



# **Water, Sanitation and Hygiene (WASH) in schools**

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Client:	Sue Cavill, DFID Water and Sanitation Team	
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Contact and correspondence:	DEW Point, The Old Mill • Blisworth Hill Barns • Stoke Road • Blisworth • Northampton, • NN7 3DB • UK TEL: +44 (0)1604 858257 FAX: +44 (0)1604 858305 e-mail: helpdesk@dewpoint.org.uk <a href="http://www.dewpoint.org.uk">www.dewpoint.org.uk</a>	
Authors:	Dr Richard Rheingans and Matthew Freeman	
Organisations undertaking work:	Emory University and London School of Hygiene and Tropical Medicine	
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Task Manager :	Ingrid Carlier	
Quality Assurance. DEW Point:	Elizabeth McVeigh	Date: 11/03/2010

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<sup>1</sup> Consortium comprises Harewelle International Limited, NR International, Practical Action Consulting, Cranfield University and AEA Energy and Environment

# Table of Contents

1. Description of enquiry
2. Water, Sanitation and Hygiene (WASH) in schools
  - 2.1 WASH facilities costs – ensuring value for money
  - 2.2 Alternative models for operation and maintenance of school WASH
  - 2.3 Impact of school WASH on absenteeism
  - 2.4 Scaling up effective school WASH

## 1. Description of enquiry

*Schools need to have adequate and appropriate water and sanitation facilities for boys, girls and teachers (including facilities for menstrual hygiene management) and hygiene promotion. There is much evidence to suggest that lack of such facilities affects participation, lowers enrolment rates and performance, and increases absenteeism, especially in the case of girls at puberty. School construction programmes need to incorporate water and sanitation as a central element, with realistic costings and suitable budgets.*

*In the context of policy imperative of Education for All and the need for cost effective use of resources/ good value for money in schools construction, the Water and Sanitation Team are seeking a review of current practice.*

*We would like the consultants to write a 3-4 page note that provides recommendations relating to the life cycle of WASH infrastructure in schools covering:*

*(a) recommendations concerning the construction of new WASH facilities in schools as well as the operation and maintenance and rehabilitation of existing facilities – together with the implications of different options/ designs for capital and maintenance costs*

*(b) a brief assessment of the typical operation and maintenance models used for WASH in schools*

*(c) a compilation of examples/ evaluations of whether school water and sanitation increases enrolment and retention rates, particularly amongst girls*

*(d) examples of programmes that have been successfully scaled up, particularly those based around government systems (rather than projects).*

## 2. Water, Sanitation and Hygiene (WASH) in schools

*By Richard Rheingans PhD and Matthew Freeman MPH, Emory University and London School of Hygiene and Tropical Medicine.*

### 2.1 WASH facilities costs – ensuring value for money

Investing in adequate school WASH can be costly and stretches the financial resources of the schools and educational systems. This makes it essential to identify strategies for ensuring that investments are cost-effective and provide good value for money. While discussions of cost-effectiveness often focus on what to invest in, the greatest opportunity for providing value for money may be in improving how investments, operation and maintenance are financed and monitored.

In this context, there are two main strategies for improving value for money in school WASH: 1) increasing sustainability is essential to providing value for money, and 2) fully utilizing existing infrastructure increases return on investment.

Specific recommendations:

- Fully budgeting for the recurrent costs of WASH costs. For many school WASH components, initial investment costs are high and operational costs are relatively low. However, WASH improvements are often budgeted as one-time projects without fully accounting for the supplies needed for ongoing use. These include soap for

handwashing, anal cleansing materials, latrine cleaning supplies and water treatment products. Without these, the effectiveness and value of the investment is compromised. Adequate resources must be provided to ensure these are purchased. These budgets must also account for the annual expected cost of repairs to facilities.

