilets

Stakeholder	Outcome	Indicator description	Financial Proxy description
	Reduced expenditure for treatment of water and hygiene related diseases	Reduced incidences of water-hygiene related diseases	Average treatment cost (per incidence) for water-hygiene related diseases
	Increased income for households	Change in average number of months the property remains rented	Average increase in rent per month
		Reduced work-day loss due to own, child's illness	Daily wage rate for typical work in the slum (male/female)
	Enhanced comfort and convenience (physical and mental) from living in clean and odour free environment	Valuation of comfort and convenience from living in clean and odour free environment	Willingness to pay every month to maintain improved environment

Stakeholder	Outcome	Indicator description	Financial Proxy description
	Enhanced physical and mental comfort as a result of improved MHM practices	Reproductive age women's self-reported perception of enhanced comfort level	Willingness to pay for maintaining improved menstrual hygiene and health
	Increased social dignity for being clean	Self-reported valuation of enhanced social standing	Willingness to pay for maintaining enhanced social status and respect
Schools (Students and teachers – with special emphasis on girl students and female teachers for outcomes relevant to MHM practices)	Attendance of students in school increased	Increase in students' attendance in school due to improved water-hygiene practices and reduced morbidity	Daily commuting expenditure (or time value) spent for getting attending school

Stakeholder	Outcome	Indicator description	Financial Proxy description
	Students' enhanced ability to put in quality effort in their studies	Self-reported value of students' increased attention in education	Willingness to pay per month to maintain enhanced attention in education
	Increased participation in ECA	Students' self-reported increase in participation in ECA	Willingness to pay per month to maintain increased ECA participation and respect
	Enhanced privacy and safety for females (separate, more secured toilets, MHM etc.)	Girl students' and female teachers/staffs' feeling of enhanced privacy and safety	Willingness to pay per month to maintain enhanced level of wellbeing and satisfaction
	Enhanced wellbeing and satisfaction from using safe water, hygienic sanitation and environment	Perception of enhanced wellbeing and satisfaction among teachers, staff and students	Willingness to pay per month to maintain enhanced level of wellbeing and satisfaction

Stakeholder	Outcome	Indicator description	Financial Proxy description
	Enhanced leadership and advocacy skills of students and teachers	Enhanced ability to lead peers, collaborate with others and advocate	Willingness to accept compensation per month to forego the enhanced leadership and advocacy skills
	Enhanced dignity for being a teacher/ student/ staff of the school	Self-reported value of feeling of dignity for being part of the school	Willingness to accept compensation for giving up the enhanced feeling of dignity
Users of mobile and public toilets	Convenience arising out of access to safe water and hygienic sanitation	Satisfaction from having access to safe water, hygienic sanitation	Cost of water/toilet per use
CBO and NBUS members	Enhanced leadership, management and fund raising skills among CBO/NBUS members	Self-reported perceived increase in skills	Willingness to pay for acquiring and maintaining the leadership and financial management skills

Stakeholder	Outcome	Indicator description	Financial Proxy description
	Increased participation in social and development activities	Increase in the respect and dignity of CBO members among their community members	Willingness to accept compensation for giving up the increased dignity and respect
	CBO/NBUS members' enhanced dignity and acceptance in the community	Self-reported increase in the respect and dignity of CBO members among their community members	Willingness to accept compensation for giving up the increased dignity and respect
	CBO/NBUS members' enhanced acceptance among service providers, duty bearers and public representatives	Self-reported increase in the acceptance CBO/NBUS members	Willingness to pay for maintaining increased acceptance among service providers and duty bearers
Community Based WASH Service Providers - caretakers & operators of water points, latrines, mobile & public toilets, waste collectors, pit cleaners & bill collectors	Enhanced income opportunities	Increased income of and savings of service providers	By how much has the income increased from previous occupation

Stakeholder	Outcome	Indicator description	Financial Proxy description
			How much can a service provider save each month as a result of increased repair-maintenance skills
	Increased confidence and interaction ability as a result of enhanced management skills	Self-reported increase in management skills	Willingness to pay for acquiring and retaining management skills
	Enhanced status in the family	Self-reported increase in appreciation by family members	Willingness to accept compensation for giving up appreciation and respect by family members
	Enhanced social dignity and acceptance	Increased appreciation and valuation by neighbours in the community	Willingness to accept compensation for giving up increased respect among neighbours

Stakeholder	Outcome	Indicator description	Financial Proxy description
Partner organisation – ARBAN	Enhanced institutional income	Increased number of sources for organisational income	Annual revenue from the opportunity created by PEHUP project
WASA (Dhaka)	Increased water revenue for WASA	# of LIC water-points in PEHUP project slums	Water bill from LICs every month

The approach to ROI used in this study seeks to place and evaluate stakeholders' subjective estimate of outcome values. The outcomes were, therefore, valued on the basis of stakeholder consultation and secondary research.

Data collection instruments development and data collection

The DevResonance team developed a required data frame following the development of indicator descriptions and financial proxies. The data requirements were matched with the Endline evaluation report of the project, it was stipulated that a few would come from that report. For the rest of the data required set of data collection tools were developed for each stakeholder. The instruments were modified and finalised with inputs from WAB and partners. The detailed questionnaires, developed in Bangla for ease of comprehension by participants, were further adapted following field testing.

Data was collected from the stakeholders through Structured Group Discussions (for stakeholders in households, schools and CBO/NBUS) and through individual interviews (for WASH facility service providers, mobile and public toilet users, and institutional stakeholders). Institutional stakeholders included partner organisations, WASA and City Corporations. The questionnaires included not only questions related to incidences of outcomes and valuation of financial proxies but also

questions that would elicit qualitative responses of what changes the stakeholders had experienced in relation to the outcomes and how these changes have occurred. These questions helped contextualise the outcome and financial proxy related questions and enable the participants provide the best informed responses to the extent possible. At the end of discussion of each segments the stakeholder representatives filled in the outcome incidence and financial proxy data in data sheets provided to them. The illiterate participants were assisted in filling data sheets by the enumerators.

The questionnaires also enquired about the costs the stakeholders (e.g. expenditure, time) have incurred to attain the outcomes. Attribution and deadweight data were also collected from the stakeholders through these questionnaires. DevResonance engaged its own enumerators – who were trained and supervised by the research investigators during their field work. Necessary linkage and organising assistance were provided by the partner organisations DSK and Nabolok. The enumerators were engaged through the process of economic model and data collection instruments’ development to develop their understanding of the study concept and of the questionnaires and checklists, as part of their training.

Data were collected from each of the three City Corporations where the PEHUP project intervened – with two Wards selected randomly from each City Corporation. Distribution of community and school level stakeholder was nearly even across the three City Corporations and among the Wards within them – the variation arising from a few male household representatives, in Chattogram, being unable to complete the SGD for their occupational engagements and a few students being unable to attend due to examinations at the time of data collection. They were replaced by new representatives from all three City Corporations. Distribution of other stakeholders across the three geographical areas of the project was contingent on their availability across the regions. The following table summarises the stakeholders and institutions from where data were collected.

Stakeholder	Sub-group within the stakeholder	Approach	Number of stakeholder interviewed	Remarks
Households	Adolescent girls and boys, Women – mothers of less than 5 year old children, Men	Structured Group Interview	143 in 20 SGDs	SPlanned 144 in 18 SGDs

Stakeholder	Sub-group within the stakeholder	Approach	Number of stakeholder interviewed	Remarks
School students and teachers	Girl students and female teachers, Boy students and male teachers	Structured Group Interview	73 in 10 SGDs	Planned 72 in 9 SGDs
Users of mobile and public toilets	Pedestrians Floating people	Exit interviews of individual users	12 interviews	12 interviews
CBO and NBUS members	Male CBO and NBUS members Female CBO and NBUS members	Structured Group Interview	46 in 7 SGDs	Planned 54 in 7 SGDs
Community Based WASH Service Providers	caretakers & operators of water points, latrines, mobile & public toilets, waste collectors, pit cleaners, and bill collectors	Individual interviews	26 interviews	29 interviews
Partner organisations		Key Informant Interviews	2	Planned 2 (DSK and Nabolok)

Stakeholder	Sub-group within the stakeholder	Approach	Number of stakeholder interviewed	Remarks
WASA		Key Informant Interviews	2	Planned 2 (Dhaka and Khulna)
City Corporation	Ward Members	Key Informant Interviews	3	Planned 3

The study team also collected project expenditure data from WAB Finance department to help estimate project investment into the outcomes.

Estimating the ROI ratio and benefits breakdown

The data collected from the field, from institutions – including WAB, were entered in excel software. Percentages (for outcome incidence) and values (for financial proxies) were estimated using cross-tabulation and arithmetic processes. These estimated parameters were entered in the model to calculate values of return separately for each outcome and in aggregate.

The estimated outcome incidence values were then discounted for deadweight, displacement and attribution (the estimates of these factors are described in the next section). Outcome sustenance period (of 10 years of sustained benefits as a result of direct influence of the project) was determined following facility surveillance studies by WAB. It was assumed that benefits would drop off at a rate of 30% per year over the outcome sustenance period, as this drop off ratio would give a benefit value of close to zero at the of the 10th year). Finally, the NPV of outcome values were obtained by estimating returns over estimated impact was determined using the average of officially reported inflation rate over the past three years.

Estimating investments into the outcomes

The investments made to achieve the outcomes were divided into two broad components – project investment and stakeholder investment.

Project investment

Project investment was measured from project financial data (project expenditure). Cost for supporting establishment of WASH provisions, training of project participants, project activities – including advocacy networking were separated from project operations costs. Partner and WAB operations and management costs included human resources, travel and conveyances, communications, office operation and maintenance, monitoring-evaluation interventions etc. Aggregating the two cost elements gave us the total project investment in the achievement of the outcomes.

Stakeholder investment

Stakeholder investments into WASH outcomes were separately estimated for each type of stakeholders. Households' increase in expenditure on WASH was obtained from the project endline study. Schools' and student and teachers' expenditure on WASH were derived from the consultations in schools and SGDs with students and teachers. CBO and NBUS members reported contribution through their time – for CBO/NBUS meetings, advocacy and self-initiatives, and their financial contributions to CBO and NBUS and their work. Time value was determined by taking the number of days they spend in CBO/NBUS activities (we took 50% of the reported days assuming – following consultation with SGD participants, that on each reported day they spend half the time for CBO/NBUS related activities), which was monetised using prevailing daily local wage rate. Partner NGO – ARBAN's expenditure to cover the mobile toilets' operation costs were taken from the financial report of the unit responsible for managing the mobile toilets. All the financial values of stakeholder investments were annualised and their NPV was estimated by aggregating ten years' investment, which were discounted using average annual inflation rate obtained from Bangladesh Bank.

Summary of investments are presented in the table below:

Investment description	Investment amount (in Tk.)
Programme costs (includes facilities provisions, training and other programme costs)	286,228,752
Project operations (includes human resources, office, operations, overhead etc.)	247,086,384
Total investment by project	533,315,136

NPV of increased household expenditure on WASH	1,364,747,073
NPV of expenditure by schools, students and teachers for WASH	1,157,648,774
NPV of time and financial contribution by CBO and NBUS members	229,317,496
NPV of operational expenditure for income generating activity by partner NGO	2,560,133
Total stakeholder investment	2,754,273,476
Total project and stakeholder investment	3,287,588,612

Challenges faced and limitations of the study

This sub-section lists some of the challenges that we faced while conducting the study and how they were overcome.

I. During consultations for outcome mapping, the stakeholders listed a large number of overlapping outcomes – measuring one would lead to measuring other at least partially. The outcomes to be measured needed to be defined and measured in such a way that eliminated overlap and correlation as much as possible, which was a challenging exercise with the stakeholders. As the social accounting approach to estimating RoI emphasises the subjective opinion of the stakeholders, the research team engaged in extensive consultation with the stakeholders to help them understand the approach, and help them avoid overlapping outcomes and chose the material ones.

II. Some of the participants in the SGDs were illiterate, hence could not fill in the respondents' data sheet on their own. While the enumerators themselves filled in the data sheet in case of interviews, the more literate participants assisted the illiterate participants during the SGDs.

III. Many of the SGD participating stakeholders appeared to have quite strong feeling about some outcomes. This was exacerbated by the Willingness to Accept

Compensation questions for financial proxy values. Stakeholders, particularly students and young people, would, under no circumstances, wish to give up some outcomes – particularly those that related to enhanced wellbeing, enhanced respect and standing among peers, family members and community members. Eventually they relented but quoted very high ‘prices’ for their sacrifices – few to the tune of 200 millions (as one off payment). Although they deviated by a lot from the mean or the median, the number of participants reporting such high ‘prices’ were actually significant. Hence rather than disregarding them as outliers, the research team converted the demand for one off pay offs as compensation into monthly pay offs over the rest of their expected life (following WHO estimate for an average Bangladeshi, the life expectancy was taken as 72 years).

IV. The study intended to estimate ROIs for water, sanitation and hygiene components of the project separately. However, the financial record keeping process of WAB made it difficult to fully segregate beneficiary contribution for installation of provisions. Although an attempt is made to estimate the ROIs for each sub-component separately, the study team acknowledges the possibility of miscalculation and misattribution of beneficiary contribution, hence these segregated ROIs should be read with a note of caution as indicative only.

V. The study intended to estimate ROIs for each stakeholder separately. However, it was impossible to ascertain project investment for each stakeholder separately from the project financial records, hence the attempt was not made in the study.



IMPACT ASSESSMENT

Impact Assessment: Deadweight, Displacement and Attribution

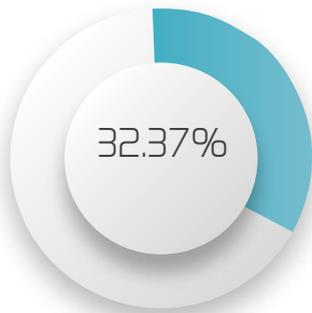
Deadweight: During the FGDs and interviews, we asked the respondents to quantify “how much of these changes in the outcomes would have happened anyway”. They were asked to take into account what would have happened with their own initiative – irrespective of whether the project was there or not, and the contributions made by government bodies, including the local government. The former included knowledge and awareness that the stakeholders might have acquired through mass media. We considered public investments as deadweight, as even if there were to be positive impact of WAB, partners’ and stakeholders’ advocacy, government decisions taken outside of the context of PEHUP project would play a determining influence behind such investments. Besides, there would be advocacy from many actors active in the WASH area, meaning that PEHUP advocacy, although critical like any advocacy taken in their totality, would not have a substantial attributable influence.

Displacement: Consultation with stakeholders indicated that the project did not have an adverse effect on any stakeholder, largely because the outcomes that the study was looking at were not mutually exclusive in way that a gain for someone would have to be at the cost to someone else. We identified a few costs that had been incurred by the households (e.g. the increased cost for WASH provisions, the time spent by CBO/NBUS members for advocacy). These costs have been monetised and used as private investments for achieving and continuing to enjoy the outcomes that we were measuring. The ‘investments’ have been used in the economic model and calculation accordingly. Displacement value in the model, therefore, has been estimated to be zero across all the outcomes in the model.

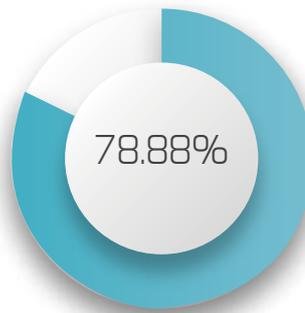
Attribution: During structured group discussions, we asked each stakeholder group to list the projects or stakeholders who were offering knowledge, provisions and other support that would result in outcomes similar to what the ‘PEHUP’ project would result. All sources of changes were listed, and were then given ranking points (by way of assigning number of dots on a scale from 0 to 10), for the perceived significance of contribution each of the sources made in achieving the outcome. Relative significance of the current project was then estimated which formed the attribution ratio for the model. The estimated attribution ratio is given the table below:

Net Present Value (NPV) discount rate: The cumulative value created over ten years of significant impact was discounted by the average inflation rate (6.31% per annum) over three years prior to the study.

