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A global assessment of budgeting and financing for WASH in schools

María Florencia Rieiro, Sue Cavill, Maya Igarashi Wood, Agnes Makanyi, and Andrew Trevett

The aim of this review is to assess the literature (published and grey) on capital and recurrent costs of water, sanitation, and hygiene (WASH) in Schools (WinS) facilities and services. The review presents life-cycle costs (e.g. consumables, repair, support, and maintenance) of WinS services and assesses the practical costing exercises and tools currently available for WinS. Furthermore, this review characterizes the typical costs and financial sources for WASH services in (primary) schools and explores the different financial mechanisms available to meet school-level WASH financing gaps.

Keywords: wash, schools, financing, budgeting, life-cycle costing

In schools, the lack of private water, sanitation, and hygiene (WASH) facilities or high student-to-latrine ratios is associated with harassment, decreased school attendance rates, and drop-out for girls (House et al., 2012; Sommer et al., 2015). The lack of basic WASH services in schools has implications for women and girls' management of their menstruation; it limits their waste disposal options and affects their safety, as well as their emotional and physical well-being (Kayser et al., 2019). WASH-related infections can lead to mortality, morbidity, and diminished learning abilities. In contrast, safe WASH access in schools can increase the health, well-being, and comfort of students and teachers (UNICEF, 2012). WASH in Schools (WinS) refers to school facilities having adequate and safe drinking water, adequate and clean toilets and urinals (to the ratio/proportion of pupils and age cohort), adequate handwashing facilities, and arrangements to support menstrual hygiene management (MHM). International donors, NGOs, and governments have invested considerable resources in improving access to WinS. Even so, globally, one in four primary schools had no drinking water service in 2016 and almost one in five primary schools had no sanitation service (UNICEF and WHO, 2018a).

To be sustainable, WinS requires the long-term funding of operating costs, capital maintenance costs, and any costs of capital (the return expected by those who provide capital). This can be done through a combination of user charges/contributions, national taxes, and international transfers.

This paper reviews WinS costing, tools, and sources of finance. The first section presents the methodology followed in this study. The subsequent section outlines how WinS services have been costed and provides an overview of WinS and WASH

María Florencia Rieiro (florenciarieiro@gmail.com), WASH consultant; Sue Cavill (sue.cavill@outlook.com), WASH consultant; Maya Igarashi Wood (migarashiwood@unicef.org), WASH Officer, UNICEF Kenya; Agnes Makanyi (amakanyi@unicef.org), WASH Specialist, UNICEF Kenya; Andrew Trevett (atrevett@unicef.org), WASH Chief, UNICEF Kenya
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items and costing tools. The other sections present the 'bottlenecks' or 'constraints' to costing of WinS. The paper concludes with a global landscape of the funding arrangements available for WinS.

Methodology

This review is based on a desk study and key informant semi-structured interviews. The desk review included published and unpublished WinS documents obtained through internet/database searches. The databases searched included: IRC WASH, Sanitation and Water for All (SWA), Sustainable Sanitation Alliance (SuSanA), *Waterlines*/Practical Action, and WEDC, as well as academic databases such as PubMed. NGO websites were also searched for reports and evaluations, in addition to WinS programme websites such as Fit for School, the SWASH+ project (Sustaining and Scaling School Water, Sanitation and Hygiene Plus Community Impact project), and WASH in Schools Mapping. The key informant interviews were conducted with WASH costing experts from academia and NGOs who have focused on applying a life-cycle costing assessment (LCCA) for WinS.

WinS service levels

The Sustainable Development Goals (SDGs) include targets to achieve basic WinS by 2030. These involve SDG targets 6.1 and 6.2 – universal access to WASH – and SDG target 4.a – inclusive and effective learning environments for all (UNICEF and WHO, 2018b). Having WASH service levels and understanding each of them is critical for the contextualization of a cost/expenditure analysis. Table 1 outlines the service levels that are defined at national level, in line with national policies, but within the parameters outlined by UNICEF and WHO's Joint Monitoring Programme (JMP).