- Consider larger investments if they are easier to maintain or more likely to be sustained. Examples of this include more durable rainwater tanks or gutters, and latrines with easier access for emptying.
- Optimize the design of large investments such as rainwater harvesting that match the local conditions. The productivity of a rainwater harvesting system depends on roof catchment area, tank size, rain amount and rain seasonality. It is easy for schools to mismatch catchment area and tank size, resulting in over investment and under productivity. Government authorities should develop design options (tank and catchment combinations) that are appropriate for different rainfall profiles.
- Supply chain for key inputs and services must be in place. School WASH components require equipment, materials, supplies and services for ongoing operation. Some of these (such as soap) may be broadly available. Others (such as rain gutters or hand washing equipment) may not be. In the absence of good supply chains, schools are likely to face high cost and limited availability, jeopardizing sustainability and long-term value. Policy or sector-wide interventions may be needed to ensure supply chains and reduce costs for key items.
- Provide schools with guidance on how to move up the WASH ladder. International and national school WASH standards often establish criteria that are beyond the available financial resources. As a result, schools are left to choose which standards to meet. Examples of prioritization include: providing at least 1 litre of water per child because it is essential for other activities; ensuring the availability of hand washing stations with soap because it is low cost; providing alternative latrine designs increasing quality and cost; encouraging long-term investment plans by schools to achieve the optimum conditions over time.
- Share responsibility for large water infrastructure investments. Water supply is essential for other WASH components, but a proper system may be beyond the realistic financial, technical and management capability of the school. In most settings, water sector policy should reflect that providing water to schools is a broader responsibility, not that of the educational sector.
- Monitor the quality of school WASH conditions. Poor monitoring is a threat to value for money because it reduces the likelihood that facilities will remain available and properly functioning. Typical monitoring problems include: unclear or mixed responsibility for monitoring, focus on outputs (such as latrines constructed) rather than conditions (latrine cleanliness), and infrequent or irregular visits. Improved monitoring would include: focus on conditions and outcomes, multiple levels (students, school management committee, governmental), and clear accountability for responding to problems.

## 2.2 Alternative models for operation and maintenance of school WASH

Systems for maintaining and operating WASH facilities vary greatly, based on the setting and which WASH component is considered. The model for any given component is characterized by three basic questions: Who does the work? Who is accountable for ensuring it is done? What resources are available for doing it? While there are numerous permutations of these features, the effectiveness of the model depends on all of these being in place.

### *Water supply*

- If the water supply is on site (well or rainwater) and owned by the school, operation and maintenance (O&M) is typically the responsibility of the school management committee or a community water committee. On site management of a water supply shared between a community and school can pose a threat if rights and responsibilities are not clearly defined.
- In some cases, especially for rainwater, O&M may be left as the responsibility of a teacher or principal. Lack of training, resources and time pose a threat to the reliability of this model, as teachers and school management committees may not be able to maintain it.
- In yet other cases (such as Roundabout pumps), O&M is the responsibility of an external institution. Lack of onsite presence and poor communication with the school can undermine this model.
- If the water supply is offsite, then O&M is based on the dominant or corresponding model in the setting, whether public utility or community water committee. This means that adequate ongoing supply to the school is vulnerable to any problems or threats posed by the external institution.

### *Hand washing and water treatment*

- The regular O&M of handwashing stations and water treatment (if applicable) are often separate from the O&M of the source itself. Daily operations are often managed by teachers with key activities performed by the children themselves. While these may not require major repairs, repurchase of soap and minor repairs to equipment are essential. If teachers are responsible for these roles (soap and repairs), they must have the necessary inputs and time. If school management committees are responsible, there must be a mechanism for them to know about needed repairs.

### *Latrine*

Operation and maintenance for latrines requires three elements: regular cleaning, occasional repairs, and long-term servicing (e.g. pit emptying, rehabilitation).

Several models are available for regular latrine cleaning, which differ between and within countries. The actual cleaning may be done by children, teachers, community members, or paid janitors.

- Janitors. Paid or volunteer community members are responsible for latrine cleaning in many settings. The advantage of this approach is that it does not take students or teachers away from education. It also ensures that an adult does the work. As long as resources are available and there is a school official with accountability, janitors may be

an option.

