Research Paper

Water, sanitation and hygiene (WASH) in schools: results from a process evaluation of the National Sanitation Campaign in Tanzania

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ABSTRACT

This study assesses the intermediate outcomes of the Tanzania National Sanitation Campaign (NSC) for schools. A cross-sectional study was designed as part of a process evaluation of the NSC in Tanzania on 70 primary schools and 54 regional and district education officers. Data was collected between August and December 2014 using questionaires, key informant interviews, and desk studies. The results showed that only 50% of schools met the Tanzania guideline of 50 boys per drop hole, while 43% met the guideline of 40 girls per drop hole. In addition, 53% of schools had a reliable water supply, 43% had some functional handwashing stations, but only 29% and 19% had water and soap available at the stations, respectively. Overall, the implementation of the NSC in schools was found to be effective, though poor planning and coordination, inadequate funding, and low technical capacity were identified as barriers to achieve the intended objectives. The study recommends stronger and coordinated stakeholder partnerships with clearly defined roles including cost sharing. Government and other stakeholders should also consider the impact of increasing funding for both software and hardware components to improve the enabling environment, and to develop a standardised monitoring mechanism for sustainable school water, sanitation and hygiene.

Key words | National Sanitation Campaign, process evaluation, schools, Tanzania, WASH

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INTRODUCTION

Safe and adequate water supply and sanitation in schools are pre-requisites for the right to basic education for school children (Mooijman 2012). The provision of adequate water, sanitation and hygiene (WASH) facilities in schools has been linked to the achievement of the Millennium Development Goals (MDGs) on universal primary education, gender equality and child mortality, and more recently to the achievement of the Sustainable Development Goals, and in particular Goal 6 on clean water and sanitation by 2030 (UN General Assembly 2015). Academic research suggests that access to adequate WASH services in schools may contribute to improved education and health of children by reducing the number of days missed in schools due to menstrual periods, or providing more time for learning tasks (Bowen *et al.* 2007; Lopez-Quintero *et al.* 2009; Freeman *et al.* 2012; Jasper *et al.* 2012). Adequate

doi: 10.2166/washdev.2017.159

WASH in schools could also prevent diarrhoea and gastrointestinal diseases (Lopez-Quintero *et al.* 2009; Jasper *et al.* 2012). It is estimated that 94% of the causes of diarrhoeal diseases are attributed to environmental factors, which include unsafe drinking water, poor sanitation and hygiene (Prüss-Üstün & Corvalán 2006). For example, in 2012, out of the total 1.5 million diarrhoea-related deaths that were reported, an estimated 502,000 and 280,000 deaths were associated with inadequate water and sanitation, respectively (Prüss-Ustün *et al.* 2014). An all-inclusive access to improved water and sanitation has also been estimated to result in 1.9 billion school days gained due to a reduction of diarrhoeal diseases among students (Hutton & Haller 2004).

Despite the potential contribution of improved WASH in schools to students' education and health, evidence shows that these benefits can be extremely heterogeneous (Freeman *et al.* 2012), as they depend on the availability of basic inputs and consumables such as soap, water and anal cleansing materials (McMahon *et al.* 2011; Saboori *et al.* 2011; Greene *et al.* 2012). It is also notable that the success in sustaining these inputs is linked to the presence of an enabling environment that includes government oversight and commitment, provision of adequate funding and an established supply chain, clear roles and responsibilities, monitoring and accountability (Saboori *et al.* 2011).

In 2015, 56% of the population in Tanzania had access to an improved drinking water supply and only 16% to sanitation, which made Tanzania off track to meet the MDG's target for sanitation (WHO & UNICEF 2015). With school WASH (SWASH), 40% of the 14,000 primary and secondary schools in Tanzania have no access to a water supply. Additionally, 84% of schools have no functional handwashing facilities (HWFs), while one latrine serves an average of 56 pupils (Ministry of Education, Science and Technology (MoEST)-SWASH Strategic Plan). In an effort to improve access to improved WASH infrastructures, the Government of Tanzania launched a National Sanitation Campaign (NSC) in 2012 to stimulate demand for sanitation, hygiene and improved water supply in rural areas of Tanzania using community- and school-led total sanitation and sanitation marketing approaches.