Stakeholder	Outcome
Households living in city slums in PEHUP project area	Availability of safe water in adequate quantity
	Increased availability of time for non-water collection related activities (may be family work, leisure etc.)
	Improved relationship with and care of children
	Increased participation in family and social activities
	Household savings due to reduced cost for consumption of water
	Enhanced security from harassment as a result of having legal access to water
	Improved relationship with neighbours
	Enhanced safety and security of using toilets by elderly, physically challenged and young children
	Reduced expenditure for treatment of water and hygiene related diseases
	Increased income for households
	Enhanced comfort and convenience (physical and mental) from living in clean and odour free environment
	Enhanced physical and mental comfort as a result of improved MHM practices
	Increased social dignity for being clean
	Enhanced adult life productivity as a result of enhanced physical and cognitive development due to reduced morbidity and malnutrition



Deadweight (%)

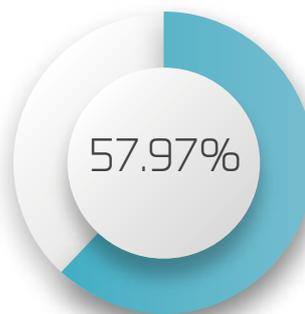


Attribution (%)

Stakeholder	Outcome
Schools (Students and teachers)	Attendance of students in school increased
	Students' enhanced ability to put in quality effort in their studies
	Increased participation in ECA
	Enhanced privacy and safety for females (separate, more secured toilets, MHM etc.)
	Enhanced wellbeing and satisfaction from using safe water, hygienic sanitation and environment
	Enhanced leadership and advocacy skills of students and teachers
	Enhanced dignity for being a teacher/ student/ staff of the school

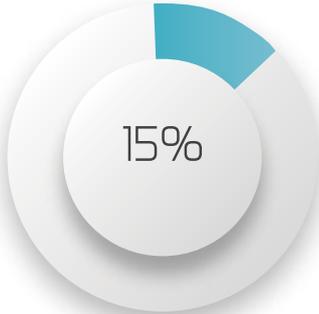


Deadweight (%)

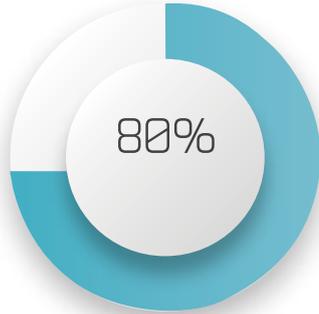


Attribution (%)

Stakeholder	Outcome
Users of mobile and public toilets	Convenience arising out of access to safe water and hygienic sanitation



Deadweight (%)



Attribution (%)

CBO and NBUS members	Enhanced leadership, management and fund raising skills among CBO/NBUS members
	Increased participation in social and development activities
	CBO/NBUS members' enhanced dignity and acceptance in the community
	CBO/NBUS members' enhanced acceptance among service providers, duty bearers and public representatives



Deadweight (%)

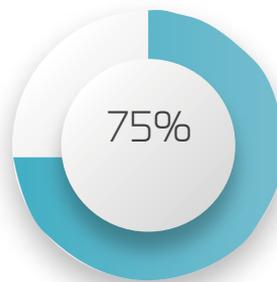


Attribution (%)

Stakeholder	Outcome
Community Based WASH Service Providers - caretakers & operators of water points, latrines, mobile & public toilets, waste collectors, pit emptiers & bill collectors	Enhanced income opportunities
	Increased confidence and interaction ability as a result of enhanced management skills
	Enhanced status in the family
	Enhanced social dignity and acceptance



Deadweight (%)

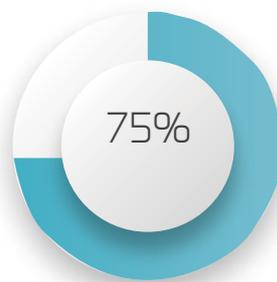


Attribution (%)

Stakeholder	Outcome
Partner organisation – ARBAN	Enhanced institutional income

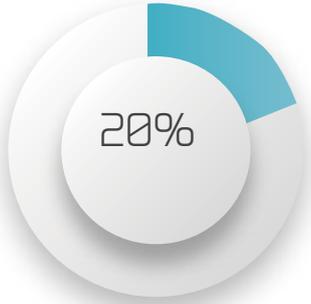


Deadweight (%)

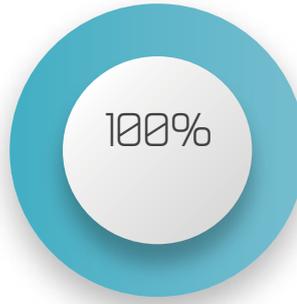


Attribution (%)

Stakeholder	Outcome
WASA (Dhaka)	Increased water revenue for WASA

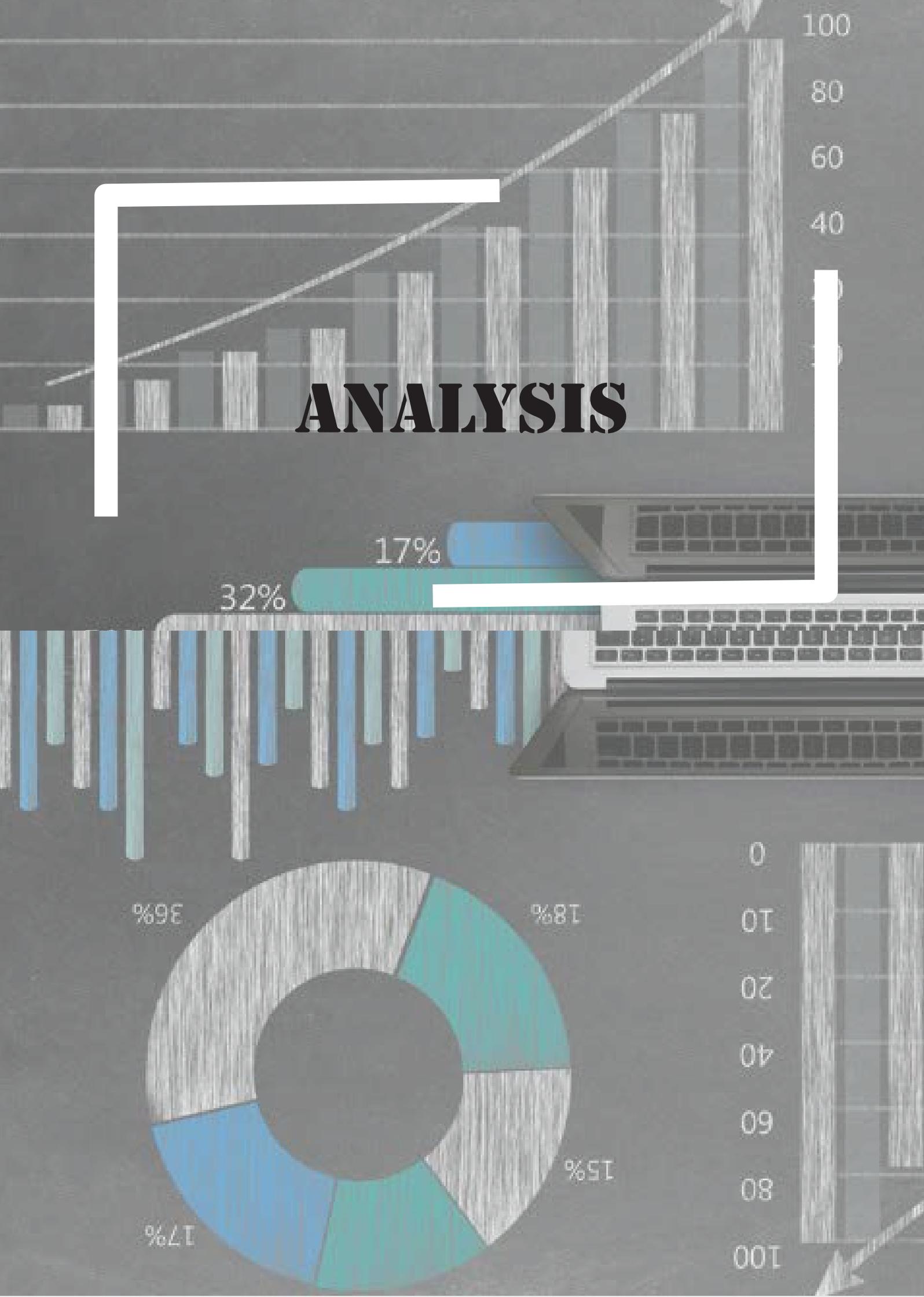


Deadweight (%)



Attribution (%)

ANALYSIS



Analysis of the model and estimated values

This section begins with a summary of estimate of ROI. The following sub-section analyses the outcomes for each stakeholder separately, which illustrates how the ROI estimate is arrived at. The section concludes with a discussion of the examples and opinions of stakeholders as expressed during consultations with them. Further information on how the financial values were calculated can be seen in Section 4.2.

Estimated ROI

Stakeholder	Outcome	Outcome incidence	Net outcome incidences	Amount of value produced (per year)	Total NPV
Households living in city slums in PEHUP project area	Availability of safe water in adequate quantity	53,612	28,600	117,686,574	319,150,913
	Increased availability of time for non-water collection related activities (may be family work, leisure etc.)	44,059	23,504	7,051,156	19,121,832
	Improved relationship with and care of children	8,959	4,779	42,236,948	114,541,193
	Increased participation in family and social activities	47,862	25,533	243,556,835	660,494,940

²Net after accounting for deadweight, displacement and attribution. The relevant parameters are described in section 3.

Stakeholder	Outcome	Outcome incidence	Net outcome incidences	Amount of value produced (per year)	Total NPV
	Household savings due to reduced cost for consumption of water	62,329	33,250	11,295,815	30,632,803
	Enhanced security from harassment by local goons as a result of having legal access to water	41,439	22,106	88,368,166	239,643,148
	Enhanced security from eviction by authorities as a result of having legal access to water	19,761	10,542	86,903,404	235,670,899
	Increased participation in family and social activities	45,650	24,353	314,346,858	852,468,414
	Enhanced safety and security of using toilets by elderly, physically challenged and young children	14,355	7,658	27,024,341	73,286,552
	Reduced expenditure for treatment of water and hygiene related diseases children	1,032,168	550,626	205,020,116	555,988,294

Stakeholder	Outcome	Outcome incidence	Net outcome incidences	Amount of value produced (per year)	Total NPV
	Increased rental income for households	77,516	41,565	377,808,484	1,024,568,215
	Increased income of households from working more days	311,146	165,986	49,795,750	135,039,696
	Enhanced comfort and convenience (physical and mental) from living in clean and odour free environment	44,553	23,767	51,748,203	140,334,499
	Enhanced physical and mental comfort as a result of improved MHM practices	43,927	23,434	45,662,123	123,829,828
	Enhanced physical and mental comfort as a result of improved MHM practices	50,125	26,740	183,740,972	498,281,981
Schools (Students and teachers)	Attendance of students in school increased	1,026,295	476,431	23,783,416	64,497,579

Stakeholder	Outcome	Outcome incidence	Net outcome incidences	Amount of value produced (per year)	Total NPV
	Students' enhanced ability to put in quality effort in their studies	77,516	41,565	377,808,484	1,024,568,215
	Increased participation in ECA	35,984	16,705	86,067,424	233,403,829
	Enhanced privacy and safety for females (separate, more secured toilets, MHM etc.)	22,019	10,222	2,921,715,254	7,923,317,519
	Enhanced wellbeing and satisfaction from using safe water, hygienic sanitation and environment MHM practices	40,410	18,759	298,290,747	808,926,296
	Enhanced leadership and advocacy skills of students and teachers	36,971	17,163	13,793,691,383	37,406,724,158
	Enhanced dignity for being a teacher/ student/ staff of the school	38,977	18,094	4,754,578,398	12,893,807,589

Stakeholder	Outcome	Outcome incidence	Net outcome incidences	Amount of value produced (per year)	Total NPV
Users of mobile and public toilets	Convenience arising out of access to safe water and hygienic sanitation	411,501,205	279,820,819	1,729,292,664	4,689,620,196
CBO and NBUS members	Enhanced leadership, management and fund raising skills among CBO/NBUS members	1,468	691	6,744,186	18,289,369
	Increased participation in social and development activities(separate, more secured toilets, MHM etc.)	1,432	674	81,540,059	221,126,196
	CBO/NBUS members' enhanced dignity and acceptance in the community-hygienic sanitation and environment MHM practices	1,504	708	81,453,156	220,890,526
	CBO/NBUS members' enhanced acceptance among service providers, duty bearers and public representatives	1,450	683	3,645,845	9,887,064

Stakeholder	Outcome	Outcome incidence	Net outcome incidences	Amount of value produced (per year)	Total NPV
Community Based WASH Service Providers - caretakers & operators of water points, latrines, mobile & public toilets, waste collectors, pit emptiers & bill collectors	Increased income in current occupation	2,919	1,751	97,751,028	265,088,268
	Cost saving as a result of enhanced skills	1,327	796	10,500,281	28,475,416
	Increased confidence and interaction ability as a result of enhanced management skills activities (separate, more secured toilets, MHM etc.)	1,123	674	20,293,576	55,033,579
	Enhanced status in the family	2,452	1,471	27,848,479	75,521,508
	Enhanced social dignity and acceptance	2,792	1,675	6,644,502	18,019,039

Stakeholder	Outcome	Outcome incidence	Net outcome incidences	Amount of value produced (per year)	Total NPV
Partner organisation - ARBAN	Enhanced institutional income			480,694	1,303,580
WASA (Dhaka)	Increased water revenue for WASA	54,482	43,585	64,311,164	174,403,638
Total outcome value				25,909,040,695	70,261,999,602
Project investment					533,315,136
Stakeholders' private investment for WASH (NPV of 10 years investment)					3,325,234,752
Total investment for WASH					3,858,549,888
ROI - PEHUP					18.21

The estimation of ROI evaluated the outcomes generated for;

- i) households living in city slums,
- ii) students and teachers of the project supported schools,
- iii) CBO and NBUS members, iv) mobile and public toilet users,
- v) WASH facility service providers,
- vi) partner organisation (ARBAN) who managed mobile toilets commercially and
- vii) Dhaka WASA for its LIC service.

The net outcome incidences – after accounting for deadweight, displacement and attribution; generated an annual value of over 25.9 billion Taka; which given ten years of sustained impact, 30% drop off per year and 6.31% discount rate; resulted in the NPV of total value being Tk. 70,261,999,602. The outcomes were resulted from a total investment of Tk. 3,287,588,612 – which comprised of total project expenditure and NPV of ten years’ investment by stakeholders adjusted inflation. The ROI for PEHUP project, of 21.377, was derived from the ratio between NPV of total value generated and total investment.

We analysed and compared the NPV of outcome value generated for each of the stakeholders included in the model and present them as a percentage share in the total outcome value generated by the PEHUP project in the pie chart below. Most of the outcome value accrued to the teachers and students of project supported schools – at 84.6% (please see the chart-1 below). A reason for such high proportion of outcome value accruing to the students and teachers was their very high valuation of enhanced convenience and social skills. While every stakeholder placed a high financial proxy value for social outcomes (e.g. enhanced respect, acceptance, standing and participation) an average student placed a much higher value for such outcomes compared to the representatives of other stakeholders. Households living in the project slums accounted for just over 7% of the total outcome value. Mobile and public toilet users – who constitute a stakeholder of particular interest for the study for the initiative being a new initiative in urban WASH programming, accounted for 6.67% of total outcome value.

The relevant stakeholder, partner organisation – who continues manage some of the mobile toilets, was also a stakeholder of interest for the same reason. Although this stakeholder accounted for only 0.002% of the total outcome value, the small scale income generating activity is expected to generate a net present of over 1.3 million Taka over the course of sustenance of outcomes for the partner making a contribution perhaps towards financial sustainability of partner organisation. Similarly, Dhaka WASA benefited from increased revenue from LICs – a mechanism devised particularly for slum dwellers with low ability to pay following pilot and advocacy by PEHUP project. It is to be noted that most of slum dwellers used water from illegal connections, depriving authorities of critical revenue although the slum dwellers would have to pay the cost to the scrupulous agents. Outcome value accrued to WASA accounted 0.25% of the total outcome value. The other two categories of stakeholders – CBO and NBUS members and WASH facility service providers accounted for 0.67% and 0.63% of the total outcome values respectively.