- Teachers. Teachers are responsible for cleaning and maintenance in some school settings. While the system may result in clean latrines, it does take teachers away from their educational responsibilities.
- Children. In many settings, children are responsible for cleaning toilets. This may be done as a systematic responsibility of all students implemented through a duty roster. A qualitative assessment in western Kenya found that children were very willing to participate in latrine cleaning, as long as they had all of the necessary supplies and equipment (including boots, gloves, mops, water, etc) (Caruso, unpublished data). Schools differ in whether cleaning is a responsibility or a punishment. While no rigorous assessments have been done, shared responsibility for cleaning may encourage latrine users to be more careful and clean.

Pit emptying and waste disposal. For onsite sanitation, pit emptying and waste disposal are key activities. Schools are likely to use a range of options that are available to them in their community. In some cases options may be very limited. As there is growing attention to this issue, particularly in urban settings, schools may actually provide an opportunity or catalyst to develop new models or services in an area. However they are unlikely to do so without external coordination and direction.

Monitoring cleanliness. Regardless of who is responsible for cleaning, latrine maintenance requires regular monitoring to ensure accountability. The fact that latrines are closed and private makes it easy for problems to go unattended. Ultimately this should be the responsibility of a teacher or the school management committee. Problems and necessary repairs can be identified in this way. This may be complemented with more frequent student monitoring and regular monitoring by health officials.

### **2.3 Impact of school WASH on absenteeism**

Children spend a large part of their day at school. Schools in low-income countries often include environments that are not conducive to learning [1], and poor water, sanitation, and hygiene conditions are contributors to this problem. Provision of sufficient water quantity for hygiene, clean water for drinking, user friendly and accessible sanitation facilities, proper hygiene education, access to soap for handwashing, and supplies for menstrual management are seen as critical to improve child health, safety, and school attainment. Because of this, much attention has been dedicated to developing best practices for implementing, sustaining, and scaling-up school WASH programs [2, 3].

Three key potential benefits to adequate school WASH facilities include:

- 1) Educational outcomes, specifically for girls. Through reduced disease burden, or merely through improved access at a school or community level, WASH improvements may lead to increased attendance and enrolment. Provision of adequate hygiene facilities and menstrual management techniques may lead to improved attendance and reduced attrition for girls.
- 2) Child health. There is some evidence that adequate school WASH can reduce diarrheal disease burden and helminth infection. Reduction in disease burden may lead to improved cognition, reduced absenteeism, reduced anaemia, and better nutrition. Schools effectively serve as nodes of pathogen transmission, as they congregate large

numbers of children into one place. Because of this, minimizing transmission of diseases in school settings may reduce disease both among pupils and their siblings [4, 5].

- 3) Improved community knowledge and practice. Children are often considered agents of change in low-income settings. Improved hygiene education programs in school may help influence practice at home, effectively influencing their parents to change behaviours and practices.

Though access to school-based WASH is not explicitly enumerated in the United Nations Millennium Development Goals<sup>2</sup>, it is evident in MDG Goal 2 (End Poverty and Hunger), Goal 3 (Gender Equity), and Goal 4 (Child Health). Goal 7 (Environmental Sustainability) specifically targets provision of safe water and sanitation provision in the home, but it follows that children need access at school as well in order to reduce environmental contaminations associated with open defecation and adequately reduce WASH related disease transmission. If access to water and sanitation is a right, it follows that access for children to WASH infrastructure and education is essential [6, 7]. UNICEF estimates that in 2008, schools in their priority countries reported 46% with adequate water supply coverage and 37% with adequate sanitation coverage.[8]

There is a lot of information about school WASH programs and many people have done considerable thinking about how to improve the sector. Critical knowledge gaps remain that need to be addressed; however, there is a lot of experience in the sector and there is a need to critically evaluate how to operationalize the best approaches and lessons learned moving forward.

