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Evaluation of Pilot DHaAL Interventions for Group Handwashing with Soap Before Mid-Day Meals in Rural Elementary Schools of Assam 2013-14

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ABBREVIATIONS AND ACRONYMS

CEE	:	Centre for Environmental Education
CFSS	:	Child Friendly Schools (and) Systems
DHaAL	:	Daily Handwashing for an Ailment-Free Life
DISE	:	District Information System for Education
ERG	:	Evaluation Reference Group
FGDs	:	Focus Group Discussions
IDIs	:	In-Depth Interviews
MDM	:	Mid-Day Meal (scheme)
NEERMAN	:	Network for Engineering and Economics Research and Management
NGO	:	Non-Government Organisation
O&M	:	Operations & Maintenance
OECD-DAC	:	Organisation for Economic Cooperation and Development – Development Assistance Committee
PHED	:	Public Health Engineering Department
PSM	:	Propensity Score Matching
RIDIE	:	Registry for International Development Impact Evaluations
RTE	:	Right to Education
SC	:	Scheduled Castes
SIEC	:	<i>Suraksha</i> Independents Ethics Committee
SMC	:	School Management Committee
SSA	:	<i>Sarva Shiksha Abhiyan</i> (Education for All Mission)
ST	:	Scheduled Tribes
ToR	:	Terms of Reference
TOC	:	Theory of Change
UNICEF	:	United Nations Children's Fund
UNEG	:	United Nations Evaluation Group
WASH	:	Water, Sanitation and Hygiene
WinS	:	Water, Sanitation and Hygiene (WASH) in School

EXECUTIVE SUMMARY

Handwashing with soap is considered one of the most cost-effective interventions to reduce the burden of waterborne diseases (Fewtrell et al. 2005; Waddington et al. 2009). Under its Water-Sanitation-Hygiene (WASH) in School (WinS) portfolio, UNICEF Assam implemented a pilot group handwashing programme called Daily Handwashing for an Ailment-Free Life (DHaAL), in collaboration with *Sarva Shiksha Abhiyan* (SSA), Government of Assam, and a local implementation partner, the Centre for Environmental Education (CEE), North East Cell. DHaAL sought to institutionalise handwashing in school settings by advocating with the state WinS Task Force and SSA, creating an enabling environment, installing group handwashing stations, making provisions for soap, and sensitising and training SSA block and cluster staff, teachers, School Management Committee (SMC) members, Mothers Group members, and students. From July 2013 to July 2014, the DHaAL pilot was implemented in 100 rural elementary public schools from Rani and Rampur blocks in Kamrup district with funding of ₹2.75 million from UNICEF.

The primary objectives of this evaluation were to:

- Assess the impact, effectiveness, efficiency and sustainability of the DHaAL pilot, based on OECD-DAC¹ criteria
- Generate relevant lessons and recommendations for sustaining and scaling up DHaAL elsewhere in Assam and across India

Findings from this evaluation now will be used to advocate for scaling up of DHaAL with national and state governments alike; to contribute to the thin sectoral knowledge base with regard to the efficacy of handwashing interventions; and to justify and inform an eventual, more rigorous evaluation of health and education outcomes of group handwashing with soap initiatives elsewhere in India.

The evaluation questions and methods were extensively discussed and finalised with an Evaluation Reference Group comprising UNICEF, SSA, Government of Assam and CEE members. In addition, this evaluation follows United Nations Evaluation Group (UNEG) Norms and Standards as well as the UNEG Ethical Guidelines for Evaluation.²

A mixed-method approach was used to evaluate the DHaAL pilot, based on OECD-DAC criteria. Qualitative research tools include document and literature reviews, in-depth interviews and focus group discussions, and school observations. In particular, this evaluation included 32 in-depth interviews and 10 focus group discussions with teachers, SMC members, Mothers Group members, and SSA and CEE staff, along with informal discussions with children.

Impacts on handwashing behaviours and other intermediate outcomes attributed to DHaAL were evaluated using a quantitative, counterfactual analysis. Two variants of DHaAL intervention were assessed: (1) DHaAL implemented along with the Child Friendly School System (CFSS) programme, which aims at the holistic improvement of the school environment in terms of teachers' capability, school infrastructure, physical education and a comprehensive focus on WinS components, of which DHaAL is a part (DHaAL+CFSS); and (2) DHaAL only, with other "business as usual" school activities

¹ <http://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm>

² <http://www.uneval.org/normsandstandards/index.jsp> and <http://www.unevaluation.org/ethicalguidelines>

and schemes (DHaAL-only). For each intervention school, a control school from adjacent blocks was chosen using regression based Propensity Score Matching (PSM) methods. The impacts or the change in an outcome attributed to the intervention were estimated by statistically comparing the outcome means between the intervention and control groups using regression models. The sample size for impact evaluation consisted of 15 DHaAL+CFSS schools, 15 DHaAL-only schools, 30 control schools, 823 children from Classes 3-5 and their parents for interviews, and 2,554 children from Classes 1-5 for handwashing observations. Nevertheless, several limitations were encountered, including (1) lack of a data-driven, and thus verifiable, logframe for the DHaAL pilot and (2) lack of adequate monitoring and evaluation (M&E) data to serve the objectives of the evaluation.

Effectiveness and Impact

DHaAL interventions benefited first and foremost from considerable institutional and policy support. For example, CEE and UNICEF mobilised policy support from SSA and the state WinS Task Force to institutionalise a dedicated time for group handwashing events during the mid-day meal break in public schools, and to allow schools to use part of the funds for the Mid-Day Meal (MDM) scheme to procure soap in this regard. CEE also built support for its capacity building and training of teachers as well as district- and block-level SSA officers. Recently, the state WinS Task Force has dovetailed construction of group handwashing stations with the building of school toilets in its effort to scale up DHaAL to more than 48,000 rural elementary schools in Assam (see also Sustainability and Scaling Up sub-section below).

Overall, the intervention improved handwashing with soap practices at schools but the size of the impacts differed considerably, depending upon the type of indicator used for measuring handwashing and the variant of DHaAL intervention. For example, in the case of the primary outcome of the proportion of children handwashing with soap before meals in school, the spontaneous recall of children (Classes 3-5) showed a very significant 45-percentage-point increase in DHaAL+CFSS and DHaAL-only schools together. However, based on enumerators' observations and counting – a more objective measure – impacts were far more modest, at only 9.5 percentage points in DHaAL+CFSS schools and 20.5 percentage points in DHaAL-only schools. In another example, a 29-percentage-point increase in washing of hands with soap after visiting the toilet was reported by children's spontaneous recall in DHaAL+CFSS schools vs. control schools, while a 19-percentage-point increase was noted in DHaAL-only schools compared to their control group. Again, impacts were much lower according to enumerators' observation and counting, at 24 percentage-points in DHaAL+CFSS schools and just 5.5 percentage points in DHaAL-only schools.

Further exploration of these results revealed that if meals under the MDM scheme were not served, most children did not eat – and thus did not wash hands at the meal-break time. Consequently, there were fewer observed instances of handwashing, and thus, a smaller magnitude of impact on handwashing. If it is assumed that the provision of meals in schools was more regular than observed in the survey, then impact needed to be corrected accordingly. It was then found that the “corrected” impact on the observed proportion of children washing hands with soap before meals showed a 31.3-percentage-point increase and a 20.9-percentage-point increase in DHaAL+CFSS and DHaAL-only schools respectively. As a consequence, an unexpected finding was that **the regularity of handwashing and the effectiveness of DHaAL were dependent on the regularity of the mid-day meal service.**

An expected but **surprisingly large “spillover” effect of DHaAL was found on the availability and use of handwashing facilities at children’s homes**. DHaAL’s theory of change had anticipated that children would act as change agents and influence the household decisions related to WASH. Nonetheless, the results were impressive: The proportion of parents reporting that their children discussed group handwashing activities and related messages at home increased by 45 percentage-points in DHaAL+CFSS schools and 49 percentage points in DHaAL-only schools over the respective control group levels of 37 per cent and 27 per cent. Moreover, the proportion of households that reportedly built or improved handwashing facilities at home increased by 24 percentage points in DHaAL+CFSS schools and 22 percentage points in DHaAL-only schools over their control groups, where the respective averages stood at 18 per cent and 15 per cent. Positive impact also was found on the number of instances of handwashing with soap during the 24 hours preceding the survey that were recalled by parents.

Qualitative research corroborated these findings, with several mothers also reporting that their children not only discussed the benefits of handwashing at home, but also insisted that the mothers and other family members wash hands in specific instances. This resulted in improving handwashing activities at homes and relevant facilities’ use by mothers as well as other family members.

Other key findings include:

1. Functionality of handwashing stations in schools: Eighteen months after the DHaAL pilot implementation concluded, 73 per cent of schools continued to use the group handwashing facilities constructed under DHaAL. Handwashing facilities in intervention schools were more accessible compared to those in control-group schools, with appropriate disposal of wastewater and cleaner surroundings. However, in eight of the 30 intervention schools (both DHaAL+CFSS and DHaAL-only), group handwashing units either were broken or dismantled because of damage, largely caused by animals or miscreants in the absence of a boundary wall. Critically, no system or dedicated funds for regular operations and maintenance (O&M) of these facilities existed.

2. Procurement and availability of soap for handwashing: Intervention schools spent a higher proportion of school budgets and used more soaps than did control schools. On average, per-child soap consumption in DHaAL-only schools was higher by 2.3 soap bars per academic year compared to the control group; this figure was only 0.7 soap bars more in DHaAL+CFSS schools compared to the control group. In more than 80 per cent of DHaAL+CFSS and DHaAL-only schools, soap was available for handwashing before the mid-day meal break; soap availability at other times was lower. Qualitative research revealed that teachers kept the soap with them at other times, primarily to avoid wastage and theft. This evaluation also highlighted that procuring soap was a challenge within the allotted budget, and that schools frequently had to rely on contributions from community members, parents and teachers. Because of this chronic lack of funds, less costly detergent or utensil washing powder sometimes was used instead of soap.

3. Discipline and supervision of group handwashing: As intended under DHaAL’s group handwashing process, children washed hands in a disciplined manner in 60 per cent of DHaAL+CFSS schools and 53 per cent of DHaAL-only schools. Supervision of group handwashing by teachers, mothers and even older students also was observed in 47 per cent of DHaAL+CFSS schools and 53 per cent of DHaAL-only schools. Qualitative research also corroborated these findings and even observed that, in a few schools, children sang songs and made group

handwashing highly enjoyable. Therefore, the DHaAL philosophy that handwashing should be a fun activity practiced in a group setting is being adhered to in most schools 18 months after project implementation concluded.

4. Indirect Effects on other WASH Facilities and Practices in Schools: DHaAL's focus was on handwashing behaviours, but CEE also sensitised and educated teachers, SMC members, Mothers Group members and students on other aspects of WASH, including maintenance and appropriate use of toilets, and segregation of solid waste. Therefore, indirect effects of DHaAL on sanitation facilities and practices in schools also were evaluated. Small to modest impacts on functionality and use of toilets, waste management and safety of drinking water in schools were found – mostly in a positive direction, but sometimes in a negative direction. Therefore, quantitative analysis could not conclusively prove whether the DHaAL intervention caused these indirect impacts, or whether other school-level factors and schemes such as CFSS were responsible. Likewise, even qualitative research findings were not conclusive about whether DHaAL actually improved WASH facilities and practices other than handwashing.

Gender- and Equity-Focused Impacts

To ascertain that the programme had impacts even on marginalised social groups and by gender, subgroup analysis was conducted by sex and age (proxy by class/standard) of children, occupation of the chief wage earner (labourer), scheduled caste or scheduled tribe (SC/ST) status of the household, and lowest-income-quartile households. Consistent impacts of DHaAL among all population sub-groups were found, but these impacts were larger for some such groups.

For example, in the case of SC/ST students, the impact on the proportion of children who recalled washing hands with soap before meals in schools stood at 82 percentage points in DHaAL-only schools, substantially higher than the 40- to 50-percentage-point impacts in other gender and social groups. In the case of DHaAL-only schools, the impacts on handwashing with soap before meals were 26 percentage points among girls and 34 percentage points among boys from Classes 3-5 -- but there were no impacts on younger children. This is likely because the younger batches of students were enrolled after DHaAL implementation concluded, and hence, they were not trained in this regard; possibly, the relevant knowledge also was not transferred from the older children to the younger new batches. In all, households of girls from Classes 3-5 reported notably higher impacts on availability of a dedicated handwashing station with water and soap (18 per cent) than household of boys from the same cohort (7.5 per cent), suggesting that girls may serve as more effective change agents.

Efficiency

Based on discussions with SSA, CEE and UNICEF staff in Assam, it was found that one of the key features of DHaAL was its affordability and efficiency. In turn, this was a major factor that the state WinS Task Force has considered in deciding to scale up DHaAL across all rural elementary schools in Assam. Infrastructure cost per child is merely ₹86 (programme cost divided by total number of students in 422 schools), according to CEE data. SSA officers also agreed that the DHaAL intervention did not incur significant additional budget burdens beyond installation of the group handwashing stations, which were low-cost (about ₹10,000) and made from locally available materials. Further, the saturation approach of targeting all schools in a block under DHaAL allowed CEE to work under

economies of scale, such that only one CEE staff member was needed to monitor and support about 30 schools.

Sustainability and Scaling Up

DHaAL's pilot successes have already led it to begin to be scaled up to all rural elementary public schools in Assam, as noted above. Yet further success in terms of sustainability and scaling up are not sure things: For example, a substantial proportion of teachers believe that additional staff will be essential as the programme moves forward and expands, especially in single-teacher schools. SMC members and teachers also expressed concern over available funds and cautioned against reliance on the community for O&M of infrastructure. **The overall assessment is that the “hardware” (infrastructure) of group handwashing is highly scalable, but that more efforts will be needed to sustain the hardware and scale up the “software” parts of DHaAL, such as capacity development, training and monitoring.**

To sustain the short-term DHaAL impacts elaborated in this evaluation over the longer term, the following other enabling factors will need to be strengthened and barriers addressed:

- 1. Sustaining the infrastructure:** Quite simply, the sustainability of handwashing practices over the long term will depend on the sustainability of the group handwashing facilities. Yet the low-cost, simple construction undertaken in the DHaAL pilot has a limited design life (possibly 5 years), so that scaling up of DHaAL will need to consider construction of more robust handwashing stations. This gap is already being partially addressed as SSA builds robust handwashing units along with toilets in 16,000 schools.
- 2. Ensuring availability of piped water:** Existing handwashing units require manual hauling of water by MDM cooks, mothers or teachers. However, this creates dependency on the availability of these human resources, and thus affects regularity of handwashing. Toilets are not maintained well and thus not used, reportedly because a piped water supply is not available to maintain the toilet more conveniently. Clearly, if the toilet usage itself is low, so also is the rate of handwashing after toilet use. As identified by CEE, the availability of piped water schemes and electricity to pump water represents serious challenges in rural Assam – a state that nevertheless has a higher rate of overall water availability than many other areas of India. As DHaAL is scaled up, therefore, the general availability of water could itself become a major barrier in schools where a perennial water source does not exist on site.
- 3. Adequate funds for soap procurement:** The current budget allocation of ₹400 per school for soap is inadequate because each child will need at least one 100-gram soap bar, costing ₹20-40, during each academic year. The reliance on community contribution of soap is an unreliable strategy and can be viable only as a stopgap arrangement.
- 4. Continuous sensitisation and training:** As teachers are transferred and children graduate to other schools, the potential exists for taking with them the knowledge of group handwashing with soap. Even so, it was found that the level of sensitisation to and awareness of the DHaAL process already is beginning to slowly erode over time. Scaling-up plans of DHaAL across Assam do not yet include a plan for capacity development, sensitisation and training support, unlike the plan that existed under the DHaAL pilot. Therefore, continuous support for expanded DHaAL sensitisation and training will be needed, which aligns with the overall assessment above of the need for further attention to programme “software.”

Lessons Learned

Evaluation of the DHaAL pilot has generated several key lessons that also can be applied to broader WASH programmes. Most importantly, learning should be an important objective of pilot programmes, which necessitates a robust and data-driven M&E system, as well as the integration of rigorous evaluation methods at the design stage of the project. Such integration also requires systematic collaboration between programme implementation and evaluation staff or external agencies.

Moreover, when a programme such as DHaAL is implemented by using another programme as a platform, such as the MDM scheme, success of the former depends critically on success of the latter, as noted above. Such dependencies need to be considered and managed during the project design stage.

Lastly, it is appropriate that the local community and institutions such as SMCs are involved in school-based programme, but the role should be commensurate with communities' capacities. Reliance on the community for contribution of funds or provision of technical and managerial skills for O&M of infrastructure, for example, may not be viable at scale and are better suited functions for the government machinery.

Recommendations

The following recommendations, which have been discussed with the Evaluation Reference Group in person, are ordered based on the evaluation team's perception of their urgency and importance, but UNICEF and SSA are encouraged to further determine the prioritisation of these recommendations based on their needs and circumstances.

Recommendations to UNICEF

1. Provide technical assistance, documentation and advocacy support to SSA to implement the recommendations made to SSA
2. Consider during further programme design improvements on how schools will transfer from simple to more robust handwashing units once behaviour change is demonstrated and how this infrastructure will be maintained
3. Make the M&E system a learning systems instead of only tracking activities and outputs and make it more data-driven system for future pilot projects
4. Include, document and monitor gender, social inclusion and equity dimensions in programme design and monitoring, in line with UNICEF's country priorities and commitment to gender- and equity-sensitive programming. Particularly, efforts are needed on better documentation and presentation of the evidence of the efforts actually taken on gender, social inclusion and equity dimensions
5. Employ a rigorous experimental impact evaluation, combined with qualitative methods, to generate robust evidence on whether handwashing programs can indeed improve health and educational outcomes and how these impacts can be moderated by fidelity of program

implementation and local institutional-geographical factors, and whether the impacts are indeed sustained over long term

6. Advocate in other states the establishment of structures similar to the Assam WinS Task Force, which played an important and effective role in coordinating various Government line departments and external agencies

Recommendations to SSA, Department of Education, Government of Assam

1. Make financial provisions for at least one bar of 100-gram soap per child per academic year
2. Consider other engineering designs in the construction of robust group handwashing units to reduce the burden of manual hauling of water in the absence of a piped water supply
3. Establish an effective and accountable system for O&M of WASH infrastructure in schools, which is critical to sustain the infrastructure being built and the habits being formed
4. Include both “hardware” and “software” aspects of the DHaAL pilot in the programme scaling up
5. Set up an electronic monitoring system to track DHaAL implementation, given that initial monitoring can be an important tool to institutionalise handwashing in schools.
6. Collect indicators in the DISE survey related to type, availability and functionality of handwashing facilities in schools, as well as the amount of soap procured/consumed
7. Consider more frequent monitoring of meal provision under the MDM given the apparent irregularity of meal service despite all schools being covered under the MDM scheme

1. INTRODUCTION

This report presents findings of an evaluation of a pilot group handwashing programme, Daily Handwashing for an Ailment-Free Life (DHaAL), in two blocks of Assam state. The evaluation, conducted more than 18 months after active support from the implementing agencies ceased, presents impacts sustained in the short term.

1.1 Background and Policy Context

1.1.1 Policy Context of the WASH in School Programmes

The education and health of all children have been well-recognised rights and development goals in both the new Sustainable Development Goals (SDGs) and, prior to this, the Millennium Development Goals (MDGs). For their part, the MDGs, promulgated in 2000, emphasised universal primary education and significant reductions in child mortality, whereas the SDGs and the global Agenda 2030 seek to provide each child with equitable and quality education and a learning environment that is child- and gender-sensitive, safe, inclusive and effective (SDG4). The SDGs also pledge to ensure healthy lives and well-being for all, at all ages (SDG3).

Nonetheless, these ambitious development goals will be challenging to achieve without fulfilling children's right to water, sanitation and hygiene (WASH) in school settings, a key part of ensuring access to water and sanitation for all (SDG6) and to adequate and equitable hygiene. With adequate WASH facilities and education in schools, children can learn better and can bring concepts and practices on sanitation and hygiene back to their families. On the other hand, lack of basic WASH facilities can discourage students, especially girls, from attending schools; affect their health negatively and increase health-related absenteeism; and further compromise their cognitive development and educational outcomes.

