CONSULT

Life cycle cost analysis for Splash school interventions in Addis Ababa, Ethiopia

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Name & Title: Arjen Naafs, Programme Officer

Company: IRC

Postal Address: International Water House, Bezuidenhoutseweg 2, 2594 AV, The Hague The Netherlands

Tel. No: +31 70 304 4000

E-mail: naafs@ircwash.org

Authors: Arjen Naafs, Catarina Fonseca, Abinet Kebede, Richard Ward

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Table of Acronyms

AAEB	Addis Ababa Education Bureau
AAWSA	Addis Ababa Water and Sewerage Association
CapEx	Capital Expenditure
CapManEx	Capital Maintenance Expenditure
ExpDS	Expenditure for Direct Support
ExpIDS	Expenditure for Indirect Support
KG	Kinder Garten
LCCA	Life Cycle Cost Approach
MHM	Menstrual Hygiene Management
ODA	Overseas Development Assistance
OpEx	Operational Expenditure
SROI	Social Return on Investments

Acknowledgements

This report presents the results of the school research that took place in Addis Ababa during May and June 2019. During our interviews with school-teachers, directors and finance staff, we were impressed by the knowledge and the commitment to WASH and we would like to thank all people that we interviewed for their frankness and honesty. We have been well supported by Addis Ababa Education Bureau, both at city level and at sub-city and woreda level. We would like to thank all of them for their openness and their willingness to share their perspective and their cost information.

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Arjen Naafs
Catarina Fonseca
Abinet Kebede
Richard Ward

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Executive Summary

Addis Ababa Education Bureau, supported by Splash have set themselves the task to supply all 483 government schools in Addis Ababa with safe water, good sanitation and good hygiene services, based on the model that Splash has developed worldwide.

Splash has partnered with IRC WASH to understand the life cycle costs of these interventions. The Life Cycle Cost Approach (LCCA) captures the costs/expenses that are needed to keep services running.

This report and findings are based on data and information collected in 2019 through interviews with stakeholders, Splash staff and a survey of 40 schools of sites where interventions have taken place.

The initial investment, or capital expenditure (CapEx) was found to be ETB 886 (USD 29.5) per student. Of this, 86% is regarded as hardware intervention (CapEx hardware) and 14% CapEx software such as mobilisation and awareness raising. The bulk of the capital investments go towards sanitation (60%), followed by drinking water (33%) and hygiene (6%).

In order to raise WASH in schools service provision to a basic level as per the Joint Monitoring Programme (JMP), it was found that additional storage tanks to supply water for both hygiene and sanitation are needed to solve the problem of intermittent piped water supply. This would require an additional 4% CapEx investment.

In response to intermittent water supply at many Addis schools, Splash recently increased their standard for water storage to require a minimum of three days of water storage volume. A single day's water storage requirement is defined as nine liters per person per day for a non-residential school. These changes did not apply to the schools surveyed by IRC during this analysis, but will be applied to all Splash schools in Addis as part of Project WISE (and retroactively applied to schools where Splash has worked in the past).

Once the services are in place, they need to be kept operational. The recurrent expenditure (those that take place each year) was currently found to be ETB 185 (USD 6.2) per student, or roughly one fifth of the capital expenditure (CapEx). Again, sanitation is the largest cost center, covering 63% of the recurrent expenditure, but hygiene has a higher maintenance cost than drinking water (at 23% as opposed to 14%).

The operational costs (OpEx) include the water bill (both drinking water and hygiene), soap costs, but also costs for the janitors (salary) and their protective gear (gloves, closed shoes, uniform) – which was relatively high, forming 29% of OpEx. Capital Maintenance Expenditure (CapManEx) is the single greatest expense - predominantly emptying the pits (24%). The expenditure on direct support is largely Splash staff costs (96%), and the

remainder 4% monitoring and support from staff at decentralised levels. See Table 1 below for details.

Table 1 Recurrent cost per school summary table

	Item	Median per school	Median per student	Percentage	Costs
Water	OpEx	9,450	9	5%	Water bill, filter, taps
	CapManEx	5,221	5	3%	Pipe, filter, tank repairs
	ExpDs	13,768	13	7%	Monitor visits, support
	Sub-TOTAL	**28,439**	**26**	**14%**	
Sanitation	OpEx	97,784	90	49%	Toilet paper, protective gear, janitor salary
	CapManEx	14,658	13	7%	Repairs, pit emptying
	ExpDs	13,768	13	7%	Monitor visits, support
	Sub-TOTAL	**126,210**	**116**	**63%**	
Hygiene	OpEx	31,606	29	16%	Part water bill, soap
	CapManEx	1,425	1	1%	Tap repair
	ExpDs	13,768	13	7%	Monitor visits, support
	Sub-TOTAL	**46,799**	**43**	**23%**	
Total	OpEx	138,840	128	69%	
	CapManEx	21,303	20	11%	
	ExpDs	41,305	38	21%	
	TOTAL	**201,448**	**185**		
Note: Cost is calculated based on day students. Students from evening classes are not included					

Considerations for the Splash team include:

On Water

- Water quality is at the heart of the Splash intervention; therefore, it would be good to have results of the water quality from before the intervention/filter systematically shared with schools, AAEB, woreda and sub-city.
- Water tariffs are set to go up yearly. Monitoring usage can lead to considerable budget savings by keeping consumption levels under the higher tariff threshold.

On sanitation:

- Splash has achieved admirable experience in providing safe water and promotion of hand washing. However, relatively limited experience has been accumulated with sanitation. As consequence, innovation and possible cost reductions have not yet taken place. Sanitation represents 60-80% of expenditure and should therefore be the focus of innovation and standardisation as most (financial) savings can be achieved there[1].
- Current sanitation intervention focusses mainly on improving facilities, but do not yet solve challenges such as intermitted water supply at toilets or looking at proper Faecal Sludge Management.

[1] Splash and Stantec (an international engineering consulting firm) are currently working to create an improved, standardized sanitation design that will be used for all new sanitation facilities that are completed as part of Project WISE. This design includes considerations for Addis' intermittent water supply and proper faecal sludge management

- Toilet paper is only made available for teachers. If it would be made available to students, and additional support would be given to ensure that emergency menstrual hygiene material would be made available, recurrent expenditure would go up to ETB 468 (USD 15.6) per student, nearly three times higher.

On Hygiene

- The role of janitors must be given greater attention in the programme and planning. They are the ones cleaning the toilets, noticing poor hygiene behaviour and typically have many years of experience working at the same school. It is recommended to make them key players in the behaviour change campaign, including increasing their visibility, recognition and status[1].
- Hand washing units and the sanitation units are dependent on an intermittent water supply. This is considered a big gap in providing good continuous WASH services, as flushing becomes impossible, cleaning is difficult, and handwashing is done less. Informal communication from AAWASA indicated that there may be a project initiated to support storage tanks at schools. Improvements recently made to Splash's water storage standards should help ensure that handwashing and sanitation units have more consistent access to water supply in the future.

On School support

- Schools with evening classed have less functionality (62% versus 85% for handwashing). SPLASH should discuss with the school administration how these evening activities influence the WASH facilities and consider specific hygiene sensitisation. Evening/night classes are common (40%) with on average 590 students and attract significant more female students (66% versus 52% for normal school).
- Together with helping partner sites set up maintenance funds Splash could consider discussions on tracking WASH-specific expenditure. The tools of the current study may provide a basis for this. The general budgeting format of schools in Addis is well developed and has clear and publicly available budget lines. However, the lack of WASH-specific budget and expenditure lines may pose a challenge if schools are to budget sufficiently for maintenance.
- Capacity supporting initiatives need to include Woreda and Sub-city staff in their planning and recognise that they are the key support to WASH in schools.
- Schools currently work on ad-hoc basis for repairs and maintenance. Using asset management principles could guide the budgeting and control expenses. It may be considered to trial this at a few schools.

[1] Over the last year, Splash has conducted formative research in Addis to understand the work environment and motivations of school janitors. Splash is launching a pilot training program in 2019 for school janitors and plans to use the results to inform a janitor training program for all Project WISE schools.

1 Introduction

Addis Ababa Education Bureau, supported by Splash, have set themselves the task to supply all 483 government schools in Addis Ababa with safe water, good sanitation and good hygiene services, based on the model that Splash has developed over the last decade.

Splash has partnered with IRC WASH to understand the life cycle costs of these interventions. The Life Cycle Cost Approach (LCCA) captures the costs and expenses that are required to keep services running. The following report and findings are based on desk based research, primary and secondary data and information collected through interviews with stakeholders and Splash staff as well as an LCCA survey of 40 schools at sites where interventions have taken place.

1.1 Background

Splash Ethiopia is an ambitious iNGO that focuses specifically on School Water, Sanitation and Hygiene (SWASH). Its mission in Addis Ababa is to ensure clean water, clean hands, and clean toilets in all 483 government schools in the city, covering 442,759 students. Splash also seeks to influence the improvement of SWASH more widely across the country.

Splash has been working in Ethiopia since 2008 and until 2018 had interventions at 49 sites spread out over 45 schools in Addis Ababa (excluding orphanages). The support has focused on water treatment and hygiene awareness (particularly handwashing) but in recent years has also included the construction of sanitation facilities.

A standardised approach has been developed, which has been documented in an earlier study (Mathijs Veenkant, 2019).

Key characteristics of the Splash SWASH model are:

- Developing innovative and durable infrastructure;
- Focusing on urban areas and full coverage;
- Using an integrated approach to behaviour change – both hardware and software interventions;
- Designing high quality interventions;
- Developing effective partnerships, particularly with local government bureaus;
- Using Monitoring, Learning, and Evaluation (MLE) to continuously develop the intervention.

Addis Ababa Education Bureau (AAEB) has the vision to build an effective educational system and a set of world class educational institutions in Addis Ababa. Together with Splash, they have initiated the WISE project to ensure clean water, clean hands, and clean toilets in available all 483 government schools in Addis Ababa. The initiative is four years in duration and has a total budget of around 470 million Birr (over 16 million USD). There is a

unique cost sharing agreement where the government contributes a significant portion of the budget (with a focus on sanitation) and Splash contributes the remaining funds.
The results of the Life Cycle Cost Approach (LCCA) are expected to help decision makers involved in planning, budgeting and service delivery make informed choices about levels and models of water service and understand the cost consequences of each decision.