### *Evidence*

Few rigorous studies have been done to critically assess common perceptions of the impact of school WASH: that it will have the same impact as household improvements in reducing diarrhoea [9-11], respiratory infection [12], and helminth infection [13]. Some research has been conducted on hygiene and water quality improvements that show a decrease in diarrhoea [14] and absenteeism [15]. The most rigorous study in the sector, a cluster randomized trial conducted by Bowen and colleagues in China showed that an intensive handwashing campaign can reduce absenteeism [16]. A recent, as yet unpublished study of a cluster randomized trial in western Kenya by the authors of this note revealed that a comprehensive school WASH program (hygiene, sanitation, water treatment improvements) reduced absenteeism among girls but not boys (Freeman et al, working paper). An earlier cross-sectional study from the same project showed a significant association between the condition and number of school latrines and absenteeism. This association was greatest for girls of low economic status [17]. Njuguna and colleagues conducted a cross-sectional study of school WASH conditions in 3 regions of Kenya. They found that the presence of both handwashing facilities and high latrine use were associated with lower absenteeism among girls [18]. However, these cross-sectional studies do not demonstrate causality due to potential confounding, as better off schools may have better facilities and lower absenteeism.

There is some evidence that school WASH interventions can affect enrolment and retention. A randomized trial of school WASH interventions in western Kenya found an increase in primary school enrolment among girls in schools with water supply improvements (Freemans et al, working paper). In resource poor settings, enrolment may be highly dependent upon other socio-economic conditions and school WASH alone may not have a significant impact.

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<sup>2</sup> United Nations Millennium Development Goals: <http://www.un.org/millenniumgoals/>



In settings with high levels of school participation, enrolment and attendance may be less sensitive measures of the educational impact of school WASH [8]. That is, children may be enrolled and attending, but not fully engaging in the educational process. No studies have rigorously assessed the impact of school WASH on attainment or school performance.

Sanitation and hygiene specifically may have profound effects on educational outcomes, specifically for girls [26]. Qualitative studies and self-reported causes of absenteeism have suggested that latrines and water for hygiene in school may reduce female absenteeism during times of menstruation [1, 3]. Considerations such as access to a functioning, private latrine and available water and soap could have a positive impact on attendance rates in older female school children [27]. Though often cited, the 11% reduction in absenteeism from sanitation in a school in India should not be relied upon as evidence from rigorous program evaluation [28].

Water, sanitation and hygiene intervention are also likely to have an impact on child health. It has been established that chemotherapy at schools can drastically reduce helminth infection, leading to reduced absenteeism [19] and improved health [20, 21]. The impact of reduced helminth infection on school performance, enrolment, and attendance has also not been definitively established [19, 20]. There are some indications that a decreased helminth infection status is linked to increased school enrolment [22-24], though at least one study has offered discordant results [25]. Additionally, a recent study in Kenya reported a 25% decrease in school absenteeism following de-worming [19]. Stunted children have shown improved attendance following treatment with Albendazole [1, 21], which indicates that school WASH may benefit those students most at risk from re-infection, since these are often the same children without access to proper facilities at home. It is generally understood that sanitation and hygiene can reduce helminth re-infection, but it has only been recently that this question has been part of an experimental trial (Freeman, unpublished data).

Little is known about the actual mechanisms of what effectively improves school WASH conditions over the long term, though it clearly requires a mix of software and hardware [29]. Children need to be actively engaged in the process of education and need child-specific messaging and activities [16, 30, 31]. In order to ensure that knowledge and practice transfer to the home, there needs to be active engagement of kids and their parents [8, 29-31]. Approaches that have been used to this end include Participatory Rural Appraisals (PRA) and Participatory Hygiene and Sanitation Education (PHAST). Within the past five years, there has been increased attention to school-led total sanitation – an offshoot of community-led total sanitation – as a way of diffusion of behaviours from school to home. Though early success has been recorded – such as in Nepal where 37% reported being open defecation free at the end of the project – we are not aware of any rigorous studies that address program success.