Globally, however, fewer than half of primary schools had access to safe water and adequate sanitation in 2011, according to UNICEF annual reports, and many schools did not even maintain data on access to WASH in schools. UNICEF thus issued a Call for Action for WASH in School, in collaboration with several international development organisations, foundations and universities, to increase investments, effective planning and action so that all children could go to a school with child-friendly water, sanitation and hygiene facilities (UNICEF 2016).

In India, the rights of children to WASH in school have been well-recognised. The Right to Education (RTE) Act of India 2009 envisions in *each school* safe drinking water, separate toilets for boys and girls, and adequate hygiene education and facilities. However, while substantial progress has occurred in providing drinking water to schools, progress on sanitation continues to lag. For example, out of more than 1.16 million primary schools in India, only 70 per cent have girls' toilets and 75 per cent have boys' toilets, compared to more than 93 per cent with a drinking water source.

At the same time the benefits of handwashing have received far less attention in India; not even monitoring of availability and use of handwashing facilities in schools. Even at global scale, in spite of the well-recognised importance of handwashing with soap, no verifiable targets have been set for

handwashing infrastructure, unlike for toilets and water sources. This situation is particularly disconcerting because hygiene education and handwashing with soap, among all WASH interventions, are shown to have the strongest impact on improving child health (Fewtrell et al. 2005; Waddington and Snilstveit 2009; Curtis and Cairncross 2003).

Recognising the existing gaps in WASH in schools and the rights to WASH enshrined in the RTE Act, the Government launched a national campaign called *Swachha Bharat–Swachha Vidyalaya* (Clean India–Clean School) in 2014. A key feature of the campaign has been to ensure that every school in India has functioning and well-maintained WASH facilities. In turn, UNICEF has been a key partner on WASH-related advocacy and implementation in schools through its WASH in School (WinS) programmes across several Indian states, which combine infrastructure and behavioural components necessary to produce a healthy school environment and to develop or support appropriate health and hygiene behaviours.³

For several years, UNICEF has promoted group handwashing in schools as part of Global Handwashing Day (UNICEF and GIZ 2013); for example, in 2012 70 million children from a half-million schools participated in group handwashing activities as a part of this special day. Since then, UNICEF has been extending the focus on group handwashing from only one day to a more continuous activity throughout the academic year. Starting with a pioneering group handwashing programme in Philippines called Fit-for-School in association with GIZ, UNICEF has implemented group handwashing programmes in countries such as Cambodia, India, Indonesia and Lao PDR. Within India, UNICEF has implemented group handwashing programmes in Assam, Madhya Pradesh and West Bengal states, and is in discussion with the national Government to scale up group handwashing programmes across the country.

This evaluation thus is timely because it can offer lessons from the pilot group handwashing programme in Assam and inform scaling-up efforts elsewhere.

1.1.2 Socioeconomic and Child Health Situations in Assam

Assam is a predominantly rural state, with four-fifths of households residing in rural areas. The population in Assam also is fairly young, with 35 per cent younger than age 15 and only 4 per cent older than age 65 (IIPS and MI 2007). Most of the people (70 per cent) follow Hinduism, with a significant minority following Islam (24 per cent). Significantly, Assam is poorer than the country as a whole: A total of 24 per cent of rural households in the state are in the lowest wealth quintile, with only 6 per cent in the highest wealth quintile. Even so, the level of school enrolment in Assam is high, and comparable with more developed states in India. Three-fourths (76 per cent) of children aged 6–17 years attend school in rural areas of Assam, including 91 per cent of primary school-age children (6–10 years).

As with family income, the health status of children in Assam likewise is poorer than the national average and underlines the need for interventions to improve child health. The most recent National Family Health Survey was concluded very recently, with only provisional data available at the time of writing (IIPS and MI 2016), but as per the National Family and Health Survey 2005–06, the infant

³ Infrastructure components include the provision of drinking water, handwashing with soap, and toilet facilities in schools for children and teachers. Behavioural components, meanwhile, include activities to promote and sustain safe WASH behaviours, including the practice of handwashing with soap before meals in a group setting.

mortality rate in Assam was the fifth-highest in the country, at 66 deaths per 1,000 live births (IIPS and MI 2007). Only 31 per cent of children aged 12-23 months were fully vaccinated, well below the national average of 44 per cent. Moreover, the prevalence of diarrhoea among children younger than age 5 stood at 8 per cent, with the prevalence of Acute Respiratory Infections (ARI) nearly as high, at 7 per cent. Critically, almost half of under-5 children (47 per cent) were stunted, or too short for their age – a health issue often linked poor WASH and nutrition – and more than a third (36 per cent) were underweight. Lastly, anaemia was a major health problem, with more than 70 per cent of children aged 6-60 months being anaemic.

Nonetheless, the new National Family Health Survey factsheets (IIPS and MI 2016) indicate that Assam has made some progress in improving child health over the past decade. For example, the infant mortality rate has decreased from 66 to 48 per 1,000 live births, with the under-5 mortality rate falling even more sharply, from 84 to 56 per 1,000 live births. In addition, the proportion of children who are fully vaccinated has risen from 31 per cent to 47 per cent. While still very high, the proportion of stunted children younger than age 5 has reduced from 47 per cent to 36 per cent, and the proportion of underweight children has declined from 36 per cent to 30 per cent.

Despite these notable gains, overall Assam continues to be one of the less-developed states in India, with a high burden of poor health among children. Thus, given the globally proven efficacy of WASH in preventing diseases and improving child nutrition, initiatives such as WASH in School are particularly necessary in states like Assam and need to be prioritised.

1.1.3 WASH in School Efforts in Assam

Progress in the provision of drinking water and toilets in school has been rapid in Assam, although gaps exist between availability and functionality of these facilities. For example, between 2007-08 and 2012-13, coverage of girls' toilets increased sharply, from 10 per cent to 94 per cent, but the coverage of functional such toilets stood at only 79 per cent, according to District Information System for Education (DISE) data. A total of 72 per cent of schools had boys' toilets, but these were functional in only 56 per cent of schools. Similarly, while 90 per cent of schools had a drinking water source available, the coverage of functional water sources was 74 per cent. Therefore, UNICEF Assam identified three broad challenges to address under its WinS initiatives:

1. Poor operations and maintenance (O&M) of toilets and drinking water sources, largely due to lack of ownership at school and community levels
2. Need to strengthen WinS monitoring to incorporate indicators related to quality of facilities and their use
3. Need for sustained hygiene behaviours, including inculcating handwashing practices before the mid-day meals

To address these, UNICEF has implemented WinS activities in collaboration with the *Sarva Shiksha Abhiyan* (SSA) of the Government of Assam. In recent years key achievements of the partnership included WinS systems strengthening;⁴ WinS being made an integral part of RTE Compliant Schools

⁴ A WinS Task Force, chaired by the Mission Director, SSA, has been in place since 2008. This task force has been instrumental in addressing key gaps on WinS in infrastructure, O&M, school curriculum and behavior change, and it coordinates with various line departments in the Government of Assam. SSA's WASH Cell also was strengthened, with district-level training programmes in 27 districts.

and Child Friendly Schools and Systems (CFSS) programmes;⁵ demonstration of model toilets;⁶ mainstreaming of WinS in teacher and headmaster trainings of the Government of Assam, with School Management Committees (SMCs) also oriented, focusing on personal hygiene and handwashing with soap;⁷ and conducting of a state-level workshop on WinS, which resulted in the outlining of priority actions for Assam.⁸

1.1.4 Genesis of DHaAL

Recognising the importance of handwashing with soap in schools, in September 2012 the Commissioner and Secretary of Elementary Education, Government of Assam, issued a directive to all schools to enable them to use untied funds under the Mid-Day Meal (MDM) scheme to procure soap for handwashing in schools. This led to institutionalising the practice of handwashing with soap in schools.

This initiative was supported by a systematic programme to sensitise the school system and students alike on handwashing, make available handwashing facilities, and cause a sustained change in handwashing practices of schoolchildren. UNICEF Assam adopted the Fit-for-School group handwashing programme piloted in Philippines, as noted above, to the local context as DHaAL, implementing this Indian pilot in 100 elementary schools in Rani and Rampur blocks of Kamrup District. This was achieved in collaboration with SSA and the local implementation partner Centre for Environmental Education (CEE), North East Cell. Total funding from UNICEF to CEE for DHaAL was ₹27,50,435.

Key components of the DHaAL pilot were:

- Creating an enabling environment at the SSA level
- Augmenting or building group handwashing facilities in the 100 schools, based on the principle of simple, scalable and sustainable models
- Training and capacity-building of teachers, SMCs, Student Councils, Mothers Groups and MDM cooks, focusing on behaviour change related to WASH practices, including handwashing
- Ensuring availability of soap for handwashing through ongoing Government programmes

1.1.5 Key Stakeholders and Their Roles in DHaAL

Figure 1-1 summarises the key stakeholders and their roles in DHaAL. As noted, CEE was the implementing agency, while UNICEF and SSA mainly provided financial, advocacy and policy support. Funding from UNICEF to CEE covered the costs of human resources, transport and other incidentals, whereas SSA funded the handwashing infrastructure itself. The school was responsible for the provision of soap and O&M of group handwashing facilities, using discretionary funds allocated to schools or other funds such as the MDM scheme budget. Specific activities under DHaAL were:

⁵ Wins and CFSS has been demonstrated in 40 schools of the Kamrup District of Assam in partnership with the implementation partner Centre for Environmental Education, North East Cell.

⁶ In 2009, UNICEF supported the demonstration of model “inclusive toilets” with water connectivity. Most design elements have now been incorporated into toilets constructed by SSA across the state.

⁷ This also has been integrated into the School Health Programme rolled out by the National Health Mission (NHM).

⁸ These included sustained functionality and use of WASH facilities and the O&M system, integration of WASH topics into the school curriculum, and introduction of a mechanism for identifying and declaring Clean School Awards.

1. School-level activities

- a. Augmenting or installing group handwashing facilities
- b. Training of head teachers, SMC members, Student Councils, Mothers Groups and MDM cooks on processes related to group handwashing
- c. Supporting teachers as needed
- d. Supporting soap provision at school level
- e. Monitoring functionality of installed group handwashing stations and their use during the implementation stage

2. District-level activities

- a. Building support for DHaAL among district- and block-level SSA officials to institutionalise group handwashing activities as an important part of school functioning
- b. Participatory monitoring along with SSA and block/cluster coordination committees

3. State-level activities

- a. Advocacy with the Government of Assam's WinS Task Force and Working Group to address gaps in implementation of DHaAL or coordination with other departments, and to scale up DHaAL



Figure 1-1. Key Stakeholders and Their Roles in DHaAL

1.2 Purpose and the Use of Evaluation

The objectives of DHaAL pilot were to demonstrate the viability of a group handwashing project within Assam and learn lessons to sustain and scale up handwashing in schools across the state. This evaluation thus was commissioned with the main purpose of independently evaluating whether the DHaAL pilot actually institutionalised and sustained group handwashing facilities and practices in schools, and of generating lessons learned and recommendations for the scaling up of DHaAL across Assam and elsewhere in India. Specifically, it has sought to apply reasonable and practically credible

methods to evaluate at least short-term impacts of the DHaAL pilot even after active support from the implementing partner ceased.

For its part, UNICEF is focused on evidence-based programme implementation to make a lasting difference in the lives of the most vulnerable. Nationally, it plans to scale up the group handwashing with soap initiative to potentially cover 110 million children from 1.4 million rural elementary schools across India. In Assam, SSA, with UNICEF support, has already committed to scale up DHaAL to all 48,001 Government elementary schools in rural areas in a phased manner. Evidence from the DHaAL pilot will be critical to persuade other state governments and the Government of India of the efficacy of group handwashing; in turn, it can eventually justify and inform a larger health and education outcome evaluation of group handwashing with soap initiatives elsewhere in India. This evidence also will be useful for sharing with the larger WinS team within UNICEF and its partners as a knowledge product, and particularly for UNICEF to improve the intervention design, implementation and processes before scaling up.

This evaluation was conceived more than a year after the DHaAL pilot concluded with a purpose of assessing whether the objective of DHaAL continued to be met even after active support from the implementation partner CEE ceased and thus provide credible evidence of at least short term sustainability of impacts. However, as an evaluation conceived *post-hoc*, it was impossible to apply the *gold standard* evaluation methods of randomised controlled trial (RCT) with a baseline survey. Therefore, this evaluation seeks to apply "reasonable and practically credible" methods to evaluate the impacts of DHaAL pilot. The findings of this evaluation will be useful for:

- Advocating with SSA for scaling up DHaAL across the entire State of Assam as well as advocacy with Ministry of Human Resource Development at the national level;
- Sharing of the findings with the larger WinS team within UNICEF and alliance partners as a knowledge product; and
- Justifying and informing a larger health and education outcome evaluation of group handwashing with soap initiatives elsewhere in India.

1.3 Evaluation Objectives and Questions

The primary objective of the evaluation has therefore been to assess the impact, effectiveness, efficiency and sustainability of the DHaAL pilot, based on OECD-DAC⁹ criteria and generate the relevant lessons and recommendations for sustaining and scaling up the programme.

Specific questions related to these objectives are summarised in Table 1-1.¹⁰

⁹ <http://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm>. The original Terms of Reference (See Appendix C) did not include evaluation of relevance criterion. However, based on the feedback on the draft report, it was felt that enough information was presented in the report to ascertain the relevance of DHaAL. Therefore, the evaluation team decided to assess relevance as per OECD-DAC criteria.

¹⁰ Several evaluation questions were made more specific and additional questions were included after the inception report and evaluation protocol were developed to better serve future learning needs. Therefore, differences exist in the presentation and content of evaluation questions between the final report, the evaluation protocol, and the Terms of Reference.

Table 1-1. Evaluation Criteria and Associated Evaluation Questions

Evaluation Criterion	Evaluation Questions
Relevance	Does DHaAL have the potential to meet the overall objective of improving child health and education outcomes?
	Is DHaAL relevant to UNICEF’s country priorities?
	Is DHaAL relevant to the Government of India’s development priorities?
Effectiveness	To what extent, and how, are the stated programme objectives achieved as per the logframe of the programme agreed between UNICEF Assam and CEE?
	Has the enabling environment been adequately created in Assam to scale up DHaAL across the state?
	What are the strengths and limitations of the Monitoring and Evaluation (M&E) system in delivering the expected programme outcomes?
Impact	Did group handwashing or DHaAL improve and sustain the practice of handwashing with soap before meals in rural lower primary schools compared to a “business-as-usual” situation?
	To what extent can changes in intermediate outputs and outcomes be attributed to the DHaAL intervention as per the Theory of Change?
	Did DHaAL result in improving other WASH facilities and practices at schools?
	Are there any “spillover” impacts of DHaAL on WASH facilities and their use at children’s homes?
	Are there external factors that can moderate the impact of DHaAL intervention? How?
Efficiency	Are the manpower and financial resources invested efficiently to deliver the programme objectives?
	Are programme outcomes delivered on time and within budget?
	What is the cost-effectiveness ratio of DHaAL in terms of “software and hardware” costs, as well as effectiveness in terms of impacts on handwashing behaviours caused by DHaAL?
Sustainability and Scalability	What is the scalability and sustainability potential of DHaAL?
	What are specific recommendations to scale up DHaAL?
Gender and Equity Focus	Did DHaAL pilot include marginalised population sub-groups?
	What are the gender-segregated impacts of DHaAL on key outcomes?

The **secondary objective** of this evaluation, as noted above, is to inform future health impact evaluations of group handwashing interventions in terms of broad recommendations for design and implementation of such evaluations and measurement of primary impact indicators. This secondary objective has been met by:

- Developing and applying protocols for measuring observation-based indicators for handwashing practices before meals and after the use of toilets in schools. These protocols are included as Appendix M in Volume II of the report.
- Measuring and reporting the impact on the prevalence of diarrhoea, highly credible gastrointestinal illnesses, and worm infections. These results are reported in Appendix A: Technical Annexure, along with intra-cluster correlations for these health outcomes that may be needed for sample design of future impact evaluations.
- Measuring and reporting faecal contamination of water used for handwashing, and extent of faecal contamination of hands of children. Results of this assessment are provided as Appendix B.
- Recommending a randomised controlled trial to evaluate health impacts of a stabilised, scaled-up group handwashing intervention as a part of national scaling-up plans.

The evaluation questions and methods to obtain answers were discussed by Evaluation Reference Group (ERG) members from UNICEF, SSA and CEE, and the consultants. The agreed evaluation protocol then was submitted to UNICEF.

2. THE THEORY OF CHANGE AND THE INTERVENTIONS

2.1 Logframe of DHaAL Pilot

Table 2-1 illustrates the logframe of the DHaAL pilot, which was developed by CEE and UNICEF Assam. This has been used to assess the effectiveness of DHaAL, in addition its use to critique the overall M&E system of the pilot.

2.2 Theory of Change for Impact Evaluation

To evaluate the impacts of DHaAL on the intermediate outputs and outcomes and on the primary outcome of handwashing with soap, a Theory of Change (TOC) was hypothesised, as summarised in Figure 2-1. This TOC goes beyond the logframe established for DHaAL pilot to map out the process from programme activities (captured in the logframe) to availability and access to functional handwashing facilities, and finally, to their use by children. The TOC also clearly includes the possibility of “spillover” effects of DHaAL on WASH facilities and practices at homes of the children, as well as their effect on other WASH facilities and their use in schools as a result of CEE training and activities. Further, the TOC specifies the dependency of DHaAL on external factors or inputs such as provision of water, availability of functional toilets, and regular provision of meals in schools. This strengthening of the logframe was necessary to objectively assess impacts on handwashing behaviour.

The impact evaluation methods specified quantifiable, specific and measurable indicators for activities, outputs and outcomes according to the TOC, and in addition attributed impact in these indicators to DHaAL (see also Section 3.2). Some outputs and outcomes were evaluated using qualitative methods, as indicated by the brown-coloured font in Figure 2-1. Also highlighted in brown are the activities assessed qualitatively as a part of the effectiveness assessment (see also Section 4.2). Critically, this evaluation was not designed to evaluate the impacts of DHaAL on overall health and education outcomes. However, to trace the complete TOC, limited health- and school attendance-related information was collected but not reported only in the Technical Annexure to the main report.

Because of inclusion of a comparison group that undergo “business as usual” activities, the identified impacts will also prove the efficacy of peer-to-peer learning in a group handwashing setting. This evaluation is one of the first rigorous evidence or proof of concept that group handwashing is more effective than business-as-usual approaches in Indian contexts.