This study presents the results of a process evaluation conducted from April 2014 to January 2015 by the SHARE consortium of the London School of Hygiene and Tropical Medicine (LSHTM) in collaboration with the Ministry of Health and Social Welfare (MoHSW) (now Ministry of Health, Community Development, Gender, Elderly and Children, MOHCDGEC) and the Ministry of Education and Vocational Training (MoEVT) (now the MoEST) to assess the NSC implementation and its intended outcomes. The other collaborators were the National Institute for Medical Research (NIMR) and the National Bureau of Statistics (NBS) in Tanzania. The study assessed the improvements made in SWASH in terms of access to WASH facilities and the presence of an enabling environment that can contribute to better health and quality education in primary schools in Tanzania. As a non-experimental study design, the process evaluation did not allow us to determine attribution of changes in behaviour and outputs to the NSC. Nonetheless, we can provide a representative overview of the prevalent sanitation and hygiene conditions and behaviours in the intervention areas, and develop assumptions that can be tested prior to the design of similar programmes.

METHODS

Drawing on the NSC's theory of change, we developed an evaluation framework. Figure 1 shows the conceptual model of the SWASH component of the NSC evaluation.

The chain represented in Figure 1 suggests that the intended impacts of improved health and education are dependent upon a combination of reduced exposures to pathogens and improved quality of basic services (e.g. more desirable and adequate latrines; a reliable water supply). Reduced exposure, in turn, depends upon two critical child behaviours: washing hands and using facilities for defecation, along with a safe physical environment. A safe physical environment includes sufficient clean latrines, handwashing with soap (HWWS) facilities, and culturally appropriate materials for post-defecation cleaning. Children's behaviour change is dependent upon both active hygiene promotion and the availability of desirable sanitation and hygiene facilities. Finally, the above-described conditions for impacts achievement are also dependent on a set of enabling institutional conditions. These include adequate water for cleaning and handwashing, availability of

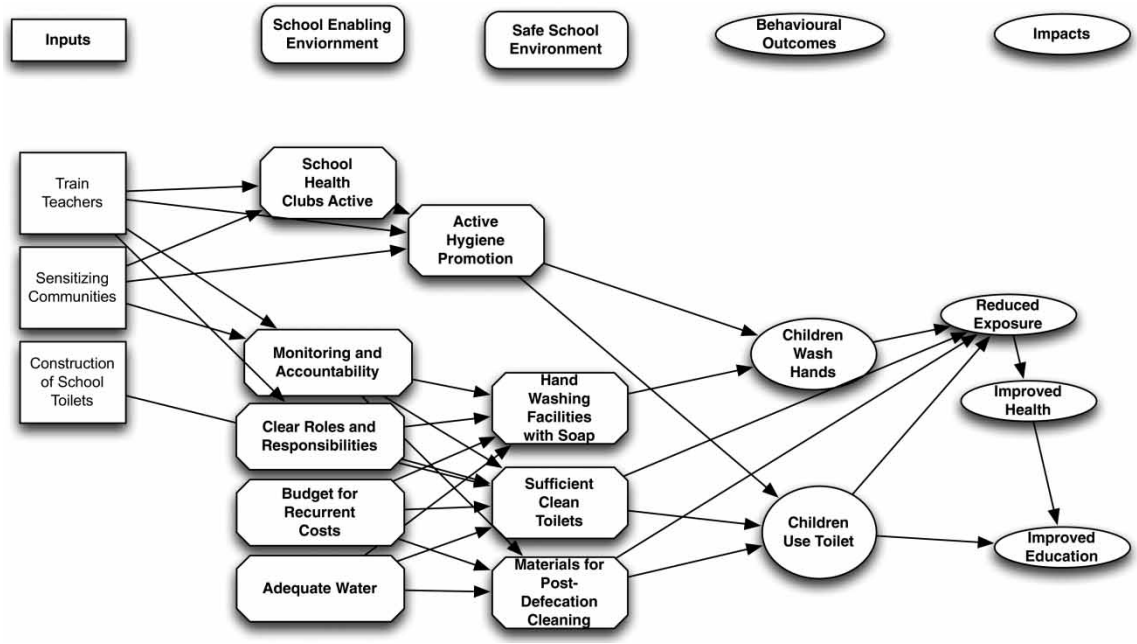

Figure 1 | Evaluation framework for SWASH (Rheingans 2012).

recurrent costs for consumables such as soap and repairs, clear roles and responsibilities for regular tasks, a system of monitoring and accountability, and active school sanitation and health clubs. We understand that several other exposures including the community and the household environment could all impact on the health and educational outcomes of school children. This study has, however, focused only on the school physical environment and its enabling environment due to the manner in which the campaign was implemented and the evaluation questions that needed to be answered.