Chart 1: Distribution of outcome values among stakeholders of PEHUP project

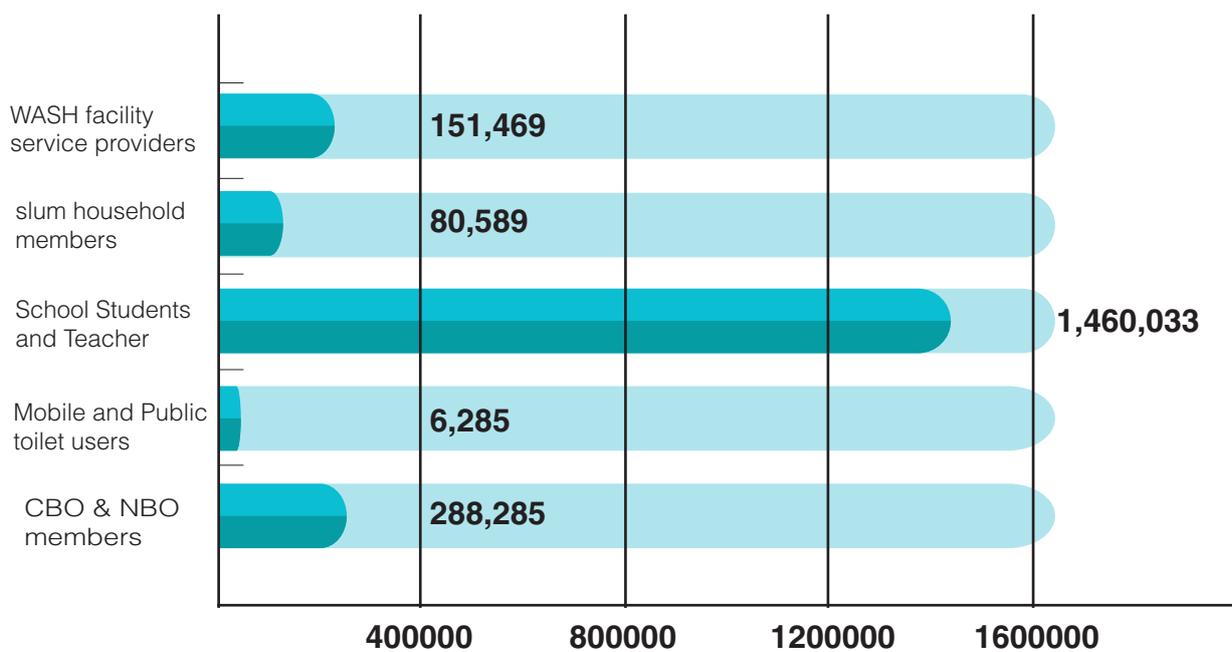


Chart 2: Per capita outcome value among stakeholders of PEHUP project

We also analysed outcome value generated per unit of the stakeholder (chart 2 above). As expected the highest per capita outcome value was generated for the school students and teachers at 1.46 million Taka. The lowest outcome value was accrued to the mobile and public toilet users, which is to be expected as the use of these facilities are intermittent at best. However, the population of these stakeholders has been sizeable giving substantial aggregate outcome values. The institutional stakeholders considered in the model were single entity for each, hence the entire outcome value accrued to one institution for the stakeholder; that for WASA being over 174 million Taka and that for ARBAN being more than 1.3 million Taka.

Breakdown of outcome values for stakeholders

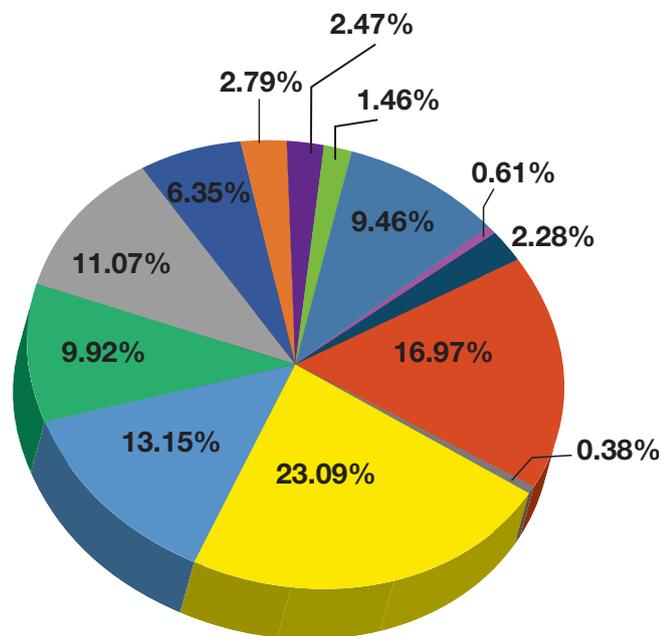


Chart 3: Break down of outcome value sources – slum households

- Availability of safe water in adequate quantity
- Enhanced comfort and convenience from living in clean, odor free environment
- Enhance physical and mental comfort as a result of improved MHM practices
- Enhance safety and security of using toilets by elderly, physically challenged and children

- Enhanced security from harassment by local goons or eviction by authorities
- Household savings due to reduced cost of water
- Improved relationship with and care of children
- improved relationship with neighbours
- increased availability of time for non-water collection related activities
- increased income for households
- increased participation in family and social activities
- increased social dignity for being clean

Chart 3 above illustrates the share of outcome sources in the total outcome value generated for the slum households. The thirteen outcomes associated with these stakeholders generated an NPV of the total outcome value of Tk. 5.02 billion. The largest share of outcome values (23.09%) arose from an economic outcome, the increased income for households, which came from two sources; i) increased income due to reduced loss of work-days as a result of water-hygiene related morbidity and ii) increased rental income – substantial portion of which was the result of improved WASH facilities and environment in the slums. Other two economic outcomes reduced expenditure for treatment of water hygiene related diseases and household savings on the cost of water contributed about 11.68% - 11.07% and 0.61% respectively, of the total outcome value. In all the economic outcomes contributed more than a third of the total outcome value for the slum households. Among social outcomes major share of the aggregate outcome value were contributed by improved relationship with neighbours (16.97%), increased participation in family and social activities (13.15%), enhanced social dignity (9.92%) and enhanced security from harassment (9.46%). It is to be noted the stakeholder participants in the SGDs attached quite high financial proxy value to each of these outcomes, which manifest the high valuation of safety-security and improved relationship by the stakeholders. Two outcomes related exclusively to two groups within the stakeholders; reproductive age girls and women – by way of enhanced physical and mental comfort from improved MHM practices, and elderly, physically challenged and children – by way of enhanced safety or reduced risk of mishap and injury, contributed 2.47% and 1.46% of the total outcome value respectively.

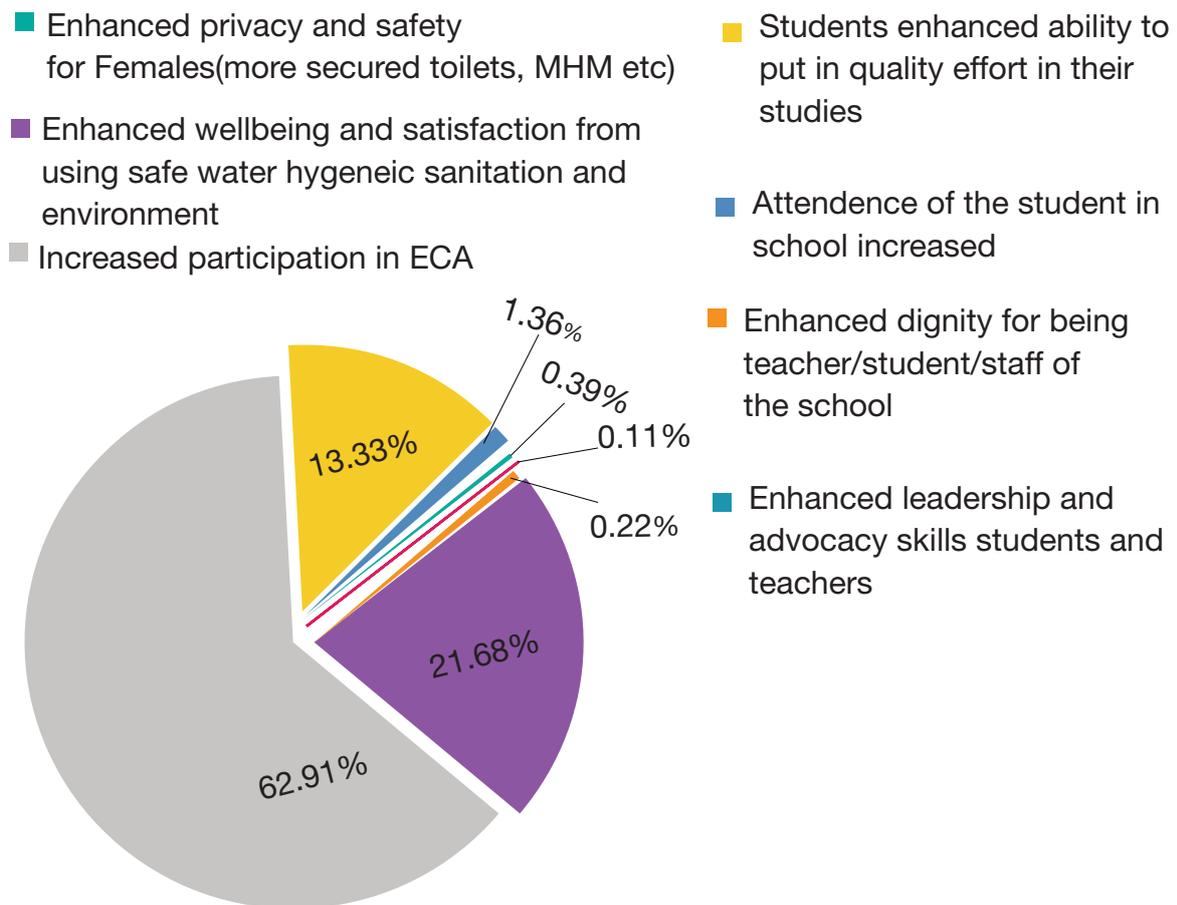


Chart 4: Break down of outcome value sources – students and teachers in project supported schools

In the schools, we considered both teachers and students as stakeholders. The seven outcomes associated with these stakeholders generated an NPV of total outcome value of over 59.46 billion Taka. Most of the outcome share (63%) arose from enhanced leadership and increased participation in advocacy – reflecting the high value the stakeholders attach to participating in activities outside of their core school activities. Another source of high share of outcome value (21.7%) was the dignity and respect the teachers and students enjoy for being part of the schools with enhanced WASH reputation. For both these outcomes the SGD participants attached a very high financial proxy value demonstrating their appreciation of them. The outcome relevant exclusively to a stakeholder sub-group of particular interest – girl students and female teachers, ‘enhanced privacy and safety’ from the provision of secured toilets and MHM provisions generated more than 13% of the total outcome value, manifesting the justification for investing such interventions.

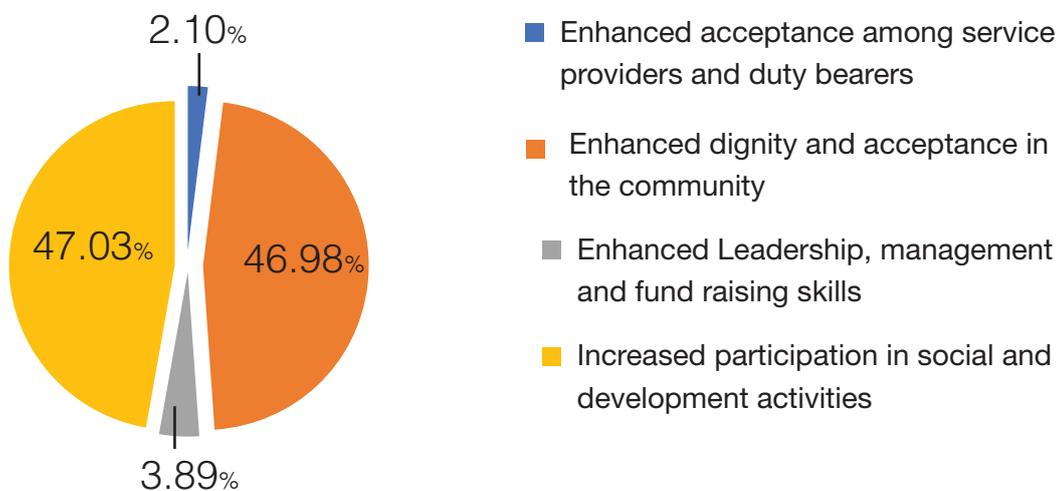


Chart 5: Break down of outcome value sources – CBO and NBUS members

The CBO and NBUS members identified four outcomes which were measured in the ROI model and generated an NPV of total outcome value of over 470 million Taka. Among them, ‘participation in social and development activities’ (47%) and ‘dignity and acceptance in the community’ (47%) accounted for about 94% of the total outcome value accrued to these stakeholders. It again manifests the very high value the stakeholders attach to social standing and participation. The other two outcomes ‘enhanced organisational skills’ and ‘acceptance among service providers and duty bearers’ accounted for about 4% and 2% of total outcome value respectively.

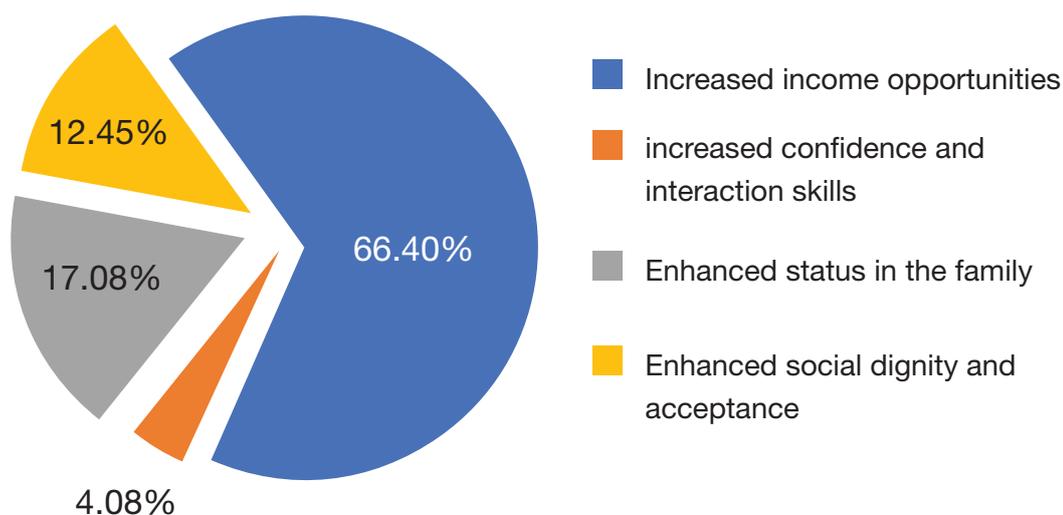


Chart 6: Break down of outcome value sources – Community Based WASH Service Providers

The Community Based WASH Service Providers – mobile and public toilet operators, waste collectors, water point operators and caretakers, pit cleaners, bill collectors; provided four estimable outcomes to the model generating an NPV of the total net outcome value of over 442 million Taka. The lone economic outcome ‘increased income’ provided nearly two thirds of the total outcome value for the stakeholder. Among the other three outcomes, ‘increased confidence and interaction skills’ generated 17%, ‘social dignity and acceptance’ generated 12.5% and ‘social dignity and acceptance’ generated 4% of the total outcome value. It would be pertinent to mention here that the while most of the stakeholders opined that their standing in the family had enhanced substantially due to their engagement in the current role – mainly due to their increased income and responsibility, most of them did not see their status in the society to have changed a great deal in the society, perhaps because some of the work (waste collectors, pit cleaners) were traditionally associated with low esteem in the society and most of these work are usually low paid menial work.

The other three stakeholders in the model – mobile and public toilet users, ARBAN (partner NGO) and Dhaka WASA; had one outcome each and generated NPV of outcome values of about 4.7 billion, 1.3 million and 174.4 million Taka.