Table 2-1. Logframe for DHaAL Programme

SN	Objective	Proposed Activities	Expected Output	Expected Outcome	Means of Verification
1	To support SSA and UNICEF in developing 100 scalable model schools on proper handwashing practices, so as to ensure sustainability and address O&M	Baseline survey using structured questionnaire	Survey report	Better planning based on the survey result	Survey report and formats
		“Handholding” of teachers, SMC members, Student Councils and Mothers Groups	At least 1,000 members trained on a module	Better understanding of WASH and cooperation with the programme	Training reports, photographs and module
		Augmenting/creating handwashing facilities through SMCs	Mass handwashing facilities in 100 schools	Better handwashing practices and less waterborne disease	Photographs of the facilities created
		Advocacy with head teachers based on 7 Sept 2012 letter of Commissioner for soap availability	Availability of soap in schools for handwashing	Better handwashing practice	Soap in schools, photographs
		Linking the schools with CFSS model schools that are already developing good practices in WASH	Each CFSS school linked to 3-5 schools	Peer learning from the CFSS schools	Photographs of school visits, written feedback by teachers and students
		Midterm survey using a structured questionnaire	Survey report	Improved understanding about the project processes and improvement in plans	Reports
		Term-end survey using structured questionnaire	Survey report	Analysis of impact of the project	Reports, photographs
2	District-level interventions for ensuring internalisation of a monitoring mechanism	Dialogue with SSA district- and block-level functionaries based on the 7 Sept 2012 letter of Commissioner for time allocation for handwashing	Minutes of the meeting	Time allocation for handwashing	Reports
		Planning meetings to involve additional block resource centre coordinators and cluster resource centre coordinators in monitoring	A joint monitoring plan	Better monitoring of handwashing in DHaAL schools	Monitoring reports

SN	Objective	Proposed Activities	Expected Output	Expected Outcome	Means of Verification
		Bimonthly sharing and review meetings	Conducting meetings	Better implementation plan	Minutes of the meetings
3	State-level advocacy	Linking the DHaAL project to decision makers through the State WASH Task Force and the WASH Working Group	Progress of the project shared and inputs received for improvement	Better implementation of DHaAL and integration of positive aspects into state policies	Minutes of the Task Force and the Working Group meetings

Source: Proposal by CEE to UNICEF for DHaAL intervention, 2012

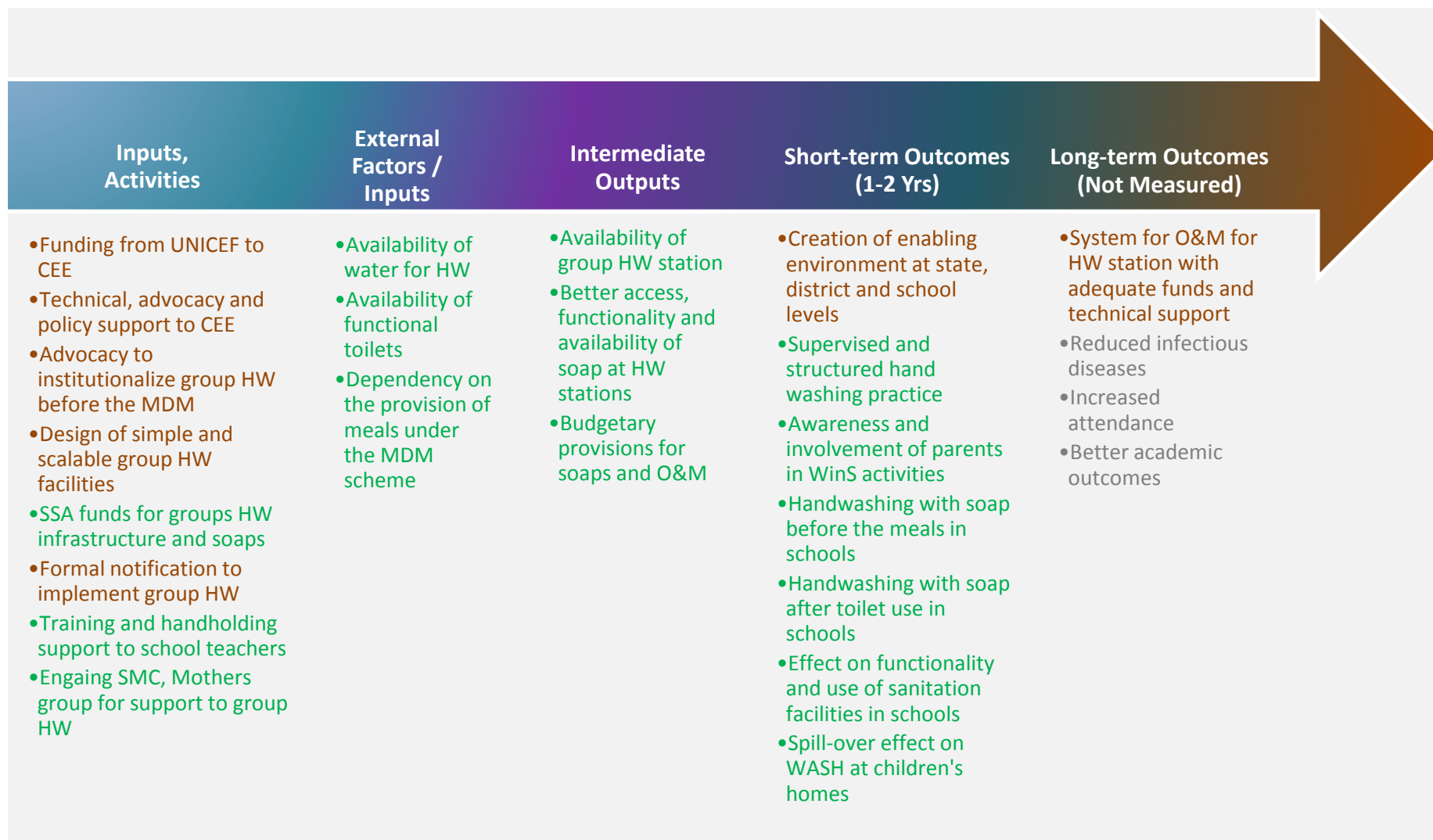


Figure 2-1. Theory of Change for DHaAL Intervention

(Colour Code – Green: Quantitative impact evaluation, Brown: Qualitative assessment, Blue: Assumed, but not measured, Grey: Not evaluated)

2.3 The Interventions Evaluated

As noted, the DHaAL pilot was implemented in 100 rural elementary schools selected by SSA and CEE. A total of 40 of these schools also were included in the more comprehensive programme of RTE Compliant Schools and CFSS. The CFSS schools benefited from a holistic focus and activities related to teacher support, learning outcome improvements, introduction of physical education, and a focus on all components of WASH in school, including group handwashing facilities under DHaAL. To assess whether DHaAL impacts were different if implemented as a part of CFSS, the ERG recommended evaluating two variants of the DHaAL intervention:

1. DHaAL only: In these 60 schools, the DHaAL pilot alone was implemented by CEE
2. DHaAL+CFSS: In these 40 schools, DHaAL was implemented in addition to other activities under CFSS and including broader support to other WinS components

Because the objective of this evaluation was to assess the impacts sustained more than 18 months after implementation by CEE concluded, **the evaluation was restricted to the first set of 100 schools where the DHaAL pilot was implemented between July 2013 and July 2014.** Evaluators confirmed with both CEE and SSA that the programme design and implementation did not change over the project implementation period.

Notably, this evaluation does not evaluate impacts of DHaAL+; Phase 2 of the originally conceived pilot, which extended DHaAL from the original 100 schools to all 422 rural elementary schools from three blocks (Rani, Rampur, Kamalpur) in a block-saturation approach from March to November 2015. This extension, with funding support of ₹1.12 million from UNICEF, resulted from a favourable review by the Government of India's Joint Review Mission for the MDM scheme, which recommended scaling up of the DHaAL pilot to all rural elementary schools in Assam. The state's WinS Task Force also had recommended a block-saturation approach to UNICEF Assam and CEE. While the quantitative impact evaluation sample did not include any intervention school from Phase 2, qualitative responses were based on lessons learned from both Phases 1 and 2. In the effectiveness assessment, the extension of DHaAL is further discussed as a success indicator for UNICEF and CEE advocacy efforts.

3. METHODOLOGY

The impact evaluation used a mixed-method approach. A counterfactual analysis using quantifiable indicators and econometric analysis (quantitative impact evaluation) was the main method to assess impacts as per the OECD-DAC criteria. Qualitative methods were mainly used to assess the criteria of relevance, effectiveness and sustainability. Results from both qualitative research and quantitative impact evaluations were triangulated to draw inference wherever required.

3.1 Qualitative Assessment

3.1.1 Evaluation Criteria

The evaluation criteria and questions listed in Table 1-1 guided the qualitative inquiry and assessment. This qualitative evaluation particularly focused on assessing relevance, effectiveness, efficiency, and sustainability and scalability.

3.1.2 Qualitative Techniques

3.1.2.1 Document and Literature Review

A set of programme reports, baseline and endline data from project M&E were reviewed; these documents are listed in Appendix N. In addition, published literature on the effectiveness of handwashing interventions also was reviewed. The published literature is cited throughout the report, with a complete list of cited sources given in Section 6.

3.1.2.2 In-Depth Interviews and Focus Group Discussions

Qualitative data were collected by using in-depth interviews (IDIs), focus group discussions (FGDs) and participatory observation techniques (Table 3-1). Respondents were programme staff from SSA, CEE and UNICEF, mothers of school students/members of Mothers Groups, and SMC members. IDIs and FGDs were conducted with the assistance of separate guidelines included in the research protocol.

Table 3-1. Respondents and Techniques for the Qualitative Research

Respondents	Qualitative Techniques	Sample		Total Sample
		Intervention Schools	Control Area	
Teachers	IDI	4	2	6
Programme implementation staff (NGO/CEE personnel)	IDI	3	NA	3
Mothers	IDI	8	3	11
Mothers	FGD	4	2	6
SMC members	FGD	3	1	4
Officials from SSA/education department/UNICEF	IDI	4	NA	4
Institutions (schools)	Observation	6	2	8
	TOTAL	32	10	42

3.1.2.3 School Observations

The qualitative research team observed the schools for functionality of WASH facilities, their appropriate use by students, existence of other infrastructure and facilities in the schools, records of budget expenditure, and overall school environment. The qualitative team also debriefed supervisors of the field survey teams employed to conduct structured interviews and observations as a part of quantitative impact evaluation. Field survey teams as a whole were debriefed on overall perceptions and observations related to WinS in general and DHaAL in particular.

3.1.3 Implementation of Qualitative Research

Four qualitative research teams, which benefited from a three-day training, were formed and consisted of two senior qualitative research consultants, one supervisor, and four research investigators or moderators. The field supervisors and moderators were local to Assam. The analysis team, meanwhile, consisted of a senior qualitative researcher and a data assistant for coding and developing thematic summaries.

Qualitative data collection was completed in two phases. In the initial phase, interviews with programme staff from CEE, UNICEF and SSA were carried out, while interviews with mothers, SMC members and teachers, FGDs with Mothers Group and SMC members, and school observations and interactions with children occurred in the second phase. All interviews were recorded, transcribed and translated into English, processed in Atlas-ti, and then analysed to identify common themes and insights.

3.2 Quantitative Impact Evaluation

The ToR requested a “reasonable and practically credible” quantitative impact evaluation to validate the theory that group handwashing interventions can be more effective than typical non-structured business-as-usual activities because of peer-to-peer learning in a group setting. As noted above, the evaluation thus estimated the impacts attributed to DHaAL compared to “business as usual” approaches to handwashing in schools in Assam.

The quantitative impact evaluation statistically validated the TOC presented in Figure 2-1 in terms of measurable, specific and quantifiable indicators of outputs and outcomes. The inputs and activities as per the TOC were assessed as a part of effectiveness analysis using qualitative methods.

3.2.1 Impact Evaluation Criteria

Non-experimental matching based counter-factual analysis was used to evaluate impacts attributed to DHaAL Interventions. Here, a Propensity Score Matching (PSM) method was used to identify pairs of DHaAL and matched control schools, as well as DHaAL+CFSS and their matched control schools using DISE 2012-13 data. Then, using the evaluation survey data, the means of various outcome indicators between intervention and control groups were statistically compared to estimate impacts attributed to group handwashing interventions.

Examples of the indicators as per the TOC are listed in Table 3-2. Notably, this table includes only a subset of indicators for elucidation purposes, while a complete indicator list is reported in the impact evaluation findings (Section 4.3.2) and Appendix A: Technical Annexure.

To ensure objectivity and transparency of the impact evaluation, the impact evaluation criterion for the primary outcome was pre-specified as a 30-percentage-point increase in the proportion of students washing hands with soap before meals in school. This criterion was discussed and agreed with the ERG during the preparatory and protocol development stages. A statistical significance level of $\alpha = 0.1$ with a two-sided test also was pre-specified for testing the null hypothesis that there was no impact caused by DHaAL on the primary handwashing outcome indicator.

For other intermediate outputs and secondary outcomes as per the TOC, the evaluation criterion was that the difference would be statistically significant at $\alpha = 0.2$ with a two-sided test, for indicators measured at child and household levels. For indicators measured at school level, statistical inference would not be valid because of low sample size, and it was decided to instead compare only the means between intervention and control schools, without any statistical inference.

3.2.2 Analytics

As noted above, the PSM method was used to identify the pairs of intervention-control schools that were similar in terms of indicators based on 2012-13 DISE data. Because DHaAL Phase 2 intended to saturate all schools of Rani and Rampur as well as Kamalpur blocks, control schools were selected from neighbouring and socio-culturally similar blocks (Boko, Hajo and Chhaygaon). The control blocks were purposively selected in discussion with the ERG. The Technical Annexure explains in detail how the matching was done.

The impact identification strategy assumes that the intervention and control groups were indeed similar before and without the intervention, so that changes observed in the intervention group were caused by the intervention. Further, this assumption is assessed in terms of several indicators reported in DISE 2012-13 (before DHaAL was implemented) and several variables measured in the endline survey that would not change over time due to the intervention. Overall, it was found that most school-level characteristics were balanced, but that several child- or household-level characteristics were not. Ordinal least-square regression models were used to estimate the impacts while statistically adjusting for the observed pre-intervention imbalance in school and household level covariates as described in detail in the Technical Annexure. The impact evaluation analysis is conducted separately for DHaAL-only and DHaAL+CFSS schools.

Evaluators specified alternative regression models to ascertain that the results are robust to different modelling assumptions. In all, the evaluation team has reasonable confidence in suggesting observed impacts as causal, while also clarifying relevant differences between DHaAL and DHaAL+CFSS schools qualitatively. In the main body of the text, results from the following two types of models are presented whereas more detailed results are presented in the Technical Annexure:

- **For impacts on the school level indicators:** Paired group mean difference with adjustment for imbalanced variables at school level; and
- **For child and household level indicators:** Paired group mean difference with adjustment for household level covariates, and child's sex and Class level.

Critically, it was found that meals under the MDM scheme were not served in almost one-fourth of the schools on the day of survey. The level of handwashing before meals thus would be negligible in these schools, which also would lower the magnitude of impacts observed. Therefore, the analysis

was extended to answer a hypothetical question of what *could* have been the impacts had meals been served on the day of survey team’s visit.

Finally, to estimate impacts by gender and socially marginalized groups, the data were restricted to the population sub-group of interest and the impacts estimated for key outcome indicators such as handwashing by children, use of toilets by children, and availability and use of handwashing facilities in the children’s homes.

3.2.3 Sample Size and Target Population

As discussed further in Appendix A: Technical Annexure, the designed sample size for this evaluation was:

1. Treatment Arm 1 (DHaAL+CFSS): 15 schools
2. Matched control for DHaAL+CFSS: 15 schools
3. Treatment Arm 2 (DHaAL only): 15 schools
4. Matched Control for DHaAL only: 15 schools

The overall target population for the evaluation was children of Classes 1 to 5 from public primary schools in rural areas of Assam. All students present on the day of the survey visit were observed for their handwashing behaviours. For more detailed measurements at child and household levels using structured interviews, the target population consisted of children from Classes 3, 4 and 5 and their parents/households, among whom up to five students from each class and their parents were randomly sampled. Table 3-3 summarises the achieved sample size by different target population groups.

3.2.4 Survey Instruments and Measurements

The following survey instruments were used:

- **Children (Classes 1-5) handwashing-before-meals observation forms** (Appendices E and F): Enumerators observed and counted children present in the school, those who washed hands and those who washed hands with soap before meals in the school by their grade and sex.
- **Children (Classes 3-5) handwashing-after-toilet observation forms** (Appendix G): Enumerators observed and counted children present in the school, those who visited the toilet, purpose of toilet visit, and whether they washed hands (with and without soap).
- **Structured school observations form** (Appendix H): Enumerators observed the school premises to assess the access to and functioning of group handwashing and other types of handwashing stations and other WASH facilities, as well as other school-level infrastructure.
- **Schoolteacher questionnaire** (Appendix I): Enumerators interviewed teachers to collect information on school facilities, exposure to DHaAL support activities, WASH facilities and their use in schools, provision of funds and procurement of soap, O&M of school facilities, and other school-level information.

Table 3-2. Abridged Evaluation Matrix and Measurement Tools

Outcomes	Indicators	How is it measured
Adequate exposure to DHaAL promotion and support activities	% of schools reporting receiving support from SSA, UNICEF or CEE	Teachers interview (self-reported)
Exposure of parents to handwashing programmes	% of households (parents) reporting that they volunteered in any handwashing-related activity at school	Household (parent) interview
	% of households (parents) reporting that they observed improved handwashing infrastructure/practices in school over past 2 years	Household (parent) interview
MDM is being served	% of schools serving the MDM on the day of interview	School observations by enumerators
	% of schools reporting serving the MDM almost all days	Teacher interview (self-reported)
	% of children reporting the MDM is served regularly in the school	Schoolchildren (Class 3-5) Interview
Functional water source	% of schools reporting water supply on all school days	School observations by enumerators
	% of schools reporting adequate water availability	Teacher interview (self-reported)
Functional toilet on premises	% of schools with functional toilets or boys and girls	School observations by enumerators
Availability of handwashing stations	% of schools having different types of handwashing stations	School observations by enumerators
Functionality of handwashing stations	% of schools where handwashing station has water and soap available	School observations by enumerators
Adequacy of funds for handwashing	% of schools reporting having funds for procuring soap	Teacher interview (self-reported)
	% of schools with adequate O&M funds for the handwashing facilities	Teacher interview (self-reported)
Handwashing after using toilet	% of children washing hands with soap after using the toilet	Children observations and counts
Handwashing before the MDM	% of children washing hands before the MDM	Children observations and counts
	% of children washing hands with soap before the MDM	Children observations and counts
Indirect effect on handwashing at homes	% of households reporting making any WASH-related improvement due to messages from the child	Household (parent) interview
	% of parent households having handwashing station	Household (parent) interview
	% of parent households having handwashing station with soap	Household (parent) interview

Table 3-3. Achieved Sample Size

Block	Control	DHaAL+CFSS	DHaAL	Total
Number of schools: Teacher survey, school observations, school water sample	30	15	15	60
Number of children present in the school (Classes 1-5): HW observation before the meals in school	1,314	793	447	2,554
Number of children interviewed (Class 3-5): Child interview, parent survey ^{&}	397	216	210	823

[&] 75 per cent of household respondents were mothers of the children surveyed, while 18.4 per cent were the fathers, and 3.1 per cent were the grandparents.

- **Child (Classes 3-5) questionnaire** (Appendix J): Enumerators elicited responses to handwashing practices in school and at home, access to and use of other WASH facilities, provision of meals in school, and basic information about children’s homes.
- **Household/parent questionnaire** (Appendix K): Enumerators interviewed mostly mothers (sometimes fathers, and rarely others) and collected information on WASH facilities and practices at home, participation of parents in WASH in school activities and basic socioeconomic information about the household, and observed WASH facilities at homes and their functionality.

3.2.5 Implementation of Impact Evaluation

The surveys for impact evaluation were conducted by four teams of five enumerators and one supervisor each who were trained extensively in-class and on-field. These teams were supervised by senior field manager and field executives throughout the survey duration. All instruments, their translations and field protocols were thoroughly tested in a pilot. The surveys were conducted electronically using a Computer Assisted Personal Interview (CAPI) app (SurveyCTO™). The survey implementation protocols are available in Appendix M. All data was de-identified prior to analysis in STATA v13.

3.2.6 Cost-Effectiveness Analysis

As a part of efficiency assessment, the ToR required estimation of cost-effectiveness of DHaAL using available data. Qualitative methods described in Section 3.1 were used to assess efficiency of DHaAL whereas quantitative methods were used to estimate the cost-effectiveness ratios. The main purpose of cost-effectiveness ratio will be to compare different approaches to institutionalizing handwashing behaviours in school settings in future and also to cost future programmes elsewhere. However, cost-effectiveness ratio is an economic concept and needs appropriate interpretation from trained economists who can appreciate and analyse the effect of various assumptions made in estimating these ratios and presented in the Technical Annexure.

The costs for infrastructure, capacity development and resource agency support were obtained from the budget submitted by CEE as well as discussions with UNICEF-Assam, SSA and CEE. The cost of soap provision was estimated based on data from a published journal article and typical market price for soaps. Assuming the group handwashing stations would last for a period of 5-years, the total cost of DHaAL per school was annualized over a five-year period. The cost effectiveness ratios are estimated as:

$$\frac{\text{Change in the handwashing-related indicator of interest (the effect)}}{\text{Cost of programme implementation per school}} \times 1000.$$

3.3 Key Limitations

Despite the numerous methodological controls, several key limitations of the evaluation were noted, which are summarised below along with how those limitations were addressed.

Poorly verifiable targets in the logframe and limited use of M&E information: Most of the means of verification in the logframe for the DHaAL (see Table 1-1) cannot be summarised quantitatively, while even qualitative assessment would be too subjective for means of verification such as photographs, minutes of meetings and/or reports. M&E data from the baseline and endline surveys by CEE were used only to verify that group handwashing facilities were installed and soap was available in all 100 pilot schools. However, the M&E data which collected limited indicators subjectively and coarsely at school level, was found inadequate for more systematic quantitative analysis. The ERG instead recommended that the impact evaluation use official DISE data as the baseline, although DISE data did not collect information on handwashing facilities. Lack of baseline data on various indicators as per the TOC limited the overall impact evaluation to using only endline data in counterfactual analysis.