Costing WinS services

Understanding the costs of WASH facilities and services in schools is essential for budgeting for schools and supporting WASH programmes to be more sustainable. The challenge inherent in WinS costing assessments is that the costs of WASH services vary depending on the setting (urban or rural), the delivery approach, the level of service, and the wide range of technologies available. The TrackFin (Tracking Financing to WASH) methodology, although it is not focused on WinS per se, represents significant progress towards standardizing the understanding of the life-cycle costing methods for WASH at a large (national) scale (UN-Water GLAAS, 2017). Recent SWASH+ activities highlight a need to adopt a life-cycle cost budgeting for WASH operation and maintenance (O&M) in schools. Furthermore, in recent years, there have been few studies that aim to cost WinS; these include a global systematic review (McGinnis et al., 2017) and studies in Bangladesh (Snehalatha et al., 2015) and Kenya (Gallo et al., 2012; Alexander et al., 2013, 2016; Save the Children, 2016). These studies describe the evidence

Table 1 Joint Monitoring Programme (JMP) WinS Service Levels

Service level	*Drinking water*	*Sanitation*	*Hygiene*
Improved Service	Additional criteria may include quality, quantity, continuity, and accessibility to all users	Additional criteria may include student per toilet ratios, menstrual hygiene facilities, cleanliness, accessibility to all users, and excreta management systems	Additional criteria may include hygiene education, group handwashing, menstrual hygiene materials, and accessibility to all users
Basic Service	Drinking water from an improved source and water is available at the school at the time of the survey	Improved sanitation facilities at the school that are single sex and usable (available, functional, and private) at the time of the survey	Handwashing facilities with water and soap available at the school at the time of the survey
Limited Service	Drinking water from an improved source but water is unavailable at the school at the time of the survey	Improved sanitation facilities at the school that are either not single sex or not usable at the time of the survey	Handwashing facilities with water but no soap available at the school at the time of the survey
No Service	Drinking water from an unimproved source or no water source at the school	Unimproved sanitation facilities or no sanitation facilities at the school	No handwashing facilities available or no water available at the school

Source: UNICEF and WHO (2018b)

on costs and financing models that could be applied to WinS. Their findings demonstrate the need for increases in allocations to schools and guidance on costing WASH inputs.

Box 1 shows the different components of an LCCA.

Several studies have attempted an LCCA; however, there is little uniformity in how this has been done. Table 2 illustrates the variation in how the six main types of life-cycle costs (LCC) have been defined in the literature consulted; for instance, not all studies address the same categories, for example, McGinnis et al. (2017) do not address CapManEx. In general, the studies focused on OpEx as smaller, recurring costs (Alexander et al., 2016: 3). Moreover, the indirect costs and the cost of capital tend to be excluded from the analysis given the difficulty in accurately calculating the cost of macro-level support, and also due to the fact that only a few schools apply for loans for WinS. Alexander et al. (2016) differentiated between software and hardware costs – rather than by the direct and indirect costs involved in CapEx and OpEx – as teaching and training about hygiene implied different costs from purchasing or installing latrines or handwashing stations. In their LCCA methodology, software costs are featured as

Box 1 Definitions

Life-cycle costs: Aggregate costs of service delivery over the full life cycle, including capital investments, operation costs, repairs, and maintenance, until the facility or service is eventually retired or replaced (Smits et al., 2011; Burr et al., 2012; Reddy and Batchelor, 2012; WASHCost Project, 2012; Dwumfour-Asare et al., 2014).

1. *Capital expenditure (CapEx)*. The initial investment in the development of a water or sanitation system, referring to both the investment costs in infrastructure as well as costs related to the mobilization of the community.
2. *Operation and minor maintenance expenditure (OpEx)*. Recurrent (regular, ongoing) expenditure on labour (salary for staff), costs for management (transport, fuel), energy and chemicals, materials, and minor repairs of the infrastructure.
3. *Capital maintenance expenditure (CapManEx)*. Costs of maintenance and irregular repairs not done on a monthly/yearly basis. Expenditure on asset renewal, replacement, and rehabilitation of the infrastructure.
4. *Direct support costs*. Back-up support to keeping services running including monitoring, training the community and students (if supported outside the school budget as part of a larger campaign), and technical support to communities and service providers.
5. *Indirect support costs*. Expenditures on non-WASH supplies or services that were purchased in the course of maintaining a WASH system.
6. *Cost of capital*. The interest rate paid on any fund borrowed to finance CapEx plus any return to the owner of the system.

a mix of CapEx software (initial training and setup) and direct support (ongoing training). In a school setting, software may also fall under OpEx for the teachers' salaries (labour). Furthermore, the majority of the reports consulted did not clearly distinguish between actual expenditures and budgeted amounts, and there was also a lack of differentiation between WASH and non-WASH expenses. Notably, no studies included taxes in the analysis separate from other costs. Ultimately, the studies listed in Table 2 indicate that all the LCC categories are highly context specific and comparisons are only possible within a country or countries sharing the same service level and types of WASH technologies.