The key research questions for the SWASH component were the following:

- Are there environmental conditions in place for effective SWASH (i.e. adequate and clean latrines, HWFs with soap, post-defecation materials)?
- Are there enabling conditions in place for effective SWASH (i.e. budget, roles and responsibilities, monitoring and accountability, adequate water)?

A cross-sectional study was designed to collect information from 84 primary schools (sanitation improvements have been made or were ongoing in these schools) targeted by the NSC at the time of the evaluation. From this sample, 70 valid semi-structured interviews were gathered for analysis from 70 schools where sanitation improvements have been completed. Data collection was conducted through face-to-face semi-structured interviews with school head teachers, as well as direct observations of the school environment (where possible). Data were collected between August and December 2014, by eight teams composed of one supervisor and four enumerators per team. The questionnaire aimed to gather two sets of outcome information:

- The presence of a safe school physical environment; that is whether the appropriate infrastructural conditions are in place to reduce exposure to faecal pathogens
- The presence of a school enabling environment, which includes appropriate human and financial resources to allow the physical environment to work effectively

To better understand and assess the schools' enabling environment, key informant interviews were conducted with 40 district education officers (DEOs) and 14 regional education officers (REOs), representing the districts and regions where the campaign was implemented. Questions capturing the external mechanism of the enabling environment (planning and budgets, coordination, implementation, and monitoring) of SWASH were asked

through semi-structured interviews over the telephone. Furthermore, we triangulated our interviews with the analysis of the Water Sector Development Programme (WSDP) Aide Memoire documents of Joint Supervision Missions (JSM) and the quarterly reports compiled by the MoEVT for SWASH activities.

In the analysis of the enabling environment for the implementation of the SWASH sub-component, we have disaggregated the results into four categories:

(a) Planning: relates to the role and responsibilities and the main activities of the campaign.
(b) Budget allocation and financing: refers to funds disbursement, budget planning and execution.
(c) Coordination: relates to the role and responsibilities allocated within the NSC at central government, regional and district levels as well as among the main actors in the sector.
(d) Monitoring and reporting: refers to compliance by regions and local government authorities (LGAs) to the financial and output monitoring and reporting required by the WSDP.

Data were analysed using STATA 13 (StataCorp LP, College Station, TX). Descriptive statistics, including means and proportions, were used to assess the availability and adequacy of WASH infrastructure and the enabling environment for SWASH. Descriptive statistics were also used to describe the institutional relationships and activities within the external enabling environment, and to provide a basis for an overall assessment of functioning and barriers in each of the four areas and how it affected the level of implementation of SWASH at the district level. The association between exposures and outcomes (for example toilet technology type and toilet cleanliness) was assessed using the Pearson Chi-square test.

The NSC evaluation protocol received ethical approval from the NIMR, with Ref: NIMR/HQ/R.8a/Vol.IX/1744 on 16 June 2014.

RESULTS

Seventy out of the 84 primary schools in 10 districts were included in the study. All but one of the schools were day schools. On average, there was similar enrolment for male and female students (305 males vs. 312 females). Within the past year from the survey implementation, 69 of the 70 schools had benefited from at least one WASH-related activity. The most common WASH activities implemented in the schools were development of hygiene education packages (70% of schools), construction or rehabilitation of latrines (53%), and provision of water sources (36%). Table 1 presents a summary of the schools surveyed during the process evaluation.

The study results also showed that all surveyed schools had access to at least one toilet facility, though the survey could only provide limited information on the functionality of these toilets at the time of field data collection. Almost all the facilities surveyed (97%) could be classified as improved based on the JMP classification (Figure 2). The most common type of toilet facility used in the schools was the ventilated improved pit latrine (47%) and the least was the traditional pit latrine (3%).

The majority of the schools (89%) had one toilet block with an average of six compartments or drop holes. Each of the gender-segregated toilet compartments serves an average of 48 girls and 50 boys. Half the schools surveyed satisfied the MoEVT/MoEST guidelines for student to toilet compartment ratio of 1:50 for boys, while only 43% of schools satisfied the ratio of 1:40 for girls (Table 2). For the WHO/UNICEF guidelines (Adams *et al.* 2009) for student to toilet compartment ratio, only 20% of the schools met the standard ratio of 1:25 for girls.