The evaluation team however notes that UNICEF-Assam and CEE had recognized limitation of previously estimated M&E framework and commissioned this evaluation by external experts to address some of the limitations. In fact, this experience has resulted in important learnings on importance of integrating robust and data-driven M&E at project design and implementation stages.

Non-experimental methods compromise validity of impact estimates: Theoretically, attribution of impacts is possible only with a large, well-conducted randomised controlled trial. Matching-based and other non-experimental methods are a viable alternative often used when randomisation is not possible, but they require a high quality baseline data. However, this post-hoc impact evaluation suffers from lack of detailed baseline data on handwashing related outcomes of interest and other children specific variables which limits our ability to convince ourselves that the control group correctly captures the counterfactual situation of what would have happened in the absence of DHaAL.

To at least ensure balance or similarity of intervention and control groups in terms of school characteristics before the intervention, a secondary data source (DISE 2012-13) was used as a baseline; in addition, the regression models controlled for several school, household and individual level variables. Impact estimates using alternative regression models were verified as similar, which again increased confidence that the identified impacts could be attributed to DHaAL interventions.

Possible measurement biases in indicators for handwashing with soap: If handwashing practices are enumerated based on the recall of practices by students, impacts can be overestimated because reported behaviours often demonstrate knowledge that a behaviour is needed, but not the actual behaviour. Use of a control group did not address this source of bias because children from intervention schools were expected to be more knowledgeable of the need for handwashing with soap, and thus could over-report handwashing at a much higher rate than children from control schools.

On the other hand, enumerator observation and counting can underestimate impacts if students do not wash hands on the day of the survey team visit because meals were not served under the MDM. In those circumstances, as noted above, the observation-based indicator would not capture the typical handwashing behaviour of the children if the meals were served.

The risk of under- or overestimating the impact on handwashing with soap was addressed by providing results for both types of indicators and then triangulating the findings. The evaluation team also pre-specified and agreed to use observation-based measurements as the primary indicator for handwashing behaviour.

Impact evaluation findings may not be externally valid across Assam or India: As stated above, the evaluation team has high confidence that the impacts measured in the endline survey are attributable to the DHaAL pilot. However, it is possible that these impact estimates may not be valid elsewhere in Assam or India. This is because the impact evaluation sample was identified using matching methods and restricted to only five adjacent blocks in a single district. The Kamrup district also is the capital district of Assam and likely benefits from better administrative oversight. Using DISE data, it was verified that the sampled schools were similar to other schools in Kamrup district, but not necessarily to schools across Assam.

Limitations of qualitative methods: The qualitative methods are subject to limitations such as limited sample size, reliance on subjective narrations that could be biased, possible influence of researchers' skills and biases in inference, and lack of reproducibility of results. These methods adopted reasonable quality assurance measures to reduce bias in inference such as: (a) random selection of schools for qualitative assessment; (b) data coding by a different set of researchers; and (c) independent inference from qualitative data by 3 different researchers and their collective agreements on findings.

3.4 Ethics and Transparency

The evaluation, implemented with official approval from SSA, followed United Nations Evaluation Group (UNEG) norms and standards as well as UNEG Ethical Guidelines for Evaluation.¹¹ It was provided Institutional Review Board oversight by the *Suraksha* Independent Ethics Committee (SIEC), Hyderabad, for confidentiality, data security and ensuring the rights of respondents. To ensure objectivity and transparency, the impact evaluation design (primary outcome, estimation methods, evaluation criteria) also was registered on www.clinicaltrials.gov (NCT02617225) and the Registry for International Development Impact Evaluations (RIDIE) (5661ada7c0587). To ensure involvement and ownership by key stakeholders, UNICEF established the ERG for this evaluation as per UNICEF India's memorandum on "Management of Evaluation Processes and Accountability in UNICEF India." (See Appendix D for the Terms of Reference for the ERG.)

¹¹ <http://www.uneval.org/normsandstandards/index.jsp> and <http://www.unevaluation.org/ethicalguidelines>

4. MAIN FINDINGS

4.1 Relevance

Does DHaAL have the potential to meet the overall objective of improving child health and education outcomes?

While strong evidence exists on the efficacy of handwashing to improve child health, whether the actual programmes or interventions can indeed deliver the required level of handwashing infrastructure and behaviours is less clear. Handwashing or hygiene improvements are found more effective overall in improving child health than are water or sanitation interventions, although such evidence is lacking on whether the provision of handwashing facilities or the resultant health benefits can improve broader education or academic outcomes. This may be because almost no impact evaluations of reasonable quality in school settings have been conducted. In fact, ***one of the value additions of this evaluation is to provide the first credible evidence of the behaviour change impacts of group handwashing intervention in school settings.*** Below we summarise earlier key studies related to the effectiveness of handwashing interventions:

- Fewtrell and colleagues conducted a systematic review and meta-analysis of the effectiveness of various types of WASH interventions in reducing diarrhoea prevalence in 2005 (Fewtrell et al. 2005). They found that handwashing and/or hygiene education-based interventions were the most effective, compared to only water supply or sanitation interventions. However, the authors also found evidence of publication bias in favour of only positive findings.
- A systematic review by Curtis and Cairncross in 2003 found diarrhoea risk reduced by 42-44 percentage points because of handwashing, with risks of severe intestinal infections and of shigellosis reduced by 48 and 59 percentage points respectively (Curtis and Cairncross 2003). The authors also cautioned against poor quality of the studies and, again, the possibility of publication bias.
- Waddington and colleagues updated the previous systematic reviews in 2009 (Waddington and Snilstveit 2009; Waddington et al. 2009) and found the provision of soap for hand-washing was effective in reducing diarrhoea prevalence, and compliance with handwashing did not fall over time.
- Rabie and Curtis reviewed eight studies that estimated the risk reduction in Acute Respiratory Infections (ARI) due to handwashing ranged from 6 to 44 percentage points (Rabie and Curtis 2006).
- Willmott and colleagues systematically reviewed evidence from 18 trials on the effectiveness of hand hygiene interventions among school, preschool and day-care children (Willmott et al. 2016). They found the studies presented mixed results and suffered from several quality issues. In turn, they summarised that the effect of the handwashing interventions in

educational settings was mixed for gastrointestinal infections, but that interventions may have been more successful in reducing respiratory tract infections.

- A randomised controlled trial in primary schools in China compared the rate of absenteeism in control schools with a standard school handwashing programme and an expanded handwashing intervention consisting of promotion, soap for school sinks, and peer hygiene monitors (Bowen et al. 2007). Compared to the control schools, both standard and expanded intervention schools had reduced absenteeism (2.0 versus 1.2 median episodes of absence per 100 student-weeks), but no difference was noted in the absenteeism rate between the two types of intervention schools.
- Lastly, Galiani and colleagues conducted a randomised control trial of a large-scale general-population-level handwashing promotion intervention in Peru in 2012. (Galiani, Gertler, and Orsola-Vidal 2012). The intervention had no significant effect on handwashing behaviour or the health of children.

Overall, handwashing in school settings has strong potential to improve child health by reducing exposure to faecal pathogens and improved hygiene. The evidence on whether handwashing can improve broader education or academic outcomes is too thin and with mixed findings thus far, but improved health conditions are associated with improved education outcomes overall.

Is DHaAL relevant to UNICEF's country priorities?

The focus of the UNICEF India Country Office (ICO) is on social inclusion to advance basic rights for all children irrespective of ethnicity, caste, gender or any other marker to gaining access to information, public services and institutions. ICO promotes an enabling environment through advocacy, communication, capacity strengthening and awareness raising on non-discrimination and social change. One of the ICO Programme Component Results (PCRs) is that “Boys and girls live in a protective environment and have equitable access to and utilise quality education and protection services.” This PCR is associated with the Government of India’s planning priority on education (*Universal elementary and quality education, expansion of lower secondary education*). Further, a strategic result under the PCR is that the Government and other UNICEF partners have increased capacity to implement RTE and CFSS.

For its part, the DHaAL pilot improved social equity by strengthening WASH facilities in schools and also assisting the Government to deliver its obligations under the RTE Act. Moreover, the DHaAL pilot also responded to the Global Call for Action by UNICEF and its partners, as discussed in Section 1.1.1, again underscoring its relevance.

Is DHaAL relevant to Government of India's development priorities?

As summarised in Section 1.1.1, India has committed to providing all elementary schools with safe drinking water, as well as with separate toilets for boys and girls, and hygiene facilities and education,

all as per the RTE Act 2009. India also has launched the *Swachha Vidyalaya* (clean schools) programme since 2014. Notably, however, while the provision of drinking water and sanitation are being delivered through national and state programmes, programmes on improving handwashing facilities and practices in schools have not been prioritised across India. Given the nation's stated commitment to improve hygiene and health outcomes among schoolchildren, DHaAL is thus highly relevant to India's current development needs.

4.2 Effectiveness

To what extent, and how, have the stated programme objectives been achieved as per the logframe of the programme agreed between UNICEF Assam and CEE?

Table 4-1 summarises the assessment of expected outputs as per the logframe of the DHaAL pilot, taking into account the previously mentioned caveat that the means of verification in the logframe could not be aggregated, summarized and verified. However, based on qualitative research findings it was found overall that:

1. Baseline, midline and endline surveys were conducted in 100 pilot schools
2. A total of 200 teachers, 350 SMC members, more than 1,500 Mothers Group members and 4,000 students were oriented and trained on WASH issues, with a special focus on handwashing with soap
3. Three designs of group handwashing facilities were developed, appropriate to the field situation, in collaboration with the Engineering Cell, SSA
4. Group handwashing facilities were augmented/installed in 100 schools
5. A total of 25 international and national delegates witnessed and learned about the pilot as part of the WinS International Learning Exchange
6. Government of India's Joint Review Mission on the MDM scheme recommended that SSA scale up DHaAL to cover all Government elementary schools in rural areas of Assam in a phased manner, as noted above. The State WinS Task Force, in consultation with UNICEF Assam, then decided to expand the DHaAL pilot to all rural elementary schools in Rani, Rampur and Kamalpur blocks in Kamrup district as Phase 2 of the pilot (DHaAL+).

Table 4-1. Qualitative Assessment of Expected Outputs as Per the Logframe

SN	Objective	Proposed Activities	Expected Output	Evaluation Findings
1	To support SSA and UNICEF in developing 100 scalable model schools on proper handwashing practices, so as to ensure sustainability and address O&M	Baseline survey using structured questionnaire	Survey report	Baseline survey was used to assess the availability of handwashing facilities and bottlenecks in terms of funding and soap provision. The baseline survey served the purpose of planning; for example, the cost of group handwashing unit was revised from Rs 8,000 to Rs 10,000.
		“Handholding” of teachers, SMC members, Student Councils and Mothers Groups	At least 1,000 members trained on a module	350 SMC members, 1,500+ Mothers Group members and 4,000 students were oriented and trained on WASH issues, with a special focus on handwashing with soap. Qualitative research identified that SMC members, Mothers Group members and students recalled such training activities. The impact evaluation also found that teachers recalled training by CEE.
		Augmenting/creating handwashing facilities through SMCs	Mass handwashing facilities in 100 schools	All 100 pilot schools had group handwashing facilities as per the monitoring data from CEE. The status of group handwashing was verified by the field teams. Out of 130 sampled schools, the group handwashing unit was broken/dismantled in eight schools because of damage by cattle and miscreants.
		Advocacy with the head teachers based on 7 Sept 2012 letter of Commissioner for soap availability	Availability of soap in schools for handwashing	Most pilot schools had soap available, but sometimes the “soap” was detergent or utensil washing powder. Soap was readily made available at the handwashing station before meals in about 80 per cent of schools in the evaluation. However, soap was available in the morning at the handwashing site in only 60 per cent of project schools surveyed. Therefore, soap is not available in all schools, reportedly because of budget constraints in procuring it.
		Linking the schools with CFSS model schools that are already developing good practices in WASH	Each CFSS school linked to 3-5 schools	Non-CFSS schools (60) were taken for exposure visits to CFSS schools, but no verification was available on what further linking was done.
		Midterm survey using a structured questionnaire	Survey report	The survey was conducted at school level by CEE and assessed the presence of a handwashing facility and soap while also recording perceptions about the level of handwashing practices in school on a Likert scale. Data were used primarily to confirm that the DHaAL intervention was being implemented as planned.

SN	Objective	Proposed Activities	Expected Output	Evaluation Findings
		Term-end survey using structured questionnaire	Survey report	Endline survey by CEE verified functionality of handwashing stations and availability of soap. Photographs of the facilities were taken as proof of delivery.
2	District-level interventions for ensuring internalisation of a monitoring mechanism	Dialogue with SSA district- and block-level functionaries based on 7 Sept 2012 letter of Commissioner for time allocation for handwashing	Minutes of the meeting	District and block SSA officials recalled several meetings with CEE; however, CEE works with SSA on other WASH projects as well, not only DHaAL. At the same time, SSA officials recalled discussions related to DHaAL. Because the qualitative team's mandate was not to audit Government records, it did not verify the availability of any minutes of meetings in the government offices.
		Planning meetings to involve additional block resource centre coordinators and cluster resource centre coordinators in monitoring	A joint monitoring plan	CEE developed a joint monitoring plan in collaboration with additional block-resource centre coordinators and cluster resource centre coordinators. During their visits to schools, these coordinators monitored the functionality of group handwashing units, availability of soap and their use by children. However, these data were not recorded and updated in an electronic M&E system and could not be verified.
		Bimonthly sharing and review meetings	Conducting meetings	District officials recalled frequent meetings with CEE, but it could not be verified whether these were formal biweekly meetings.
3	State-level advocacy	Linking the DHaAL project to decision makers through the State WASH Task Force and the WASH Working Group	Progress of the project shared and inputs received for improvement	Several meetings of the WinS Task Force and WASH Working Group were reportedly minuted, with UNICEF Assam and CEE present at most of these meetings. The state programme officer clearly recalled reports from CEE and UNICEF Assam on DHaAL progress, observed successes and limitations, and credited their communication (among other factors) for the state's decision to scale up the DHaAL pilot.

As discussed in Section 3.2 , to find impacts as per the TOC, teachers' exposure to training activities by CEE was measured, along with any other support from CEE or SSA officials. Teacher recall of receipt of support from SSA and CEE for DHaAL was very high in both DHaAL+CFSS (93 per cent) and DHaAL-only schools (80 per cent). The average number of teachers per school who reportedly were sensitised and trained on group handwashing activities by CEE stood at 2.5 in DHaAL+CFSS schools and 1.7 in DHaAL-only schools.

Has the enabling environment been adequately created in Assam to scale up DHaAL across the state?

4.2.1 Enabling Environment for DHaAL

Below we discuss the enabling environment that worked in favour of DHaAL, and that will need to be continually ensured to sustain programme impacts. Critically, a lack of, or inadequacy in, these factors can become bottlenecks to scaling up DHaAL elsewhere.

4.2.1.1 Institutional Factors and Policies

Pursuant to Section 1.1 presented the policy and institutional context as well as the role of institutional stakeholders in DHaAL, ***a critical enabling factor is the existence and effectiveness of the high-powered state-level WinS Task Force***. Without such high-level policy support within state government, it would have been challenging to scale up DHaAL even within Assam. Through the task force, coordination between various line departments and funding support for DHaAL was organised. The task force and SSA also integrated toilet construction carried out by the PHED under the *Swachha Bharat Swachha Vidyalaya* initiative with the construction of group handwashing stations, thereby enable future scaling up of DHaAL wherever newer toilets are built or repaired.

4.2.1.2 Involvement of the Larger Community

A clear understanding existed that the programme was a joint effort between the community and schools, with recognition that community support is essential because the entire community can potentially benefit. Both teachers and elders in the community were instrumental in disseminating knowledge about handwashing and hygienic behaviour among children. One mother noted: *“Society needs to be aware of cleanliness, hygiene, washing hands. ... Mothers Groups, teachers and guardians must take the initiative to spread the message [of DHaAL].”* Some members of SMCs and Mothers Groups stated that villagers as a whole were well aware of the programme and that the entire community was supportive and cooperative. In some villages, community members were reportedly recommending the programme to other communities.

In the opinion of CEE, SSA staff and local UNICEF officers, community engagement in managing schools was a critical success factor not only for DHaAL, but also for most other school-based programmes. Many Assamese communities established schools in their villages on their own, without Government support. Even after these schools were later transferred to the Government to manage, these communities remained highly involved and interested in all school affairs. A Government officer observed: *“Ultimately, it is their school, and Government is a stakeholder and a caretaker.”* However, equally strong community involvement in school affairs may not be replicable outside of Assam, according to SSA, CEE and UNICEF Assam.

4.2.1.3 Support by the School Management Committee

An effective SMC is crucial for the successful running of the school in all aspects. The SMCs are particularly involved with regard to arranging supplies, mobilising funds for school electricity bills and other school maintenance costs. One SMC member succinctly summarised the vital role the SMC plays: *“The responsibility of the SMC is the management of the school and its various activities, including teachers, discipline of the school, ensuring that the headmaster collaborates with the SMC before taking decisions, problem solving, maintaining the cleanliness of school premises, any kind of repair work, the operation of the mid-day meal, and also the teaching and learning process.”*

In some cases, additional costs for soap were met through funds from community contributions organised by the SMC members, or from the SMC members themselves. One SMC member recalled: *“We can tell them [community members, parents, villagers] about DHaAL’s importance. If they understand that handwashing with soap and water can reduce some ailments like diarrhoea, then they will understand that the cost of soap is much less than suffering from sickness [and so they contribute money].”* In a few cases, the SMC members even took the initiative of building a more robust and longer-lasting group handwashing unit, rather than opt for the simple unit provided under DHaAL. Teacher responses also highlighted the important role the SMC played in the success of the DHaAL programme. Said one teacher: *“Nothing can happen in the school without [the SMC’s] support. We should mobilise them first [if we want a programme to work]. Then only it can take place in the school.”*

4.2.1.4 Assistance of Mothers Groups

Mothers Group members monitor the mid-day meal activities and are given a responsibility to monitor group handwashing practices before the mid-day meal. In a substantial proportion of schools with no piped water, mothers and MDM cooks are filling the water tanks manually for handwashing. Along with making soap available for handwashing before the mid-day meal and monitoring of handwashing, this helped reduce the burden on teachers.

Overall, support of Mothers Groups was perceived vital to run the programme, especially in schools where only a single teacher was available. In a strongly worded opinion, a CEE staff said: *“If this programme has any impact, it is because of the Mothers Group.”* Despite the dedication of many mothers to group handwashing supervision, in some schools mothers were not involved in DHaAL activities. Further discussion with mothers who later visited the schools to pick up their children, indicated lack of a sense of ownership or sensitisation to be involved with DHaAL.

4.2.1.5 Well-Trained Teachers

Teachers were mainly responsible for maintenance of the group handwashing station, making the soap available, coordinating with the SMC for their needs related to DHaAL, and supervising children during group handwashing. Therefore, ***the programme was successful only when teachers have been well-trained and have wholeheartedly accepted the programme as a part of mid-day meal activities.*** Evaluators also perceived that the DHaAL programme was more effectively implemented where teachers not only were well trained, but also benefited from several follow-up visits by CEE, and when they considered programme activities as part of their regular responsibilities.

4.2.1.6 Importance of Mid-Day Meal Cooks

In many schools, *mid-day meal cooks fill the water tanks at the handwashing stations* as a daily responsibility, as noted above. As such, the mid-day meal staff play a critical complementary role to teachers and Mothers Groups. Often it was observed that MDM cooks were as involved in supervision of handwashing as teachers or mothers.

4.2.1.7 Adequacy of Mid-Day Meal Provisions

Obvious as it might sound, regular provision of meals under the MDM scheme also meant more regular group handwashing events, and thus, the higher likelihood of impacts on handwashing habits. In the impact evaluation findings, the critical dependency of handwashing impacts on the regularity of meal provision under the MDM scheme is highlighted, even though it was an expected finding.