Table 2 disaggregates the WASH items used across (and beyond) the papers referenced according to each LCC category. As shown in Table 2, the items are differentiated by WASH component (water, sanitation, and hygiene) but there are also shared ones for CapEx, OpEx, and CapManEx as well as for the direct and indirect costs and for the cost of capital.

Constraints to costing and financing of WinS

There has been progress elsewhere in the WASH sector on cost estimates for providing and sustaining WASH services. For example, IRC's WASHCost project developed a methodology for estimating the costs of delivering WASH services. A methodology has also been developed by the World Health Organization (WHO) to track financial flows from and to the WASH sector at the national level: the TrackFin initiative. DFID also funded a Value for Money and Sustainability analysis to assess the performance of its WASH programmes. However, with regard

Table 2 Summary of standard WASH items to include in each LCC category

	Standard items include:			
	Sanitation	*Water*	*Hygiene*	*Others shared*
CapEx	Excavation of pits, lining/septic tank/ sewer connection, slabs/platforms, superstructure, concrete structures, latrines, urinals, drop hole covers, ramps, handrails, and toilet seats (for accessible toilets)	Borehole/tubewell, shallow well, rainwater harvesting system, piped water systems, solar panels, storage containers, pumps, pipes and fittings, gutters and accessories, spring protection, drinking water facilities	Handwashing stations, vessels, hygiene awareness sign on toilets, MHM facilities, incinerators, waste bins, water containers for anal cleansing/digging of rubbish pit	One-off capacity building with key WASH stakeholders
OpEx	Repair of hinges or locks on latrine doors, repair of roof, walls, vent pipes, repair of ramps and handrails, repair of cracks and leaks in sewer, supplies for cleaning latrines (detergent and disinfectant, brooms and buckets)	Water treatment products/water filter, electricity bills for motor pump, repair of taps for water dispensers, repair of containers and taps, repair of pump/pipes, water quality tests	Soap and other cleaning materials, materials for MHM (reusable/ disposable napkins) materials for anal cleansing (toilet paper, water re-fill), repair of bins, burning/ collection of rubbish	Labour, fuel, chemicals, tools and materials, used for routine maintenance
CapManEx	Replacement of slabs or emptying septic tanks, sludge disposal, replacement of doors/locks, repair of the floor/holes, painting of toilets, replacement of the sewer line (costs of rehabilitating latrines, fixing drainage, latrine emptying)	Rehabilitation of water points, replacement of pump rods or foot valves in hand pumps or a diesel generator in motorized systems, cleaning/ replacement of storage containers, maintenance of the source (for springs), replacement of solar panels	Replacement of handwashing vessels or repair of handwashing stations, replacement of taps, replacement of bins/water containers, replacement of incinerator/ digging of a new rubbish pit	Labour, fuel, chemicals, tools and materials, used for irregular maintenance/ rehabilitation of the infrastructure
Direct costs	Salary costs for local government or district support staff, leaflets, posters, hygiene charts and videos for hygiene promotion, knowledge management, monitoring school WASH systems by government officials, opportunity costs, training of teachers and students			
Indirect costs	Advocacy and policy-making, transport of WASH supplies and services, planning and policy-making, purchase of non-WASH supplies or services			
Cost of capital	Interest payments on micro-finance and loans			

to WinS, this short review has demonstrated that there are still a number of constraints especially regarding costing, which are summarized below:

- *Limited evidence base*. With the exception of Kenya, costing for WinS is still a relatively under-documented and under-researched topic. There are few published studies that estimate expenditures for school WASH or that calculate the actual expenditures and life-cycle costs of WinS. In particular, the differentiation between hygiene campaigns, direct support to schools, and in-school teaching of hygiene and hygiene activities. These different types of software costs fall into different categories of the LCCA components. Most data is assumed to be available as grey literature (records, reports, project budgets, and so on). In particular, there is a lack of information on software costs compared with hardware in the individual school (McGinnis et al., 2017).
- *Limited global reporting on WinS financing*. Trends show that funding for the category of 'basic WASH' has increased in recent years; however, the proportion directed towards WinS is unclear. Combining multiple financing methods and strengthening national systems would help to ensure the financial sustainability of WinS (McGinnis et al., 2017). Yet, experience on financing mechanisms that blend private and donor funds with government resources for school budgets to finance WinS have not been documented. School-level funding strategies for life-cycle WinS costs often assume parents can meet O&M funding shortfalls.
- *Lack of budgeting guidance for all school types*. SWASH+ research found that WASH programme resources/needs depend on the school type (public/private and primary/secondary). As well as settings (i.e. urban/rural or in arid/semi-arid lands). Furthermore, there is variability in the CapEx costs of WinS, depending on the geographical location of the intervention area and the national WinS design/standards, or the models of different implementing agencies.
- *Limited WASH budgeting practices in schools*. SWASH+ research found that few schools in Kisumu (Kenya) have a WASH-specific budget-line. And where the school had a budget, the amount was often lower than actual reported expenditures. There is limited guidance on how to better plan for WinS budgets and costs. There are few tools available that can calculate the life-cycle costs of WinS at the local government or school level. Moreover, SWASH+ research in Kenya found that annual expenditures were lower than the estimated life-cycle costs required to maintain minimum school WASH standards.
- *Costing tools do not routinely include the costs incurred for making facilities inclusive for people (children and staff) with disabilities*. Limited efforts have been made to cost WinS for children and staff with special needs. Inclusive latrines in a school would have separate blocks for girls and boys, with flat, level paths and handrails for accessibility, water and basins for handwashing, and appropriate facilities for MHM. National standards and guidelines may include inclusive designs but these are not typically costed. WEDC (2011) research in Ethiopia shows that the additional cost of making a school latrine accessible can be less than 3 per cent of the overall costs of the latrine.