## **2.4 Scaling up effective school WASH**

Prior to discussing the successes and shortcomings of moving WASH in schools to scale, it is important to assess what we mean by scale. Some domains for addressing scale include: 1) effective technology becomes widely adopted and available, 2) concepts and approaches become adopted by implementers or systematized into government programs, and 3) Governments allocate additional resources to addressing school WASH. There are examples of scaling within these three contexts [32, 33], but the vast majority of school WASH programs often are short-term and unmonitored. The critical questions about scale necessitate an evaluation of what we also know about sustained behaviours and sustainable technological solutions. One study conducted in India four years after an intervention found that facilities

were cleaner and better maintained than those in control schools [34]. Studies like this are uncommon. Though we could hypothesize that the benefits of many projects last 2-3 years, due to a lack of available data from quality program monitoring, even that claim is difficult to make. Better data monitoring and long-term follow-up studies are essential to better understand the factors that contribute to sustainable change in school WASH.

*Scaling and sustaining technology:* Much has been written about the need for developing child-friendly approaches to sanitation and hygiene facilities and these ideas have been widely, though not universally, applied in the sector. Less attention has been paid to how to sustain the hardware components. Durable pit lining and systems for evacuation may be a key solution to high-use school sanitation in areas without water-based or municipal options. However, the increased use of aboveground systems with low capacity or eco-san in the absence of systems to keep children from being in contact with excreta is highly problematic. It may take up to two years under the right conditions for helminth ova to become inactive, and many schools rely on children to clean latrines, including the emptying of latrine vaults.

*Government direct funding.* An increasing number of countries are using direct decentralized funding to schools to improve WASH conditions. This scaling approach relies on developing WASH standards, school development of WASH improvement plans, providing devolved funding for schools to implement, and monitoring the investments made. The advantage of the strategy is that it utilizes and strengthens existing education sector institutions. It also opens the possibility of reaching large numbers of schools, compared to traditional school- or district-level approaches. The challenge of the approach is that it is dependent upon key factors being in place. First, adequate resources must be in place for the recurrent costs of WASH components after the initial implementation period. Second, the infrastructure-focused approach must be accompanied by the necessary behaviour change components that may have traditionally been provided by smaller NGO-led programs. Third, schools must have the technical support or skills to design appropriate plans. Fourth, financial systems must be in place to ensure accountability. Finally, active monitoring systems must be in place to sure the quality conditions and sustainability prerequisites are established.

For water supply improvements, rainwater harvesting is a short-term option at best, in most places with seasonal rainfall, it will never guarantee water throughout the school year. For other “improved supplies,” the only way to drastically increase coverage at school and sustain that improvement is to ensure that school improvements are paired with community interventions. In places with piped municipal systems, the solution may merely be ensuring financing to ensure that schools can pay the water bill. In rural areas, schools are rarely able to maintain stand-alone systems, especially in water scarce areas where the demand from the community is high.

To scale and sustain behaviour change at school, one solution may be to embed hygiene education in the curriculum for teachers. One program in Kenya led by CARE has developed a training curriculum in collaboration with the Ministry of Education that is being included in teaching training courses in college. Often, teachers in low-income settings are over taxed with large classes and insufficient resources. By including hygiene education training as part of teacher certification, making the case for greater focus on these issues at school can be immediately scaled throughout a country as a low-cost, technology independent solution. Developing country-level, culture specific messaging for latrine use, handwashing behaviours, and water handling is another way to scale behaviour change approaches.

A final way to scale WASH in schools and ensure sustained improvement in access is through engagement with other sectors. In school WASH programs, engineers and experts in technology provision are often charged with program implementation. With all of WASH

provision, but especially school WASH, behaviour change is a critical component. Engagement with other sectors – education, specifically – with greater experience in engaging children is critical. Technology provision is often not seen as needing long-term implementation, so combining school WASH programs with district-level nutrition, child feeding, micronutrient supplementation and de-worming campaigns will ensure that programs are scaled and sustained appropriately.

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