Less than half of the schools (44%) made provision for male urinals. In addition, only 37% of schools reported regularly providing anal cleansing materials for students. The majority of the schools (74%) had no facilities accessible to students with physical disabilities. Although more than half (59%)

Table 1 | Summary of selected schools

Total number of schools surveyed	70
Average male enrolment per school	305
Average female enrolment per school	312
Average teacher to student ratio per school	1:42
Male students with physical disabilities (all schools)	106
Female students with physical disabilities (all schools)	74

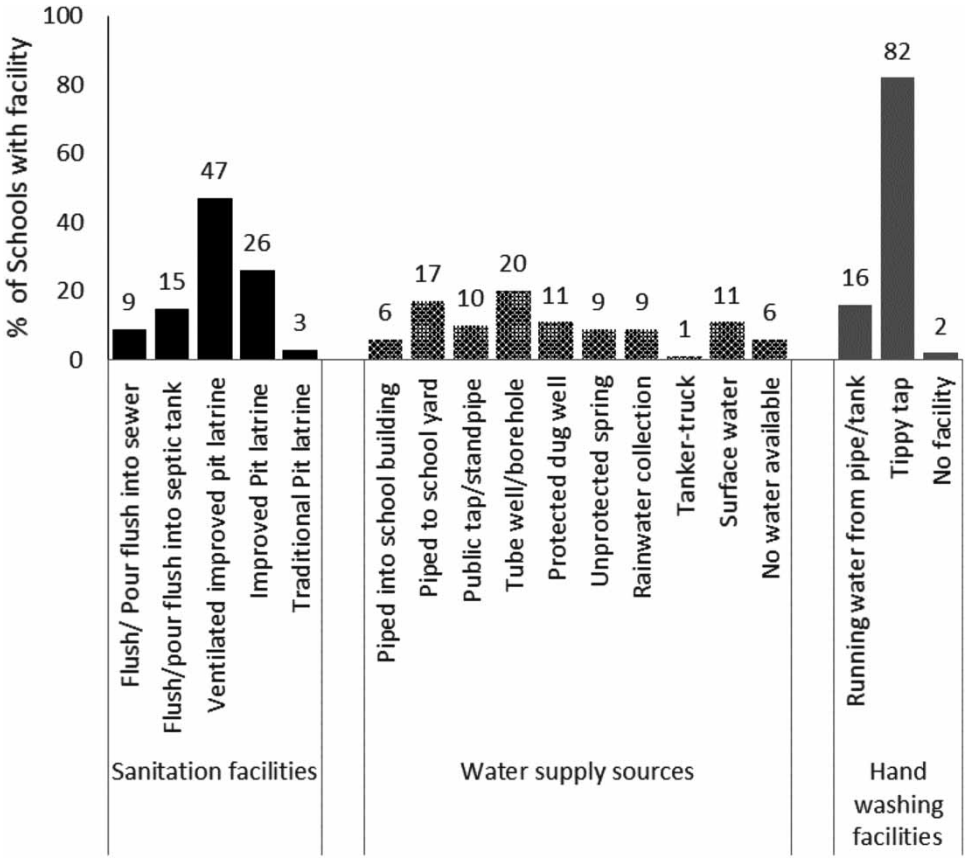

Figure 2 | WASH facilities reported in schools.

Table 2 | Frequency of schools meeting WHO and MoEVT toilet-student ratios

Guideline	Percentage of schools that meet guidelines	
	Boys	Girls
WHO guideline: *1 drop hole separate for 50 boys and 25 girls*	50%	20%
Tanzanian Government national guideline: *1 drop hole separate for 50 boys and 40 girls*	50%	43%

Table 3 | Conditions of school toilets

Parameter	% (n)
Provision of anal cleansing materials in schools (reported)	
Always	37 (26)
Sometimes	13 (9)
Never	50 (35)
Toilet cleanliness (reported)	
Clean	59 (41)
Not clean	41 (29)
Proportion of full pits (observation)	
All toilets	88 (62)
Some of them	6 (4)
Observation not possible	6 (4)

of the schools surveyed were reported to have clean toilets, observations showed that a far higher number of schools (95%) had toilets which were smelly (either inside or outside the toilet privy room), while 88% of schools were observed to have their toilet pits full at the time of the survey (Table 3). We found no association between the type of toilet technology and the reported cleanliness of the toilets.

Our study found that 66% of the schools had a functional water supply system, though only 53% had a regular supply throughout the year. The most common source of

water supply was the tube well/borehole (20%), while the least was the tanker truck service (1.4%). The study also found that 70% of the schools use their water supply for drinking purposes, though of the main uses of water, using it for drinking purposes was ranked third (19%) compared with using it for cleaning purposes (top of ranking, 34%) or for hand washing (4%, almost the lowest in the ranking, Table 4). Nevertheless, a little over half of the schools (51%) reported providing drinking water for the students during school sessions.