This research recommends the most cost-effective way to improve access for children with disabilities is to incorporate accessibility into the design from the outset (inclusive design) rather than making expensive changes later. Monitoring data should also be disaggregated to ensure reporting of differential costs incurred.
- *Prioritizing WinS planning and budgeting*. Head teachers are often responsible for budgeting but their time, opportunity costs, and expenses for school financial planning, record-keeping, and management are not typically included in the costing (Gallo et al., 2012).

WinS and WASH services costing tools

A number of WinS and WASH costing tools have been developed; these are presented in Table 3. More specifically, a number of checklists have been designed to support the collection of data on costs for schools. For example, Snehalatha et al.'s (2015) study provides a WinS life-cycle costs questionnaire to help government and development agencies design their own LCCAs and WinS access monitoring assessments, also the University of North Carolina developed some simple checklists for schools to collect WinS data.

The WinS and WASH costing tools and checklists, presented in Table 4, enable users to calculate WASH capital and operational costs as well as to estimate financing gaps based on revenue calculations (Aqua for All, Emory, and IRC WASH/BRAC). The IRC WASH/BRAC tool allows the users to map and record the status of different WASH assets, whereas the COWI tool also assists the users to navigate through the viable financing options according to the estimated financing gap. The tools and checklists are mainly targeted to government officers and development partners (only Emory's tool focuses on head teachers as primary users); they tend to differentiate between high/mid/low-cost technologies and geographic areas (urban/rural), making calculations more accurate by having the possibility to adapt them to a specific context. Above all, Table 4 indicates that more attention is needed to document WinS LCC in order to share analyses and the expected expenditures needed to sustain WinS in different contexts.

How much does it cost?

There is limited systematic data on the costs of providing and sustaining WinS services. Part of the problem is the simple lack of available studies. The second challenge is that costs vary widely based on the setting, the delivery approach, the level of service, and the type of technology. The literature includes estimation/modelling tools and expenditure tracking methodologies and reports.

Nevertheless, a number of studies have attempted to estimate the cost per student per year, based on a combination of historical expenditures and some assumptions. For instance, Save the Children (2016) projected that the median total cost for a custodian, supplies for latrines and handwashing, maintenance of