The first step in understanding life-cycle costs is determining the status of existing water infrastructure by creating an asset inventory. The second step is collecting cost data. The overall objective is to establish the cost of current water service delivery and determine the gap between existing services and full coverage at the desired service level. The necessary information is normally collected from government water offices at different levels—local, district, municipal, zonal, or regional, depending on the country's administrative system—and from end users such as schools (Veenkant & Fonseca, 2019).

1.2 Objectives

The primary research aim is to apply the LCCA approach to the Splash intervention as scheduled to take place under the WISE project.

Specific objectives of the study:

1. To understand the life-cycle costs of the Splash School Water, Sanitation and Hygiene (SWASH) model in Addis Ababa, Ethiopia
2. To understand the existing requirements for maintenance costs, the budgets available and if there are or there will be financing gaps.
3. To offer strategic advice on relevant programmatic activities considering the LCCA data.

Specific research questions include:

On costs:

- What are the initial capital hardware costs of Splash WASH interventions? Namely: handwashing and drinking stations (the latter with a filtration system); water storage; construction or rehabilitation of sanitation infrastructure; and hygiene behaviour change programming.
- What are the operation and maintenance costs requirements in schools for interventions to reach at least a "basic service level"?
- What are the capital maintenance costs requirements in schools for interventions to reach at least a "basic service level"?
- What are the software costs of creating the demand for these services? (human resources mainly, technical assistance)
- Overall, what are the ongoing costs of maintaining, supporting and sustaining behaviour change over time?

On funding available:

- What are the existing school maintenance budgets? (to compare with the cost requirements for maintenance described above)

For each of the costs:

- Cost ranges per child
- Cost ranges per type of school (2 categories: KG vs primary/secondary schools)
- Cost ranges per intervention (water, sanitation and hygiene separately)
- Cost ranges per size of school (Small <250, Medium 251-1000, Large >1001)
- All the above cost ranges per child disaggregated by gender
- All the above cost ranges with estimates for replacing fibre glass by plastic (with estimated and not real costs).

The overall target is to enhance the sustainability of the intervention, as per contract agreement with AAEB (Figure 1).

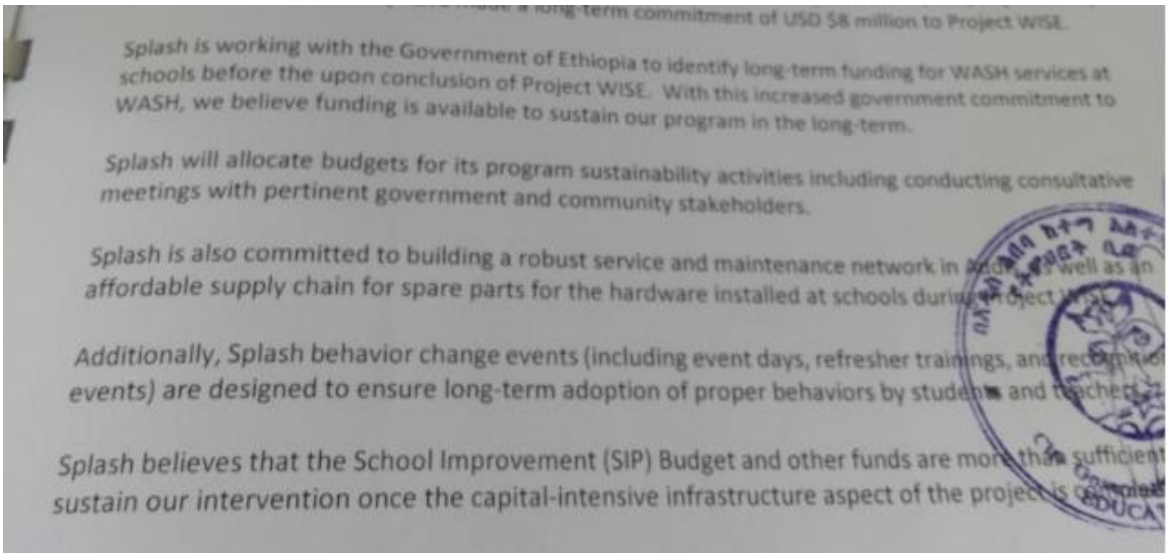

Figure 1 Commitments to sustainability and identifying long-term funding

Source: project agreement WISE between Splash and AAEB

2 Methodology and Sampling

2.1 Methodology

The methodology used is based on the extensive experience of IRC on Life Cycle Costing and application in Ethiopia, which has been described and captured in (Veenkant & Fonseca, 2019). The approach is based on collecting information from schools, partners and from supporting literature. The bulk of the primary information has been collected from schools, using surveys and key informants interviews. This information has been captured and analysed in mWater (or Solstice). To gather the data, the following survey tools were developed:

Table 2 Tools used for the data collection

Tool (hyperlinked to electronic form)	Objective	Number of surveys conducted
Tool A - LCCA tools headmaster and WASH team	Capture WASH practices and costs at schools	40
Tool B - LCCA School Finance team	Capture cost and budget as per financial books	36
Tool C - LCCA Janitors	Capture perception from janitors (cleaners)	40
Tool D - Splash	Capture costs as of project WISE	Excel files and interviews
Tool E - AAEB	WISE Project costs and monitoring costs	1 at AAEB level; 2 at sub-city level and 4 at woreda level
Tool F - AAWASA	Semi-structured interview	Single interview
Tool G - MHM	Capture activities related to MHM	Two semi-structured interviews

The school data was collected by two experienced enumerators (one female sociologist and one male economist) with the institutional information collected by the IRC Supervisor and international expert. The bulk of the data was collected in May 2019, finishing just before the national exams (and internet black-out). Analysis took place over June with Draft report submitted early July.

2.2 Sampling

As the objective is to cost the Splash methodology, the sample has been based on the sites where interventions had been completed as of early 2019, which totalled 49, with 34 more planned for 2019 (Table 3).

Table 3 Overview of interventions Splash

Intervention	2008	2009	2011	2012	2013	2015	2016	2017	2018	2019	Total
Water & Hygiene		2	2			1	3	3	19		30
Water Only	1										1
Water, Hygiene, & Sanitation		1		1	1	6	3	4	2		18
Still to have intervention										34	34
Total	**1**	**3**	**2**	**1**	**1**	**7**	**6**	**7**	**21**	**34**	**83**

A total of forty schools were selected, which included all pre-2018 sites and purposely included both the secondary schools in 2018. During the data collection, two schools were replaced in the survey: Abebech Gobena School because it was operated by an NGO and Selam Ber Kinder Garden as the financial information was all combined with the primary school, which was not served by Splash. Two replacement schools were provided. The final list of schools that took place in the survey is provided in Annex 2 and Figure 2.

During the primary school data collection, three schools indicated they had had MHM activities. The team went back to two of them to get more information on MHM.

Following the various discussions with AAEB at central level, it became apparent that the woreda and sub-city departments have an important role in supporting and monitoring the schools. As follow-up, two sub cities were visited and four woredas (Woreda 1 and 12) and Arada sub-city (Woreda 6 and 9).

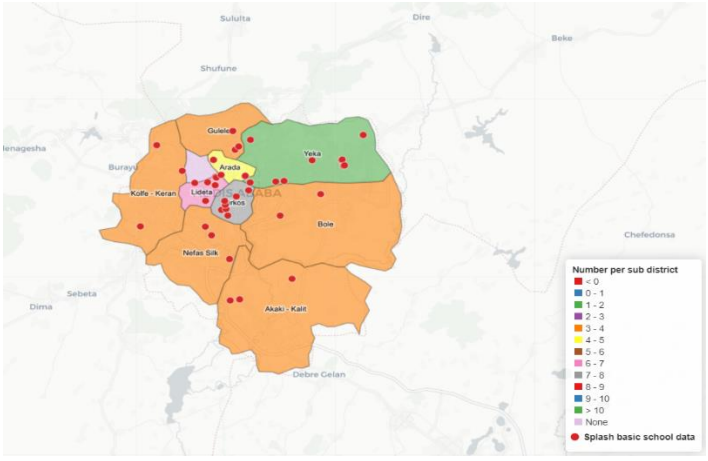

Figure 2 Location of the sampled schools (source Project Console)

2.3 The Life Cycle Cost Approach

The life cycle cost approach was developed to allow decision makers to plan for budgets and financing beyond ad-hoc single interventions and focus instead on the cost to deliver sustainable services that last.

The principles and concepts were established in 2010 (Fonseca, 2011) and (Veenkant & Fonseca, 2019) have detailed the methodology for collection and analysis (Figure 3).

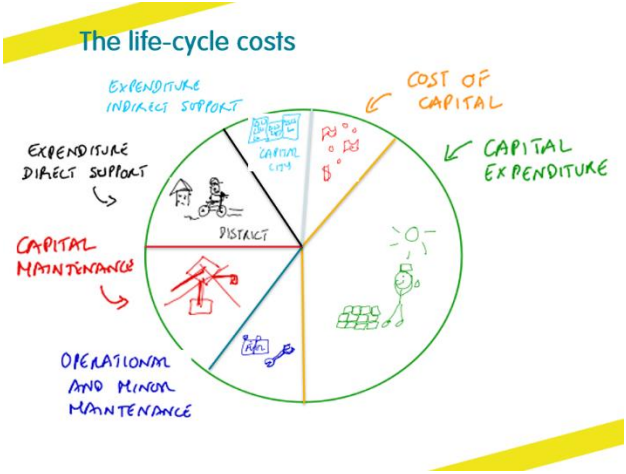

Figure 3 Cost categories as presented in the supporting PowerPoints

A prior example of applying the approach in schools has been undertaken in Bangladesh (Mekela, et al., 2015). The various cost components and examples for school WASH are presented in Table 4.

Table 4 Life Cycle Cost Approach – adapted from (Mekela, et al., 2015)

Cost components		Definition and examples
Capital expenditure The costs of providing a service where there was none before; or of substantially increasing the level of services	Capital Expenditure (CapEx)	One-off capital investment in hardware such as excavation, lining, slabs, superstructures, handwashing facilities, drinking water facilities, menstrual hygiene management facilities, etc. Software costs include investment in work with stakeholders prior to construction or implementation, such as schoolteachers and children's education, one-time hygiene promotion, training materials, training of trainers, school management committee meetings, etc.
Recurrent expenditures Service maintenance expenditure associated with sustaining an existing service at its intended level	Operational expenses (OpEx)	Typically, regular operating and minor maintenance expenditure, such as soap and other cleaning materials, payment of person that does the cleaning, water bill, tap replacement, materials for menstrual hygiene management (bin, napkins), etc.
	Capital maintenance expenditure (CapManEx)	Asset renewal and replacement costs; occasional costs that seek to restore the functionality of a system, such as replacing a pipe or emptying a septic tank and sludge disposal.
	Expenditure on Direct Support (ExpDS)	Recurrent costs related to monitoring and support by AAEB at woreda, sub-city and municipality, as well as the Splash support and operation in Ethiopia.
	Expenditure on indirect Support (ExpDS)	Expenditure on macro-level support, including planning and policy making, to decentralised district, municipal or local government. Global Splash support is also part of this.
	Cost of Capital (CoC)	Cost of interest payments on loans used to finance capital expenditure.