As already noted, SSA allowed schools to use a part of untied MDM funds to procure soap, which meant that adequate and timely funding for MDM to schools also could affect DHaAL performance. In some schools where a mid-day meal was not served, teachers and staff cited reasons such as a lack of funds, lack of firewood, lack of ration supplies, absence of an MDM cook, or cooks not being paid on time. In such cases, it was very difficult for schools to spend money on soap from the MDM budget when what was available was not even adequate to provide regular meals on all days.

4.2.2 Potential Barriers to Sustainability and Scaling Up

Factors that impeded the further success of DHaAL were not necessarily highly prevalent in the schools assessed, but they were identified as potential barriers from the perspectives of sustainability and scaling up.

4.2.2.1 Robustness and Security of Handwashing Stations

Although even the simple, plastic pipe-based group handwashing facilities constructed under DHaAL were functional and used in 22 out of 30 schools, their expected design life is about five years. Thus, simplicity of design represented a barrier to longer-term sustainability of group handwashing stations. In eight out of 30 schools – nearly 1 in 4 – the group handwashing station was damaged by cattle or vandalism. This issue was especially noted in schools without a boundary wall. Other school properties such as handpump iron rods and pipes also were sometimes stolen in these schools.

In summary, while the simple design serves the purpose of behaviour change and rapid scaling up at lower cost – an approach that may indeed be viable to assess to what extent group handwashing will be successful and to institutionalize group handwashing in schools initially – for longer-term sustainability, a more robust handwashing unit will be needed.

4.2.2.2 Lack of Adequate Funds for Procurement of Soap

Although schools were allowed to utilise a part of the MDM budget to procure soap, this provision was not adequate to procure a sufficient number of soap bars. This resulted in rationing of soap by teachers. One mother of a student reported, *“Teachers give them soap before the mid-day meal, and they keep it inside after that. Soap is available at the school at one time in the day only. Students don’t use soap after using toilets.”* It also was observed that proper handwashing soap often was not available, but instead, cheaper dishwashing soap/powder or detergent was used. When a teacher was asked about it, he stated, *“A dishwashing powder is soap, and it can be used for handwashing. Using detergent rather than nothing is 100 times better, and we don’t have separate funds to buy soap for handwashing. It is difficult to manage.”*

In all, challenges in mobilising funds to make soap available in school for all children at all times were widely reported. Some schools were addressing these challenges by teachers sponsoring the soap or, sometimes, parents donating soap on the occasion of their child's birthday. One teacher from an award-winning school said, *"Arranging soap from mid-day meal funds is difficult, because providing quality meals with the budget is already a challenge. We have been managing with the support [donation] of the community."*

Although community participation is an important aspect of DHaAL, heavy reliance on the community to provide soap could work against the scaling up and sustainability of the programme in areas where communities are not as engaged and empowered as in Kamrup district. Recently SSA made a provision of ₹400 to each school for soap, but even this is grossly inadequate, given that a student will need on average two 75-gram soap bars per year and one bar of soap costs between ₹20 and 40.

4.2.2.3 Lack of Funds and Systems for O&M and Repairs

Discussions revealed that the main source of funds for the maintenance or repair of the group handwashing facility was the annual discretionary budget of ₹10,000 that a school receives. However, almost all teachers reported that this budget was barely adequate to meet school requirements related to general repairs, stationery, cleaning supplies and other incidentals. Therefore, a lack of relevant funds could hamper the functionality and repair of WASH infrastructure in schools, including the group handwashing units.

Even if the SMC or schools managed the funds for O&M of WASH facilities well, no technical knowledge might exist within the community. Seeking such expertise from outside would be time-consuming, and the community still might not be able to source the right set of skills. Therefore, an efficient and accountable O&M system under the jurisdiction of SSA is critically needed.

4.2.2.4 Lack of Reliable Water Supply

All schools in the evaluation sample had adequate water supply; thus, as a pilot, DHaAL worked in areas with the fewest problems with water availability – but this is likely not to prove true in other areas of Assam and other states, where water issues are often far more acute. This underlined the importance of reliable water for scaling up DHaAL elsewhere.

At the same time, the availability of water did not necessarily translate to easier access to water for handwashing, as demonstrated by the need in most schools for the MDM cook, Mothers Group members or, sometimes, teachers to fill up the water tank of the group handwashing stations manually. Because these staff and volunteers have other workloads as well, this sometimes resulted in the absence of group handwashing practices. As observed by the survey team: *"In two schools the group handwashing facility could not be used because no one was available to fill the water, and thus students used buckets to wash hands."* All interviewees agreed that having a piped water supply to handwashing facilities would solve the dependency on filling of water tanks.

4.2.2.5 Lack of Proper Sanitation Facilities

Even though most schools reported functional toilet facilities, issues such as unclean toilets and lack of water remained prevalent. The observation team found that students often used the area near the toilet for urination because the toilets were dirty and smelly. Some students, especially girls, used the toilets for urination and defecation due to privacy concerns, but nonetheless complained about the cleanliness. To quote a teacher: *"Generally our school looks clean, but the toilet is not that clean. Small*

children sometimes do not use water properly. Because the tap in the toilet is not working, it needs repairing in order to maintain proper hygiene standards of the students. Presently students carry water using buckets for their urination and defecation.”

As a part of the *Swachha Bharat Swachha Vidyalaya* programme, as noted above, new school toilets that are being constructed also have an attached handwashing station, most likely with a piped water connection. However, numerous existing toilets without a piped water connection or a nearby/attached handwashing station will continue to represent a key barrier to handwashing after toilet use.

4.2.2.6 Awareness Generation, Sensitisation and Training of School Staff

The level of sensitisation and awareness among teachers about the importance of, and process of, group handwashing appeared to have eroded over time. Some teachers were involved in the process wholeheartedly, and some grudgingly, on the day of the qualitative researchers’ visit. To an extent, this could be expected because any training loses its effectiveness over time unless knowledge and awareness are refreshed periodically. CEE staff suggested that refresher trainings and awareness generation were particularly important because teachers faced a huge workload and might neglect group handwashing, which is an additional task. One CEE staff said: *“Yes, we fail to conduct many awareness programmes due to a shortage of funds. But if we can get funds from other sources, we can surely expand the programme along with awareness.”*

What are the strengths and limitations of the Monitoring and Evaluation (M&E) system in delivering the expected programme outcomes?

4.2.3 Monitoring and Evaluation System of DHaAL

To understand the M&E system of DHaAL and its implementation, interviews of CEE and SSA staff were conducted and available data reviewed, complementing the original logframe (see also Table 2-1).

To institutionalise the practice of handwashing with soap before meals, regular monitoring visits were required in the initial period and formed a key part of programme implementation. A CEE staff noted, *“The challenge was that you have to visit regularly – if you take some break in visiting, the participants become a bit negligent. So, to counteract this, we have to make regular visits. It may not be right for all schools, but for some schools we have to make repeated visits at specific intervals.”*

After initial monitoring by CEE, the handwashing monitoring task was given to mothers and SMC members, as noted above. Mothers Group members already monitored mid-day meal provision and the quality of food served during the meal. The SMC also was expected to monitor overall WASH facilities in the school in as a part of its routine review and management tasks. Block and cluster coordinators from SSA likewise monitored WASH facilities during their routine school visits. Lessons learned from these monitoring visits by SSA and CEE officials then were discussed in the State WinS Task Force meetings and WASH Group Meetings as required.

Below are the observed and reported strengths and main weaknesses of the M&E system used for the DHaAL pilot:

Strengths

- ***Involves all stakeholders:*** The M&E system involved all key stakeholders, such as SSA, SMC members and Mothers Group members, in monitoring activities.
- ***Least additional burden and low skills requirement:*** Monitoring was integrated with routine activities of stakeholders, such that it placed a minimal burden on the need to acquire new skills.
- ***Need-based, flexible system:*** No format was prescribed for collection of information or frequency of monitoring, so that monitoring could be adapted to each school's needs.

Weaknesses

- ***Ad hoc monitoring rather than a full system for M&E:*** Although the logframe was available, the means of verification (reports, minutes of meetings, photographs) were problematic for assessing progress and learning lessons, as noted above. Monitoring by SSA officers, teachers, and mothers was basically informal, and no quantitative indicator data were available, except for those from the baseline and endline surveys. Without quantifiable indicators, progress toward targets could not be assessed. Even verifiable targets were not set in the logframe, except for installation of group handwashing units. Moreover, survey instruments used for both the baseline and endline duplicated information already collected annually through DISE. Survey instruments would have been more useful for evaluation if information from children, teachers, parents and SMC members was collected as per the TOC. Overall, the usefulness of the M&E system in the objective evaluation of the project was very limited, although it did serve the purpose of implementing the project on time. In future pilot programmes, it would be useful to involve research and evaluation specialists at UNICEF or elsewhere to develop a thorough, appropriate M&E framework.
- ***Need to integrate evaluation at the design stage of the project:*** In hindsight, integrating evaluation and learning as one of the programme objectives at the design stage would have been helpful. Pilot programmes have a higher burden of ensuring that impacts of efficacious interventions are well-documented and ineffective interventions are improved before scaling up. However, the choice of robust evaluation methods can be restricted if evaluation is not integrated at the design stage of the programme.
- ***Lack of human rights- and gender-sensitive framework:*** Although the programme design included Rani and Rampur blocks, where a tribal population is prevalent, the monitoring system itself did not track dedicated information from a human rights, social inclusion or gender perspective. For example, progress in tribal vs. non-tribal schools was not tracked and reported separately. Because child-specific data were not collected, project outcomes by gender, caste or characteristics of other socially marginalised groups could not be assessed. The evaluation collected this data and conducted limited gender-segregated analysis, but overall M&E system data on these dimensions would provide much deeper insights into how the implementation process considered gender, social inclusion and equity aspects.

4.3 Impact Evaluation

For the sake of consistency, findings of the impact evaluation are organised according to the sequence of evaluation questions for the impact criteria.

Did group handwashing or DHaAL improve and sustain the practice of handwashing with soap before meals in lower primary schools of rural areas, compared to a “business as usual” situation in schools?

4.3.1 Impacts on Handwashing with Soap in Schools

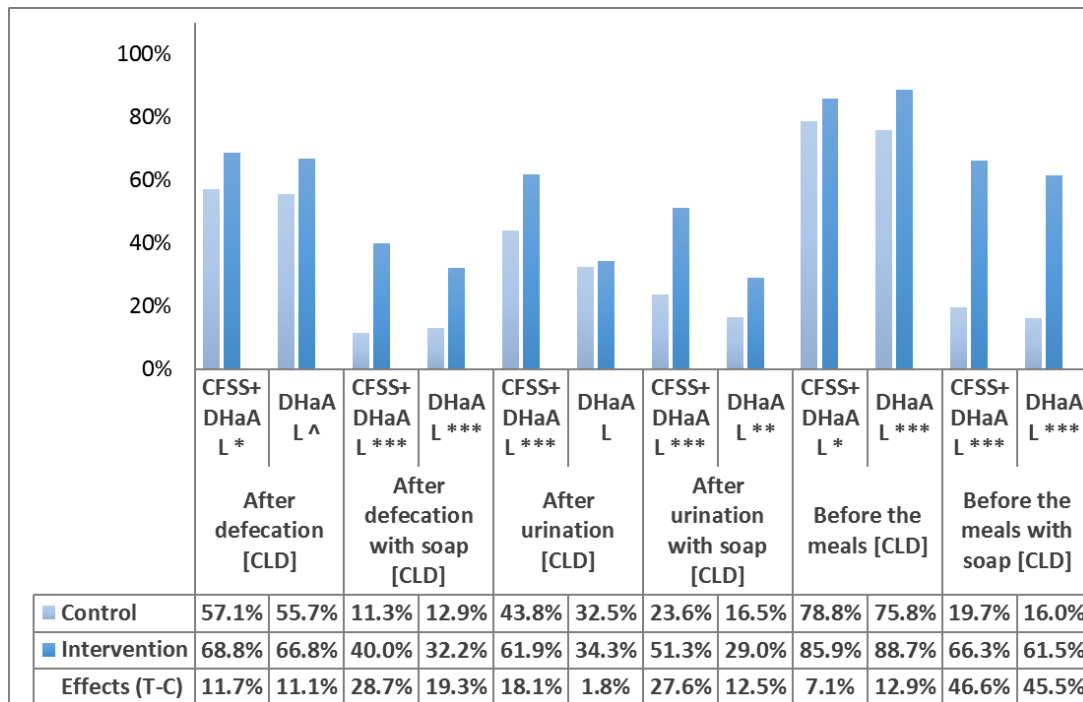
4.3.1.1 Children’s Self-Recall of Handwashing Practices in Schools

As presented in Figure 4-1, the impacts on handwashing with soap after defecation in DHaAL+CFSS schools stood at 29 percentage points (11 per cent control vs. 40 per cent intervention), compared to 19 percentage points in DHaAL-only schools (13 per cent control vs. 32 per cent intervention). Impacts on self-recalled handwashing with soap before meals in schools were much larger, however: 47 percentage points in DHaAL+CFSS schools (over the control group mean of 20 per cent) and 46 percentage points in DHaAL-only schools (over the control group mean of 16 per cent). These impacts are much larger than the pre-specified impact criteria of 30 percentage points and statistically significant at $\alpha = 0.01$, but these impact magnitudes are a likely overestimate, as discussed in Section 3.3 .

4.3.1.2 Children’s Observed Handwashing Practices in Schools

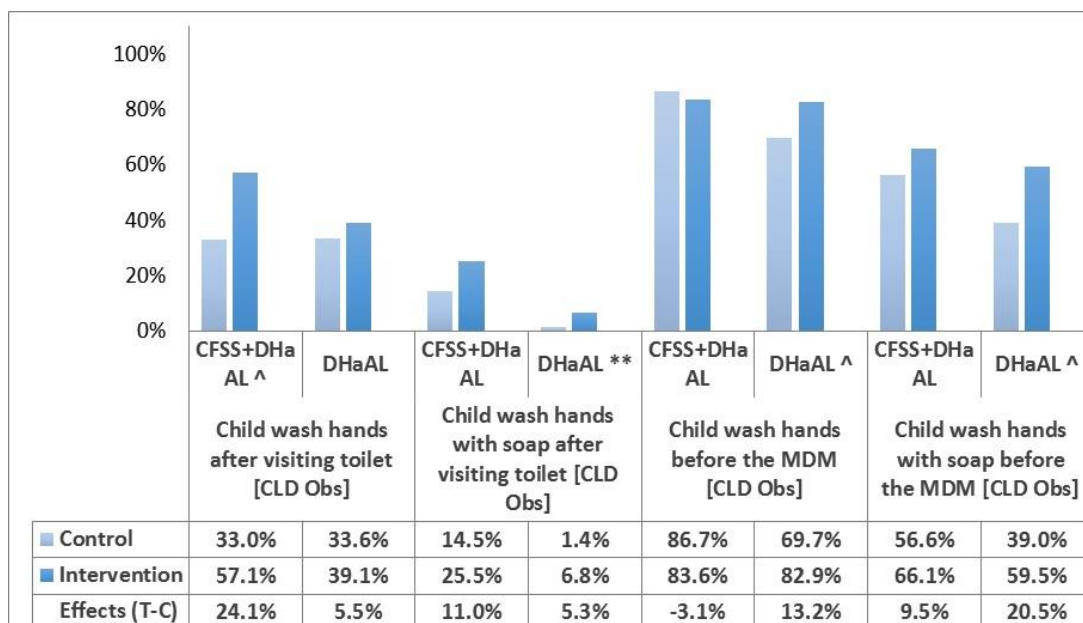
Critically, compared to self-recall-based handwashing behaviours, observed handwashing behaviours yielded mixed results and a much lower magnitude of impacts, as reported in Figure 4-2. No statistically significant effect of DHaAL+CFSS was found on handwashing with soap after the use of toilets¹² or before meals. At the same time, the lack of impact of DHaAL+CFSS on handwashing with soap could be explained by a stronger prevalence of these practices even in the control group. The CFSS schools were purposely selected in the pilot, and their matched controls likely shared some characteristics that positively affected handwashing practices even when there were no group handwashing interventions.

¹² Observed students were debriefed about the purpose of visiting the toilets. Almost all events were reported as being for urinations and only a few for defecation.



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations.
 Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-1. Effects on the Recalled Instances of Regular Handwashing with Soap at Schools



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations, MDM – mid day meals from any source.
 Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.
 * The enumerators debriefed the students observed to use toilets and find that almost all visits were for urination and not defecation

Figure 4-2. Effects on the Observed Proportion of Children Washing Hands with Soap After Toilet Use (for Urination*) and Before Meals at Schools

In the case of DHaaL-only schools, a modest impact was found of 20 percentage points, statistically significant at $\alpha = 0.2$, with regard to the proportion of children washing hands with soap before the

mid-day meals. However, neither the magnitude of the impact nor the statistical significance met the pre-specified impact criterion of 30 percentage points with an effect at $\alpha = 0.1$.

In the gender- and equity-segregated analysis reported in Section 4.5, it was found that ***the impacts were close to the pre-specified level of 30 percentage points, but only among children in Classes 3-5, whereas impacts were statistically null in younger children in Classes 1-2.*** Further exploration of this finding using qualitative methods revealed that the children in Classes 1-2 were enrolled after the active support from CEE ceased and thus were not actively trained by CEE. The transfer of knowledge about group handwashing had been expected from older children or the teacher to newer batches, but again likely lost the level of intensity over time. In turn, this suggests a role for continued sensitisation and training in group handwashing to sustain impacts, as discussed below.

4.3.1.3 Qualitative Perspectives on Handwashing Impacts

Qualitative research teams visited multiple schools and held discussions with teachers, SMC members, parents and students. From this, it was noted that group handwashing had become a norm, with peer-to-peer learning observed in the form of help and instruction. Group handwashing was perceived as a fun exercise among children; sometimes it was found that children sang songs related to handwashing too. This action was self-driven, suggesting that handwashing had become a regular, fun group exercise as intended in group handwashing programmes.

One mother, who lives near a school compound, said: *“Though handwashing was carried out before, it was not in a proper manner. Now all the children stand in a queue to wash their hands before and after their meals. They wash their hands with soap and water, and these days it is a habit for them. I can see them from my home washing their hands before and after meals, and it makes me feel happy.”* Another mother stated: *“Previously children were not very much clean; we mothers also sometimes neglected this matter. But after this programme, we see many changes, both in the children and in ourselves.”* Parents also reported that children were now more particular about cleanliness, both at school and at home, so that they were trying to keep homes clean as well.

On the other hand, student behaviours in the two control schools visited were observed to differ distinctly. In the control schools soap was not available, so that there could be no handwashing with soap. Most mothers of schoolchildren reported that soap was available at home. At the same time, however, they reported that students did not always use soap for handwashing at home even when available. This was possibly because the children practice washing hands only with water at school and therefore do the same at home. Only few students reported using school toilets. On the day of the school visit, no student at the control schools visited toilet for defecation and thus could not be observed for their handwashing behaviour after defecation.