Of the 70 schools, more than half (52.9%) had one or more handwashing stations, with an average number of six (Table 5). The most common type of handwashing facility in the schools was the tippy tap (83%), a temporary kind of handwashing facility in schools. Of the schools that had handwashing stations, the majority of these were functional for both boys (91%) and girls (88%). Although HWFs were available in the majority of schools, only 54% of schools were observed to have water available at the HWFs and 35% had soap available for students. In terms of accessibility, only 41% of HWFs were accessible to students with physical disabilities. The proportion of schools that reported having water available for handwashing was higher than those with HWFs (Table 5), though it was unclear from the survey how students in schools without HWFs actually wash their hands.

Over 80% of schools reported having an active School Health Club (SHC) at the time of the survey, with an average membership of 33 students. Less than half (47%) of the SHCs were reported to meet once a week, while 21% reported meeting monthly and 16% only a few times within a year. The SHCs were involved in six main WASH-related activities, but the top three activities conducted in the SHCs were: latrine cleaning (53%), and promotion of hygiene behaviour

Table 4 | Drinking water availability and adequacy of water provision in schools

Variable	Frequency (N = 70)	%
Availability of drinking water for students at time of visit	36	51.4
Schools with one or more water supply sources	66	94.3
Schools with functional water supply at the time of visit	46	65.7
How constant the water supply is		
Constant throughout the year	37	52.9
Not constant during one or more months of the year	23	32.9
Not constant during all months of the year	10	14.3
Main uses of water supply in schools		
Cleaning	24	34.3
Cooking	18	25.7
Drinking	13	18.6
Flushing and pour flushing toilets	11	15.7
Hand washing	3	4.3
Any other purpose	1	1.4
Schools which have experienced problems with the water supply system since the beginning of the 2013/2014 financial year	42	60

Table 5 | Handwashing in schools

Variable	Frequency (N = 70)	%
HWFs in schools (reported)	37	52.9
Schools with water available for HW (reported)	50	71.4
Schools with soap available for HW (reported)	27	38.6
Observations in schools with hand washing facilities (N = 37)		
Availability of water at HWFs at time of visit		
Yes, in all facilities visited	20	54.1
In some of facilities visited	7	18.9
No water was available	10	27.0
Availability of soap at HWFs at time of visit (N = 37)		
Yes, in all facilities visited	13	35.1
In some of facilities visited	11	29.7
No soap was available	12	32.4
Observation not possible	1	2.7
Number of HWFs accessible to students with physical disabilities	15	40.5
Number of HWFs accessible to younger students	23	62.2
Functional handwashing stations (exclusive for boys)	30	81.1
Functional handwashing stations (exclusive for girls)	29	78.4
Functional handwashing stations (communal – boys and girls)	15	40.5

and practices through art, drama and/or poetry either in the schools (63%) or in the community (40%).

Duty rosters for cleaning facilities were at least available in some of the schools, though only those for cleaning latrines were available in almost all the schools (97%). Less than 20% of schools had duty rosters for water treatment. The display of duty rosters for WASH activities was uncommon (more than 80% of schools did not display their rosters). Similarly, the promotion of good hygiene practices through the display of messages as posters was uncommon in schools. In the majority of schools (83%), all students (boys and girls) were responsible for cleaning the latrines.

Less than half of the schools (39%) reported having budgeted for repairs, maintenance or provision of water supply and sanitation facilities. In addition, more than 90% of schools reported having an insufficient budget to meet WASH activities. On average, schools budgeted for two latrine maintenance activities, with the most common one being the repair of the superstructure (30%). No school budgeted for pit emptying. The problem of water supply was also quite frequent in the surveyed schools: at least 60% of schools encountered some challenges in the year preceding our survey. Regarding WASH maintenance, approximately 50% of the schools reported that the parts required for repairs of WASH facilities were unavailable locally for purchase. The study found that lack of funds was a major hindrance to the proper maintenance (repair or improvement) of WASH facilities.

THE ENABLING ENVIRONMENT

The implementation of the SWASH sub-component of the NSC, for which US$7 million was allocated, began later than planned and implementation presented several challenges. The SWASH sub-component was coordinated by the MoEVT/MoEST as the overall lead agency for NSC with the MoHCDGEC playing an advisory role.