Considering that the government funds come mainly from taxes and Splash contribution is a grant, the cost of capital is zero for this analysis. Expenditure on indirect support have not been analysed because national level costs from Education bureau have not been obtained and Splash global costs are considered outside the scope of the study.

2.4 Analysis tool

Each of the tools provided or contributed to understanding a cost component. For example, OpEx has been build-up of information from AAEB, combined with information from janitors and information from the finance departments of the schools.

In order to be able to disaggregate the costs as desired, all costs have been brought down to school level. This has allowed us to analyse by pupil, school and gender. As much as possible, the data has been prepared in mWater, after which the bulk calculations and statistics have been done in Excel.

2.5 Limitations to the approach

The above calculations and underlying data are based on certain (calculated and best practice) assumptions and therefore have some limitations that should be highlighted before proceeding:

- Though in principle night programmes increase the pressure on the WASH facilities, these students have not been added to determine cost per student – mainly as evening classes are organised by other groups/teachers.
- Costs from Tool A (head masters) are based on recall and should be regarded as best estimates.
- Many operational costs refer to the most recent month of expenditure. This has been annualised by multiplying by 12 – even though 1- 2 months are holiday.
- All costs have been calculated as annual costs and brought down to individual school level and per pupil level..
- CapEx costs were difficult to obtain from schools, and to a large extent have been based on previous research of (Mathijs Veenkant, 2019) and the financial budget and planning of project WISE (Splash and AAEB, 2019)
- The report presents averages from the 40 data points as median, with minimum and maximum. It is recognised that costs are typically varied and do not have a normal distribution. An exception is the calculations for ExpDS where often only single data points have been available
- Results are presented in birr, if required, an exchange rate of USD 1 = ETB 30 is recommended.
- Costs of previous years, particular for CapManEx and from (Mathijs Veenkant, 2019) have been brought to current ETB by using the oanda exchange rate – based on assumption that USD amount was constant.

Exchange rate at

USD 1 = ETB 30

3 Analysis

3.1 School characteristics

Of the 40 schools, 3 were secondary schools (classes 9-12, ages 15 to 18) and 37 were primary (classes 1-8 ages 5-14). Most of the schools had more than 1000 students, with median size of 1,087 (range 173-4,202). In total the 40 schools served 50,932 students. 40% indicated that the number of pupils has been increasing considerably over the last three years, with only four schools indicating declining numbers.

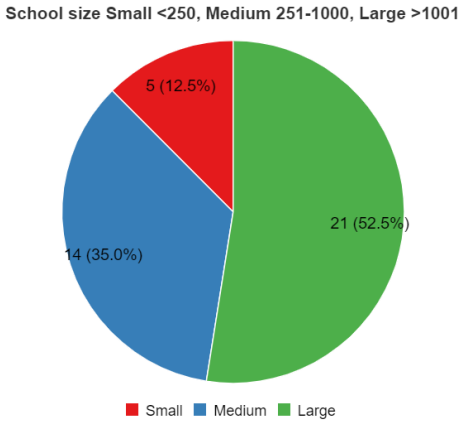

Figure 4 School sizes

52% of the students are female, with a small trend that smaller schools have slightly less female students (49%). 29% of the schools had a female headteacher and 38% a female deputy.

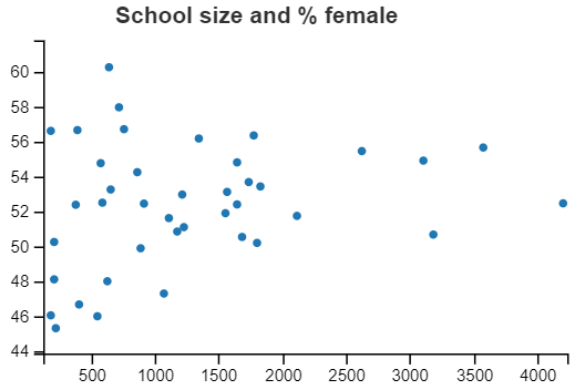

Figure 5 School size and gender balance

48% indicated that they also run an evening or night programme with average size of 520 pupils and with noticeable larger female student population (66%). Though in principle these night programmes increase the pressure on the WASH facilities, these students have not been added to determine cost per student – mainly as evening classes are organised by other groups/teachers.

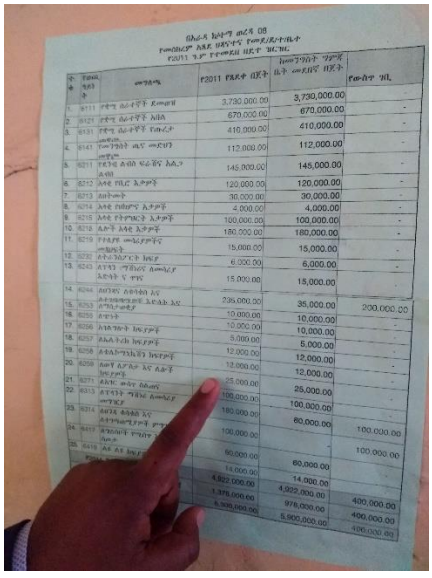

Figure 6 Publicly visible budget list with specific water bill line

The government schools in Addis Ababa have a well-designed budget system, consisting of 25 items, which allows good financial rigor and comparability between schools. Table 5 shows the relevant lines of the budget. With an annual average budget of nearly 8 million Birr (USD 266,000), schools spend 62% on staff – with average 120 staff per school (4,348 total). Government budget allocated for general maintenance has

increased sevenfold since last year, but still is low at just under 2%.

Table 5 School budget lines related to WASH 2018/2019

Budget Code	Description	Median (ETB	Min ETB	Max ETB	% total Budget	% annual increase
6111	Salaries	4,320,000	1,335,852	9,227,841	62%	
6218	Other sanitation supplies	177,000	30,000	409,261	3%	121%
6244	Maintenance budget	125,545	10,000	643,639	2%	735%
6259	Water bill, sanitation services (pit emptying), postal and other related costs	20,000	5,000	100,000	0.3%	130%
6257	Electric bill	15,000	8,000	70,000	0.2%	152%
Total	Total budget	7,020,877	3,480,425	16,767,931		

There is no separate budget item for WASH maintenance however; instead it is included under general maintenance activities (6244), which includes repair of buildings, and school compounds, etc. The electricity bill has been included for the overview, but, the electricity and the costs of it which relates to WASH are negligible. All schools visited rely on the town water supply for their water and therefore have no significant pumping costs.

The above budgeting is based on government funds, however following the SWASH Implementation Guideline (Ministry of Education, 2017), the main sources of SWASH financing in Ethiopia are:

- Government treasury department
- School grant
- Internal income
- Parent and student contributions
- Development partners
- Private contributions

The guideline emphasizes the need for schools to cover operation and maintenance costs from contributions by parents, communities, school general budget and internal incomes.

3.2 CapEx (Capital Expenditure)

Capital Expenditure is the cost of providing a service where there was none before; or of substantially increasing the level of services, via hardware investment. In the case of Splash interventions, the first-generation drinking units were made from concrete and the second from fiberglass (Figure 7). In the WISE project, it is intended to use hard plastic (third generation).

Figure 7 First generation (left) tap stands and second generation (right) - Edgat Besira primary and KG campus

21 schools (53%) have first generation concrete washing units. Based on (Mathijs Veenkant, 2019) a unit cost per tap of ETB 3300 was established for primary and secondary schools and 2200 for KG schools (Table 6) and the CapEx Hardware cost for each school reconstructed on that basis.

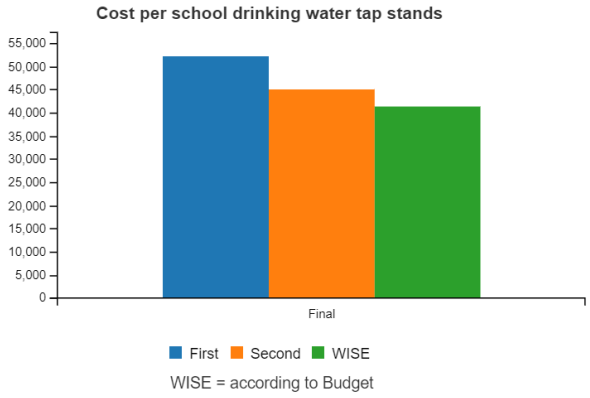

Figure 8 Decreasing costs of drinking water tap units

A 16% cost reduction per tap (based on new 3 taps stations) was achieved with the third generation units (plastic) scheduled to be used in the WISE project (Figure 8). Overall, this represents a 6% reduction in overall CapEx costs.

Table 6 CapEx tap stands values, adopted from (Splash and AAEB, 2019) and (Mathijs Veenkant, 2019)

	Item	Itemized cost	Per tap
First generation	Concrete drinking station with 10 taps	30,000	3,000
	Concrete drinking station with 5 taps	18,000	3,600
	Concrete drinking station (smaller for KG) with 5 taps	10,920	2,184
Second generation	Drinking or handwashing station body with 4 taps (6900 birr for the body, and the rest for faucets, pipes, drainage and surface levelling)	12,334	3,330
WISE project	Drinking or handwashing station body with 3 taps	8,400	2,800

In addition to the tap stands, Splash also installs two-phase water filtration systems, which have been adapted over time for ease use and care.
In recognition that the piped water from AAWASA is intermittent, government, parents and/or Splash contributed to supply a storage tank linked to the drinking water treatment (Figure 9).

Figure 9 Treatment (left) and tank in Edgat Besira primary and KG campus (right)

Table 7 CapEx Drinkwater per school (Splash and AAEB, 2019) & (Mathijs Veenkant, 2019)

	Item	Median ETB	Min ETB	Max ETB	%
Water treatment	VZN-441V SYSTEM Pre 2019	39,720	-	-	47%
	WISE project (2019 onwards)	47908	-	-	
Water taps	On average 15 taps	43,080	10,950	109,890	41%
Water storage	Water tanks (average typical 6m^3)	16,000	4,500	68,000	12%

The overall investment is ETB 860,000 per school. This information is based on project documentation (Splash and AAEB, 2019) and previous work (Mathijs Veenkant, 2019). Details of how the WISE budget has been categorised is in Annex 3.