Table 3 Items included by the literature in each life-cycle cost component

CapEx	*OpEx*	*CapManEx*	*Direct costs*	*Indirect costs*	*Cost of capital*
One-off capital investment in girls' and boys' latrine hardware such as excavation, lining, slabs, superstructures, handwashing facilities, drinking water facilities, MHM facilities, and so on (Snehalatha et al., 2015) For *water*: borehole, rainwater harvesting system, storage containers. For *sanitation*: excavation, lining, slabs, superstructure. For *hygiene*: handwashing stations, vessels (Alexander et al., 2016) Capital costs of infrastructure and hardware (McGinnis et al., 2017)	Typically soap and other cleaning materials, payment of person that does the cleaning, water treatment products, electricity bills for motor pumps, materials for MHM (bin, napkins), and so on (Snehalatha et al., 2015) May include hinges or locks on latrine doors, supplies for cleaning latrines, water treatment for making water safe to drink, soap for handwashing, or taps for water dispensers (Alexander et al., 2016) Hardware that needs to be replaced on an ongoing basis, consumables, cleaning (McGinnis et al., 2017)	Asset renewal and replacement costs; occasional costs that seek to restore the functionality of a system, such as replacing a slab or emptying a septic tank, sludge disposal (Snehalatha et al., 2015) Larger costs for maintaining or repairing WASH infrastructure at the school. Costs of rehabilitating latrines, fixing drainage, latrine emptying; rehabilitating water point, replacing handwashing vessels or fixing handwashing stations (Alexander et al., 2016)	Salary costs from staff supporting water and sanitation related programmes, costs of leaflets, posters, hygiene charts and videos for hygiene promotion (Snehalatha et al., 2015) Costs of monitoring school WASH systems by government officials (Saboori et al., 2011; Alexander et al., 2016) Costs of ongoing support to users and local stakeholders, for example on local government or district support staff (Jones, 2015) Expenditure on support activities for service providers, users, or user groups (Burr, 2014)	Costs of macro-level support including advocacy and policy-making (Snehalatha et al., 2015; Alexander et al., 2016) Expenditures on non-WASH supplies or services that are purchased in the course of maintaining a WASH system. Transport of WASH supplies and services (Gallo et al., 2012) Expenditure on macro-level support, including planning and policy-making, support to decentralized service authorities or local government (Burr, 2014)	Cost of interest payments on micro-finance and loans used to finance capital expenditure. Cost of any returns to shareholders by small-scale private providers (Burr, 2014; Snehalatha et al., 2015) Domain regarding interest payments on loans taken out by the school (Alexander et al., 2016) The interest rate paid on any funds borrowed to finance CapEx plus any returns to the owners of the system, representing their cost of equity (Franceys et al., 2011, in Burr, 2014)

(Continued)

Table 3 Continued

CapEx	*OpEx*	*CapManEx*	*Direct costs*	*Indirect costs*	*Cost of capital*
CapEx hardware Capital invested in constructing or purchasing fixed assets such as concrete structures, latrines, pumps and pipes to develop or extend a service	Repair of containers and taps, repurchase of water treatment products, purchase of soap (Saboori et al., 2011)	Renewal, replacement, and rehabilitation costs which go beyond routine maintenance (Jones, 2015)	Opportunity costs related to the time spent by school personnel on WASH-support activities that could have been spent on other activities (e.g. teaching and administrative tasks) (Gallo et al., 2012)		
CapEx software The costs of one-off work with stakeholders prior to construction or implementation, extension, enhancement and augmentation (including costs of one-off capacity building) (Burr, 2014)	Expenditure on labour and materials needed for routine maintenance which is needed to keep systems running, but does not include major repairs (Jones, 2015)	Asset renewal and replacement cost; occasional and 'lumpy' costs that seek to restore the functionality of a system, such as replacing pump rods or foot valves in hand pumps or a diesel generator in motorized systems (Burr, 2014)	Training teachers and students on proper latrine use, water handling and treatment/filtration, handwashing techniques and key times, local monitoring (Alexander et al., 2016)		
	Typically, regular expenditure such as labour, fuel, chemicals, materials (Burr, 2014)		Hygiene education, health clubs or health promotion, promotion and administration, staff costs for handwashing, and a safe water system capacity building (Saboori et al., 2011; McGinnis et al., 2017)		

Table 4 Assessment of WinS costing tools

Tool	*Developer*	*Format*	*Audience*	*Details*	*Pros*	*Cons*
UNICEF WASH in schools cost model	UNICEF HQ	Excel-based tool	Ministry of Education and Ministries involved in WASH and health, WASH specialists and organizations involved in the design of large-scale WinS programmes	Users can add additional cost categories if they do not appear in the model. The tool was used to produce figures for Ghana's National Costed Strategy for WASH in Schools 2018–30 (IMC Worldwide, 2018)	Helps to calculate WinS low-cost, mid-range, and high-cost options. Separates WASH capital and operational costs into rural and urban costs	It is targeted to UNICEF WASH programmes. Costs are not disaggregated using the LCC categories
'Cost recovery for planning WASH in schools' tool	Aqua for All	Excel-based tool	Kenyan Government and development agencies	Includes: 1) preliminary information about the school, 2) annual revenues, 3) annual costs differentiated by hardware and software, and 4) direct and indirect support costs for O&M (UNICEF Kenya, n.d.)	Supports the adequate overview of the costs and financial viability and sustainability of the Football for WASH programme	It is tailored to the Football for WASH programme. It is focused on recurrent O&M costs only – it doesn't follow the LCC categories. It could have a few blank cells that allow users to add other costs to be used in different WinS scenarios
WinS costs outline	Kenyan Ministries of Education, Health and Water and Sanitation, and UNICEF Kenya	PDF outline	Head teachers and school accountants	Includes an additional outline with general material, labour, and transportation costs for different types of WASH technologies. An adjustment factor is included to adapt each cost to the local price (MoE, MoH and MoWS, 2018)	Helps to calculate the installation costs of WinS facilities according to different types of WASH technologies	Costs have to be calculated manually as the tool is available in hard copy only. It could be useful for users to have an Excel version that makes the costs' calculation more straightforward and limits the chances of error