As illustrated in Figure 3, the MoEVT was mostly involved in training and knowledge management activities (58%), such as the development of the SWASH guidelines and the training of regional secretariats (RS) and LGAs to implement them, followed by monitoring and supervision activities and advocacy and promotional events.

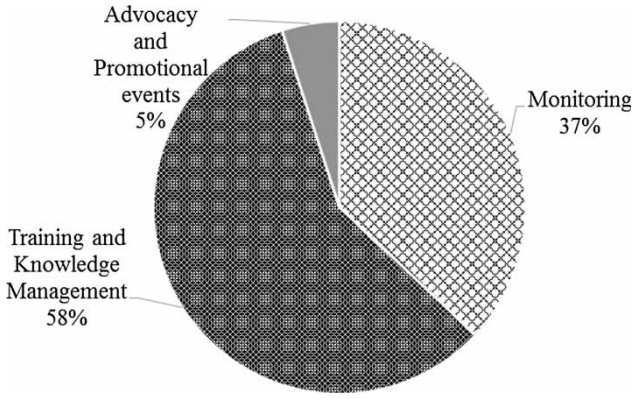

Figure 3 | Activities conducted by the MoEVT during the NSC for SWASH.

Interviews with district officials revealed that the main responsibility for planning SWASH activities lay with districts (71% of respondents) and the school management committees (SMCs) (49% of respondents). The results from the REOs were in line with those reported by the DEOs, except that the RS was found to be more active in the planning of SWASH at the regional level.

In terms of budget allocation, the rehabilitation of school toilets (83% of DEOs' responses), NSC supervision and monitoring (68% of DEOs), and training (56% of DEOs) were the activities most prioritised. Accordingly, 31% of DEOs reported that the NSC budget was used for recurrent expenditures, such as soap or water treatment. The majority of DEOs (>90%) confirmed that the school budget was inadequate for any recurrent or maintenance expenditures. REOs reported similar results on fund allocation, although a higher proportion of REOs reported that funds were allocated for recurrent (64% of respondents) and maintenance costs (71% of respondents), showing lack of a common understanding on expenditure allocations.

The analysis of the WSDP documents also confirmed the presence of several challenges to the implementation of the SWASH component of the programme (see Table 6).

DISCUSSION

The study found that WASH facilities and an appropriate enabling environment were available in most schools, though they were inadequate to ensure a sustainable

Table 6 | Challenges to implementation of the NSC campaign in schools

Challenges identified	Description	Source of information
Financial	• Late and erroneous disbursement of funds • Insufficient funds for monitoring SWASH activities to all LGAs • Poor budget execution by RS and LGAs	Aide Memoire 10th JSM, May 2013; 11th JSM, October 2013; Aide Memoire, 8th JSM, May 2012 MoHSW January–March 2014; MOHSW April–June 2014
Coordination	• Weak coordination between regions and LGAs in collating monitoring reports and outputs • Weak coordination between LGAs and local artisans in the rehabilitation of school toilet infrastructure and all funds for rehabilitation should be sent to school account • Weak coordination among the supervision members from the RS and district level involved in the campaign (Regional Water and Sanitation Team, and Council Water Sanitation Team)	MoHSW, April–June 2013; MoHSW, April–June 2014 and MoHSW; October–December 2014)
Monitoring and reporting	• Poor quality of monitoring reports due to lack of coordination between REOs and DEOs • Late submission of monitoring reports • Difficulty monitoring and evaluating the NSC attribution and the contribution of other SWASH actors in the LGAs • Lack of resources that facilitate monitoring and supervision at LGA level (i.e. means of transport)	MoHSW, April–June, 2013, MoHSW, July–September 2013; MoHSW, July–September 2014; MoEVT, January–March 2014

SWASH capable of achieving improved health and education for all schoolchildren in Tanzania.

The first parameter of the evaluation framework for the SWASH component aimed to assess whether the NSC implementation was executed as it was planned, i.e. whether the expected inputs of the campaign were implemented according to the programme's theory of change. The analysis of the campaign's enabling environment allowed a review of the main barriers and functioning mechanisms related to the implementation of Phase I. During Phase I of the NSC, the MoEVT was mostly involved in training and knowledge management activities (58%), followed by monitoring and supervision missions (37%). Despite the involvement of the central government in conducting training and assessing progress, the SWASH component of the NSC was characterised by several challenges that need to be addressed for the future phase.