Table 8 Capital Expenditure CapEx

	Whole project	Per school	Per student	Percentage
Water	130,022,887	285,138	294	6%
Sanitation	236,952,591	519,633	535	60%
Hygiene	25,337,635	55,565	57	33%
Total	392,313,112	860,336	886	

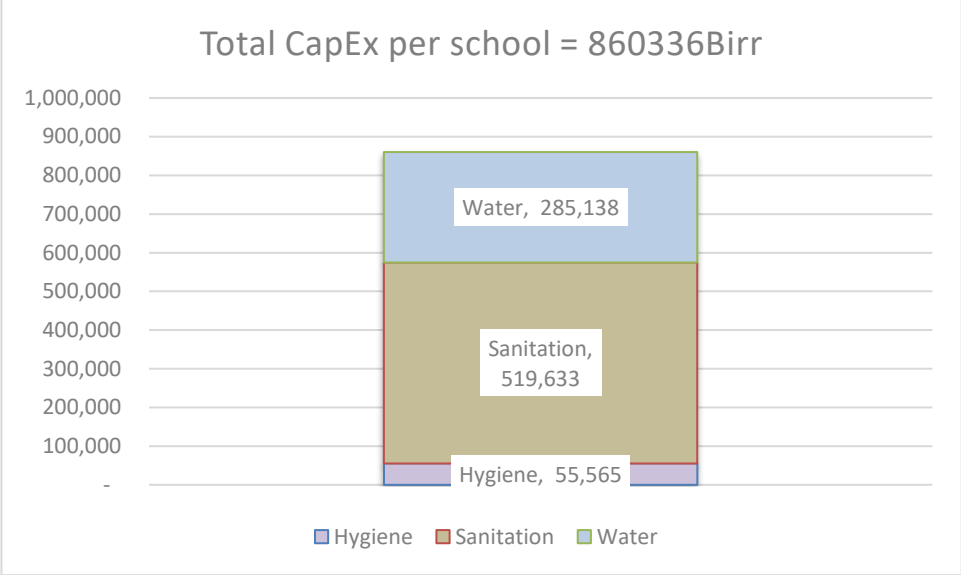

Figure 10 CapEx costs split per intervention type per school

About 10% of the CapEx costs were general (such as mobilisation and staff cost etc.) and have been equally distributed amongst the three interventions. Sanitation forms the largest investment at 60%.

Sanitation forms 60% of CapEx

3.3 OpEx (Operating Expenditure)

OpEx costs are typically regular operating and minor maintenance expenditures, such as soap and other cleaning materials, payment of person that does the cleaning, water bill, tap replacement and materials for menstrual hygiene management (bin, napkins).

Table 9 OpEx costs per school per year

	Item	n	Median ETB	Min ETB	Max ETB	% of total
Water	Water bill (based on 9-month data extrapolated to 12) – 32% percentage allocated based on taps	35	6,840	299	35,509	5%
	Water filters 900 birr per filter per year (carbon replacement)	40	900	900	2700	1%
	Taps replacement/small maintenance on pipes	21	1,710	260	6,001	1%
	SUB-TOTAL		9,450			7%
Sanitation	Toilet paper (only to for teachers)	34	33,270	3,792	99,840	24%
	Protective gear for janitors (bought yearly)	35	40,110	6,039	210,080	29%

	Item	n	Median ETB	Min ETB	Max ETB	% of total
	Janitor costs – 8.5 staff working on average 22% of time on WASH with median salary of 1,193	35	24,404	9,383	46,847	18%
	SUB-TOTAL		97,784			70%
Hygiene	Water bill – 68% percentage allocated based on taps	35	14,536	635	75,456	10%
	Soap (60% of schools paid by parents)	28	17,070	1,632	163,920	12%
	SUB-TOTAL		31,606			23%
	TOTAL		138,840			

The total Operational Expenditure is ETB 138,840 annually – with sanitation being the biggest cost at 70% (Table 9).

Sanitation forms 70% of OpEx

Water bill

The median water bill is 21,376, which is about 7% above the school account budget line 6259 (Table 5) – which is supposed to be covering the water bill. The utility (AAWASA) deals with schools as with any non-domestic: non-domestic users pay the tariff rate of the band on their total consumption. This means if a non-domestic user consumes 50 m^3 it will pay at Birr 9.71/m^3 for the whole consumption.

Table 10 Tariff settings by AAWASA

Band	m^3 / month	Rate / m^3 EBT	Rate start ETB	Rate end ETB
1	0-7	1.75	0	12
2	8-20	3.8	30	72
3	21-40	9.71	194	379
4	41-100	14.57	583	***1442***
5	101-300	19.42	***1942***	5807
6	301-500	24.28	7284	12116
7	> 501	26.71	12140	
Public tap		1.75 (flat rate)		

The median water bill is ETB 1,781 and the schools are consuming near to 100m^3. However, due to the band principle of the water tariffs, if a school uses 100 m^3, the bill is ETB 1,442, however, if 101m^3 is used, the bill is 35% higher with ETB1,942 (see bold figures in Table 10). This means that schools need to very be attentive to their water consumption at the end of each month to avoid entering the higher band.

In informal discussions some directors indicated that water consumption has been increasing due to the Splash intervention, as there is more awareness, more taps and a storage tank. However, this increase in consumption could not be confirmed, and perception may be because AAWASA has also imposed a significant annual increase in tariffs.

The consumption of 100m^3/month indicates a usage of about 16 litre per person per day (including staff and excluding weekends). Using the 32% as the division for drinking water, we get about 5 litre per person per day for drinking. This appears high, but bear in mind that this is a rough estimation and consumption levels includes leakages, irrigation/gardens etc.

Toilet paper

Toilet paper is only provided for staff. The yearly amount of ETB 33,270 seems initially quite significant – however, breaking it down to expense per staff member per month, it is only ETB 23. This is quite reasonable – as one toilet roll is ETB 15 each.

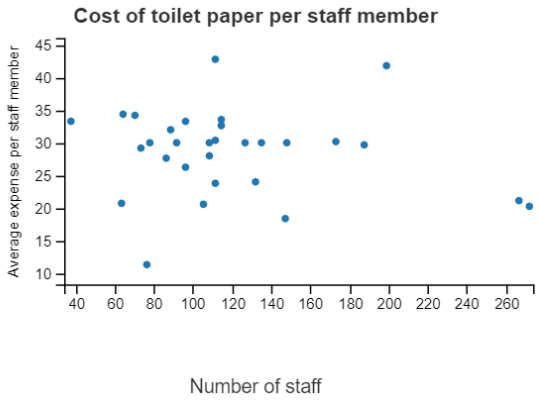

Figure 11 Monthly expense per staff member on toilet paper

No toilet paper is provided to the students. In an ideal WASH support scenario, this would be provided. Should the same unit rates be applied for students – then the amount needed would be another ETB 298,000 per school per year, *which would triple the needed OpEx budget*.

Protective gear

The protective gear was initially not regarded as WASH expense, but it was indicated by schools that it is needed for janitors to do their work (relating to dignity and safety) and therefore it has been included. All schools claim to purchase it and the annual yearly median cost is ETB 5,013 per year. Overall, this expense seems to be expensive. Gloves, masks and gowns are reported to be present in > 90% of the schools, but often just shoes are provided and not boots. 18% of the janitors say they are replaced more than once a year, but the opinion on quality and timeliness of delivery varies considerably by school.

Soap

Soap is typically financed by the parents (60% of the cases) Each child should bring a bar of soap at the start of the year. The overall expense of ETB 17,070 for soap breaks down to ETB 16 per child, which indeed is the typical expense of a bar of soap (ETB 10-20). This confirms that even though based on estimations, the expenses provided by the school directors and validated by the enumerators are realistic.

3.4 CapManEx (Capital Maintenance Expenditure)

Capital Maintenance Expenditure include asset renewal and replacement costs; occasional costs that seek to restore the functionality of a system, such as replacing a pipe or emptying a septic tank and sludge disposal.

Table 11 Annualised CapManEx per school

	Item	n	Median	Min	Max	% of total
Water	Water pipe repairs	17	1,621	667	25,140	8%
	Pending water tank repairs	8	1,500	600	12,500	7%
	Costs of water filter repairs	5	2,100	1,500	8,000	10%
	TOTAL		5,221			25%
Sanitation	Sanitation repairs	8	1,978	618	14,750	9%
	Pit emptying	20	5,150	650	24,198	24%
	Pending Sanitation repairs	29	7,530	360	70,550	35%
	TOTAL		14,658			69%
Hygiene	Pending tap repair	24	1,425	350	3,500	7%
	TOTAL		1,425			
	Total		21,303			

Pipe repairs and repair to the tank were the most commonly mentioned repairs undertaken for water infrastructure. For sanitation services, pit latrine emptying has occurred in 73% of the schools and is probably the single greatest expense. Emptying should be initiated by calling in the service of AAWASA. They charge 653 birr per trip for 10-12m^3 (which will go up to ETB 784 and ETB 914 in the next two years respectively), indicating 8 trips per year. It is also possible that commercial operators are used, which have higher rates.

In Table 11, pending repairs have been included as CapManEx, with estimates of costs provided by school, together with the experience of the enumerator. Such estimations, as indicated in the chapter 2.5, should be regarded as best estimates.

The considerable difference between minimum and maximum (often a factor 10 -20, but up nearly a factor 200 for pending sanitation repairs), demonstrates that CapManEx is difficult to plan and budget for.

69% of CapManEx is for sanitation

3.5 ExpDS (Expenditure on Direct Support)

Expenditure on Direct Support includes recurrent costs related to monitoring and support by AAEB at woreda, sub-city and municipality and the Splash support.

The information obtained has come from interviews with woreda, Sub-city and AAEB staff as well as the Splash team. The information therefore has less statistical strength and cannot be split by intervention type.

The schools reported to have had 3 visits in the last quarter from Splash and 5 from AAEB/government staff. This would correspond to 12 by Splash and 20 by government over a year. The government has many responsibilities to undertake during these visits from curriculum development, through to supporting finance and monitoring. Discussions indicated that about 10% of the monitoring work focusses on WASH (AAEB tackles one theme per month and the month of December is focussing on updating WASH status of the schools). These numbers are reflected in Table 12.