Comparing the economic and social outcomes

The premise of using social accounting approach of measuring ROI was that measuring economic outcomes only tends to leave out subjective social and environmental benefits from the estimation. The overwhelmingly major proportion of the outcome value being generated for social outcomes lends support to the notion. It should, however, be noted that we had left out long term impacts on economic pro-

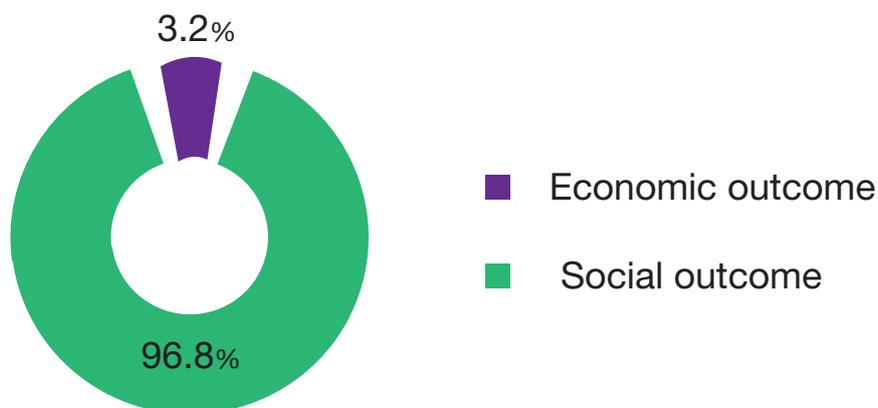


Chart 7: Distribution of NPV values between economic and social outcomes

ductivity from improved WASH environment and practices for they would be realised in the period beyond the model duration. Hence, the economic impact itself has been underestimated

Of the 31 outcomes in the model, seven were of economic in nature and the others social. These seven outcomes accrued to slum households (4), and Community Based WASH Service Providers, WASA and ARBAN (one each).

Nearly 97% of the total outcome value of 70.26 billion Taka was generated from the social outcomes and rest just over 3% from economic outcomes. However, it should be mentioned that some of the social outcomes were either closely related with economic outcomes and wellbeing. As mentioned before, the high value of social outcomes is reflected in high subjective financial proxy valuation of them by the stakeholders.

ROIs for Water, Sanitation and Hygiene

The study made an attempt to estimate the ROIs for water, sanitation and hygiene components of the project separately. It should be noted that the financial records of the project did not allow for precise calculation of beneficiary contributions towards installation of WASH provisions. Some of the outcomes were relevant for more than one, often all three components. And some of the expenditures were common to all components. The common outcomes were distributed among the components in the ratio of directly attributable outcome values. The common expenditures were distributed among the components in the ratio of directly attributable expenditures. These distributions may not be true reflection of their affect. Besides, the three components are highly interrelated, availability of adequate water affects how the latrines are used and how hygiene is maintained. Hence the estimated ROIs are to be taken as imprecise in their distribution, as an indicative estimate.

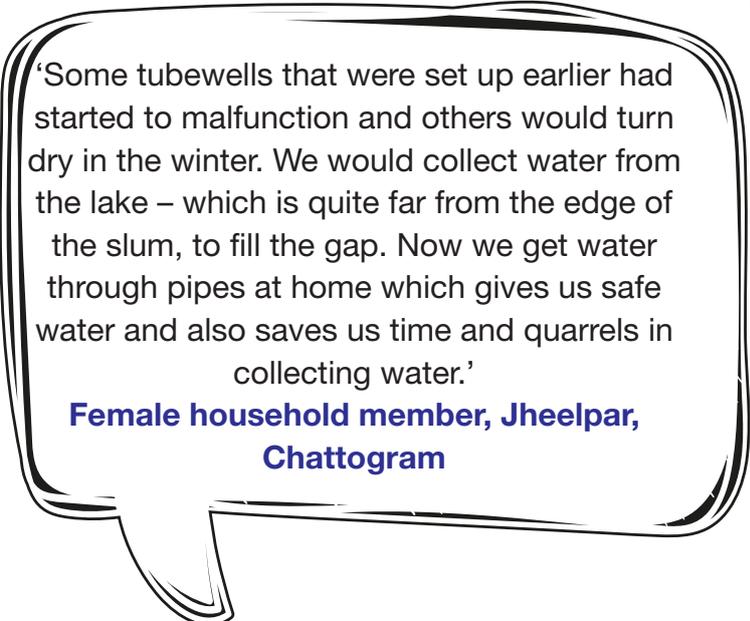
The ROIs for water, sanitation and hygiene subcomponents were measured to be 13.20, 16.14 and 30.97; respectively.

	Water	Sanitation	Hygiene
Component			
NPV of total outcome value	12,040,759,353	35,939,652,756	22,281,587,494
NPV of total investment	912,357,129	2,226,770,911	719,421,848
ROI	13.20	16.14	30.97

Insights from discussions during SGDs and interviews

Discussions during the SGDs and interviews created the context in which the project stakeholders formulated their responses to the questions for data to be used in the economic model. These discussions also shed light into how the lives of the stakeholders have transformed as a result of the interventions by the PEHUP project. This section briefly discusses what the stakeholders said, the stakeholders include, household members, school students, mobile and public toilet users, and community based service providers engaged by the project.

Households, particularly in Chattogram, talked about the source of safe water that they get water from now compared with the unsafe and inconvenient water source



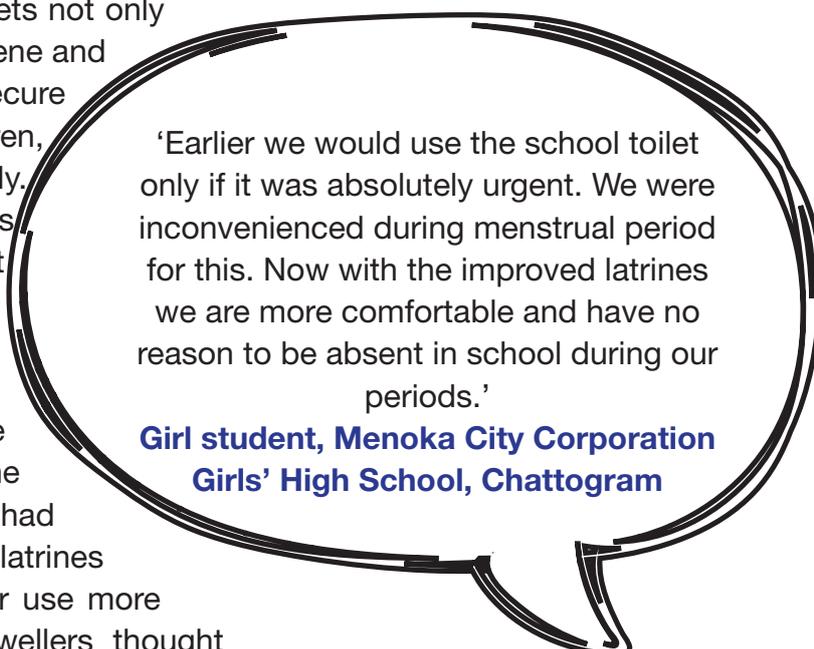
‘Some tubewells that were set up earlier had started to malfunction and others would turn dry in the winter. We would collect water from the lake – which is quite far from the edge of the slum, to fill the gap. Now we get water through pipes at home which gives us safe water and also saves us time and quarrels in collecting water.’

**Female household member, Jheelpar,
Chattogram**

previously. Most of the household member interviewed reflected on the time and effort they save in collecting water for their domestic use. Availability of water in their homes throughout the day has eliminated their inconvenience of leaving other activities to collect water when available. Most people living in the hilly areas would have to collect water from nearby lake or from holes dug on the edge of the

hills. Water would seep and deposit very slowly in the holes and thus they would have to wait for a long time for the well to fill up. The water from both the lake and the holes would often be dirty, causing frequent incidences of diseases according to them. The school students and teachers also indicated availability of water throughout the day. As water is available in schools they do not have to worry about carrying potable water from home or for fetching water for the toilets. This has increased households’ and schools’ expenditure on water – as they have to pay user fees or bills for the water they use, but has also enhanced the convenience and comfort in their day to day life

Structurally improved toilets not only have enhanced their hygiene and comfort, they are more secure for use of the children, disabled and the elderly. The household members feel less anxiety about these vulnerable groups' use of the toilets. Still they feel that it would be more convenient for the less able people to use the toilets, if the ramps had railings. The installed latrines have not only made their use more convenient, the slum dwellers thought that the environment has also improved dramatically as a result of them. Girl students and female teachers mentioned that improved latrines with adequate water have made it easier for them to maintain hygiene during menstruation.

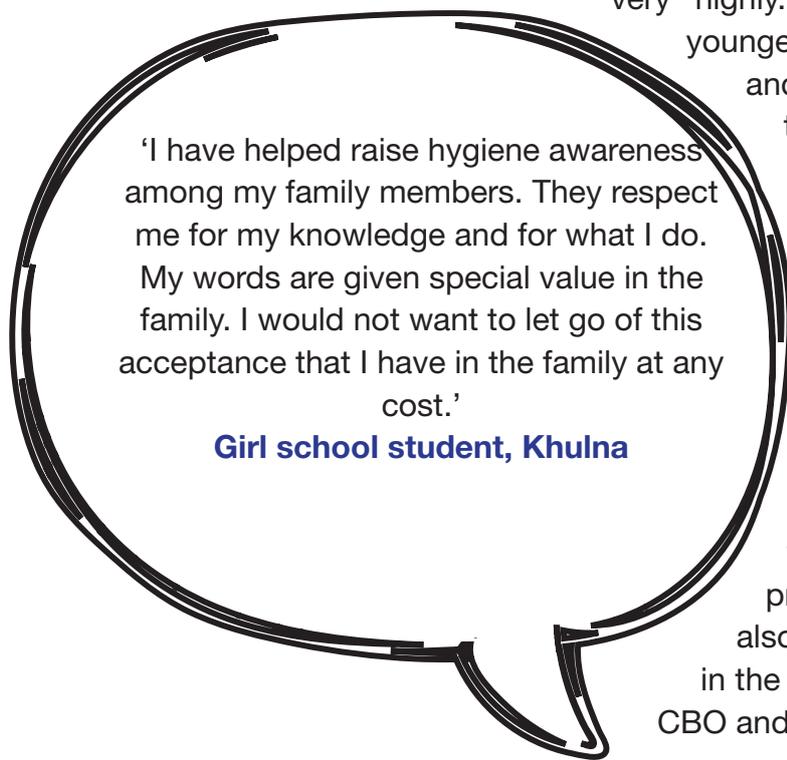


'Earlier we would use the school toilet only if it was absolutely urgent. We were inconvenienced during menstrual period for this. Now with the improved latrines we are more comfortable and have no reason to be absent in school during our periods.'

**Girl student, Menoka City Corporation
Girls' High School, Chattogram**

The participants mentioned that they are more aware than before about basic hygiene practices – like handwashing, cleanliness. They mentioned that PEHUP and other projects in the community have helped raise the awareness, as a result they follow safe hygienic practices. The mothers mentioned that they take care of their children in a better manner. The school students particularly would WASH their hands before critical activities like before eating, after defecation etc. The slum dwellers particularly mentioned solid waste management to have contributed to improvements in their surrounding environment, reduced water logging. The adolescent girls, during interviews, mentioned that the biggest change they have experienced, among water, sanitation and hygiene behaviours was in their management of menstrual hygiene. Most of them now use sanitary pads, instead of clothes, those who use clothes WASH the used clothes well before reusing. The stigma associated with menstruation among adolescent girls, as a result – as one teacher in Khulna mentions, they are more comfortable and confident in talking about their issues.

All the stake holders appear to value outcomes like improved relationship with peers, neighbours, participation in social activities, their own dignity in the society

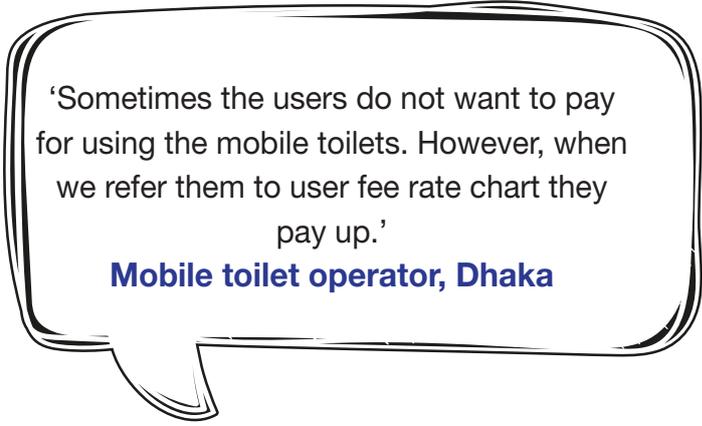


Girl school student, Khulna

very highly. This is especially so for younger people, the school students and adolescent girls and boys in the slum communities. Many of them would not want to give up the improved environment, their participation and dignity for any price. Their appreciation for the enhancement of their status and the ability to raise voice was reflected in the values they placed for the financial proxies. The phenomenon was also true for the older members in the communities, particularly the CBO and NBUS members.

Contrarily, the valuation of family and social respect earned was relatively lower, still quite substantial, among Community Based Service Providers. It was apparent from the discussions most of the toilet pit cleaners had been in this occupation hereditarily, and these jobs are viewed very lowly in the society – which was reflected in relatively low level of self-esteem they had. Other service providers like the bill collectors, mobile toilet operators mentioned that they often face conflicts with their clients. However, they also mentioned that they can solve these problems by themselves easily. The users also sometime misbehave with them, again as these occupations are seen as very lowly in the society. However, as the waste collectors, mobile toilet operators and the market committee members mentioned, many of these service providers had been unemployed – some because of illness or disability, before they got this job. We found at least one toilet operator who was a beggar before taking up this occupation which earns him about 15,000 Taka a month. He feels very strongly about the dignity he feels for having given begging as a profession.

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‘Sometimes the users do not want to pay for using the mobile toilets. However, when we refer them to user fee rate chart they pay up.’

Mobile toilet operator, Dhaka

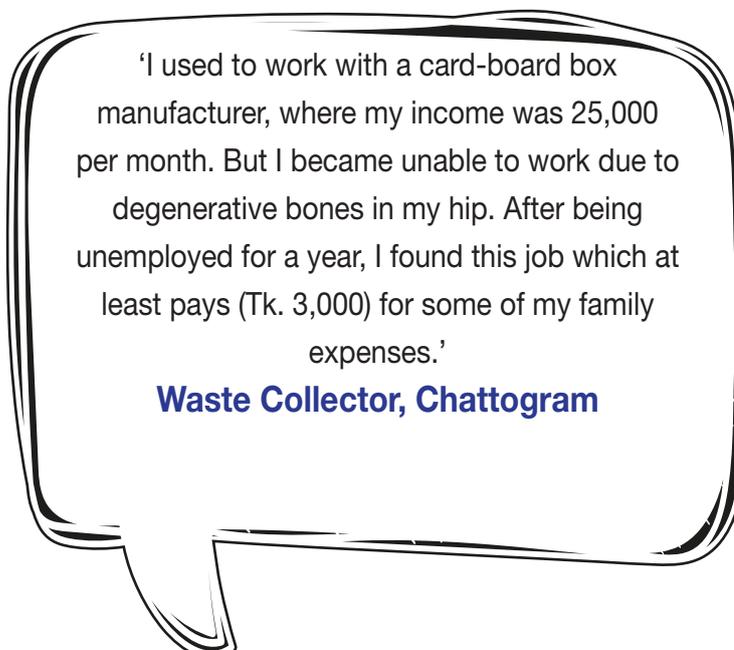
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The waste collectors complained of the service recipients complaining about the times they collect wastes, some households’ wastes having watery contents which pollutes the surrounding – which again brings complains from others. While they try to manage these complaints – by helping the complainants understand their working context, they suggested raising awareness about waste management among the residents to help their work.

Many water point caretakers do not earn anything for their services. Those who do, earn an average of about 3,500 Taka from this source. As this is not a fulltime work, they have taken this job more as social service.