At the same time, knowledge of the importance of and the need for handwashing was high among control-school teachers and children interviewed by the qualitative team. For example, teachers reported that all children were told about handwashing, but that a programme such as DHaAL could turn the knowledge into actual practice. One teacher from a control school said, *“Our schools have no DHaAL programme, so we only teach students about handwashing. They know every step of handwashing, but they use hand pumps, they loiter together, and they don’t wash properly. If we provide them with a tap system, it will be better.”*

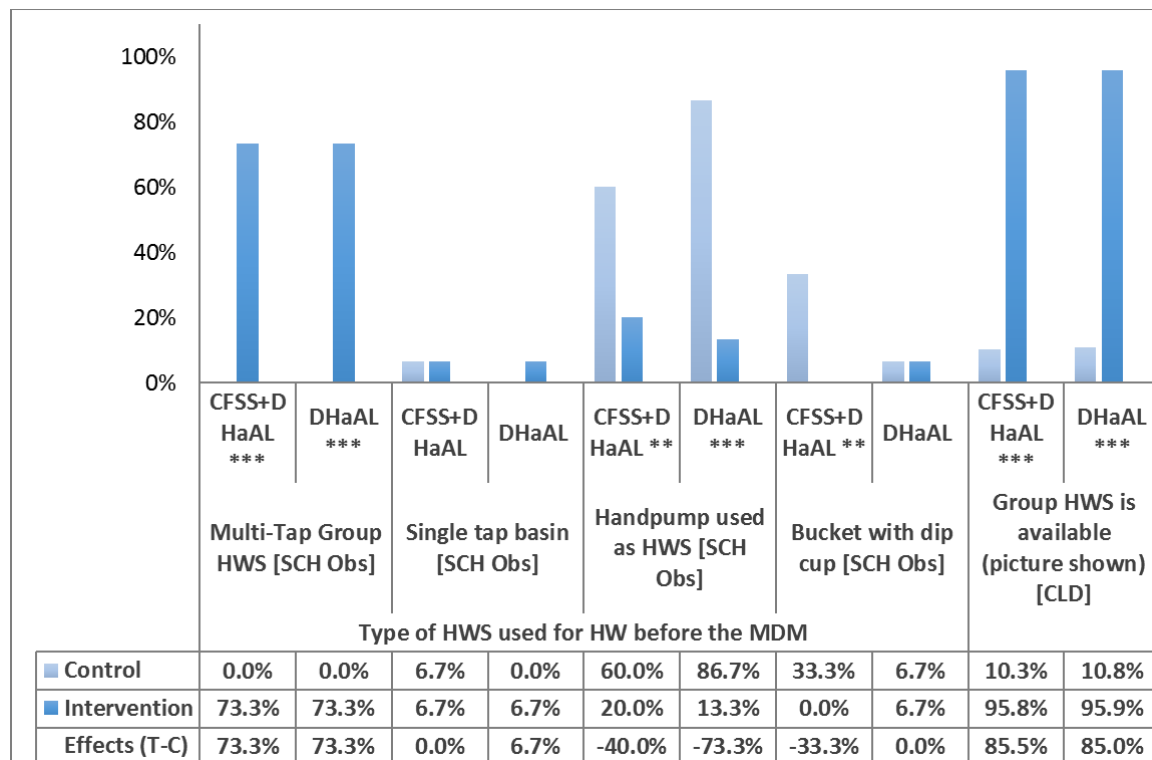
To what extent can the changes in intermediate outputs and outcomes be attributed to the DHaAL intervention as per the Theory of Change?

4.3.2 Impacts on Intermediate Outputs and Outcomes

4.3.2.1 Availability and Use of Group Handwashing Stations

The impact of DHaAL+CFSS and DHaAL-only on the use of group handwashing facilities to wash hands before meals was a very significant 73 percentage points, as presented in Figure 4-3. Correspondingly, the use of other types of handwashing facilities such as handpump and buckets with a dip cup reduced substantially in intervention schools.

Overtime effectiveness of interventions often tapers down and DHaAL was no exception. Four out of 15 DHaAL+CFSS schools and four out of 15 DHaAL-only schools did not use the installed group handwashing units because of damage to the units. As noted above, the simple construction of the group handwashing unit was vulnerable to damage by cattle and miscreants, especially when the school did not have a boundary wall. Therefore, the group handwashing units installed under the DHaAL pilot were simple and scalable, but not sustainable in the long term. At the same time, the simple construction of the group handwashing unit did not impede behaviour change in the short term, given that in 22 out of 30 intervention schools these units continued to be used.



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations, HW – Handwashing, HWS – Handwashing Station. Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

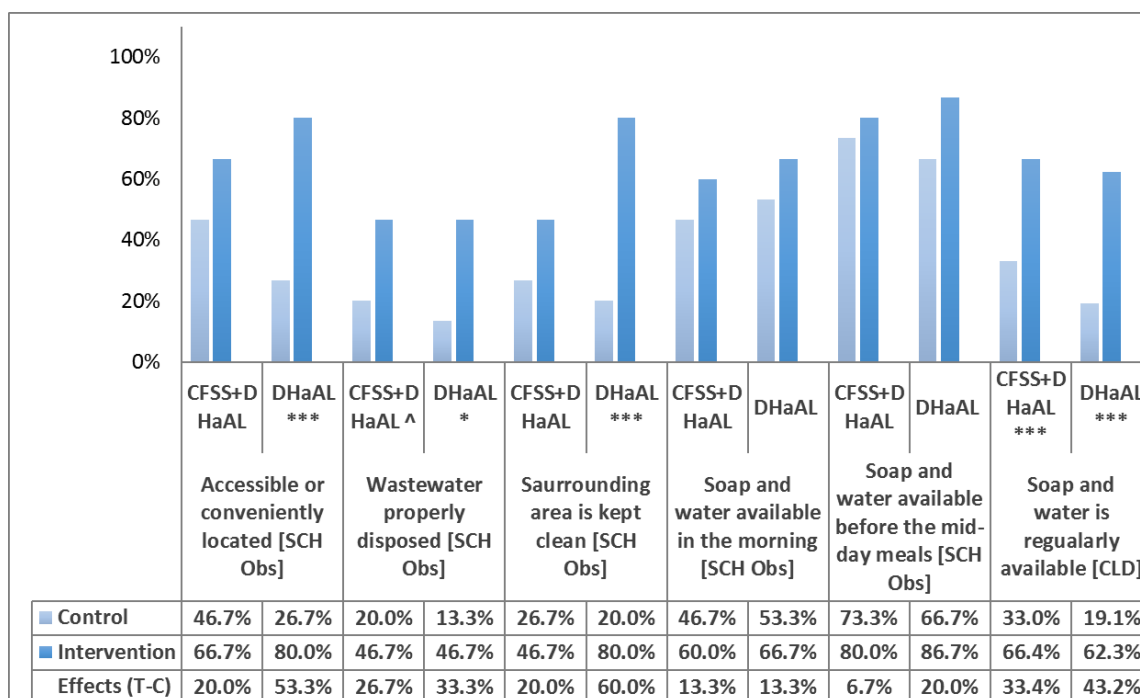
Figure 4-3. Effects on the Type of Handwashing Facilities Used Before Meals at Schools

The qualitative research team also found that in one intervention school where the group handwashing unit was not used, the teacher believed that handwashing using a handpump was enough. This teacher did not understand well the importance of peer-to-peer learning in a group handwashing setting, suggesting the need for continued sensitisation of teachers about the importance of group handwashing.

4.3.2.2 Access, Functionality and Availability of Soap at Handwashing Facility

Figure 4-4 illustrates the impacts on the indicators related to the functionality of the handwashing facility or place used for washing hands before meals. Both DHaAL+CFSS and DHaAL-only schools had improved functionality of handwashing stations in terms of accessibility, proper wastewater disposal and cleanliness of surrounding area, but these impacts are substantially higher in DHaAL-only schools than in DHaAL+CFSS.

The survey team also assessed the availability of water and soap at two points unannounced – morning upon arrival at the school, as well as before the meal break time. Both times, a larger proportion of intervention schools had running water and soap available, with these proportions increasing by the mid-day meal time. The impacts of DHaAL+CFSS on availability of soap and water were more modest (80 per cent intervention vs. 73 per cent control), compared to the impacts of DHaAL-only (87 per cent intervention vs. 67 per cent control). Therefore, DHaAL-only had stronger impacts on the availability of soap than DHaAL+CFSS. Student interviews identified that soap and water were regularly available in only about 60 per cent of intervention schools, but even this proportion was more than double the levels in the control group, suggesting a strong effect of the intervention on functionality of handwashing stations.



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations.

Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-4. Effects on Access and Functionality of the Main Handwashing Facility Used Before Meals at Schools

The qualitative research also showed that while soap was available for handwashing before meals, it was available only with the teacher the rest of the time. One school observation note read: *“Schoolteachers often kept the soap in a cupboard and made it available during the mid-day meal breaks only.”* It also was possible that teachers, suspecting the purpose of the evaluation, deliberately set out soap; in two of the eight intervention schools visited, the team observed new soap at the handwashing station.

4.3.2.3 Budgetary Provisions for Soaps and O&M

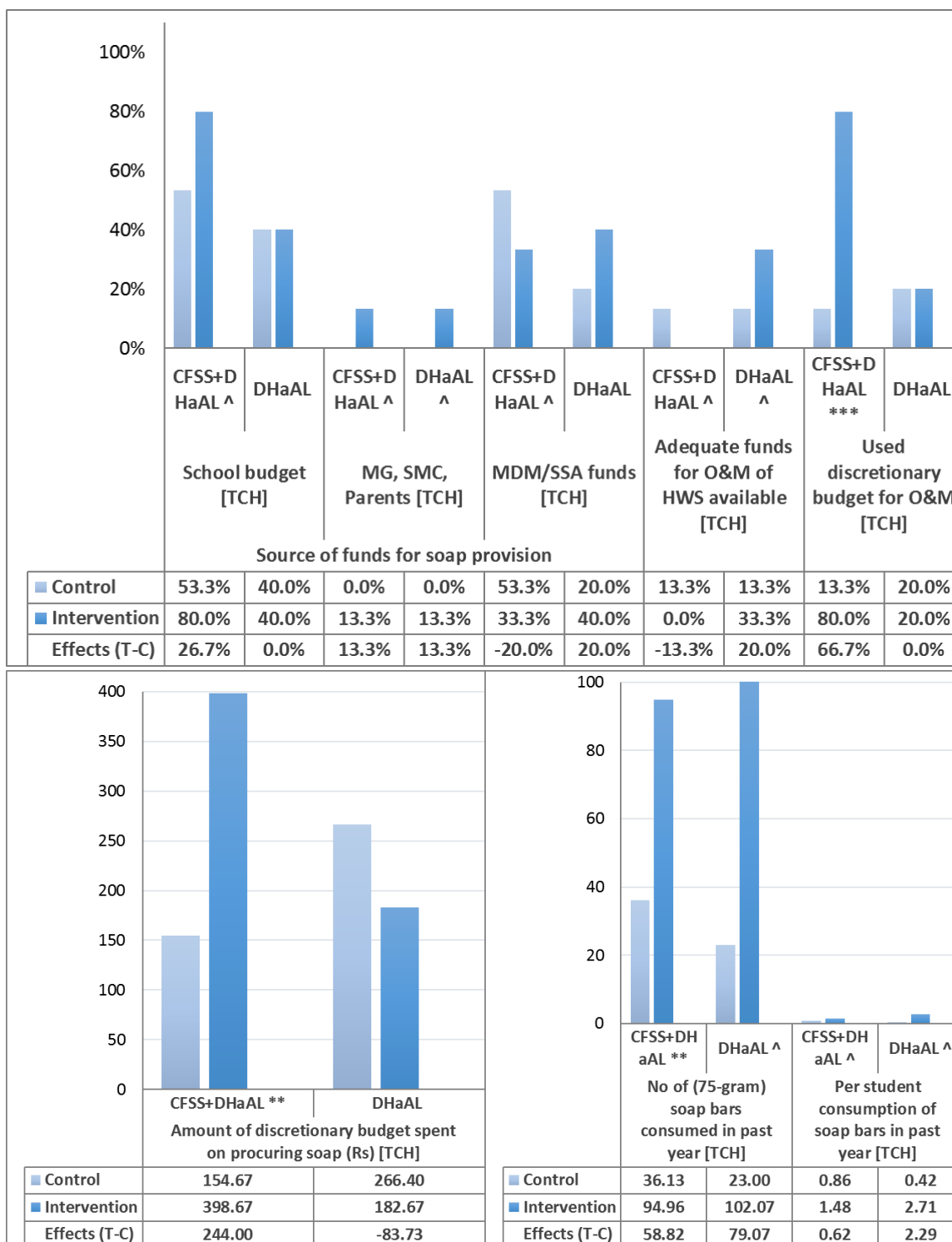
A critical bottleneck identified during preparatory stages of DHaAL was the lack of budget provisions for soap for handwashing, which was addressed when the WinS Task Force allowed the use of the untied MDM scheme budget by schools, as well as by sensitisation of communities and teachers by CEE to procure soap as community contributions or with the school’s discretionary budget. As reported in Figure 4-5, the effects of DHaAL on using the school’s discretionary budget was 27 percentage points in DHaAL+CFSS schools (80 per cent intervention vs. 53 per cent control), compared to 20 percentage points with use of the MDM budget in DHaAL-only schools (40 per cent intervention vs. 20 per cent control).

During the year preceding the evaluation, DHaAL+CFSS schools spent an average of ₹400 to procure soap, more than double the control group spending of ₹155. At the same time, DHaAL-only schools spent a much lower amount to procure soap, although they reportedly consumed significantly more soap, which the qualitative research suggested was because of contributions from parents and SMC members. In DHaAL+CFSS schools, an average equivalent to 1.5 soap bars of 75-gram size¹³ were consumed per enrolled student during the previous year, compared to 0.86 soaps in their control group; in DHaAL-only schools, 2.7 soap bars were consumed per student compared to the control group consumption of 0.4 soaps.

Significantly, when asked if adequate funds were available for O&M and repair of handwashing facilities (any type), the impacts were negative in DHaAL+CFSS schools and only 20 percentage points in DHaAL-only schools (33 per cent intervention vs. 13 per cent control). DHaAL+CFSS schools also relied on the ₹10,000 discretionary budget to conduct maintenance or repairs.

The qualitative inquiry identified reported inadequacy of budgets for procuring funds, as most teachers said that they relied excessively on community contributions. As noted above, teachers reported using utensil washing powder or detergent for handwashing because of a lack of funds; this was verified by observation by the qualitative team as well. SMC members particularly identified the need for a system and funds for O&M of handwashing facilities, as well all other WASH facilities, in schools and strongly expressed a need for introduction of such an O&M system from the Government.

¹³ Soap types such as powder or liquid soap were converted to the unit of soap bars of 75-gram size. Based on a handwashing study in the US, one handwashing instance needs 0.35 grams of bar soap (Koehler and Wildbolz 2009), so that with 1.5 75-gram soap bars, a child can wash her or his hands 320 times, and with 2.7 soap bars 560 times.

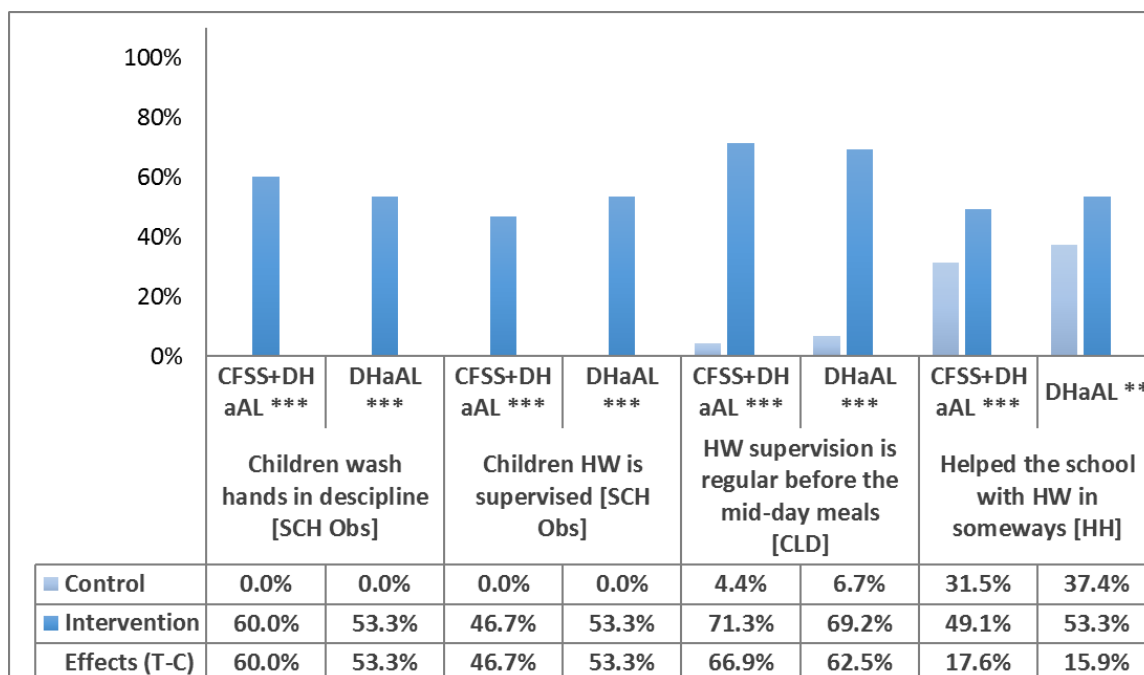


Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations.
 Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-5. Effects on Funding Sources, Their Adequacy, Soap Procurement and Soap Consumption

4.3.2.4 Supervised and Structured Handwashing

DHaAL’s Theory of Change argues that making handwashing a group activity under supervision creates peer pressure and a sense of ownership of the activity, with both then inculcating the habit of handwashing. Enumerators observed handwashing in a line or a group with discipline and supervision only in intervention schools, as presented in Figure 4-6 (60 per cent in DHaAL+CFSS, 53 per cent- in DHaAL-only. Self-reports by children in Classes 3-5 identified substantially higher supervision in intervention schools than in control groups.



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers’ Interview, [Sch Obs] School Observations, HW – Handwashing.
 Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-6. Effects on Observed Discipline During, and Supervision of, Handwashing Before Meals at Schools

4.3.2.5 Involvement of Parents in Handwashing Events

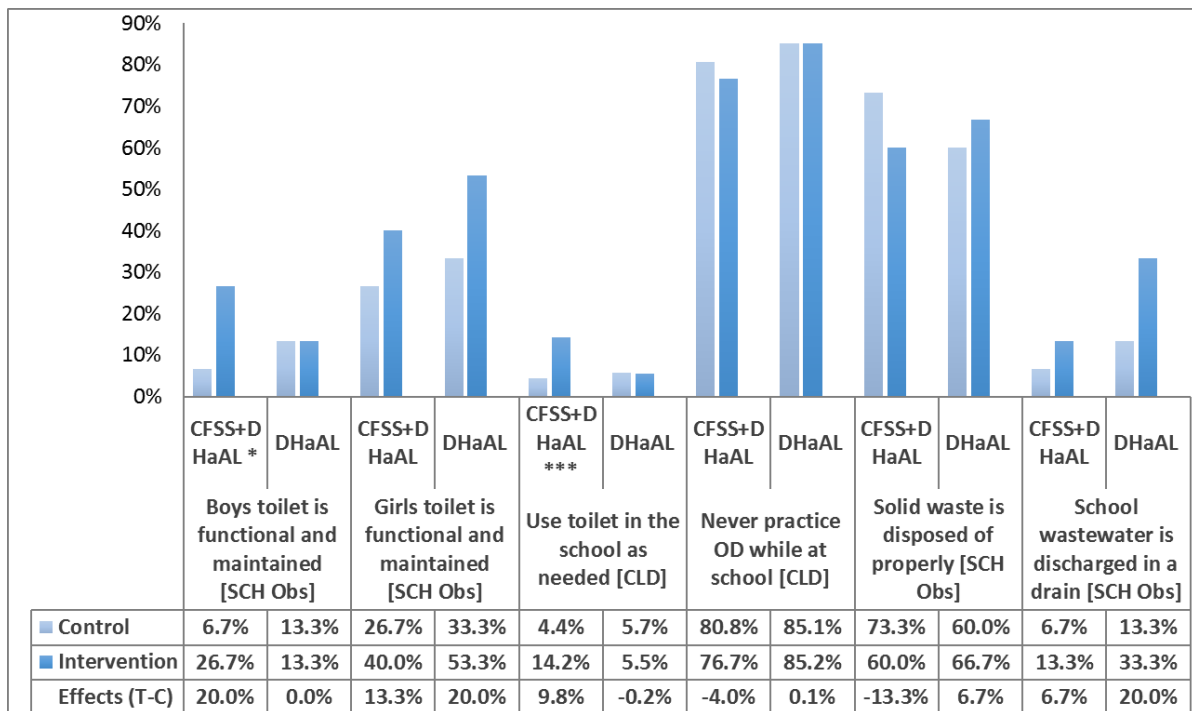
Almost half of parents from intervention groups reported helping the school with handwashing activities, as reported in Figure 4-6. However, one-third of parents from control groups also reported assisting schools with handwashing events.

Qualitative researchers also found that students washed hands in a disciplined manner, sometimes under the supervision of mothers. One mother said, “We can see the handwashing practices of our children during mid-day meal time when we visit the school. They stand in lines: Ten students can wash their hands at a time, and they always maintain a disciplined manner with the supervision of the mid-day meal cook, us or the teacher.”