Table 12 Annualised ExpDS per school from Government for WISE

	Position	No	salary	year salary	%	Annual WASH	No of schools	Per school	%
AAEB	Director	1	7,000	84,000	10%	8,400	483	17	1%
	Planning and budgeting	2	6,030	72,360	10%	7,236	483	15	1%
	Construction department	5	6,030	72,360	10%	7,236	483	15	1%
	Sub-TOTAL							47	3%
Sub-City	Cross cutting expert	1	6,406	76,872	30%	23,062	40	577	35%
	Other staff salary	4	10,500	126,000	1%	916	40	23	1%
	Costs monitor visits	4	5,000	60,000	10%	6,000	40	150	9%
	Sub-TOTAL							749	45%
Woreda	Cross cutting expert	1	5,303	63,636	30%	19,091	24	795	48%
	Other staff salary	4	10,500	126,000	1%	916	24	38	2%
	Costs monitor visits	4	600	7,200	10%	720	24	30	2%
	Sub-TOTAL							864	52%
	TOTAL							1,660	

Woreda and sub-city level spend more to support the schools than AAEB (Table 12 and Figure 12). This is not surprising when considering the decentralised approach and the responsibilities of each party. The woreda staff are supporting and monitoring primary and KG schools while the sub-city staff support secondary schools.

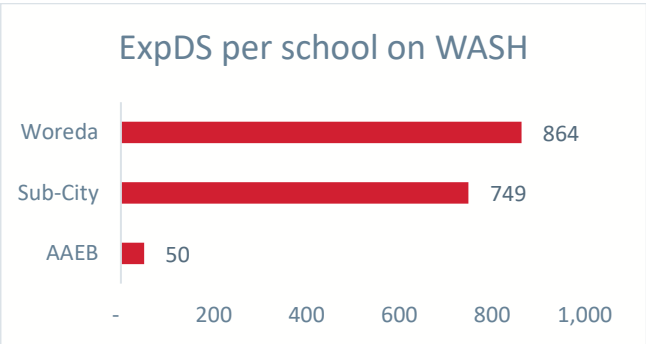

Figure 12 ExpDS from Woreda level is more intense than the support provided by AAEB

Discussions with the AAEB indicated that they consider themselves stretched in their ability to guide the project satisfactorily and indicate that to do so properly, they may need triple the capacity at AAEB level.

Table 13 shows the support costs that Splash incurs during the project WISE period. These have been brought down to annual amounts and per school. There was no detailed information available differentiating support staff from programme staff and therefore all have been considered as supporting staff. Without considering the 60% salaries, the ExpDS would go down to ETB 9,244.

Table 13 Annualised ExpDS per school from Splash

Description	per school per year	% of total
Salaries	23,997	60.5%
Additional staff costs	6,402	16.1%
Computers	2,149	5.4%
Office	1,474	3.7%
Car rent	1,263	3.2%
Telecommunication	1,105	2.8%
Office supplies	921	2.3%
Warehouse	548	1.4%
Conferences & meetings	516	1.3%
Staff training	516	1.3%
Parking	169	0.4%
Audits & legal	154	0.4%
Car fuel	132	0.3%
Tools & safety equipment	92	0.2%
HR costs	88	0.2%
Printing	61	0.2%
Monitoring costs	56	0.1%
	39,642	

The total ExpDS per school under WISE is ETB 41,305 per school, with Splash taking the greater share of 96%. This is significant, but is based on the agreement that Splash will cover the overhead costs of WISE. In addition, it should also be noted that all Splash staff can be fully allocated to WASH activities, whereas even for focal staff of AAEB, their allocation is maximum 30%.

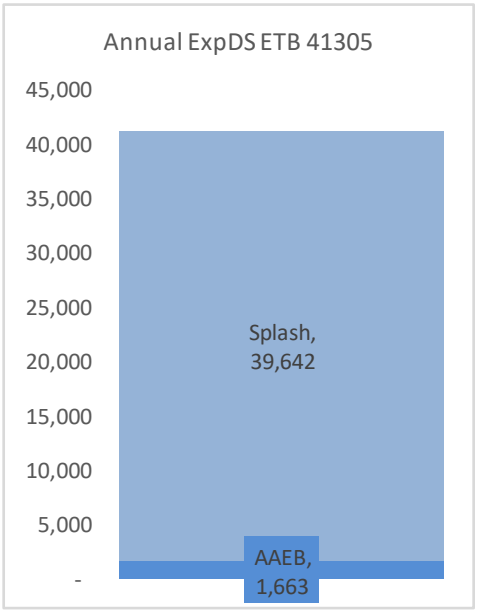

Figure 13 ExpDS Splash support under WISE is order of magnitude larger than government support

3.6 Functionality

Though the study focussed on costs, information has also been collected concerning functionality (if the infrastructure was functioning as planned). For taps, this meant that water was flowing and for treatment filters this meant that water would be filtered if flowing.

Table 14 Average functionality per school type

	School category	n	% drinking functionality	% Splash handwashing	% filter units functionality
Type	KG	6	85%	74%	100%
	KG & Primary	19	85%	77%	89%
	Primary	12	83%	85%	96%
	Secondary	3	88%	63%	100%
Size	Small	5	89%	88%	100%
	Medium	14	91%	81%	100%
	Large	21	79%	74%	88%
	Grand Total	40	85%	78%	93%
Evening classes	No	21	92%	85%	100%
	Yes	19	77%	69%	87%
	Grand Total	40	85%	78%	93%

From Table 14 the following can be concluded:

- The filter units overall have high functionality levels.
- Larger schools have lower functionality on all three indicators, around 10% lower than small schools
- Secondary schools maintain drinking water well, but maintenance of hand washing is clearly problematic with just 63% of taps functioning
- Presence of evening classes are the biggest threat to functionality with 20% lower functionality on all three indicators
- Drinking water units have a slightly higher functionality (85%) than hand washing units (78%)

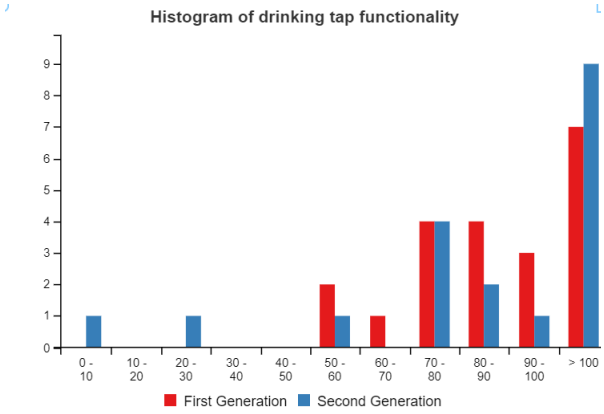

Figure 14 Drinking tap functionality

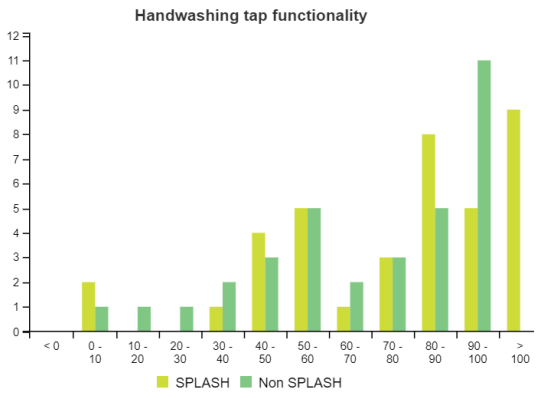

Figure 15 Handwashing tap functionality

Figure 14 and Figure 15 show the following:

- There is no significant difference between functionality of first or second generation of Splash handwashing units (Figure 14)
- For hand washing units there is only a small difference between Splash and non-Splash (78% versus 72%) (Figure 15) This is interesting as the latter are often older and would be expected to be functioning less. This lack of difference may be explained by the fact that the raised awareness has helps schools to improve maintenance of both sets of taps.

3.7 Menstrual Hygiene Management

The initial scope of the research was to also include menstrual hygiene management (MHM). Globally, there has been an increase in focus and attention for MHM, with an excellent handbook available with a school module (Sarah House, 2012). However, in Ethiopia, these interventions are only just starting and even though primary schools go up to age of age of 14, only 30% of the schools (excluding KG) indicated that MHM was part of the hygiene promotions. Contrary to the WASH activities, which are led by the WASH groups, the MHM activities have been led by the gender groups.

An extensive example of the activities of a gender group was provided by Ethio-Korea primary:

"*The Gender club has 47 members (26 girls student, 14 boys students,12 female teachers, 4 Male teachers and one female vice head of school). Activities included: Provided information for girl on MHM, Arranged room for changing menstrual pad(cloth), distribution of pad during emergency (when girls asked at school (pad was purchased by school budget), having information dissemination session for Gender club members and for those who were interested once per week (every Tuesday) on reproductive health issues. MHM was discussed as one of the issues, student question and answer at school, and celebrating MHM day."*

The schools visited had minimal costs/expenses (ETB 1500) per year for having pads for emergency needs/purposes. The typical costs for one menstrual period ranges from ETB 30 to ETB 50 per month, which is not affordable for most of students' parents. The gender clubs indicated a host of challenges such as financially not able to purchase pads on monthly basis; have limited knowledge on proper MHM, not openly discussed/afraid of asking pads during emergency, some of the student not have underwear to change, no shower room for cleaning etc.

The Gender club also indicated not having MHM guidelines and requested support of materials which is easily visualized and understood by school girls. Splash is currently conducting formative research in Addis to better understand existing MH programming and resourcing. They plan to begin testing MH work in 2019, with the goal of expanding this to all schools in Addis as part of Project WISE. It is anticipated that the support Splash can provide to AAEB and schools will improve MHM understanding considerably.

3.8 Financing gap

Though the current study has focussed on understanding existing expenditure, a number of additional aspects have been identified that should be funded for achieving sustainable WASH. It is based on what was captured during the meetings and is not exhaustive. For example, basing CapManEx on asset management principles, would require an increase expanding to include CapManEx as well. Furthermore, it is not possible to reliable establish the CapEx needed for sanitation, as state and number of toilets is not known.

Table 15 Identified missing WASH expenses

Category	Description	per school per year	Per student ETB	Per student USD
CapEx	Additional tanks for solving intermittent water availability. One for handwashing and one for sanitation	32,000	30	1.0
OpEx	Toilet paper for all students	298,000	276	9.2
OpEx	Emergency MHM material	1500	1	0.0
ExpDs	AAEB indicated to need triple the staff time to do their work accordingly	5000	5	0.1

Table 8 indicates that current CapEx of ETB 860,336 is allocated per school. Adding ETB 32,000 for continuous water for sanitation and hand washing, would just add 3.7% on the CapEx. However for recurrent expenses (OpEx plus ExpDs in Table 15), the gap is at 160% with ETB 304,500 needed on top of the existing ETB 201,448 (Table 17) – making it ETB 505948 per school per year.