(Continued)

Table 4 Continued

Tool	*Developer*	*Format*	*Audience*	*Details*	*Pros*	*Cons*
LCCA tool	Emory University, CARE International, and the Kenyan Ministry of Education	Excel-based tool	Senior school stakeholders in Kenya (e.g. head teachers, school boards of management, and school directors)	Consists of navigating through: 1) a budget tab which shows the calculated overall budget for the school given the data entered, 2) a recommendations tab which includes current student to latrine ratios, goal ratios, and a repair and maintenance schedule, and 3) an additional information tab which includes tool assumptions and additional resources (Freeman et al., 2019)	Identifies the gaps in funding WASH operational costs to advocate and justify specific funding needs for primary and secondary schools	It is not possible to tailor the items to be costed to a specific context/WASH scenario as it provides average items and costs based on the information collected from 189 schools. Having an 'other items/materials' cell per LCC category could allow users to make it even more specific to their contexts
'Costing and budgeting' tools	IRC WASH/ BRAC	Excel-based tool	Service authorities at the district level and service providers	Provides instructions on how to calculate costs and also information on financial terminologies. It generates a results overview and graphs with a summary of the available assets, revenues, and expenditures (IRC WASH, 2017)	Allows mapping the existing WASH assets and estimating cash flows, direct support costs, and financing gaps by calculating the gaps between the actual and required expenditures and revenues. It also provides currency details and allows users to choose the design lifetime according to the country	Its amount of detail can make it hard for users to navigate through the 18 sections. Having a version that only recalls on the summaries of the asset registry assessment, the cash flow, and the direct support could make its use and the visualization of results simpler and straightforward

(Continued)

Table 4 Continued

Tool	*Developer*	*Format*	*Audience*	*Details*	*Pros*	*Cons*
The FEASIBLE tool	COWI consultancy group	Computer-based tool	It can be adapted to local situations and to other different scenarios	Covers drinking water supply, wastewater, sanitation, and solid waste. It is based on: 1) planning for water supply and sanitation targets; 2) determining the costs of achieving those targets; and 3) comparing the required expenditures with the available resources to identify any financing gap (Fonseca et al., 2011)	Supports the formulation of environmentally sustainable financing strategies. Its outputs are disaggregated in four main categories: 1) technical information, 2) expenditure needs, 3) financing, and 4) financing gap	The tool needs refreshment as it was designed in the 2000s. A section for hygiene is needed
Rural sanitation costing framework	WaterAid	Excel-based tool	Organizations working on rural sanitation	Focuses on 14 different costs for running a rural sanitation programme (capacity development, community implementation, monitoring and evaluation, enabling environment and knowledge management, among others) and differentiates between seven stakeholders who can be involved in its financing (WaterAid, 2018)	Calculates the cost of accessing rural sanitation. Different from other tools, it supports the calculation of direct support costs for monitoring and evaluation of sanitation facilities as well as for knowledge management activities. It also differentiates between three types of costs: financial, time, and in-kind	It was designed more as a checklist rather than a tool. It could be further developed to let users add other LCC categories and items to calculate life-cycle costs

water supply, waste disposal, school committees training, and health club activities in Kenya was KES 506 (US$5.56) per student per year. Fit for School (2017) has also estimated the cost of O&M for sanitation in Kenyan schools as $4.70 per student per year. Other studies, notably in Bangladesh and Kenya as shown in Table 5, have attempted to show the costs across the life cycle for WinS. BRAC performed an LCCA, which showed that the number of separate toilets for girls and boys, waste management, and water testing should have been given more attention in order to improve WinS service levels (Snehalatha et al., 2015). Although the studies were done at the very beginning of the SDG era, a service level approximation for these settings would be a basic level of service; however, due to each country's different settings and WASH infrastructure, it is not considered possible to compare the costs across contexts.