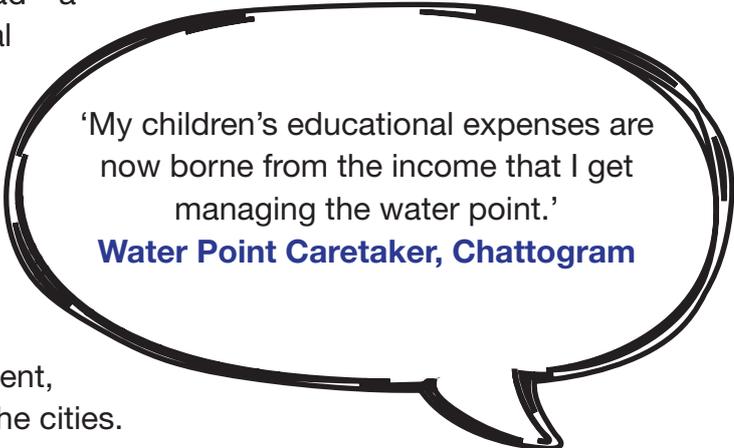
The owners of the houses in the slums mentioned that the improvements in water supply, availability of improved toilets,



‘I used to work with a card-board box manufacturer, where my income was 25,000 per month. But I became unable to work due to degenerative bones in my hip. After being unemployed for a year, I found this job which at least pays (Tk. 3,000) for some of my family expenses.’

Waste Collector, Chattogram

improved environment have had a positive effect on their rental incomes. The occupants now usually do not leave the property frequently to move to other slums as a result their properties remain vacant for lesser duration. The rent has also increased as the tenants get to live in a better environment, compared to many other slums in the cities.



'My children's educational expenses are now borne from the income that I get managing the water point.'

Water Point Caretaker, Chattogram

Mobile toilets, was a new initiative from the project, that was introduced in the Dhaka City Corporations. The users of these toilets were very appreciative of the availability of the facilities and the way they were kept clean and hygienic. Many of the pedestrians and floating people spend hours of day on the road, and their convenience and comfort have increased substantially as a result. They also mentioned that use of these toilets help keep the surrounding environment clean.

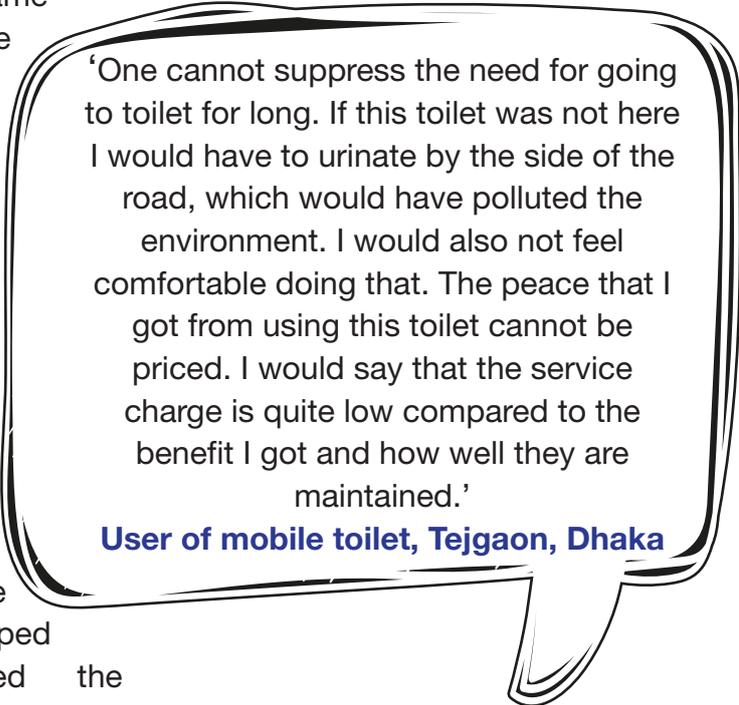
Effectiveness of the CBOs-NBUSs work – both their role and that of participation, were appreciated by both the beneficiaries of the WASH interventions and by the members of the CBOs. They mentioned that they organised through the CBOs, had advocated with local government representatives and functionaries which resulted in resolution of their issues in most cases. The members felt very strongly about the membership. They were very reluctant to give up their roles in the CBOs or situation, in addition to their own initiatives, therefore the impacts needed to be seen in its totality.

in the NBUS. One SGD participant NBUS member responded to the question of giving up members by saying, “one does not become involved with such activities for money, but for the joy of being engaged in social development. The question of giving up our participation in CBOs is insulting for the good sense in us.”

ARBAN, the partner organisation which was managing the mobile toilet intervention, was initially sceptical if the service can be provided economically viably. The City Corporation was not also forthcoming with the permission to operate such toilets, potential pollution if the toilets were not managed efficiently appeared to be one of the concerns. It took a number of meetings over nearly a year to convince the City Corporation of technical and operational feasibility and obtain permission. Both the Dhaka City corporations (North and South) are very supportive of the mobile toilets operation now, as they see the benefits. When it started, there were very few users initially. The Project Manager of ARBAN mentioned that, WAB continually motivated the ARBAN management and the start up support provided helped uptake of the service.

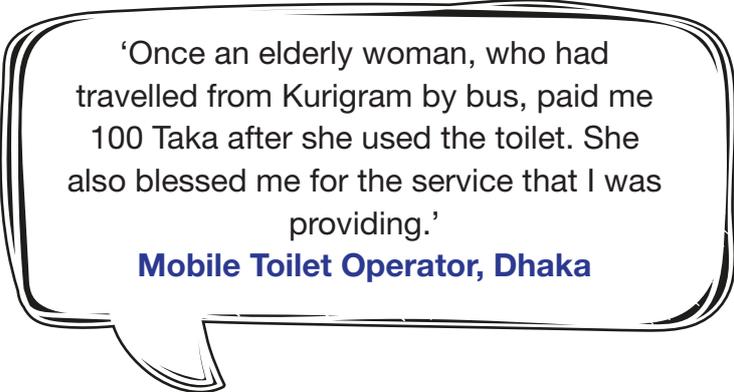
Eventually use and income started to pick up and operators became interested to take over the operation independently. ARBAN rents out the mobile toilets it manages to various public and private programmes both in Dhaka and outside. They get high appreciation from politicians, social leaders who use them and from civil society members.

The City Corporation officials mentioned, particularly, waste management – how it has helped their work and improved the



‘One cannot suppress the need for going to toilet for long. If this toilet was not here I would have to urinate by the side of the road, which would have polluted the environment. I would also not feel comfortable doing that. The peace that I got from using this toilet cannot be priced. I would say that the service charge is quite low compared to the benefit I got and how well they are maintained.’

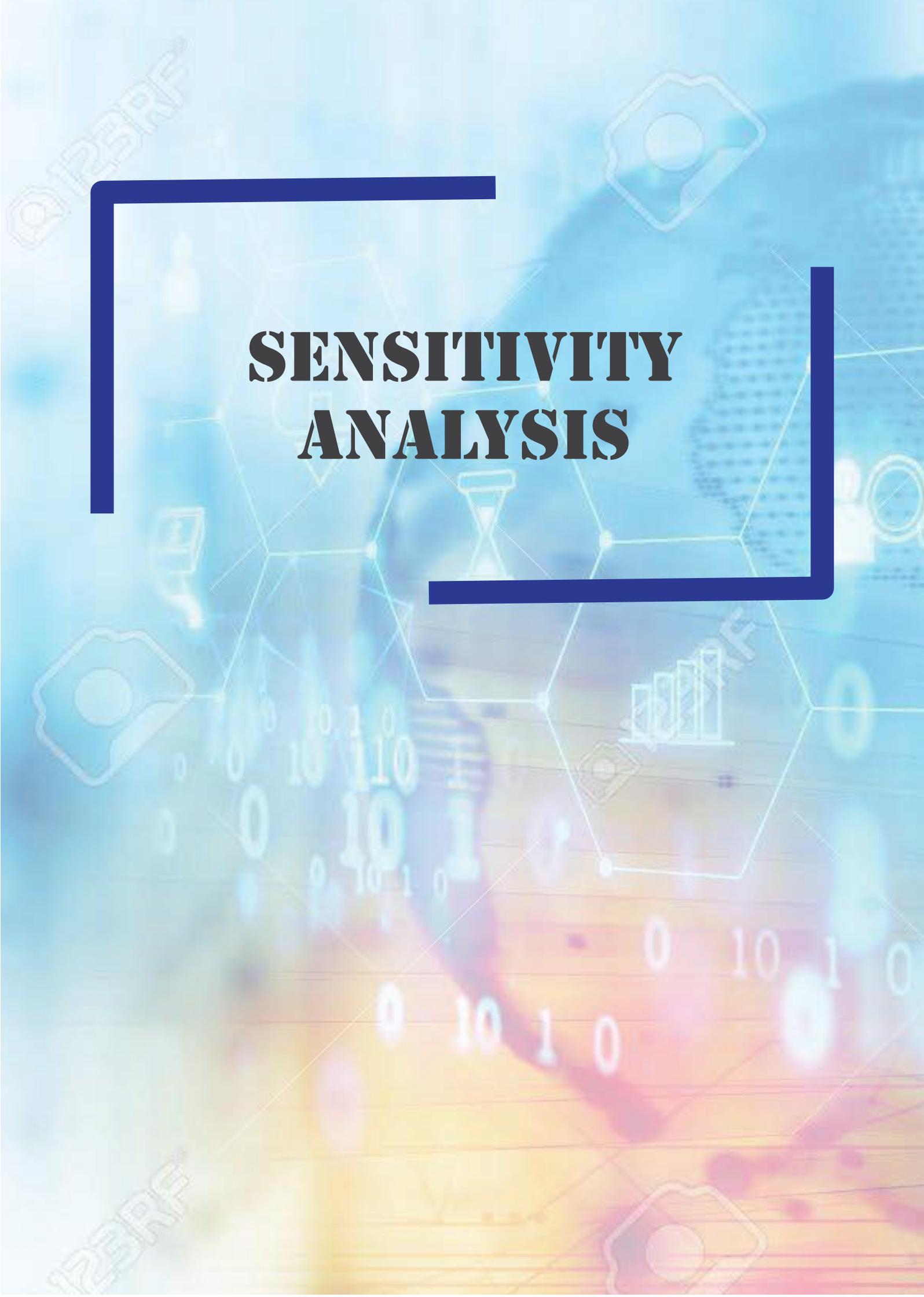
User of mobile toilet, Tejgaon, Dhaka



‘Once an elderly woman, who had travelled from Kurigram by bus, paid me 100 Taka after she used the toilet. She also blessed me for the service that I was providing.’

Mobile Toilet Operator, Dhaka

environment in the slums and in the surrounding. They also talked about increased access to water for the poor living in the slums. They mentioned that PEHUP project is only one of a number of projects working in the slums to improve WASH situation, in addition to their own initiatives, therefore the impacts needed to be seen in its totality.



SENSITIVITY ANALYSIS

Testing the model's robustness

A test of robustness of the economic model was carried out following the estimation of ROI. A number of factors – financial proxy value, attribution, deadweight and drop off ratio; were varied to test the model's sensitivity to these changes.

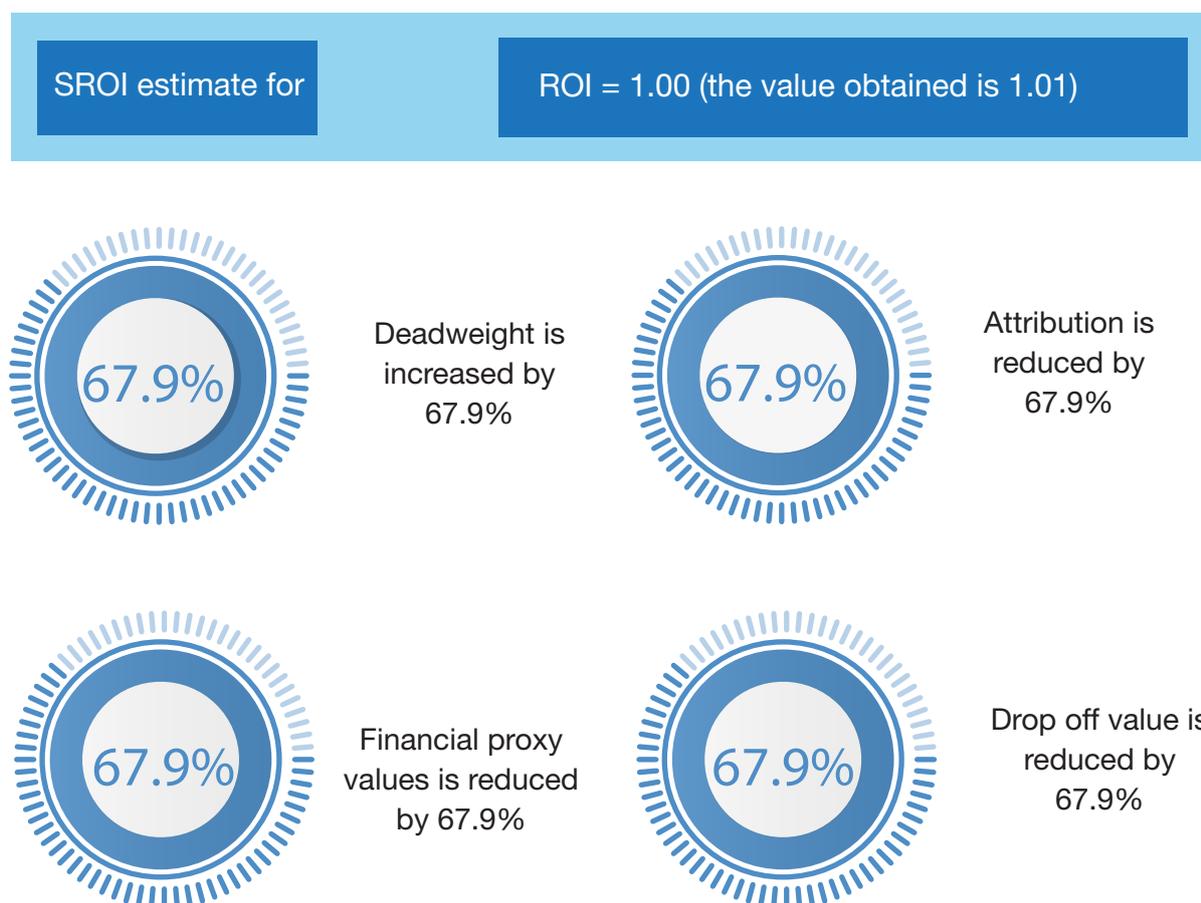
Robustness to adverse changes in parameters:

The ROI for PEHUP generated outcomes were tested for sensitivity and robustness by varying deadweight (increasing by 50% on the model values), attribution (reducing by 30% on the model values), financial proxy values (reducing by 30% on the model values) and drop off rate (increasing by 20% on model values). The test results are presented in the table below:

Dead weight		Attribution		Financial proxy		Drop off	
Change	ROI & % change	Change	ROI & % change	Change	ROI & % change	Change	ROI & % change
Estimated model ROI = 21.37							
Dead weights increased by 50%	ROI: 18.59 87% of ROI value retained	Attribution decreased by 30%	ROI: 14.96 70% of ROI value retained	Financial proxies reduced by 30%	ROI: 14.96 70% of ROI value retained	Drop off increased by 20%	ROI: 18.51, 86.6% of ROI value retained
In a scenario where all negative changes take place simultaneously – ROI: 7.89, a retention of 36.9% of ROI value							

The test results indicate that the estimated ROIs for the PEHUP project are robust to the changes for each of the variables. The reduction in ROI value is less than proportionate for increases in deadweight and drop-off, and proportionate to the decreases in attribution and financial proxy value. In an unlikely scenario where all the changes take place at the same time, the ROI still retains 36.9% of its value.

estimate of 1.00). There are various combinations of variable changes, the one that we report is summarised in the table below. The table below presents the limit when all changes occur simultaneously for all variables and, all stakeholders and relevant outcomes.