As expected, fund transfer delays affected the implementation of the SWASH component at the same level it did the household sanitation component. In particular, the analysis of the Aide Memoires of the JSM reported that throughout the first year of the NSC implementation, funds for SWASH activities were channelled directly to MoEVT, reportedly in violation of AfDB financial agreement. While producing delays in the campaign flow, these issues highlight coordination challenges among the NSC actors at central level. Other coordination challenges have impacted the management of the campaign at school level, in particular between region and districts engineers and artisans conducting rehabilitation and construction of latrines in the schools. Poor quality and late reporting of progress and expenditure significantly impacted on the effectiveness of the school programme. Insufficient funds at local level were reported as one of the main challenges in conducting appropriate monitoring activities.

Lack of human resource capacities at a local level was also cited as a hurdle to conducting appropriate monitoring of programme outcomes. Quarterly progress documents reported that LGAs were unaware of funds being allocated in their accounts, or it was difficult to discern among those activities conducted under the NSC umbrella and those implemented by other partners. However, another critical hurdle to effective monitoring of the NSC was the delayed development and dissemination of the SWASH guidelines, a comprehensive document produced at central level that was set to guide local and regional governments in implementing and assessing the

SWASH activities. A recent study conducted by Jiménez *et al.* (2014) reported that, at the time the survey was conducted, the districts interviewed were not aware of or were not using those guidelines.

The second component of the evaluation framework guided the assessment of whether the campaign's inputs resulted in the expected changes in behaviours and outputs. The evaluation of 70 schools that received implementation of the NSC found that half the schools surveyed met the MoEVT guidelines standard for student to toilet compartment ratio for boys, while only 43% of schools satisfied the ratio for girls. To meet the National Standard for Sanitation and Hygiene (named as the National Latrine Options Manual), the construction of additional latrines (90 for girls and 3 for boys) would be required, paying particular attention to latrines for female students. Meeting the required toilet per student ratio is necessary, as evidence indicates that students are likely not to use the toilets when there is a queue, particularly during the planned breaks (Upadhyay *et al.* 2008). Furthermore, almost 90% of the schools were characterised by only one toilet block. Although respondents reported that separate toilet facilities were present for boys and girls, these were not exclusively detached, and could therefore not be considered as gender specific. The lack of user-friendly facilities for children including adolescent girls and disabled students often makes these vulnerable groups feel isolated in the schools. This could have a significant impact on enrolment, absenteeism, and lack of pupils' safety (UNICEF 2011). As indicated by the results of a randomised controlled trial conducted in Kenya (Freeman *et al.* 2012), the presence of an appropriate WASH environment (hygiene promotion, water treatment and sanitation access) has increased school attendance of female students by almost 60%.

Together with availability, latrine functionality has an impact on use in ensuring an appropriate hygienic environment (UNICEF 2015). Due to a lack of data, however, this study was unable to assess this parameter, which should be considered in future monitoring reports.

Although there are national variations in the definition of clean toilets, the UNICEF SWASH monitoring package (UNICEF 2015) identifies three key indicators to measure cleanliness: lack of smell, no visible faeces in or around the facility, and no flies. Results from our survey show that although over 90% of the toilets were improved latrines, and more than half of schools reportedly had clean toilets, most latrines were unable to satisfy all UNICEF criteria. For example, over 90% of the toilets observed were found to be smelly, which could be due to the fact that the toilets were full, or had some visible faeces either from overflowing pits or from improper disposal of anal cleansing materials. It could also be due to poor design or inadequate ventilation of the toilets.

Another indicator ensuring hygienic separation of faeces from human contact is HWWS at critical times, such as after defecation and before handling food. Although more than half of schools featured handwashing stations, only 39% reported availability of soap for HW. These results were confirmed by teachers, who reported that the budget for soap was allocated by only 39% of schools in the reported financial year. Although this proportion is higher than Tanzania's MoHSW goal of at least 15% of schools having HWFs with soap, this proportion is still low considering the effectiveness of HWWS in reducing the transmission of diseases such as diarrhoea.

Together with soap availability, the provision of cleansing material for students is a fundamental hygienic practice, which was reported in only 37% of the schools visited. Furthermore, the presence of regular messages displayed, instructions and monitoring are needed to promote hygiene practices among students, and to reduce illness-related absenteeism and other diseases such as influenza (Talaat *et al.* 2011; Lau *et al.* 2012).