Table 5 Summarizing the costing data available by country

	CapEx costs	*OpEx costs (Minor repairs and recurrent costs)*	*CapManEx costs (Major repairs)*	*Total operations and maintenance costs*	*Direct support costs*	*Total costs*
Bangladesh	BDT 814 (US$10) median per student per year (hardware and software components)	BDT 65 (US$0.8) median per student per year (including MHM facilities)	BDT 2 (US$0.03) median per student per year	BDT 67 (US$0.83) median per student per year	BDT 41 (US$0.5) median per student per year (hygiene promotion activities and training of student and teacher brigades)	BDT 922 (US$11.33) median per student per year
Kenya	KES 439 (US$4.92) per student per year	KES 210 (US$2.35) per student per year (latrine cleaning supplies, soap, water treatment and sanitary pads, among others)	KES 60 (US$0.65) per student per year	KES 270 (US$3.03) per student per year	KES 74 (US$0.83) per student per year (capacity-building on the use of WASH infrastructure and WASH monitoring for teachers, parents-teachers groups, and government officials)	KES 783 (US$8) per student per year

Source: Snehalatha et al., 2015; Alexander et al., 2016

These reviews are an important starting point in identifying ‘bottlenecks’ or ‘constraints’ to costing of WinS. For instance, Jordanova et al.’s (2015) study in Nicaragua found that only 8 per cent of schools had budgets to purchase toilet-cleaning supplies and 75 per cent obtained supplies from students’ families. They found that such a strategy puts an undue burden on poor communities, and can thus act to further increase inequality and undermine sustainability. McGinnis et al.’s (2017) study showed high software costs for hygiene and recurrent costs such as soap, which together became significant. In addition, Snehalatha et al.’s (2015) study reveals low costs related to water treatment, only being reported in 14 out of 117 schools in Bangladesh. As previously mentioned, items included in recurring costs are often the most important ones to students’ health and comfort (Alexander et al., 2016: 3). Reliance on donated supplies and services may also explain why schools purchase less than the necessary amount of WASH supplies. Gallo et al.’s (2012) study reveals that sending students to purchase and transport WASH supplies to save on-site costs was, in fact, resulting in a considerable loss of children’s learning time as well as exposing them to potential risk to health and well-being while collecting water.

A review of the various existing studies and tools indicates a lack of consistency across the studies. There would be added value in achieving a level of consistency and standardized and comparable data. Adding service level information is important to make better comparisons. A consistent and repeatable methodology is needed for collection of cost data for delivering WASH services, perhaps building on the TrackFin methods, which are national in scope. Ongoing efforts are needed to understand the effect of the service level on the life-cycle costs, and to have empirical information on recurrent and unplanned costs based on settings or based on conditions (e.g. rural versus urban sanitation or water supply versus sanitation and hygiene).

Global landscape of the funding arrangements for WinS

The importance and necessity of adequate and predictable financial support for WinS has been consistently recognized. In this section a global scan of the funding landscape available for WinS is presented with reference to the financing types elaborated by TrackFin.

Domestic public transfers

National governments channel their own resources to support WinS. These domestic investments can come in the form of budgetary allocations, tax revenues, and national funds (UNDESA, 2013). The SDGs place an expectation that countries should increasingly fund their own WASH services through public finances and resources. In the Eastern and Southern Africa region there are countries allocating funds to WinS (Chatterley and Thomas, 2013). For instance, in Rwanda the unit cost of additional classrooms includes a budget line for the construction of toilets and water facilities. Another case is Tanzania, where as part of the National Sanitation Campaign a WinS programme rolled out with $7 m budget expected to reach 700 schools, and a costed action plan was designed in the National Strategic Plan to scale up WinS. In Ethiopia, there is a national budget allocation for WinS programmes, even if not sufficient. In Eritrea, there is no WinS budget but the construction of latrines and water provision are included in the budget for every new school construction. Table 6 reviews whether budget allocations are sufficient to meet national WinS targets.

Table 6 Sufficiency of WASH financing to meet national targets

WASH area	*Percentage of countries reporting sufficient finance*
Urban/rural drinking-water (*n* = 78)	21/15
Urban/rural sanitation (*n* = 74)	14/8
Hygiene (*n* = 67)	4
WASH in health care facilities (*n* = 69)	12
WASH in schools (*n* = 71)	8

Source: 2018/2019 country survey in UN-Water GLAAS, 2019
Note: sufficient finance was defined as more than 75% of what is needed to meet national targets

International public transfers

According to the GLAAS 2019 Report, globally, over $10 bn was disbursed in development assistance for water and sanitation in 2017, provided by bilateral donors, multilateral development banks, NGOs, and private foundations. Aid commitments for water and sanitation to sub-Saharan Africa increased from $1.7 bn to $3 bn from 2015 to 2017 (UN-Water GLAAS, 2019).