4.3.3 Indirect Impact on Sanitation Infrastructure and Practices in Schools

Although DHaAL’s primary objective is to institutionalise handwashing with soap in school settings, the capacity development and training by CEE also included other WASH facilities and practices, especially toilets and solid waste management. To quote a CEE staff member: “After DHaAL programme [training], we [also] discussed a lot with these groups [Mothers Groups, SMCs] about their problems, what was the school progress and the reason for absence of children, about WASH facilities and usage of toilets. Our project was group handwashing, but we oriented teachers on WASH [as a whole]. People from the WASH team also helped us.” Evaluators investigated whether such activities resulted in strengthening of school sanitation, shown in Figure 4-7.

The DHaAL+CFSS intervention resulted in a significantly higher proportion of schools with functional boys’ and girls’ toilets alike. In the case of DHaAL-only interventions, the impact on availability of functional girls’ toilets (20 percentage- points) was larger than that in DHaAL+CFSS schools (13 percentage points). DHaAL-only also recorded stronger results than DHaAL+CFSS schools in terms of wastewater disposal in an organised drain. It was unlikely that these changes in the sanitation infrastructure were caused by DHaAL activities in schools, but it was possible that block-level SSA officers were more sensitised on WinS components in the pilot intervention blocks than in the control blocks, in turn resulting in this impact.



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers’ Interview, [Sch Obs] School Observations.
 Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-7. Indirect Effects on Sanitation Infrastructure and Practices in Schools

Overall, no direct impacts of DHaAL alone were found with regard to school sanitation facilities and practices, but CEE advocacy and capacity development at block levels could have resulted in better overall WinS infrastructure, and hence, its higher use compared to the control blocks.

Were there any “spillover” impacts of DHaAL on WASH facilities and their use at children’s homes?

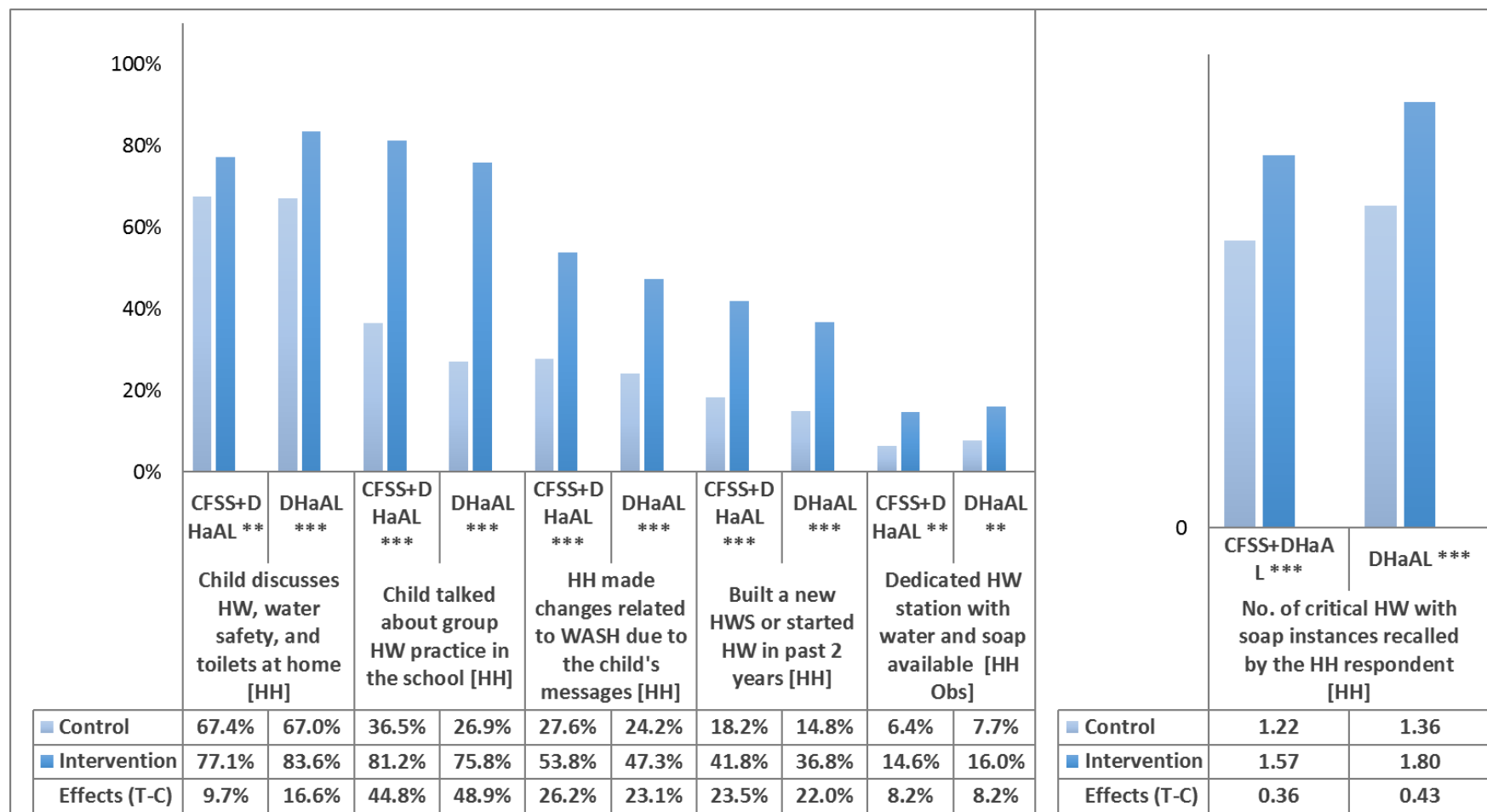
4.3.4 ‘Spillover’ Effect on WASH at Children’s Homes

DHaAL’s Theory of Change considered children themselves as change agents, and thus expected a “spillover” effect of the programme in the homes of the children. It was believed the children could inform, discuss and motivate their parents to adopt better WASH facilities and behaviours at their homes. This theory was found to be credible, as even in the control schools more than 65 per cent parents reported that their children discussed WASH-related topics at home (see also Figure 4-8). Nonetheless, while DHaAL-only resulted in a 17-percentage-point impact (compared to the control group) on the proportion of parents reporting that their child discussed WASH-related messages at home, this impact was much lower in the DHaAL+CFSS group, at only 9.7 percentage points. However, the impact on the proportion of parents reporting receiving messages at home specifically related to group handwashing practices at school stands at more than 45 percentage points across both DHaAL+CFSS and DHaAL-only schools, indicating the strength of sharing of these messages.

The impact on the proportion of households that built a new handwashing station or started using an existing one within two years after DHaAL implementation began likewise was significant in those from both DHaAL+CFSS and DHaAL-only schools, at 24 and 22 percentage points respectively. Even in terms of observed availability of a handwashing station with soap and water at home, both DHaAL+CFSS and DHaAL-only households reported close to 15-percentage-point impacts vs. the control groups. Statistically significant impacts also were found with regard to the average number of reported instances of handwashing with soap by the parent during the 24 hours preceding the interview.

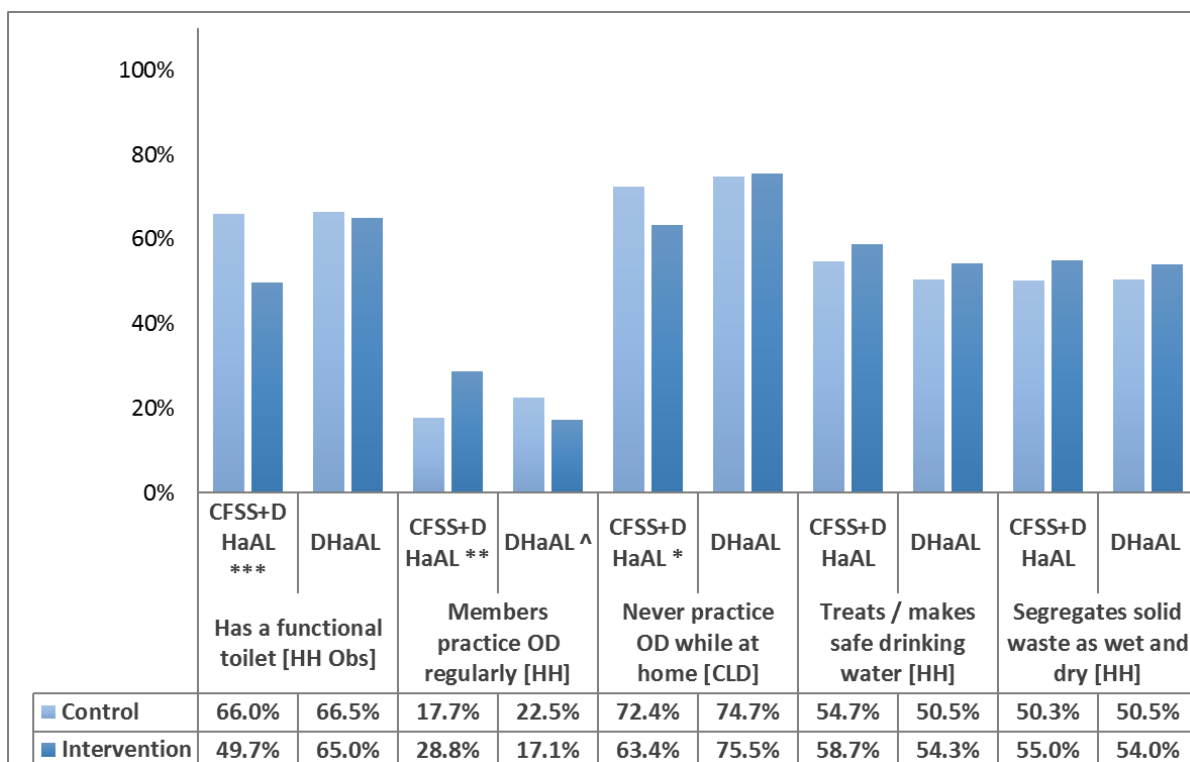
No meaningful effect of the intervention was found, however, on household sanitation, waste management and water safety behaviours at home, although the DHaAL+CFSS control group was better off with regard to availability and use of toilets, as summarised in Figure 4-9.

Qualitative research also found a strong effect of DHaAL on WASH at homes, with children as the channel. A substantial proportion of mothers reported that children had carried the message of handwashing benefits back to their homes and communities and continued the handwashing practices at homes. In particular, mothers reported that their children were demanding that the mothers and other members also practice handwashing at home. One mother said, *“This programme enhanced the health of the school as well as the parents, because previously parents did not practice handwashing before taking meals and after defecation. But nowadays they are used to such practices, which have been handed from the school to the children and on to their parents.”* Another mother says: *“Children are well-acquainted with handwashing, and they really enjoy it now. We are thankful to this programme. Children teach us mothers how to wash hands properly, and it reduces sickness.”*



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations. Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-8. “Spillover” Effects on Handwashing Infrastructure and Practices at Homes of Children Due to WASH Messages Shared by the Children



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations.
 Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-9. “Spillover” Effects on Water Safety and Sanitation Infrastructure and Practices at Homes of Children Due to WASH Messages Shared by Children

Are there external factors that can moderate the impact of DHaAL interventions? And how?

4.3.5 Dependency of DHaAL’s Impacts on External Factors

4.3.5.1 Availability of Water Supply for Handwashing

Adequate water availability is essential for handwashing, and more than 80 per cent of both intervention and control schools reported adequate water supply, as summarised in Figure 4-10 and also noted above. However, as also already highlighted, although inadequate water supply was not a barrier in the evaluation sample, it could be so elsewhere in Assam and across India.

Qualitative discussions with CEE corroborated that water supply is not a problem in Kamrup districts, but that other parts of Assam are water-stressed. One mother participating in a FGD shared: “Yes, the school has sufficient water facilities. Water is available in all seasons. A tube well is available within the school campus, which is used for drinking water after filtration and for other works. In the rainy season, rainwater is kept in the water tank, which can be used for sanitation purposes. Two water tanks are available in the school for storage of rainwater.”

Nonetheless, some schools still face issues. A staff of CEE noted: *“There is one school on a small hill, and there is a rock bed. They have tried many times, but failed to secure their own water source. They don’t have a handpump, and there is no piped water supply in that area. We had several meetings, and finally one of the SMC members agreed to pump water up to the school from his house, using his own pump. We negotiated that the school will pay a certain percentage of his electricity bill through parent contributions. The Mothers Group and the cook fetch the water in buckets from his home.”*

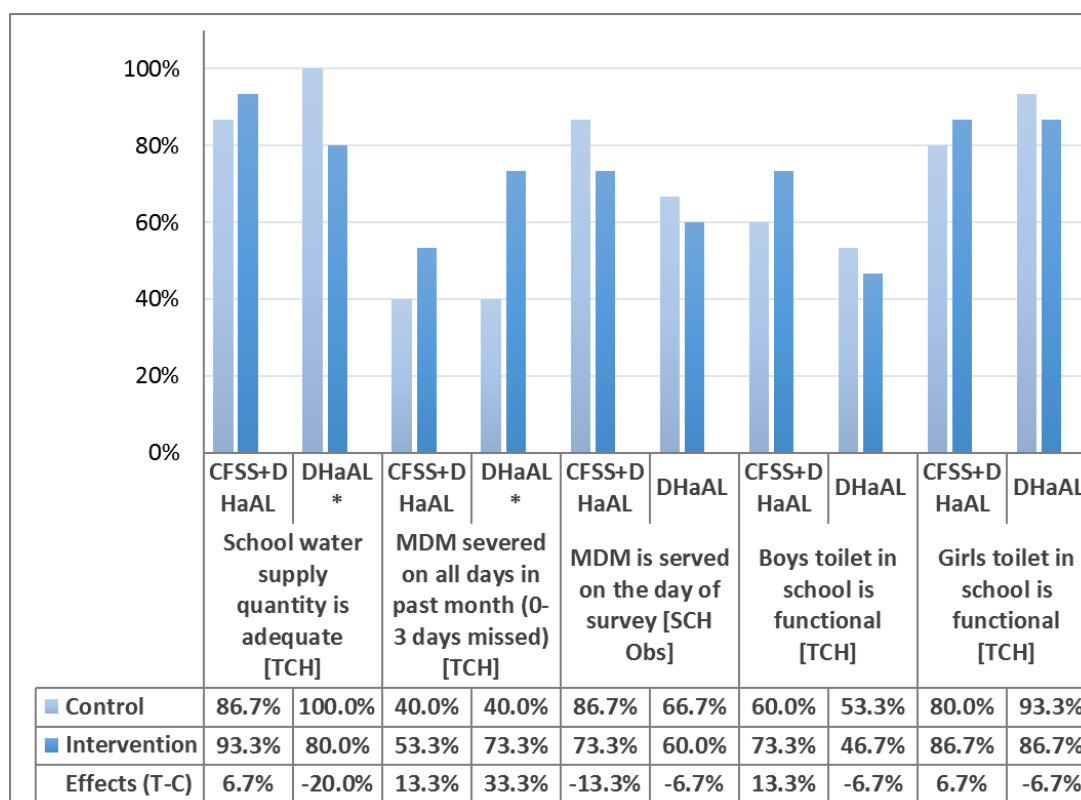
An additional problem identified in discussion with teachers, MDM cooks and mothers was the need to manually haul water from a source to the group hand washing unit, linked to the need to fill the cistern attached to the unit. Discussion with CEE identified that although water sources were available on school premises, pump sets and electricity were not; therefore, even if a school had a piped water supply, it would still be dependent on the availability of a water pump and electricity. As highlighted above, this reliance on manual hauling created a dependency on the availability of an MDM cook, mother or teacher for this task, which often is difficult because of competing responsibilities. This again underscores the need for a reliable piped water supply serving the handwashing stations.

4.3.5.2 Availability of Functional Toilets

For handwashing after toilet use in schools, having a functional toilet is clearly a necessary precondition. Toilets for girls were functional in more than 80 per cent of control and intervention schools, but the availability of functional boys’ toilets was much lower, as reported in Figure 4-10. No meaningful differences were found between intervention and control schools except for a small impact of the DHaAL+CFSS intervention on the proportion of functional boys’ toilets (73 per cent DHaAL+CFSS vs. 60 per cent control). Discussion with CEE revealed that because WinS is already integral to CFSS, observed impacts on functionality of boys’ toilets is likely a result of CFSS activities rather than DHaAL.

Qualitative research found that in most schools visited, separate toilet facilities for boys and girls were available as per SSA norms. However, many school toilets were observed to suffer from inadequate water facilities, unclean toilets and only sporadic use. Lack of piped water supply inside the toilets was identified as a key impediment to their use and maintenance by teachers as well. Said one teacher, *“Though water availability on the school premises is satisfactory, toilets are not connected to the piped water supply. For this reason, all children – particularly Class 1 and 2 – generally do not use the toilets for urination and defecation. Until the toilet facilities are working with proper pipe-connected water, we can’t say that the school has proper hygiene facilities.”* Another teacher stated, *“Before providing any additional facilities [like group handwashing], the programme should focus on existing dilapidated facilities such as the piped water that is connected to the toilets.”*

Although handwashing with soap after toilet use was not the primary outcome of interest of the evaluation, it is a critical handwashing event to break faecal-oral transmission of pathogens. Therefore, a lack of functional toilets with adequate water provisions is a barrier to handwashing after defecation.



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations.

Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-10. Availability of Water, MDM Scheme and Functional Toilets in Schools

4.3.5.3 Dependency on the Provision of MDM

Almost all the children in the relevant Government primary schools in rural Assam relied on meals provided under the MDM scheme instead of home-provided food. Therefore, as highlighted above, the regularity of group handwashing before mid-day meals was closely tied with the regularity of meal provision under the MDM scheme.

An unexpected finding of the evaluation, again noted above, was that meals under the MDM scheme were not served regularly on all days, even though coverage of the scheme in primary schools across Assam was near-universal. Because group handwashing would form the habit and change handwashing practices if handwashing events were conducted regularly, this had implications for the effectiveness of DHaAL. As per the RTE Act and MDM scheme norms, meals are required to be served on all school days. However, the field teams found that meals were served irregularly for a variety of reasons, including a lack of funds to procure groceries, delays in procurement of groceries, the need to ration available groceries, and leave absence of MDM cooks. It was found that meals were served more regularly if the school was served by a centralised kitchen instead of *on-site* cooking by its own MDM cooks.

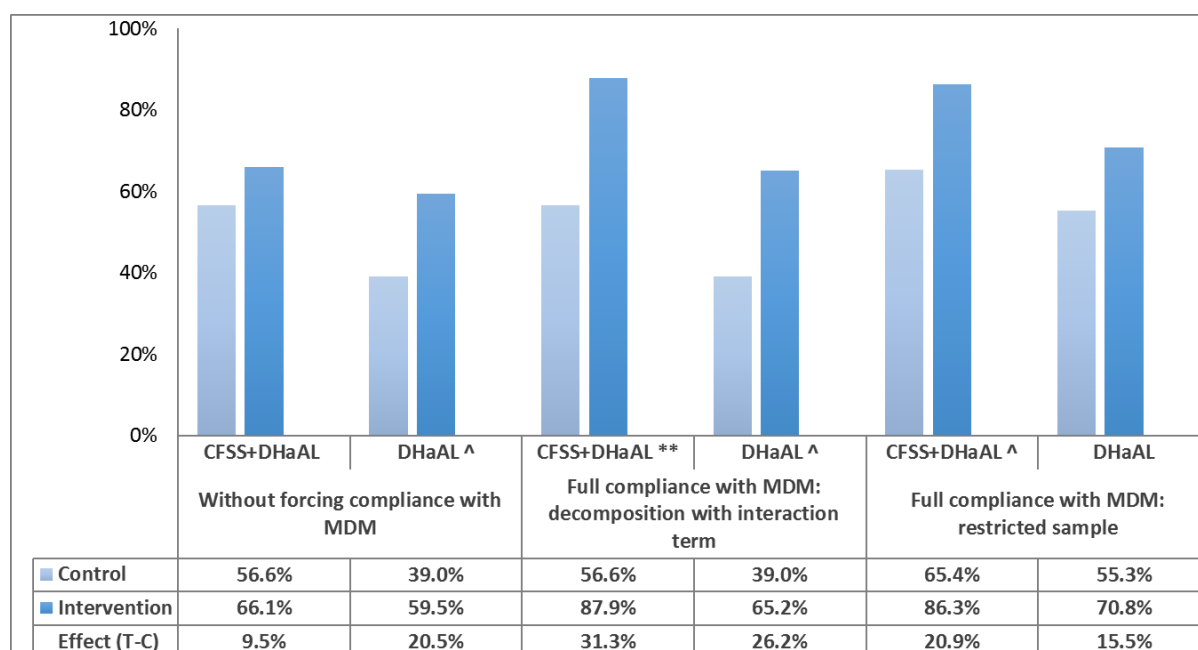
As shown in Figure 4-10, only 40 per cent of teachers in control schools reported that meals were served on almost all days in the month prior to the evaluation. In contrast, the proportion of schools serving meals regularly was 13 percentage points higher in DHaAL+CFSS schools, and 33 percentage points higher in DHaAL-only schools. On the day of survey visits, however, a much higher proportion

of both intervention and control schools served meals because the field survey teams had requested this if possible. This was done so that the teams could observe how many children washed their hands before meals, although that purpose was not disclosed in advance.¹⁴ Nonetheless, compared to their respective control groups, fewer DHaAL+CFSS (-13 percentage points) and DHaAL-only schools (-7 percentage points) served meals under the MDM on the day of the survey. As a result, the impact of the proportion of children washing hands with soap before meals was likely underestimated.