Table 16 Maintaining basic service levels recurrent costs

	per school per year	Per student	Per student
WISE	201,448	185	6.2
Additional	304,500	282	9.4
	505948	468	15.6

4 Results

4.1 On life cycle costs

Objective 1 of the research is "to understand the life-cycle costs of the Splash School Water, Sanitation and Hygiene (SWASH) model in Addis Ababa, Ethiopia"

The findings consistently show that sanitation is by far the largest cost, both for capital and for recurrent expenses. 68% of the annual recurrent expenses are related to sanitation. This is at odds with the perception of school staff of which more than 75% indicated that water is their largest cost. This is probably because the water bill is a clearly defined expense, whereas janitor expenses and protective gear for them, are often not considered by school staff as sanitation expenses.

Table 17 Recurrent annual expenses

	Item	Median	% of total	Per student
Water	OpEx	9,450	5%	9
	CapManEx	5,221	3%	5
	ExpDs	13,768	7%	13
	Sub-TOTAL	**28,439**	**14%**	**26**
Sanitation	OpEx	97,784	49%	90
	CapManEx	14,658	7%	13
	ExpDs	13,768	7%	13
	Sub-TOTAL	**126,210**	**63%**	**116**
Hygiene	OpEx	31,606	16%	29
	CapManEx	1,425	1%	1
	ExpDs	13,768	7%	13
	Sub-TOTAL	**46,799**	**23%**	**43**
Total	OpEx	138,840	69%	128
	CapManEx	21,303	11%	20
	ExpDs	41,305	21%	38
	TOTAL	**201,448**		**185**

Secondly, the CapEx figures are largely based on budgeted information. It would be useful for the WISE project to keep a track of the actual expenditure and unit costs in the coming year, to allow further finetuning of the budget and also initiate an asset management approach, using depreciation and planning for maintenance of the provided infrastructure.

4.2 Disaggregated costs

Cost ranges per child

The cost per student is ETB 886 for getting the services installed (CapEx) and ETB 185 on annual basis to keep them operational.

Table 18 Costs per student

	Item	CapEx	Annual recurrent expense
Water	CapEx	57	
	OpEx		9
	CapManEx		5
	ExpDs		13
	Sub-TOTAL		**26**
Sanitation	CapEx	535	
	OpEx		90
	CapManEx		13
	ExpDs		13
	Sub-TOTAL		**116**
Hygiene	CapEx	294	
	OpEx		29
	CapManEx		1
	ExpDs		13
	Sub-TOTAL		**29**
Total	CapEx	886	
	OpEx		128
	CapManEx		20
	ExpDs		38
	TOTAL	**886**	**185**

Cost ranges per child disaggregated by gender

As the schools have a equal gender balance and there is no gender balance difference discernible at school level. However, there are a couple of aspects that result in a different cost per gender:

- Boys need less stalls per student as they have normally more cost effective urinals
- Toilets for girls should have better water facilities, particularly to allow washing and cleaning for menstrual hygiene at secondary schools
- Provision of menstrual pads – particularly for emergency situations
- Cost ranges per type of school (4 categories: KG vs primary/secondary schools) (in process)
- Cost ranges per size of school (Small <250, Medium 251-1000, Large >1001)(in process)

4.3 Addressing the financing gap

The second objective of the study is "to understand what the existing requirements for maintenance costs vs are schools budgets available and if there will be financing gaps"

One of the conclusions of the study is that the financial budgeting of schools in Addis Ababa is relatively well organised and financial data, contrary to studies in other countries, is available. Furthermore, for access and accountability purposes, budgets are made public.

On the assumption that ExpDs is covered by AAEB/Splash, the schools need to cover OpEx and CapManEx. Table 17 shows that amounts is ETB 160,143, which in practice is covered by pulling from various budgets.

Table 19 Budget analysis

Budget Code	Description	Median (ETB	% total Budget	% annual increase	Remarks based on costs
6111	Salaries	4,320,000	62%		
6218	Other sanitation supplies	177,000	3%	121%	
6244	Maintenance budget	125,545	2%	735%	Massive increase since 2017/2018.
6259	Water bill, sanitation services (pit emptying), postal and other related costs	20,000	0.3%	130%	Insufficient to even cover water bill
6257	Electric bill	15,000	0.2%	152%	Not applicable for WASH
	Total WASH related budget	4,657,545			
Total	Total budget	7,020,877			

One observation is that *Budget Code 6259* seems to cover the water bill (median 99%) but does not allow for any of the other services (sanitation) services. As indicated by AAWASA, the tariffs will increase on an annual basis and the budgets will at least need to be aligned to that.

Throughout the study, the high cost of sanitation is clear. It is a credit to the department of planning and budget that a specific *budget code 6218* has been created for sanitation products. However, this budget line is used very differently per school and better guidance could help to support sanitation and hygiene expenses and ensure that it is remains ringfenced for sanitation, particularly to include menstrual pads, toilet paper and cleaning products.

The maintenance *budget code 6244* covers everything from paint, through to labour and material for any repair or maintenance at the school. As such the expenses under this budget vary widely and some schools have zero WASH expense, and some have up to 40,000 (purchase of new tanks in Addis Fre). One school (Bole community campus primary and KG), indicated that of the ETB 220,000 budget listed under *6244*, only ETB 20,000 was covered by government and the other 200,000 by parents and income generating activities. It is unclear to what extend this also takes place in other schools.

4.4 Strategic advice

Often, LCCA is researched or analysed only when an intervention is completed. Splash and AAEB have created a unique and forward-thinking approach by addressing the costs and financing of the sustainability of their intervention right from the start. Splash and AAEB can therefore adapt the funding, financing and costing model as the project develops over time.

AAEB and Splash are undertaking an extensive baseline to establish where the baseline coverage of 2018/2019 is and will work over the next four years to go to 100%. During these four years, this shift in expenditure and maintenance will also need to be achieved.

Figure 16 shows the shift that needs to happen when moving from low coverage (when CapEx is the main expense) through to a situation where coverage comes up to 75% or higher and a shift in expenses is needed. Maintenance of the services already present becomes much more important/costly than expanding the construction of new infrastructure.

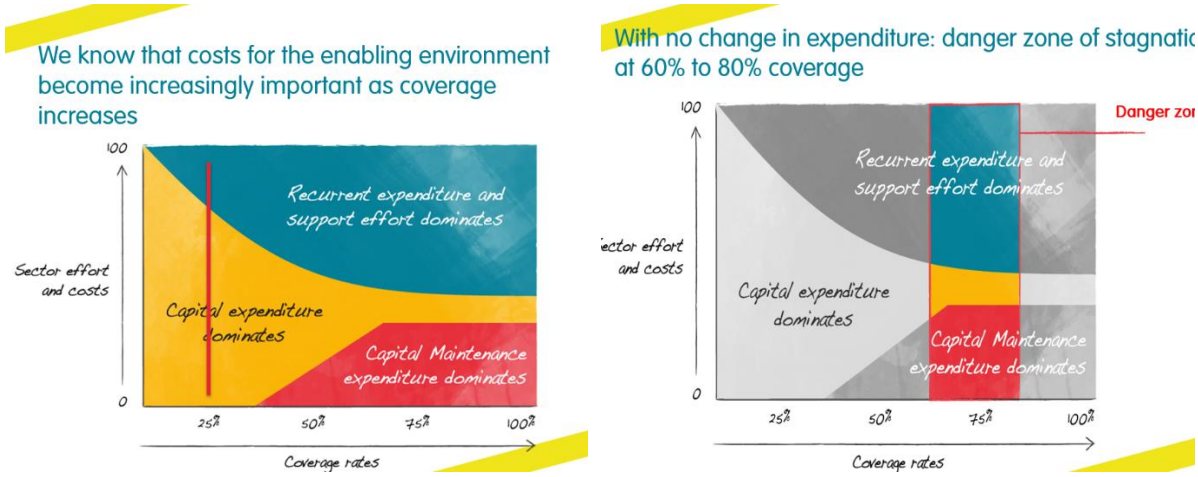

Figure 16 The shift in expenditure type when moving from low to high coverage

In order to accompany the required shift in expenditure, the following measures are recommended:

- Apply asset management principles to the infrastructure build – and provide support to schools for understanding and working with this.
- Review budgeting and planning on at least a yearly basis and plan for shifting from CapEx to CapManEx. In year 4 for example, CapEx should be smaller than the maintenance budget.

- Conduct follow-up study/surveys to keep track of how costs are developing under the WISE approach.

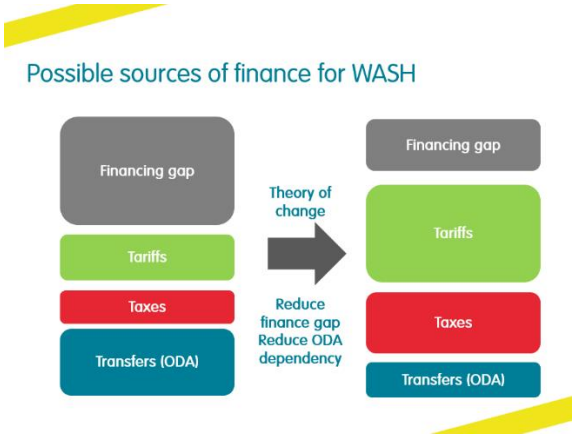

Figure 17 Shift in financing – reducing dependency on ODA, and reducing finance gap

Aside from the expenditure and budgeting, the second shift that will need to happen during the WISE project, is a shift in finance funding (Figure 17) where a decrease in dependency on ODE (Overseas Development Assistance) is achieved. For the WISE project, this is particularly important for the expenses on direct support.

In addition, the increase in tariffs should include clearer contributions from parents and income generating activities.

To achieve this, the following is recommended:

- Work with AAEB to ensure that ExpDs at these levels are supported and funded, in recognition that the government's support follows a decentralised approach,.
- Research with schools which opportunities arise for increasing income generating activities.
  Currently, the following are indicated:
  - School fees from night school
  - Revenue from room rent
  - Sales of on-site production centres
  - Revenue from cafés and restaurants
  - Grass sale at the beginning of the year.

The fund raising measures above have to be undertaken with a strong emphasis on avoiding damage to WASH services. If the sports field for instance is rented out over the weekend – ensure that funds are allocated to making the toilets clean and serviceable.