Sensitivity to changes in positive direction

We tested for ROIs’ responsiveness to positive changes in variables (decrease in deadweight and drop off values and increase in attribution and financial proxy values). The table below shows that in keeping with the changes in negative direction, the ROI is less than proportionately responsive to a decrease in deadweight and drop off value, while it is proportionately responsive to an increase in attribution and financial proxy values. When all the exogenous variables change by 20%, in directions that positively impact the model estimate, the ROI increases by 77.8%

Dead weight		Attribution		Financial proxy		Drop off	
Change	ROI & % change	Change	ROI & % change	Change	ROI & % change	Change	ROI & % change
Estimated model ROI = 18.21							
Dead weights decreased by 20%	ROI: 19.16 5.2% increase in ROI value	Attribution increased by 20%	ROI: 21.84 19.95% increase in ROI value	Financial proxies increased by 20%	ROI: 21.85 20% increase in ROI value	Drop off decreased by 20%	ROI: 21.38 17.4% increase in ROI value
In a scenario where all positive changes take place simultaneously – ROI: 38, a 77.82% increase in ROI value							

A low-angle, upward-looking photograph of several modern skyscrapers with glass facades. The buildings are arranged in a way that creates a sense of height and depth. A prominent blue L-shaped graphic frame is overlaid on the image, framing the central text. The sky is a pale, overcast grey.

CONCLUDING REMARKS

Concluding remarks

On project impact from the model

The accounting process resulted in net positive and robust ROI value for the WASH interventions of PEHUP project. The interventions included creating access to affordable and clean water, improved and hygienic toilets, initiatives to improve environment through waste management, raising awareness among WASH users and skills among service providers, advocacy by WAB, partners and slum communities with city corporations, WASA at the city level and at national level. The ROI was estimated given the stakeholders, outcomes, assumptions and computed parameters. Robustness was tested for variations in deadweight, attribution, financial proxy values and impact drop off rates; the estimates demonstrated their resilience against large variations in each of them and in their various combinations.

Estimated ROI = 18.21

The estimated ROI value indicates that for each Taka spent, which include project investment and investments by stakeholders themselves, on WASH provisions and activities, a return of Taka 21.37 is accrued to the stakeholders included in the study. The model estimate covers the duration of ten years after the project interventions. When estimated separately for water, sanitation and hygiene components of the project, the ROIs are 13.2, 16.14 and 30.97 respectively.

The study estimated outcome values for seven stakeholders; viz. households living in project slums, students and teachers of project supported schools, members of the CBOs and NBUSs organised and supported by the project, Community Based WASH Service Providers in the slums, users of mobile and public toilets, WASA and ARBAN, a partner of WAB in the project. More than 84% of the benefits accrued to the school students and teachers. Slum households enjoyed over 7% of the benefits. These two stakeholders had the largest population and larger number of outcomes associated with them, which perhaps goes onto explain them accounting for nearly 92% of all benefits. While both stakeholders placed high value on social outcomes like enhanced participation, respect and acceptance; the students placed very high value on them compared to the other stakeholders, which accounts for them having disproportionately large aggregate outcome value compared to the slum dwelling households. This is reflected in the students' and teachers' accruing more than 62% of the total outcome value from one outcome – namely enhanced leadership and advocacy skills.

Among the other stakeholders, mobile and public toilet users – another stakeholder with even larger population, accounted for nearly 6.7% of the benefits, although they had only outcome associated with them. There were other outcomes which could be associated with them (e.g. illnesses related to water and hygiene, suppressing the use of toilet for prolonged time etc.) but the study team and WAB

assessed that the PEHUP project will have very little attribution attached these outcomes as individually they would have much greater exposure to provisions and practices beyond the project. The users did mention the environmental effect of availability of mobile and public toilets, but the study team felt they were the outcomes that would have more impact on the lives of those living around the facilities, and as such the outcome was included for the slum dwellers. CBO and NBUS members, and Community Based WASH Service Providers, being a very small population compared to the households and students and teachers accounted for about 1.35% of all outcome values. The CBO and NBUS members, especially, in spite of very little material benefits accruing to themselves and them having to invest money and time into the organisations' activities, demonstrated high appreciation of the enhanced acceptance and respect for being associated with these organisations.

Two stakeholders – partner organisation and WASA, were of particular interest as the initiatives by the project contributed to new revenue for both institutions. It was estimated that WASA enjoyed average annual revenue of more than 64 million Taka from the LIC connections to the urban slums in Dhaka, which was adopted after piloting in the PEHUP project. The partner organisation, ARBAN, through its management of mobile toilets continues to enjoy average net annual revenue of nearly 420,000 Taka.

The model comprised for outcomes which were economic in nature and those which were social. The economic outcomes – as estimated accounted for about 3% of the total outcome value, while the social outcomes accounted for 97% of the outcomes. This distribution of outcome values – contributing proportionally to overall ROI, indicates that ROI models based on economic outcomes only may not be full reflection of the impact a WASH programme may have. Inclusion of social outcomes allows for capturing the full impact of such programmes and may help toward justifying the investment.

The overall ROI for the PEHUP project may have been larger than what is usual for such projects, as the project was implemented in urban slums which are far more populous than rural or non-slum urban communities. Typically these communities enjoy very little basic WASH provisions, in whose absence – and also due to congestion, maintenance of best practices are difficult. The high ROI may also have resulted to have from the low endowment that the project beneficiaries had to begin with.

Robustness of the estimate

The sensitivity tests indicate that the estimated ROI is robust to most unlikely scenario of all exogenous variables changing in the negative direction, in sense of the direction each of them affects the estimate, simultaneously. The estimate is found to be robust to the limit of 67.9% changes in all factors – positively for deadweight and

drop off values and negatively for attribution and financial proxy values.

Outcomes beyond the duration of the model

Jeffrey Sachs (2002) uncovers the potential for WASH interventions' contribution in growth in low income countries. It was found that poor countries with access to clean water and sanitation services enjoyed a considerably higher growth compared to countries with similar levels of per capita GDP who did not have such access. A UNICEF study (2013) found that increased participation in education is expected to lead to a higher per capita income path for children – each year's additional education leading to 13% increase in income in the longer term.

Both the endline and ROI studies of the PEHUP project indicate reduction in morbidity in young children and increase in school attendance, enhancing the likelihood that they would obtain higher educational outcomes, will be able to continue in school longer and thus fulfil the potential of higher life-cycle income as a result of the improvements in WASH provisions and practices. The study however, did not attempt to capture and add the potential for enhanced life-cycle income as this would begin to materialise and continue long into beyond the impact duration of the model. The ROI study remains limited to the costs saved for treatment of water-hygiene related morbidity, increased income earning ability of economically active population and immediate valuation the students' ability to attend school more regularly; which gives a total outcome value more than 1.78 billion Taka, i.e. about 2.53% of the total outcome value of the model.

Annex: Illustration of outcome value estimation

This section illustrates the computation process of how we arrived at valuation of outcomes for each stakeholder.

It is to be noted that the outcome improvement values through the section involved asking the respondents question regarding change in status in behaviour, relationships etc. with a five point response scale. Generically the response options consisted of 1-significant deterioration, 2-a little deterioration, 3-no change, 4-a little improvement and 5-significant improvement. In evaluating total change, responses 1 were given a score of (-2), responses 2 a score of (-1), responses 3 a score of 0, responses 4 a score of (+1) and responses 5 a score of (+2). The scores were aggregated and scaled against maximum possible improvement.

Stakeholder: Slum dweller households – NPV of total Taka 5,023,053,206

Indicator	Value	Data source	
Number of household	62,329	Project data	
Outcome 1: Availability of safe water in adequate quantity			
Feeling of convenience and satisfaction for having adequate water at homes	0.8601	Questionnaire response at SGD with household members	Sample size 143. Improvement score (86.01%) from responses summarised in chart 8.mem- bers
Willingness to pay to maintain the enhanced convenience and comfort	4114.92		Sample size 143

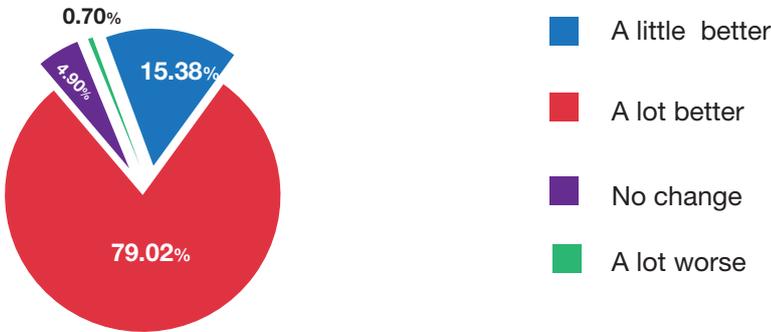


Chart A1 : Household members’ self-reported response of change in convenience from having adequate safe water

Outcome 1 (availability of safe water in adequate quantity) resulted in an outcome incidence value of 53,611.66. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 28,599.97. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 117,686,573.63. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 319,150,912.88. Households save an average of 39 minutes a day for collecting water, which can be spent in other activities.

Indicator	Value	Data source	
Number of household	62,329	Project data	
Outcome 2: Increased availability of time for non-water collection related activities			
Reduction in time for collecting water for household consumption	0.7069	Questionnaire response at SGD with household members	Sample size 143. Improvement score (70.69%) from responses summarised in chart .
Prevailing wage rate	300		Sample size 143

Outcome 2 (increased availability of time for non-water collection related activities) resulted in an outcome incidence value of 44,058.81. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 23,503.85. Monetising the net outcome incidence using the prevailing average wage rate (discounting for number of days working in a month) resulted in a total annual outcome value of Tk. 7,051,156.04. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 19,121,831.97.

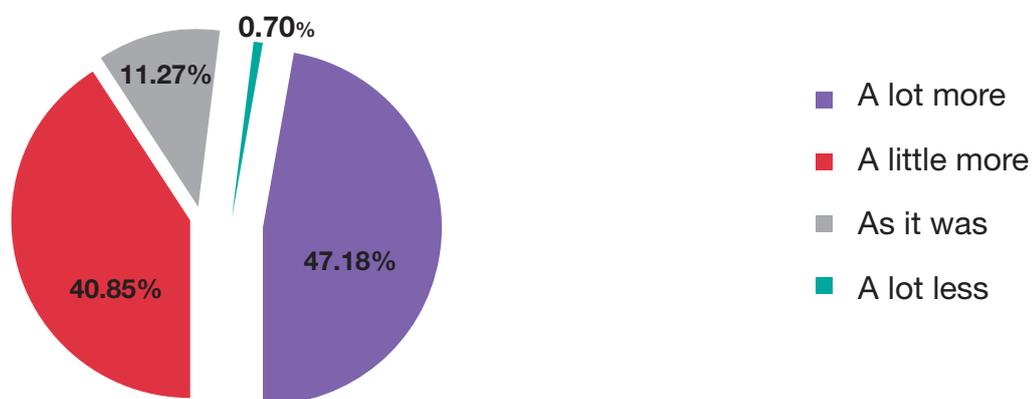


Chart A2: Household members' self-reported response of change in their relationship with children in the family

Outcome 3 (Improved relationship with and care of children) resulted in an outcome incidence value of 8,959.25. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 4,779.45. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 42,236,948.26. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 114,541,193.44.

Indicator	Value	Data source	
Number of households	62,329	Project data	
Outcome 4: Increased participation in family and social activities			
Increased participation in family and social affairs	0.7679	Questionnaire response at SGD with household members	Sample size 140. Improvement score (76.79%) from responses summarised in chart 10.
Willingness to accept compensation for foregoing participation in family and social activities	9,538.92		

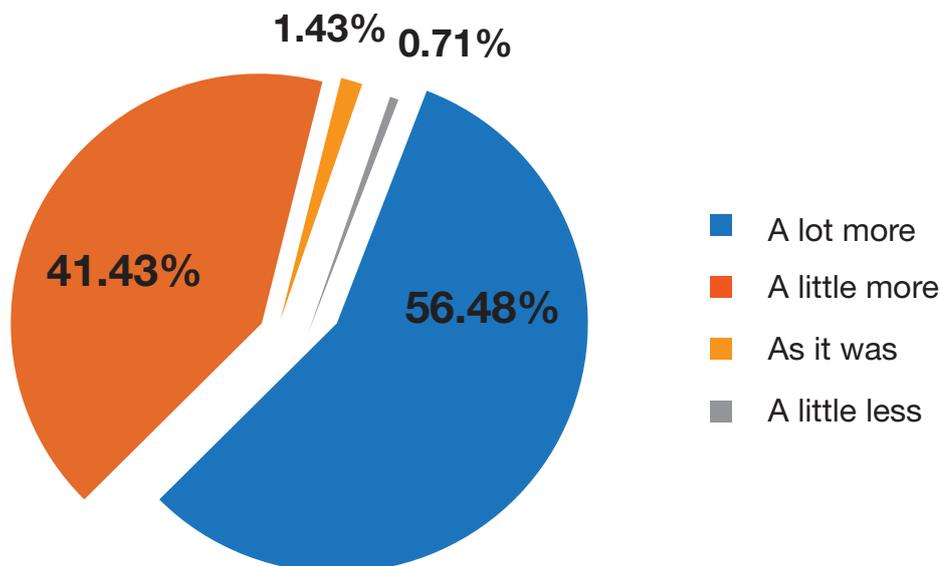


Chart A3: Household members' self-reported response of change in their participation in family and social activities

Outcome 4 (Increased participation in family and social activities) resulted in an outcome incidence value of 47,862.44. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 25,532.96. Monetising the net outcome incidence using average WtAC resulted in a total annual outcome value of Tk. 243,556,835.46. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 660,494,939.90

Indicator	Value	Data source	
Number of households	62,329	Project data	
Outcome 5: Household savings due to reduced cost for consumption of water			
Reduced water related cost (buying and boiling water)	1.0	Questionnaire response at SGD with household members	Sample size 143. Reduction reported by all SGD participants.
Average reduction in cost of water that households consume reduced	339.72		Sample size 143

Outcome 5 (household savings due to reduced cost for consumption of water) resulted in an outcome incidence value of 62329. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 33,250.37. Monetising the net outcome incidence using average reduction in cost of water resulted in a total annual outcome value of Tk. 11,295,814.82. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 30,632,802.87

Indicator	Value	Data source	
Number of households	62,329	Project data	
Outcome 6: Enhanced security from harassment by local goons or eviction by authorities			
Indicator 6.A. Reduction in harassment by local goons as a result of having legal access to water	0.6648	Questionnaire response at SGD with household members	Sample size 142. Improvement score (66.48%) from responses summarised in chart 11.
WtP per month for continued relief from harassment	3,997.44		Sample size 142

Indicator	Value	Data source	
Indicator 2: Reduced fear of eviction by authorities due to having legalised access to water	0.3107		Sample size 142. Improvement score (31.07%) from responses summarised in chart 12.
WtAC for evicioneviction	8,243.88		Sample size 142

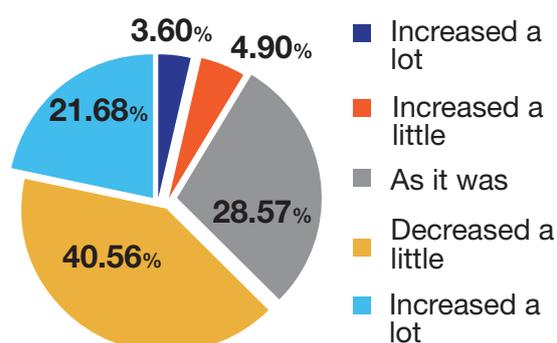
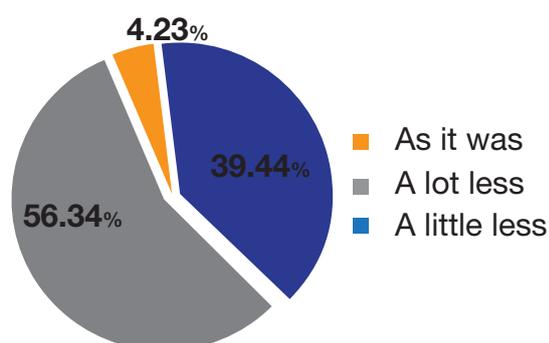


Chart A4: Change in harassment by local goons

Chart A5: Change in the level of fear of eviction

Outcome 6 (Increased participation in family and social activities) resulted in an outcome incidence value – combined for two indicators of the outcome, of 61,199.38. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 32,647.76. Monetising the net outcome incidence using average WtP and WtAC resulted in a total annual outcome value of Tk. 175,271,569.96. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 475,314,046.70.