Regarding WinS, transfers can fill a gap where at times government funding is not sufficient to finance services. However, such funding can often be short-term, restricted (i.e. project-specific) or small-scale, often focused on construction rather than O&M of services. Moreover, changing donor priorities can mean they withdraw from funding WinS, presenting problems for continuity of services.

Examples of international public transfer mechanisms currently used to finance WinS are presented below:

- *Bilateral grant finance* has been principally used for financing the installation of new WASH facilities in schools; however, it has shown limitations in financing recurrent costs such as operation and minor and major maintenance. According to a seach on the WASH Funders website (https://washfunders.org/), Bi lateral aid of $82 m was given to WinS between 2015 and 2020[1]. Bilateral funding partnerships provide finance for the demonstration of WinS-based activities. Sustained changes in behaviour can be difficult to achieve without grants that provide free or subsidized distribution of durables (such as ceramic filters) and consumables (such as soap or chlorine).
- *Multilateral finance* (international and regional) sources fund country programmes, and multiple projects that operate at scale. Again, the funding has been principally used for financing the installation of new WASH facilities in schools rather than recurrent costs such as operation and minor and major maintenance.

- *Private foundations*, more philanthropic and private funders, such as the Bill & Melinda Gates Foundation, are providing funding for WinS (in particular MHM) and supporting NGOs working on this topic. According to WASH Funders (https://washfunders.org/), $93 m was provided in grants from private foundations/corporate social responsibility (CSR) efforts to WinS between 2015 and 2020. In many cases, financing from foundations lacks predictability, making planning for O&M difficult.
- *Public–private partnerships* (PPPs) have shown that leveraging private capital with public resources can boost limited government financial resources (WEF, 2005; IRC WASH and Water.org, 2017). For instance, the Football for WASH programme was developed as a PPP, with 50 per cent funded by private organizations and 50 per cent by the Dutch Ministry of Foreign Affairs to generate income for the schools in Ghana, Kenya, and Mozambique (Football for Water, 2018).
- *Global funds* such as the Global Sanitation Fund (a pooled fund) has supported sanitation and hygiene behaviour change activities in over 15,000 schools, through the 13 country programmes.

Repayable financing

There are few examples in the literature of repayable finance in relation to WinS.

Tariffs for service provided

Schools pay tariffs for their water supplies or faecal sludge management services. However, users are unlikely to be willing to pay tariffs to fund the necessary 'software' aspect of behaviour change communication.

Users' expenditure on self-supply

Parents may send children to school with their own drinking water supplies or materials for anal cleansing.

Voluntary contributions

Contributions from parents, parents-teachers groups, and the community can come in the form of materials, labour, or cash, or the three of them together (IRC WASH, 2007). There are also reports of income-generating activities in schools to fund WinS such as: selling poultry and making the sanitation and handwashing facilities available to the community for a fee in Tanzania (Linda and van Soelen, 2018); fostering agriculture projects and the production of crafts in Western Uganda (Linda and van Soelen, 2018); or producing and selling re-usable sanitary pads made by local women's groups (Simavi and A4A, 2016). In Uganda, parents and teachers have been trained on savings approaches for fundraising for WinS (Simavi and A4A, 2016; Linda and van Soelen, 2018). Communities may also pay through regular payment of user fees or ad hoc contributions (e.g. to fix a broken part) for WinS. Other initiatives include developing a water business on the school's premises or using the school facilities to run a business (such as a sapling nursery). Another idea is a crowd-funding mechanism through small donations from alumni (this has already worked well at Ghanaian high schools). However, recurrent costs may be unaffordable or beyond low-income communities' willingness to pay.

Conclusions

This short review assessed the life-cycle costs (e.g. consumables, repair and maintenance) of WinS services. The practical costing exercises and tools currently available for WinS were presented. And the typical costs and financial sources available to meet school-level WASH financing gaps were characterized including government support and donor financing, as well as income-generating activities and blended finance approaches. The persistent bottlenecks include inadequate knowledge of life-cycle costing, insufficient finance to meet all O&M costs, limited attention to strengthening national systems, and lack of awareness of financing options. Life-cycle costing and budgeting can help governments and other WinS stakeholders to better plan for financing the cost of the operation and minor and major maintenance of those facilities and services. LCCA tools can be used to share costing results which, over time and with recurrent use, will improve in accuracy, strengthening the planning for and running of sustainable WinS facilities and services.

Note

1. This refers to bilateral funding by DAC donors in support of Basic drinking water supply and sanitation; starting in year(s) 2015, 2016, 2017, 2018, 2019, 2020; with text that includes school.

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