5 Conclusions and recommendations

5.1 Answering the research questions

1 What are the initial capital hardware costs of Splash WASH interventions?

The total comes to ETB 886 per student. These are discussed in section 3.2 and presented in Annex 3.

Table 20 CapEx unit costs (Splash and AAEB, 2019)

DIRECT PROGRAM COST	UoM	Quantity	Unit Price	Category
Community moblization for project sustanability	# of schools	483	14671	All
Salary & wage of Program staff	# of staff	80	359647	All
Supervisor Training (Education & Health sector)	# of schools	483	7448	All
Health & hygiene Education for children/students	# of schools	483	14896	Hygiene
WaSH training for Adults (i.e. School principals, PTSA ,HEW, Focal persons and KG teachers)	# of schools	483	7448	Hygiene
Global hygiene events days & school inaugurations	# of schools	483	4816	Hygiene
Latrine stalls constructed	number	1968	86660	Sanitation
Latrine stalls renovated	number	3125	16660	Sanitation
Urinals constructed	number	534	2604	Sanitation
Construct drinking stations with 3 faucets	number	3094	8400	Water
Construct handwashing stations with 2 faucets	number	3137	9268	Water
Large water filtration system (VZN441V)	number	466	47908	Water
Small water filtration system (UF216cc)	number	42	19796	Water
Electrical components for water filtration	# of filters	508	18984	Water
Water reservoirs	# of schools	483	36092	Water
Site work, drainage, & plumbing	# of schools	483	16996	Water
Donor Recognition	# of schools	483	1932	Water
Operations & maintenance	# of schools	1016	1624	Water
Water quality test kits	# of schools	1016	644	Water
Technical skill training to Partner site staffs	# of schools	483	3976	Water

2 What are the capital costs requirements in schools for interventions to reach at least a "basic service level"?

Globally, the basic levels for WASH in Schools are water 69%, sanitation 66% and hygiene 53%. However, the situation in Ethiopia is difficult with 0% reported of the schools achieving

basic levels for water and sanitation and 6% for hygiene ((JMP, 2018). This demonstrates that achieving basic levels as per JMP is particularly challenging in Ethiopia and the endeavour of AAEB and Splash to have schools achieve this throughout Addis Ababa is ambitious.

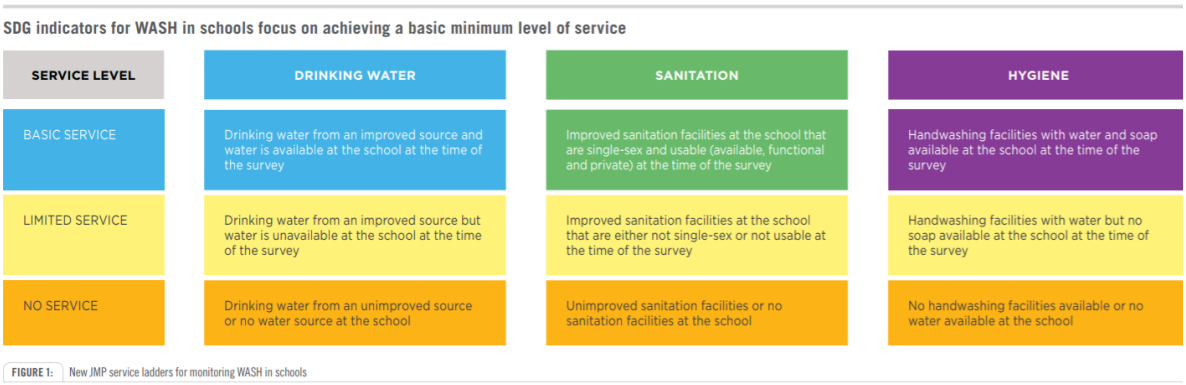

Figure 18 WASH service levels by JMP ((JMP, 2018)

The current services provide basic service levels for drinking water. However, for both sanitation and water, the lack of reliable water provision keep the services at a limited service level. To reach a basic service level, additional storage tanks would need to be installed. This additional cost is reflected in Table 21, which shows that on top of the existing WISE budget another 4% would be needed to have a basic storage tank for handwashing and Hygiene and thus reaching basic service levels. Note that this does not take into consideration the number of seats per student, nor presence of toilet paper.

Table 21 CapEx reaching basic service levels

Criteria	WISE budget	Main missing constraint	Estimated cost	Extra %	Total
Water	55,565				55,565
Sanitation	519,633	Functionality needs water -> water tanks needed	16,000	3%	535,633
Hygiene	285,138	Water availability needs tanks	16,000	6%	301,138
	860,336		32000	4%	892,336

3 What are the operation and maintenance costs requirements in schools for interventions to reach at least a "basic service level"?

To achieve good quality basic service levels a financing gap analysis has been undertaken (Table 15) which indicates that ETB 468 per student is needed in total, though this does include toilet paper – which is arguably, not part of the basic service.

Table 22 Recurrent Costs reaching basic service levels

	per school per year	Per student	Per student
WISE	201,448	185	6.2
Additional	304,500	282	9.4
	505948	468	15.6

4 What are the software costs of creating the demand for these services? (human resources mainly, technical assistance)

When looking at the ongoing WISE budget (Annex 3), 14% can be allocated as CapEx Software (Figure 19). This study did not capture the details of the past interventions, how they were conducted and how they set up. For this, reference is made to (Mathijs Veenkant, 2019).

5 Overall, what are the ongoing costs of maintaining, supporting and sustaining behaviour change over time?

Arguably, this estimate includes all recurrent expenses as presented in Table 17, as behaviour change can only take place if supporting infrastructure is available. However, the support that woreda and sub-city officials provide is essential for maintaining standards and the regular monitoring may serve as a trigger to keep WASH groups active and effective. As such, the key for maintaining behaviour change is the Expenditure on Direct Support from government (Table 12)– which is ETB 1,663, but which should be a triple higher according to their estimates ETB 6652 per school.

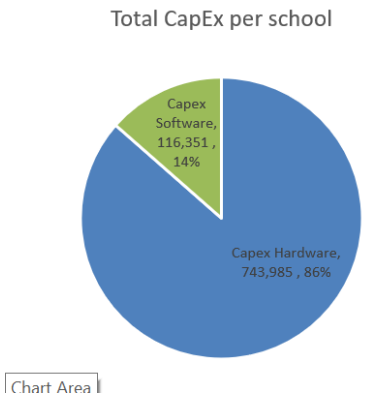

Figure 19 CapEx Software and CapEx Hardware

5.2 Recommendations

On Water

- Water quality is at the heart of the Splash intervention; therefore, it would be good to have results of the water quality from before the intervention/filter systematically shared with schools, AAEB, woreda and sub-city.
- Water tariffs are set to go up yearly. Monitoring usage can lead to considerable budget savings by keeping consumption levels under the higher tariff threshold.

On sanitation:

- Splash has achieved admirable experience in providing safe water and promotion of hand washing. However, relatively limited experience has been accumulated with sanitation. As consequence, innovation and possible cost reductions have not yet taken place. Sanitation represents 60-80% of expenditure and should therefore be the focus of innovation and standardisation as most (financial) savings can be achieved there[1].
- Current sanitation intervention focusses mainly on improving facilities, but does not yet solve challenges such as intermitted water supply at toilets or looking at proper Faecal Sludge Management.

On Hygiene

- The role of janitors must be given greater attention in the programme and planning. They are the ones cleaning the toilets, noticing poor hygiene behaviour and typically have many years of experience working at the same school. It is recommended to make them key players in the behaviour change campaign, including increasing their visibility, recognition and status.
- Hand washing units and the sanitation units are dependent on an intermittent water supply. This is considered a big gap in providing good continuous WASH services, as flushing becomes impossible, cleaning is difficult, and handwashing is done less. Informal communication from AAWASA indicated that there may be a project initiated to support storage tanks at schools. Improvements recently made to Splash's water storage standards should help ensure that handwashing and sanitation units have more consistent access to water supply in the future.

On School support

- Schools with evening classed have less functionality (62% versus 85% for handwashing). SPLASH should discuss with the school administration how these evening activities influence the WASH facilities and consider specific hygiene sensitisation. Evening/night classes are common (40%) with on average 590 students and attract significant more female students (66% versus 52% for normal school).

[1] Splash and Stantec (an international engineering consulting firm) are currently working to create an improved, standardized sanitation design that will be used for all new sanitation facilities that are completed as part of Project WISE. This design includes considerations for Addis' intermittent water supply and proper faecal sludge management

- Together with helping partner sites set up maintenance funds Splash could consider discussions on tracking WASH-specific expenditure. The tools of the current study may provide a basis for this. The general budgeting format of schools in Addis is well developed and has clear and publicly available budget lines. However, the lack of WASH-specific budget and expenditure lines may pose a challenge if schools are to budget sufficiently for maintenance.
- Capacity supporting initiatives need to include Woreda and Sub-city staff in their planning and recognise that they are the key support to WASH in schools.
- Schools currently work on ad-hoc basis for repairs and maintenance. Using asset management principles could guide the budgeting and control expenses. It may be considered to trial this at a few schools.