Indicator	Value	Data source	
Number of households	62,329	Project data	
Outcome 7: Improved relationship with neighbours			
Reduced quarrel /conflict among neighbours	0.7324	Questionnaire response at SGD with household members	Sample size 142. Improvement score (73.24%) from responses summarised in chart 13.
WtP per month for maintaining improved relationship with neighbours	12,908.16		Sample size 142

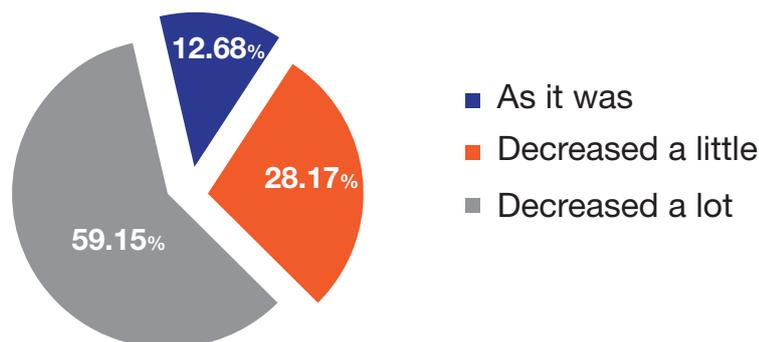


Chart A6: Household members' self-reported response of change in their conflicts with neighbours

Outcome 7 (Improved relationship with neighbours) resulted in an outcome incidence value of 45,649.76. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 24,352.57. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 314,346,858.24. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 852,468,413.97.

Indicator	Value	Data source	
Number of households	34,869	Project data	
Outcome 8: Enhanced safety and security of using toilets by elderly, physically challenged and young children			
Perception of enhanced safety and security in using toilets	0.4117	Questionnaire response at SGD with household members	Sample size 142. Improvement score (41.17%) from responses summarised in chart 14.
WtP per month for maintaining structurally improved toilets	3,528.84		Sample size 142

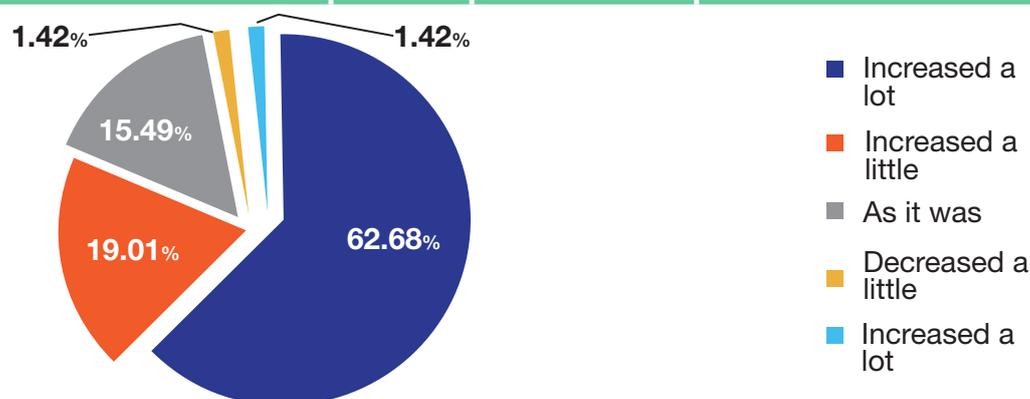


Chart A7: Household members' self-reported response of change safety and security while using toilets by the less abled

Outcome 8 (Enhanced safety and security of using toilets by elderly, physically challenged and young children) resulted in an outcome incidence value of 14,355.45. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 7,658.14. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 27,024,341.36. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 73,286,552.15.

Indicator	Value	Data source	
Number of households	62,329	Project data	
Outcome 9: Reduced expenditure for treatment of water and hygiene related diseases			
Incidences of water-hygiene related diseases in household	16.56	Questionnaire response at SGD with household members	Sample size 143. Reduction per annum (16.56) from responses summarised in chart 15.
Average treatment cost (per incidence) for water-hygiene related diseases	372.34		

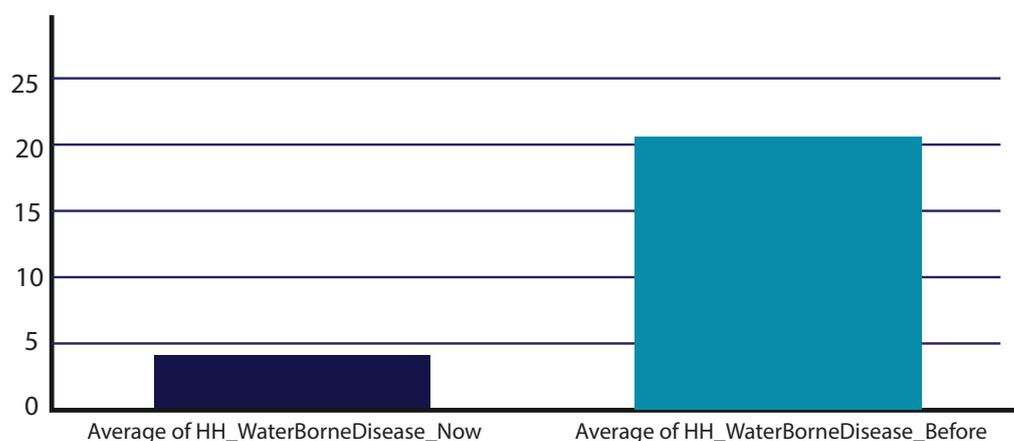


Chart A8: Household members' self-reported response of incidences of water-hygiene related morbidity before and after the PEHUP project.

Outcome 9 (Reduced expenditure for treatment of water and hygiene related diseases) resulted in an outcome incidence value of 1,032,168.24. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 550626.08. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 205,020,116.23. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 555,988,293.62.

Indicator	Value	Data source	
Number of households	62,329	Project data	
Outcome 10: Increased income for households			
Indicator 10.A. Difference in the number of months per year the property remains vacant	1.64	Questionnaire response at SGD with household members	Sample size 89. Improvement score from responses summarised in economic model.
Increase in rent per year	9,089.52		Sample size 89
Indicator 2: Reduced workday loss due to own, child's illness	4.99		Sample size 143. Improvement score from responses summarised economic model.
Daily wage rate for typical work by slum dwellers	300		Sample size 143

Outcome 10 (Increased income for households) resulted in an outcome incidence value – combined for two indicators of the outcome, of 389,061.98. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 201,557.12. Monetising the net outcome incidence using average increase in rental income and wage rate resulted in a total annual outcome value of Tk. 427,604,234.66. Using the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 1,159,607,911.38.

Indicator	Value	Data source	
Number of households	62,329	Project data	
Outcome 11: Enhanced comfort and convenience from living in clean and odour free environment			
Change in comfort and convenience from living in clean and odour free environment	0.7148	Questionnaire response at SGD with household members	Sample size 142. Improvement score (71.48%) from responses summarised in chart 16.
WtP for maintaining improved environment	2,177.88		Sample size 142

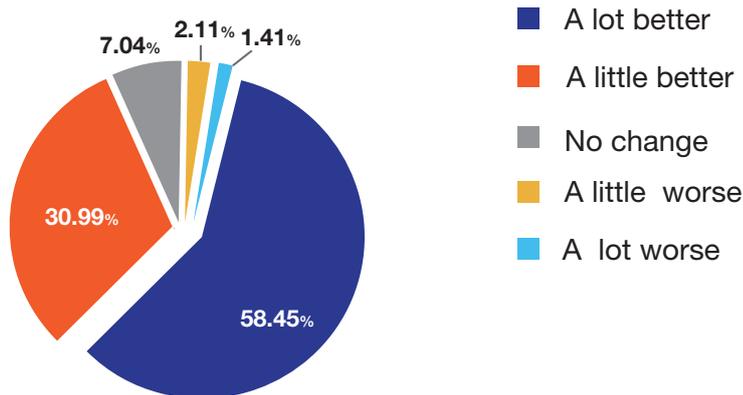


Chart A9: Household members' self-reported response of change in the comfort and convenience of living in clean and odour free environment

Outcome 11 (Enhanced comfort and convenience from living in clean and odour free environment) resulted in an outcome incidence value of 44,552.77. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 23767.36. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 51,748,203.30. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 140,334,498.76.

Indicator	Value	Data source	
Number of households	49,322	Project data	
Outcome 12: Enhanced physical and mental comfort as a result of improved MHM practices			
Reproductive age girl/ women's self-reported perception of enhanced comfort level	0.8906	Questionnaire response at SGD with household members	Sample size 96. Improvement score (89.06%) from responses summarised in chart 17.
WtP for maintaining improved menstrual hygiene and health	1948.56		Sample size 96



Chart A10: Reproductive age girls' and women's self-reported response of change in mental and physical wellbeing as result of change in MHM practices

Outcome 12 (Enhanced physical and mental comfort as a result of improved MHM practices) resulted in an outcome incidence value of 43,927.45. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 23,433.78. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 45,662,122.75. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 123,829,827.91.

Indicator	Value	Data source	
Number of households	62,329	Project data	

Outcome 13: Increased social dignity for being clean

Self-reported valuation of enhanced social standing	0.8042	Questionnaire response at SGD with household members	Sample size 143. Improvement score (80.42%) from responses summarised in chart 18.
WtP for maintaining enhanced social status and respect	6,871.44		Sample size 143

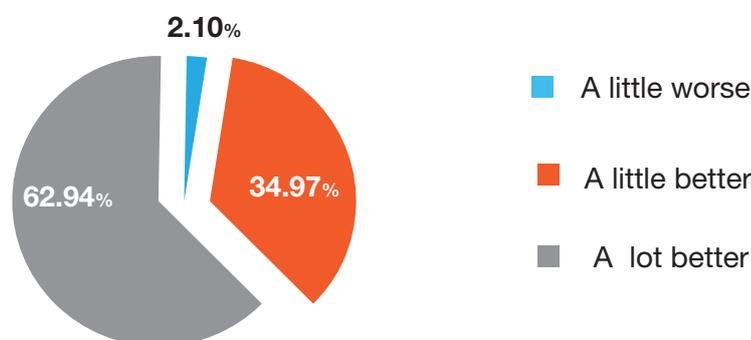


Chart A11: Household members' self-reported response of change in their social standing

Outcome 13 (Increased social dignity for being clean) resulted in an outcome incidence value of 50,124.72. Accounting for deadweight (32.37%), displacement (0%) and attribution (78.88%) resulted in a net outcome incidence value of 26,739.81. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 183,740,972.26. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 498,281,980.87.

Indicator	Value	Data source	
Number of students	40,726	Project data	
Outcome 14: Attendance of students in school increased			
Increase in students' attendance in school due to improved water-hygiene practices	25.20	Questionnaire response at SGD with household members	Sample size 56. Attendance increase and average commuting expenditure was calculated from responses by school students.
Commuting expenditure for attending school	49.92		

Outcome 14 (Increased attendance of students in school) resulted in an outcome incidence value of 1,026,295.20. Accounting for deadweight (19.92%), displacement (0%) and attribution (57.97%) resulted in a net outcome incidence value of 476,430.62. Monetising the net outcome incidence using average commuting expenditure resulted in a total annual outcome value of Tk. 23,783,416.38. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 64,497,578.74.

Indicator	Value	Data source	
Number of students	40,726	Project data	
Outcome 15: Students' enhanced ability to put in quality effort in their studies			
Self-reported extent to which ability to put in efforts in education increased	0.9315	Questionnaire response at SGD with household members	Sample size 73. Improvement score (93.15%) from responses summarised in chart 19.
WtP for maintaining enhanced attention in education	2,734.80		



Chart A12: School students' self reported change in their ability to put in more effort in education

Outcome 15 (students' ability to put in quality effort in their studies) resulted in an outcome incidence value of 37,936.55. Accounting for deadweight (19.92%), displacement (0%) and attribution (57.97%) resulted in a net outcome incidence value of 17,611.047. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 48,162,691.14. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 130,611,049.08.

Indicator	Value	Data source	
Number of students	40,726	Project data	
Outcome 16: Increased participation in ECA			
Self-reported extent of increase in student's participation in ECA	0.8836	Questionnaire response at SGD with household members	Sample size 73. Improvement score (88.35%) from responses summarised in chart 20.
WtP to maintain increased ECA participation	5,152.32		Sample size 73

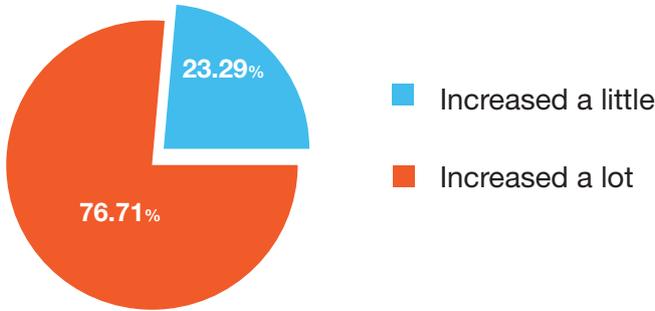


Chart A13: School students' self reported change in their participation in extra curricular activities

Outcome 16 (increased participation in ECA) resulted in an outcome incidence value of 35,983.93. Accounting for deadweight (19.92%), displacement (0%) and attribution (57.97%) resulted in a net outcome incidence value of 16,704.596. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 86,067,423.98. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 233,403,829.21.

Indicator	Value	Data source	
Number of female students and teachers	40,726	Project data	
Outcome 17: Enhanced privacy and safety (MHM related) for females			
Female students' and teachers' self-reported feeling of enhanced privacy and safety	0.9375	Questionnaire response at SGD with household members	Sample size 40. Improvement score (93.75%) from responses summarised in chart 21.
WtAC to forego enhanced safety and privacy	285,832.56		Sample size 40

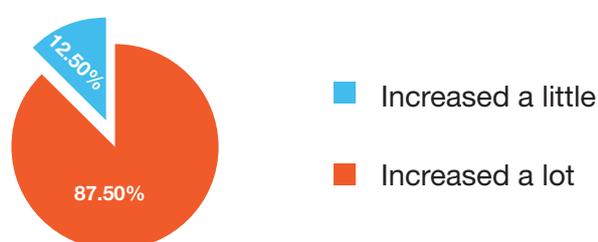


Chart A14 : Female teacher and students' self reported change in their privacy and security related to MHM

Outcome 17 (Enhanced MHM related privacy and safety for females) resulted in an outcome incidence value of 22,019.06. Accounting for deadweight (19.92%), displacement (0%) and attribution (57.97%) resulted in a net outcome incidence value of 10,221.77. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 2,921,715,254.33. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 7,923,317,519.06.

Indicator	Value	Data source	
Number of students and teachers	41,843	Project data	
Outcome 18: Enhanced leadership and advocacy skills of students and teachers			
Self-reported extent of enhanced ability to lead peers, collaborate with others and advocate	0.8836	Questionnaire response at SGD with household members bn	Sample size 73. Improvement score (88.36%) from responses summarised in chart 22.
WtAC to forego enhanced leadership and advocacy skills	803,699.08		Sample size 73

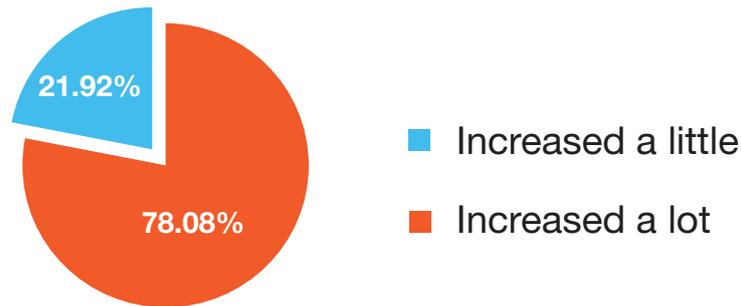


Chart A15 Teachers' and students' self reported change in their ability to lead and participate in collaborative activities

Outcome 18 (enhanced leadership and advocacy skills of students and teachers) resulted in an outcome incidence value of 36,970.87. Accounting for deadweight (19.92%), displacement (0%) and attribution (57.97%) resulted in a net outcome incidence value of 17,162.76. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 13,793,691,382.90. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 37,406,724,157.87.