Adequate water supply in schools, particularly for drinking and for handwashing, also plays a major role in improving the health and education of students. The study found that more than half the schools surveyed reported having drinking water available for students at the time of the visit. However, only about half of the schools reported a constant water supply throughout the year, which is in line with a recent cross-sectional survey of SWASH conditions in rural areas of Tanzania (Brombacher *et al.* 2014). In line with findings reported from the literature, the budget for SWASH managed by the school committee is mostly dedicated to hardware interventions, such as the rehabilitation and construction of sanitation and hygiene facilities (John *et al.* 2009; Jiménez *et al.* 2014; Deroo *et al.* 2015). Our study reported that lack of funds and insufficient parts for repairs and maintenance, as well as budget for recurrent costs, were some of the main challenges experienced in maintaining an appropriate environment in

schools. While we discussed the importance of HWWS, lack of or poor maintenance of latrines and water supply sources may lead to contamination of soil, groundwater or even lead to wastewater flow, exposing students to faecal pathogens. Thus, while a budget for SWASH infrastructure is the starting point for creating a hygienic environment in schools, funds for post-implementation monitoring and maintenance are equally fundamental to sustain this environment (Deroo *et al.* 2015).

Another fundamental pillar of the UNICEF child-friendly schools model (UNICEF 2015) is that schools deliver to children the appropriate hygiene messages, so that they can become agents of change not only in their schools but also in their communities. While teachers were reported to teach hygiene messages and to ensure that students participated in WASH activities, it was unclear whether teachers had received adequate training on hygiene promotion, and whether the schools had a behaviour change campaign in place. From the analysis of the MoEVT activities, it appears the SWASH guidelines for implementing the appropriate WASH behaviour in schools were finalised with significant delays at the end of 2014, suggesting that some of the schools that received the NSC had not received the appropriate training. The importance of appropriate training is further confirmed by a recent study finding, showing that students with adequate knowledge of hygiene and sanitation practices are at a lower risk of parasitic infections and diarrhoea diseases in schools (Gottfried 2010). The participation of the SMC and PTA in WASH activities was reported in the majority of the schools surveyed (>80%). Students and teachers engaging with the community can act as agents of change towards appropriate hygiene behaviours in the wider context. For example, UNICEF in partnership with the Government of Nepal launched the School Led Total Sanitation (SLTS) project, and reported a 100% achievement of household toilets in all 314 homes by the residents of Baijalpur through a school-led community project initiative (Mooijman 2012).

CONCLUSIONS

The process evaluation of the NSC provided a comprehensive and representative overview of the prevalent WASH conditions and behavioural determinants in the target population during Phase I implementation. Furthermore, through the analysis of key programmatic documents, this evaluation has highlighted the main barriers that affected Phase I, and provided a clear baseline for defining improvements for the next phase. The study found that although WASH facilities were available in some of the schools, they were inadequate in terms of facility-user ratios, functionality and proper operation and maintenance. There was also active participation in SWASH activities by key actors such as teachers, school children, the community and the various government departments, though poor planning and coordination, inadequate funding and budgeting, and a lack of spare parts for repairs and maintenance were found to be the main challenges to improved WASH in schools in Tanzania. For Phase II of the NSC, the study recommends more holistic and coordinated stakeholder partnerships, with clearly defined roles and responsibilities (including corrective mechanisms for non-compliance), cost sharing arrangements and proper planning, budgeting and financial management. There should be a balance in the allocation of funds for both hardware and software components of SWASH. It is also recommended that the capacities of teachers and the SMCs are built into WASH-related issues including operation, maintenance and monitoring, and also in financial management. It is also necessary to consider the impact of increasing financial efforts to improve the enabling environment within schools, particularly increasing the ratio of latrines per boys and girls and access for disabled pupils. Copies of the National WASH Guidelines should also be made available to all schools to guide them in the operation and maintenance of their installed facilities. Lastly, a common and standardised reporting mechanism with key indicators and milestones should be developed by the campaign coordinators to be used by all stakeholders for reporting and monitoring of SWASH activities.

ACKNOWLEDGEMENTS

The authors wish to thank Dr Rick Rheingans (University of Florida) for contributing to this manuscript and to Professor Sandy Cairncross (LSHTM) and Esther Forgan (DFID) who reviewed parts of this manuscript. We would also like to acknowledge and thank the field supervisors and

enumerators who conducted data collection for the process evaluation in 2014, as well as the enumerators who supported with data entry and translation.

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First received 5 October 2016; accepted in revised form 30 January 2017. Available online 14 February 2017