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Annex 1: Survey instruments

Tool (hyperlinked to electronic form)	Objective	Observations
Tool A - LCCA tools headmaster and WASH team	Capture WASH practices and costs at schools	40
Tool B - LCCA School Finance team	Capture cost and budget as per financial books	36
Tool C - LCCA Janitors	Capture perception from janitors (cleaners)	40
Tool D - Splash	Capture costs as of project WISE	Excel files and interviews
Tool E - AAEB	WISE Project costs and monitoring costs	1 at AAEB level; 2 at sub-city level and 4 at woreda level
Tool F - AAWASA	Semi-structured interview	Single interview
Tool G - MHM	Capture activities related to MHM	Two semi-structured interviews

Annex 2: List of schools surveyed

#	Campus Name	Site Name	Site ID	Sub city	Woreda	mWater ID	Latitude	Longitude	Scope of Work	Year of Intervention
1	Ethio Korea Primary - Campus	Ethio Korea_School_Akaki-Kaliti	0016100000VvJYdAAN	Akaki-Kaliti	7	5641583	8.905436	38.75488	Water & Hygiene	2017
2	Furi - Campus	Furi_School_Akaki-Kaliti	0016100000VvJZ6AAN	Akaki-Kaliti	7	5641947	8.906511	38.76321	Water, Hygiene, & Sanitation	2015
3	Gelan Gura - Campus	Gelan Gura_School_Akaki Kaliti	0016100000VvJZ7AAN	Akaki-Kaliti	10	5641789	8.926642	38.80943	Water & Hygiene	2018
4	Meskerem - Campus	Meskerem_School_Arada	0016100000VvJaqAAF	Arada	8	5641916	9.026785	38.76792	Water, Hygiene, & Sanitation	2015
5	Meskerem Secondary - Campus	Meskerem Secondary	0016100000VvJarAAF	Arada	8	5641796	9.027243	38.76821	Water & Hygiene	2018
6	Bole Addis - Campus	Bole Addis_School_Bole	0016100000VvJWgAAN	Bole	9	33103055	9.009365	38.83465	Water, Hygiene, & Sanitation	2016
7	Bole Addis - Campus	Bole Addis KG 2	0016100000VvJfCAAV	Bole	9	55184577	9.009365	38.83465	Water, Hygiene, & Sanitation	2016
8	Bole Community - Campus	Bole Community_School_Bole	0016100000VvJfFAAV	Bole	13	33102690	8.988332	38.79893	Water, Hygiene, & Sanitation	2017
9	Jerusalem KG - Campus	Jerusalem KG	0016100000VvJZxAAN	Gullelie	3	5641820	9.052744	38.75918	Water & Hygiene	2018
10	Jerusalem Primary - Campus	Jerusalem Primary	0016100000VvJZmAAN	Gullelie	3	55184560	9.055895	38.76237	Water & Hygiene	2018
11	Addis Zemen Primary - Campus	Addis Zemen Primary	0016100000VvJWqAAN	Gullelie	6	7517116	9.071042	38.75719	Water, Hygiene, & Sanitation	2015
12	Woreha Yekatit - Campus	Woreha Yekatit_School_Kirkos	0016100000VvJc9AAF	Kirkos	4	7516593	8.98842	38.75281	Water & Hygiene	2009
13	Eweket Minech - Campus	Eweket Minech Primary	0016100000VvJYnAAN	Kirkos	5	5641521	8.994744	38.7512	Water & Hygiene	2011
14	Eweket Minech - Campus	Eweket Minech KG	0016100000VvJfQAAV	Kirkos	5	5641837	8.993939	38.74717	Water & Hygiene	2018
15	Tinsae Birhan - Campus	Tinsae Birhan Primary	0016100000VvJbxAAF	Kirkos	8	7517123	9.013099	38.77108	Water & Hygiene	2009
16	Biherawi - Campus	Biherawi_School_Kirkos	0016100000VvJXgAAN	Kirkos	9	5641569	9.007073	38.76025	Water & Hygiene	2016
17	Wondmamach KG - Campus	Wondmamach KG	0016100000VvJc8AAF	Kirkos	11	33102731	9.002709	38.75002	Water, Hygiene, & Sanitation	2018
18	Wondmamach Primary - Campus	Wondmamach primary school	0016100000VvJc7AAF	Kirkos	11	33102717	8.998866	38.75053	Water, Hygiene, & Sanitation	2017
19	Repi - Campus	Repi_School_Kolfe-Keranio	0016100000VvJbPAAV	Kolfe-Keranio	3	33103048	8.97785	38.67567	Water, Hygiene, & Sanitation	2016
20	Addis Fana Primary - Campus	Addis Fana Primary	0016100000VvJWhAAN	Kolfe-Keranio	14	5641930	9.057206	38.69011	Water, Hygiene, & Sanitation	2015
21	Mezgebe Birhan - Campus	Mezgebe Birhan_School_Lideta	0016100000VvJauAAF	Lideta	2	5641590	9.020321	38.7236	Water & Hygiene	2017
22	Addis Fre Primary - Campus	Addis Fre Primary	0016100000VvJWiAAN	Lideta	4	5641552	9.018099	38.7416	Water & Hygiene	2016
23	Karamara - Campus	Karamara Primary	0016100000VvJZvAAN	Lideta	4	5641806	9.020968	38.73492	Water & Hygiene	2018
24	Edget Besira - Campus	Edget Besira_School_Lideta	0016100000VvJYOAA3	Lideta	6	33103024	9.02562	38.74262	Water, Hygiene, & Sanitation	2015

#	Campus Name	Site Name	Site ID	Sub city	Woreda	mWater ID	Latitude	Longitude	Scope of Work	Year of Intervention
25	Tesfa Kokeb - Campus	Tesfa Kokeb_School_Lideta	0016100000VvJbnAAF	Lideta	8	5641851	9.026224	38.74175	Water, Hygiene, & Sanitation	2009
26	Mekanisa Akababi - Campus	Mekanisa Akababi_School_Nefas Silk-Lafto	0016100000VvJabAAF	Nefas Silk-Lafto	3	33102700	8.977551	38.73291	Water, Hygiene, & Sanitation	2017
27	Gofa Primary - Campus	Gofa Primary	0016100000VvJZGAA3	Nefas Silk-Lafto	5	33103031	8.969111	38.73844	Water, Hygiene, & Sanitation	2015
28	Megabit 28 - Campus	Megabit 28_School_Nefas Silk Lafto	0016100000VvJaXAAV	Nefas Silk-Lafto	12	5641813	8.945884	38.75427	Water & Hygiene	2018
29	Miyaziya 23 - Campus	Miyaziya 23_School_Yeka	0016100000VvJatAAF	Yeka	1	5641868	9.062438	38.77275	Water, Hygiene, & Sanitation	2012
30	Yeka Terara - Campus	Yeka Terara_School_Yeka	0016100000VvJcNAAV	Yeka	5	7517130	9.022198	38.80241	Water & Hygiene	2011
31	Miss Ford Campus	Miss Ford_School_Yeka	0016100000VvJb2AAF	Yeka	6	33102724	9.020745	38.77247	Water, Hygiene, & Sanitation	2018
32	Tesfa Birhan - Campus	Tesfa Birhan_School_Yeka	0016100000VvJbmAAF	Yeka	8	5641844	9.02164	38.79505	Water Only	2008
33	Salayesh - Campus	Salayesh_School_Yeka	0016100000VvJbUAAV	Yeka	10	5641875	9.042446	38.82714	Water, Hygiene, & Sanitation	2013
34	Abado - Campus 1	Abado_School_Yeka_1	0016100000VvJWKAA3	Yeka	12	5641600	9.067138	38.8722	Water & Hygiene	2018
35	Karalo - Campus	Karalo_School_Yeka_2	0016100000VvJZtAAN	Yeka	12	5641765	9.037496	38.85569	Water & Hygiene	2018
36	Karalo - Campus	Karalo_School_Yeka_1	0016100000VvJZuAAN	Yeka	12	33103079	9.036975	38.85477	Water, Hygiene, & Sanitation	2017
37	Kotebe Birhane Hiwot - Campus 1	Kotebe Birhane Hiwot_School_Yeka_1	0016100000VvJaIAAV	Yeka	12	5641772	9.043111	38.85371	Water & Hygiene	2018
38	Kotebe Birhane Hiwot - Campus 2	Kotebe Birhane Hiwot_School_Yeka_2	0016100000VvJftAAF	Yeka	12	5641758	9.042658	38.85302	Water & Hygiene	2018
39	Lideta Selam - Campus	Lideta Selam	0016100000VvJaQAAV	Lideta	1	55184618	9.002777	38.7331	Water & Hygiene	2018
40	De.j / Zeray Deres Primary - Campus	De.j / Zeray Deres Primary	0016100000VvJYMAA3	Lideta	7	55184601	9.028146	38.74682	Water & Hygiene	2018

Annex 3: Categorisation of WISE budget

DIRECT PROGRAM COST	UoM	Quantity	Unit Price (ETB)	Unit in USD	Category	Cost	Detail	Per school ETB	cost per school USD	Cost per student ETB	Cost per student USD	%
Community moblization for project sustanability	# of schools	483	14671	222,999	All	Capex	Software	14,671	489	15	0.5	2%
Salary & wage of Program staff	# of staff	80	359647	959,059	All	Capex	Software	63,096	2,103	65	2.2	7%
Supervisor Training (Education & Health sector)	# of schools	483	7448	113,210	All	Capex	Software	7,448	248	8	0.3	1%
Health & hygiene Education for children/students	# of schools	483	14896	226,419	Hygiene	Capex	Software	14,896	497	15	0.5	2%
WaSH training for Adults (i.e. School principals, PTSA ,HEW, Focal persons and KG teachers)	# of schools	483	7448	113,210	Hygiene	Capex	Software	7,448	248	8	0.3	1%
Global hygiene events days & school inaugurations	# of schools	483	4816	73,203	Hygiene	Capex	Software	4,816	161	5	0.2	1%
Latrine stalls constructed	number	1968	86660	5,684,896	Sanitation	Capex	Hardware	374,006	12,467	385	12.8	43%
Latrine stalls renovated	number	3125	16660	1,735,417	Sanitation	Capex	Hardware	114,172	3,806	118	3.9	13%
Urinals constructed	number	534	2604	46,351	Sanitation	Capex	Hardware	3,049	102	3	0.1	0%
Construct drinking stations with 3 faucets	number	3094	8400	866,320	Water	Capex	Hardware	56,995	1,900	59	2.0	7%
Construct handwashing stations with 2 faucets	number	3137	9268	969,124	Water	Capex	Hardware	63,758	2,125	66	2.2	7%
Large water filtration system (VZN441V)	number	466	47908	744,171	Water	Capex	Hardware	48,959	1,632	50	1.7	6%
Small water filtration system (UF216cc)	number	42	19796	27,714	Water	Capex	Hardware	1,823	61	2	0.1	0%
Electrical components for water filtration	# of filters	508	18984	321,462	Water	Capex	Hardware	21,149	705	22	0.7	2%
Water reservoirs	# of schools	483	36092	548,598	Water	Capex	Hardware	36,092	1,203	37	1.2	4%
Site work, drainage, & plumbing	# of schools	483	16996	258,339	Water	Capex	Hardware	16,996	567	18	0.6	2%
Donor Recognition	# of schools	483	1932	29,366	Water	Capex	Hardware	1,932	64	2	0.1	0%
Operations & maintenance	# of schools	1016	1624	54,999	Water	Capex	Hardware	3,618	121	4	0.1	0%
Water quality test kits	# of schools	1016	644	21,810	Water	Capex	Hardware	1,435	48	1	0.0	0%
Technical skill training to Partner site staffs	# of schools	483	3976	60,435	Water	Capex	Software	3,976	133	4	0.1	0%
								860,336	**28,678**	**886**	**29.5**	