Indicator	Value	Data source	
Number of students and teachers	41,843	Project data	
Outcome 19: Enhanced dignity for being a teacher/student of the school			
Self-reported feeling of dignity for being part of the school	0.9315	Questionnaire response at SGD with household members	Sample size 73. Improvement score (93.15%) from responses summarised in chart 23.
WtAC for giving up enhanced feeling of dignity	262,770		Sample size 73

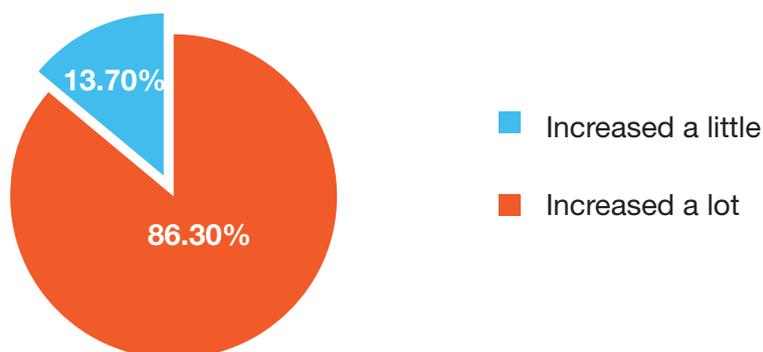


Chart A16 : Teachers' and students' self reported change in dignity for being part of the school

Outcome 19 (enhanced dignity for being a teacher/student of the school) resulted in an outcome incidence value of 38,977.04. Accounting for deadweight (19.92%), displacement (0%) and attribution (57.97%) resulted in a net outcome incidence value of 18,094.07. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 4,754,578,398.46. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 12,893,807,589.36.

Indicator	Value	Data source	
Number of mobile and public toilet users	731,376	Project data	
Outcome 20: Convenience arising out of access to safe water and hygienic sanitation			
Average number of times toilet is used outside of home	562.64	Questionnaire response at SGD with household members	Sample size 11.
Cost per use	6.18		Sample size 11

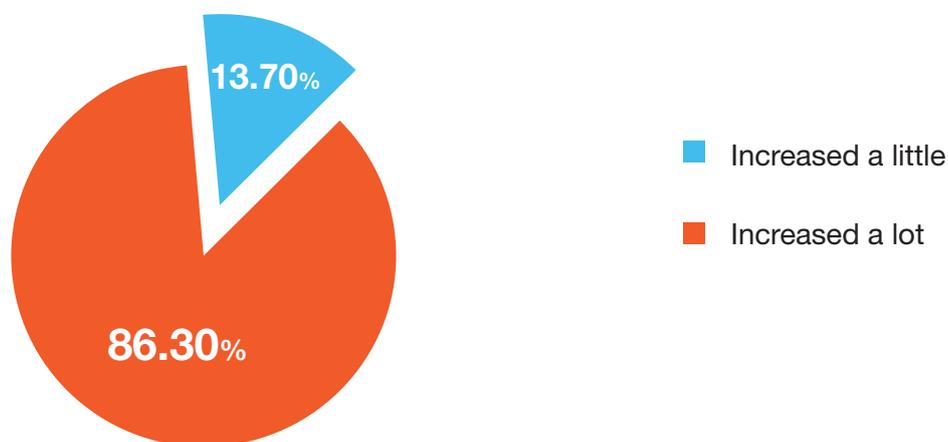


Chart A16 : Teachers’ and students’ self reported change in dignity for being part of the school

Outcome 20 (enhanced convenience arising out of access to safe water and hygienic sanitation) resulted in an outcome incidence value of 411,501,205. Accounting for deadweight (15%), displacement (0%) and attribution (80%) resulted in a net outcome incidence value of 279,820,819. Monetising the net outcome incidence using average cost per use resulted in a total annual outcome value of Tk. 1,729,292,664.28. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 4,689,620,195.60

Indicator	Value	Data source	
Number of CBO & NBUS members	1,631	Project data	
Outcome 21: Enhanced leadership, management and fund raising skills			
Perceived increase in skills of leadership, management and fund raising among CBO/NBUS members	0.9	Questionnaire response at SGD with household members	Sample size 45. Improvement score (90%) from responses summarised in chart 24.
WtP for acquiring and maintaining the leadership and financial management skills	9,756.24		Sample size 45

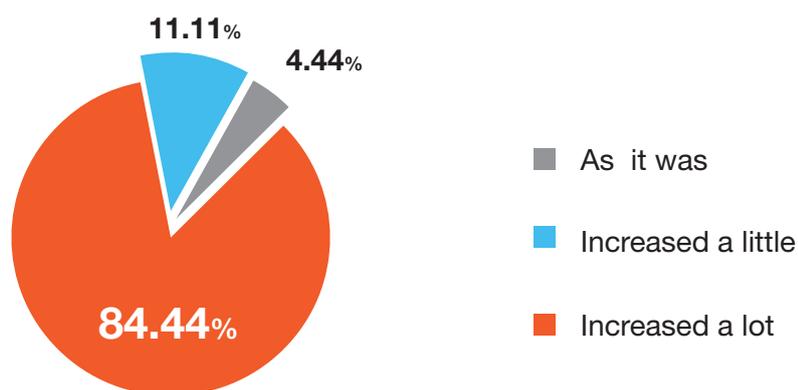


Chart A17: CBO and NBUS members' self-reported increase in their management and leadership skills

Outcome 21 (enhanced leadership, management and fund raising skills) resulted in an outcome incidence value of 1,467.9. Accounting for deadweight (20%), displacement (0%) and attribution (59%) resulted in a net outcome incidence value of 691.27. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 6,744,186. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 18,289,368.55.

Indicator	Value	Data source	
Number of CBO & NBUS members	1,631	Project data	
Outcome 22: Increased participation in social and development activities			
Perceived increase of participation in social and development activities	0.8778	Questionnaire response at SGD with household members	Sample size 45. Improvement score (87.78%) from responses summarised in chart 25.
WtAC for foregoing increased participation in social and development activities	120,943.32		Sample size 45

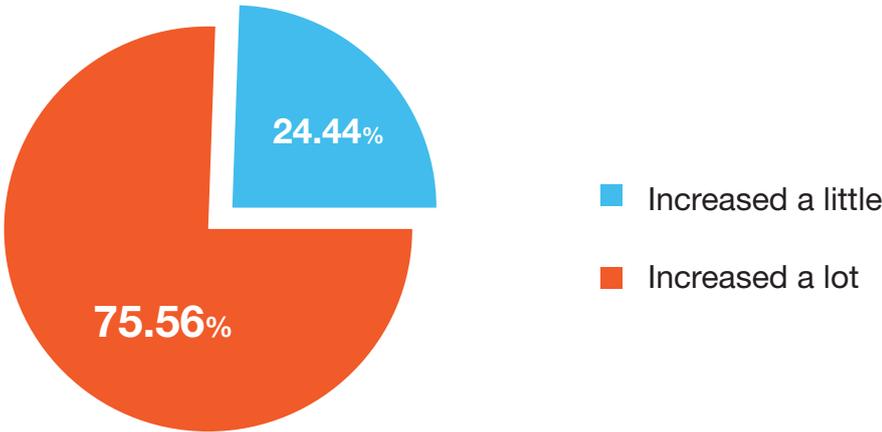


Chart A18 : CBO and NBUS members’ self-reported increase in their management and leadership skills

Outcome 22 (increased participation in social and development activities) resulted in an outcome incidence value of 1,431.66. Accounting for deadweight (20%), displacement (0%) and attribution (59%) resulted in a net outcome incidence value of 674.20. Monetising the net outcome incidence using average WtAC resulted in a total annual outcome value of Tk. 81,540,059.26. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 221,126,196.03.

Indicator	Value	Data source	
Number of CBO & NBUS members	1,631	Project data	
Outcome 23: CBO/NBUS members' enhanced dignity and acceptance in the community			
Perceived increase in the respect and dignity of CBO members among their community members	0.9222	Questionnaire response at SGD with household members	Sample size 45. Improvement score (92.22%) from responses summarised in chart 26.
WtAC for giving up the increased dignity and respect	114,992.04		Sample size 45

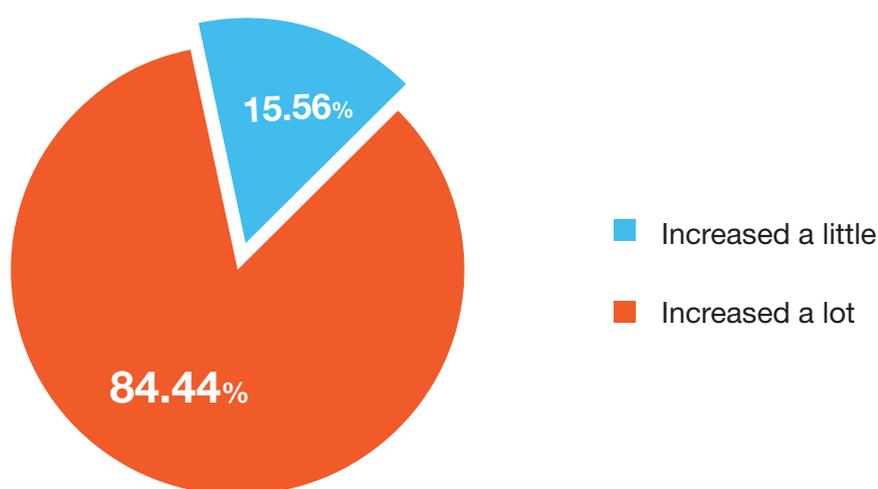


Chart A19 : CBO and NBUS members' self-reported increase in their management and leadership skills

Outcome 23 (CBO/NBUS members' enhanced dignity and acceptance in the community) resulted in an outcome incidence value of 1,504.14. Accounting for deadweight (20%), displacement (0%) and attribution (59%) resulted in a net outcome incidence value of 708.34. Monetising the net outcome incidence using average WtAC resulted in a total annual outcome value of Tk. 81,453,156.00. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 220,890,525.51.

Indicator	Value	Data source	
Number of CBO & NBUS members	1,631	Project data	
Outcome 24: CBO/NBUS members' enhanced acceptance among service providers and duty bearers			
Increase in the acceptance CBO/NBUS members enjoy among service providers, duty bearers and public representatives	0.8889	Questionnaire response at SGD with household members	Sample size 45. Improvement score (88.89%) from responses summarised in chart 27.
Willingness to pay for maintaining increased acceptance among service providers and duty bearers	5,340.06		Sample size 45

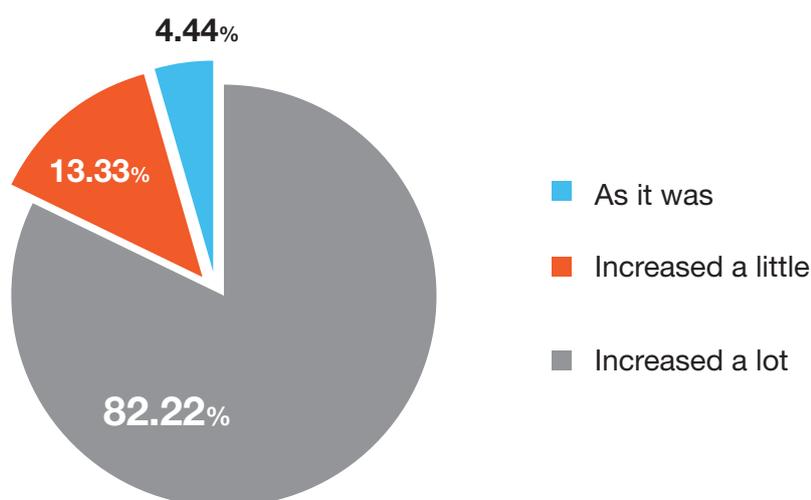


Chart A20 : CBO and NBUS members' self-reported increase in their management and leadership skills

Outcome 24 (CBO/NBUS members' enhanced acceptance among service providers and duty bearers) resulted in an outcome incidence value of 1,449.78. Accounting for deadweight (20%), displacement (0%) and attribution (59%) resulted in a net outcome incidence value of 682.73. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 3,645,844.73. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 9,887,063.90.

Indicator	Value	Data source	
Number of Community Based WASH Service Providers	2,919	Project data	
Outcome 25: Enhanced income for service providers			
Indicator 25.A Increase in income in current occupation	100%	Questionnaire response at SGD with household members	Sample size 45. Improvement score (88.89%) from responses summarised in chart 27.
Change in income per year	55,813.08		Sample size 26. Average of responses.
Costs saved by doing repair and maintenance work	45.45%		Sample size 26. Reported by respondents.
Costs saved per year	13191.12		Sample size 26. Average of responses.

Outcome 25 (Enhanced income of Community Based WASH Service Providers) resulted in an outcome incidence value of 2,919 and 1,327, for two outcome indicators respectively. Accounting for deadweight (20%), displacement (0%) and attribution (75%) resulted in a net outcome incidence value of 1,751.4 and 796 respectively. Monetising the net outcome incidence using average increase in income and average costs saved resulted in a total annual outcome value of Tk. 108,251,308.89. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 293,563,683.50.

Indicator	Value	Data source	
Number of Community Based WASH Service Providers	2,919	Project data	
Outcome 26: Increased confidence and ability to manage			
Perceived increase in management skills	0.3846	Questionnaire response at SGD with household members	Sample size 26. Improvement score (38.46%) from responses of service providers.
WtP for acquiring and retaining management skills	30,128		Sample size 26

Outcome 26 (Community Based WASH Service Providers' increased confidence and ability to manage) resulted in an outcome incidence value of 1,123. Accounting for deadweight (20%), displacement (0%) and attribution (75%) resulted in a net outcome incidence value of 673.59. Monetising the net outcome incidence using average WtP resulted in a total annual outcome value of Tk. 20,293,576.14. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 55,033,579.03.

Indicator	Value	Data source	
Number of Community Based WASH Service Providers	2,919	Project data	
Outcome 27: Enhanced status in the family			
Increased appreciation by family members	0.84	Questionnaire response at SGD with household members	Sample size 26. Improvement score (84%) from responses of service providers.
WtAC for giving up appreciation and respect by family members	18,929		Sample size 26

Outcome 27 (Community Based WASH Service Providers' enhanced status in the family) resulted in an outcome incidence value of 2,452. Accounting for deadweight (20%), displacement (0%) and attribution (75%) resulted in a net outcome incidence value of 1,471.18. Monetising the net outcome incidence using average WtAC resulted in a total annual outcome value of Tk. 27,848,478.97. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 75,521,507.79.

Indicator	Value	Data source	
Number of Community Based WASH Service Providers	2,919	Project data	
Outcome 28: Enhanced social dignity and acceptance			
Increased appreciation and respect by neighbours	0.9565	Questionnaire response at SGD with household members	Sample size 26. Improvement score (95.65%) from responses of service providers.
WtAC for giving up increased respect among neighbours	3,966		Sample size 26

Outcome 28 (Community Based WASH Service Providers' enhanced social dignity and acceptance) resulted in an outcome incidence value of 2,792. Accounting for deadweight (20%), displacement (0%) and attribution (75%) resulted in a net outcome incidence value of 1,675.21. Monetising the net outcome incidence using average WtAC resulted in a total annual outcome value of Tk. 6,644,502.20. Discounting by the annual drop of rate of 30% and NPV discount rate of 6.31% gave the NPV of outcome value over 10 years as Tk. 18,019,038.85.

Outcome 29: The ROI model included partner organisation, ARBAN's increased revenue stream from managing the mobile toilets. The organisation had an average annual revenue of 801,156 Taka. Accounting for deadweight, displacement and attribution resulted in an annual outcome value 480,693.84 Taka, which following accounting for drop off ration and present value discount ration gave a total outcome value – over ten years, of Taka 1,303,580.12.

Outcome 30: The model also included Dhaka Wasa as a beneficiary of water connections for low income people in urban slums. The estimation was limited to the households who had legal water connections from WASA, giving an outcome incidence of 54,482. Accounting for deadweight, displacement and attribution resulted in a net outcome value 43,585.4. The financial proxy (water bill of slum dwellers) gave an annual outcome value of 64,311,163.52 Taka, which following accounting for drop off ration and present value discount ration gave a total outcome value – over ten years, of Taka 174,403,637.67.

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