4.3.5.4 Potential Handwashing Impacts Under Perfect Compliance with MDM

The impact evaluation criterion of a 30-percentage-point impact was pre-specified without knowledge of the extent of the irregularity of meals served under the MDM scheme.

To assess the potential impacts of the interventions on handwashing with soap before consuming meals in school under the assumption of full compliance (in serving meals) under the MDM, evaluators specified two alternative regression models, as explained in the Technical Annexure. Both models made serious econometric assumptions, but one model found an almost 30-percentage-point impact of both DHaAL+CFSS and DHaAL-only interventions at statistical significance level $\alpha = 0.1$ (see Figure 4-11). However, the second model estimated 21-percentage-point and 16-percentage-points impacts of DHaAL+CFSS and DHaAL-only respectively.



Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations, [TCH] Teachers' Interview, [Sch Obs] School Observations.
 Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Figure 4-11. Effects on the Observed Proportion of Children Washing Hands with Soap Before Meals at School When Meals Under the MDM Scheme Are Served

¹⁴ Note, handwashing events were observed and counted by the field teams whether or meals were served under the MDM or not. However, they observed much fewer handwashing events in both intervention and control schools when meals under the MDM were not served.

Triangulating (a) substantially large impacts on handwashing with soap before meals in schools based on the recall of school children, (b) possible underestimate of impacts using enumerators' observations and counting-based handwashing indicators, and (c) impact estimates between these two extremes under the assumption of full compliance with the MDM scheme, the evaluation infers that both DHaAL+CFSS and DHaAL-only interventions have substantially large impacts on sustaining the practice of handwashing with soap before meals, although the impacts were larger in DHaAL-only schools.

4.4 Efficiency

Were the manpower and financial resources invested efficiently to deliver the programme objectives?

Based on discussions with SSA, CEE and UNICEF staff in Assam, the evaluation found that a key feature of DHaAL was its affordability and efficiency. According to CEE staff, the one-time infrastructure cost per child was merely ₹86 because the simple group handwashing unit cost only ₹10,000 in total. As noted above, SSA officers also agreed that DHaAL interventions did not place an additional burden on the budget except for the cost of installing the group handwashing station. In addition, the block-saturation approach of targeting all schools in a block allowed CEE to work with economies of scale; only one CEE staff member was needed to train, monitor and support about 30 schools. Monitoring of DHaAL activities also involved block and cluster coordinators as part of their routine school supervision.

Overall, DHaAL was perceived by SSA and UNICEF Assam as a highly efficient investment in terms of manpower and funding. Moreover, this was a major factor that the state-level WinS Task Force considered in deciding to scale up the DHaAL model across all schools in Assam.

Nonetheless, this cost-efficiency came at the cost of long-term sustainability of handwashing infrastructure and behaviours, as highlighted above. The simple handwashing unit was indeed sufficient to change handwashing practices before meals in school, which resulted in it being scaled up to all 422 schools in three blocks under DHaAL+. However, after more than 18 months, breakages, and thus non-usage, of the units was slowly piling up, underscoring the need for more robust – and costly – handwashing facilities in these schools in the not-so-distant future. Further, the budget provision for soap was found to be inadequate, again as noted above. Even the most recent SSA budget provision for soap (₹400 per school) is probably too low for handwashing by all children throughout the academic year.

It should be noted that some of these shortcomings already have been addressed. In scaling up DHaAL across the state, SSA is constructing more robust group handwashing stations costing ₹25,000, which are expected to last much longer than the simple DHaAL units, and thus to have lower *annualised* infrastructure costs. This decision also suggests that the state WinS Task Force considered the DHaAL pilot as a low-cost investment that worked and could now be strengthened with higher expenditures on infrastructure.

Were programme outcomes delivered on time and within budget?

Based on discussions with UNICEF Assam, review of the proposal by CEE to UNICEF Assam and the final project report, it was observed that the DHaAL pilot was concluded on time and within budget. After the baseline survey and engineering design of the group handwashing units, the cost of these units was revised from ₹8,000 to ₹10,000, but this increase was deemed reasonable and justified. Delays of few weeks occurred in submitting the final project-related documents, but the main activities were concluded by July 2014 in accordance with the proposal. DHaAL Phase 2 (DHaAL+) also was concluded in November 2015 in terms of infrastructure and training. CEE reported that the funds release from UNICEF was timely and that it suffered no unanticipated human resource constraints.

What is the cost-effectiveness ratio of DHaAL in terms of “software and hardware” costs and effective impacts on handwashing behaviours caused by DHaAL?

In addition to examining the efficiency of programme implementation, the evaluation also estimated the cost-effectiveness ratios, as mentioned above. Cost-effectiveness ratios can help compare different interventions at a later date as well as help track how cost-effectiveness changes over time. The cost-effectiveness estimates for the evaluation were based on interviews of CEE and SSA staff as a part of qualitative research. The only other source of cost information available was the budget proposal by CEE; SSA offices did not keep data on time, travel and other expenses under different schemes and activities in which they were engaged. However, most of these were fixed costs for the Government and not variable by DHaAL activities. SSA also did not make any new budget provision for procuring soap, but allowed existing MDM funds to be used by schools. Therefore, the estimated cost by the evaluation team is expected to be a close estimate of the pilot programme cost.

The cost of the programme varied with respect to various programme components, size of the school and required physical settings in each school. However, the group handwashing station in each school cost ₹10,000, as already noted, while the cost of a more robust handwashing facility of concrete and iron pipes is about ₹25,000 to ₹30,000. In addition to the “hardware” costs of infrastructure, costs also are incurred for the “software” support of capacity development, training and monitoring. According to the budget submitted by CEE, the average cost for the entire programme for a school was estimated at ₹36,436, including ₹10,000 for the basic handwashing station, and the balance for the implementing agency’s manpower costs, transportation to the schools, training of teachers, and school-level processes (training, “handholding,” administration).

The evaluation assumed a lifespan of five years for the infrastructure to annualise the costs. Therefore, the annualised cost of the total investment of ₹36,436, with a 7-percentage-point discount rate over five years, was calculated at ₹6,760. As noted, on average one handwashing instance consumes 0.35 grams of soap (Koehler and Wildbolz 2009), so for 300 handwashing events a year each child will need about 1.4 soap bars of 75-gram size. Assuming a price of ₹30 per soap bar, the annual soap cost per child thus was assessed as ₹42. An average of 70 children was found to be enrolled in a school, so the

total annual cost of soap averaged ₹2,940. Therefore, the total annualised cost of the DHaAL programme was ₹9,700 per school (6,760 + 2,940). Note, in Table 4-2 the cost-effectiveness was reported as the increase in the proportion or number of children washing hands per ₹1,000 annualised programme cost; such cost-effectiveness ratios could be estimated for other outcomes of interest using the magnitude of impacts reported in previous sections.

Table 4-2. Cost-Effectiveness of the DHaAL Programme

	Effectiveness - Proportion of additional children who ...	Cost-effectiveness – Increase in the proportion of children per ₹1000	Effectiveness – Number of additional who ... ^{&}	Increase in the number of additional children per ₹1000
HW with soap after defecation during school hours (spontaneous self-report)	22.3 percentage points	2.36 percentage points	15.6	1.65
HW with soap before the MDM (spontaneous self-report)	49.8 percentage points	5.28 percentage-points	34.9	3.70
Child observed to wash hands with soap before the mid-day meals	20.5 percentage points	2.17 percentage points	14.3	1.52

[&] On average, 70 students are enrolled in a lower primary school in the evaluation sample. The number of children was obtained by multiplying the proportion reported in Column 1 by 70.

4.5 Gender- and Equity-Focused Evaluation

Did the DHaAL pilot include marginalised population sub-groups?

Because DHaAL was a pilot programme, it experienced obvious limitations to geographic spread and population covered. However, it was decided to implement the pilot in Kamrup district so that better supervision and coordination with the state-level SSA was possible. As noted above, the Rani and Rampur blocks were specifically selected because of the higher proportion of tribal population in these blocks, so that the DHaAL pilot appeared to have considered social inclusion as a criterion in selecting programme areas.

The DHaAL second phase saturated all 422 schools in three blocks in Kamrup district and thus targeted all population groups, including socially marginalised groups. As DHaAL is further scaled up across Assam to cover all 48,000 rural elementary schools, it is expected that this will likely target first the schools with the poorest sanitation, which also is an equitable approach.

The programme design did not discriminate between girls and boys in terms of their training or access to handwashing facilities. However, it did focus on training of mothers because they formed the vital Mothers Groups, and because fathers have been culturally less involved in school affairs.

Because DHaAL did not monitor outcomes at the level of the individual child, no outcomes could be differentiated by gender. However, programme target beneficiaries included all children in the schools, without excluding anyone. Children were grouped by class or grade level, but not by any other social criteria.

What were the gender-segregated impacts of DHaAL on key outcomes, and were there any disadvantaged population groups?

To present gender-segregated impact estimates, the sample was restricted to different population sub-groups and the impacts then were estimated, as previously discussed. The evaluation conducted sub-group analysis by sex and age (proxy by class or grade) of children; occupation of the chief wage earner, including labourer or scheduled caste/scheduled tribe (SC/ST) status of the household; and households in the lowest income quartile. Results are reported in Table 4-3 and Table 4-4; these only include impact estimates, with more detailed results available in the Technical Annexure. The following are the key findings:

- The impact of handwashing with soap before mid-day meals, based on self-recall by children, stands at between 40 and 50 percentage points among different gender and socioeconomic groups for DHaAL+CFSS and DHaAL-only schools respectively. However, in the case of SC/ST students, the impact on the proportion of students who recalled washing hands with soap before meals in schools was substantially higher, at 82 percentage points in DHaAL-only schools.
- However, the impact of handwashing with soap before mid-day meals, based on enumerator observation and counting, is lower than that based on self-recall, as also discussed above. Enumerators recorded the class/grade and sex of the children while conducting observations so that sub-group analysis was possible.
 - In the case of DHaAL+CFSS schools, impacts range from <5 percentage points (statistically not different from 0) among children in Classes 3-5 to 19 percentage points among girls in Classes 1-2 and 12 percentage points among boys in Classes 1-2. The presence of these impacts suggested that the transmitting of knowledge from older children to newer batches in Classes 1-2 was successful in DHaAL+CFSS schools. However, the lack of impacts on handwashing behaviour in DHaAL+CFSS schools in Classes 3-5 also suggested that in older children there were factors other than the intervention that were driving their handwashing behaviour in both control and DHaAL+CFSS schools. Put simply, the success of group handwashing interventions could depend on school characteristics.
 - In the case of DHaAL-only schools, the impacts were statistically null among boys and girls from Classes 1-2, but stood at 26 percentage points among girls and 34 percentage points among boys from Classes 3-5. Therefore, DHaAL likely delivered impacts of the pre-specified magnitude of 30 percentage points, but only among students in Classes 3-5, who probably retained the knowledge imparted during active

DHaAL implementation. At the same time, knowledge transmission from older students and teachers to the newer batches probably did not happen in DHaAL-only schools with much intensity – and thus, the behaviour of younger children did not change as much as that in the older children.

- No statistically meaningful impacts on handwashing behaviours by sex were found other than those reported above.
- The increase in proportion of parents reporting that children discussed handwashing and other WASH-related messages at home was substantially higher among SC/ST households (40 percentage points) than among other population sub-groups (14-23 percentage points) in DHaAL-only schools. Consequently, the impact on the proportion of households observed to have a dedicated handwashing station with soap and water was again highest among SC/ST households (37 percentage points) than other sub-groups (8-21 percentage points).
- Households of girls from Classes 3-5 had higher availability of a dedicated handwashing station with water and soap (18 percent) than households of boys from that cohort (7.5 per cent), suggesting that girls may be more effective change agents than boys.

Table 4-3. Gender- and Equity-Segregated Impacts of DHaAL+CFSS Schools

Impact Indicators	Boys (Class 1-2)	Girls (Class 1-2)	Boys (Class 3-5)	Girls (Class 3-5)	SC/ST Caste	Daily Labourer HH	Lowest Q- tile income
Child recalled handwashing with soap after defecation in school [CLD]			27.1% ***	28.1% ***	44.3% ***	27.6% ***	27.5% ***
Child washed hands with soap after visiting toilet [CLD Obs]	8.0%^	0.0%	14.1%	14.2%			
Child recalled handwashing with soap before meals in school [CLD]			41.8% ***	51.4% ***	37.0% **	45.5% ***	45.8% ***
Child washed hands with soap before meals in school [CLD Obs]	11.6%	19.2% ^	3.5%	4.9%			
Parent reported that children discuss WASH messages at home [HH]			10.3%	9.1%^	12.0%	21.0% ***	12.7% ^
Household observed to have handwashing station with water and soap [HH Obs]			9.1%* *	10.1% **	18.0% **	11.9% **	7.4%* *

Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations

Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

Table 4-4. Gender- and Equity-Segregated Impacts of DHaAL-Only Schools

Impact Indicators	Boys (Class 1-2)	Girls (Class 1-2)	Boys (Class 3-5)	Girls (Class 3-5)	SC/ST Caste	Daily Labourer HH	Lowest Q- tile Income
Child recalled handwashing with soap after defecation in school [CLD]			24.7% ***	19.8% ***	12.4%	21.9% ***	37.4% ***
Child washed hands with soap after visiting toilet [CLD Obs]	0.0%	9.0%*	5.8%^	7.2%* *			
Child recalled handwashing with soap before meals in school [CLD]			50.5% ***	48.1% ***	82.1% ***	52.8% ***	43.6% ***
Child washed hands with soap before meals in school [CLD Obs]	10.5%	-5.5%	33.8% **	25.8% *			
Parent reported that children discuss WASH messages at home [HH]			22.7% ***	20.2% ***	40.2% ***	16.8% ***	14.2% ^
Household observed to have handwashing station with water and soap [HH Obs]			7.5%^	18.2% ***	36.7% **	21.1% ***	8.0%*

Abbreviation: [CLD] Child interview, [CLD Obs] Children observation and counting, [HH] Household interview, [HH Obs] Household Observations.

Statistical Significance indicated next to Intervention Name as: *** $\alpha < 0.01$, ** $\alpha < 0.05$, * $\alpha < 0.10$, ^ $\alpha < 0.20$.

4.6 Scalability and Sustainability Potential

4.6.1 Potential for Sustainability

To a limited extent, the sustainability of DHaAL was assessed in the quantitative impact evaluation by examining a sample of schools where implementation under the programme ceased more than 18 months earlier. The identified impacts gave some confidence that impacts could last longer – but how long can only be answered by a future study.

CEE appeared confident of sustainability because the programme was embedded within the community, and demonstrated both a visible behaviour change in the children as well as community ownership of the programme. A CEE staff member said: *“All the systems are in place. [I ask students, mothers, or SMC members], ‘Why are your teachers not helping you?’ They say, ‘There is no need for teachers. They helped us during the first stage. We have adopted it now. We will operate it now even if the teacher is not present at the school.’ I tried to explain to them that the teacher has done his job well. If the teacher is not there now, it doesn’t mean that he has not done his job – he has already completed his job.”*

However, CEE staff also cautioned that the programme may not be sustainable in all schools, stating, *“[Sustainability] cannot be assured for all schools. Suppose, I have been working with one teacher for the last 18 months and he retires. Another teacher takes his place; we may have a problem motivating him [because the implementing agency will not stay on forever].”* A mother brought a similar perspective with regard to enrolment of new children when she said: *“It [sustainability] might be a problem because the programme is not so established yet, and newly enrolled students need regular such awareness because so many first-generation children [without an older sibling in the programme]*

also exist in this group [at school].” Overall, a key concern is the transmission of knowledge and behaviour as teachers are transferred and as children grow older.

Another key concern is sustaining the handwashing infrastructure because of limited design life of simple construction as noted above. Already it was seen that after 18 months, about one-fourth of the schools did not use the group handwashing units due to breakages. However, as also highlighted, this concern is being addressed in the scaling-up phase with the construction of integrated toilets with robust group handwashing stations that will potentially last much longer. Yet even with such robust construction, the need for a viable, efficient O&M system came through clearly, as previously discussed. Currently, no such O&M system exist for WASH infrastructure at SSA level.

A further potential barrier to sustainability is the lack of handwashing infrastructure in secondary schools. As with primary schools, no information is available on the availability of handwashing facilities in secondary or higher schools. However, as per CEE and SSA it is likely that senior schools also suffer from lack of handwashing facilities with soap. Therefore, as students graduate from primary school, they might not have the means to continue the habit of handwashing with soap.

4.6.2 Potential for Scaling Up

The pilot DHaAL programme yielded relevant outcomes at school and child level, with these sustained more than 18 months after the initial pilot in 100 schools. With the pilot scaled up to all 422 schools in three blocks of Kamrup district during Phase 2 – and concluded recently by delivering committed outputs on time – DHaAL processes appear stabilised enough to scale up across the state, as is now under way. An SSA official said: *“The Government in the last year has made budgetary provision for 16,000 schools to have handwashing facilities, with a further commitment to cover all 48,000 schools. That is one outcome of this project, and one major impact.”* Most teachers also opined that DHaAL model is scalable elsewhere in Assam.

However, a substantial proportion of teachers also cited the need for additional staff prior to scaling up. In addition, SMC members and teachers expressed concerns over available funds for scaling up, particularly for O&M. One SMC member stated: *“The communities have even built the schools and given them to the Government to run, so building handwashing facilities is not a problem [but running/maintaining it is].”* Again, most respondents said did not think water supply would be an issue during state wide scaling up, but they suggested a piped water supply to toilets and handwashing stations for ease of use and maintenance.

Critically, it also was found that while the “hardware” infrastructure component of DHaAL is being scaled up across Assam, the “software” of capacity development, training and monitoring component is not. DHaAL still needs to build a sense of ownership and further engage SMC members, teachers and mothers in aspects such as provision of soap, operation of handwashing stations and supervision of handwashing. However, providing such support state wide also is challenging and will require capacity development among SSA staff up to block and cluster levels, as well as support from local non-Government organisations (NGOs) and resource agencies.

5. CONCLUSIONS, LESSONS LEARNED AND RECOMMENDATIONS

5.1 Conclusions

Presenting the first credible evidence that group handwashing programmes are more effective in changing and sustaining handwashing practices than the “business as usual” approach, DHaAL was successful in creating an enabling environment for such practices. This was achieved through advocacy at state and district levels in Assam, complementing capacity building of SSA staff at district and block levels and training of teachers, SMC members, Mothers Group members and students alike. Importantly, the state WinS Task Force played a key role by supporting DHaAL activities through both policymaking and funding.

DHaAL succeeded in installing group handwashing units in all schools, ensuring availability of soap, and using of these facilities before meals by students, in a disciplined and supervised manner. Nonetheless, some slippage has occurred in functionality of group handwashing units, soap availability and, thus, handwashing practices. Even so, DHaAL significantly increased the proportion of primary school children who washed their hands with soap before meals. However, DHaAL+CFSS was less successful in changing handwashing behaviours because other school-level factors likely played a more dominant role in determining the handwashing behaviour of children in these schools than DHaAL. This resulted from underlying, complex behaviour change mechanisms that cannot be fully understood by the qualitative and quantitative evaluation methods used for this evaluation.

Although the impact evaluation methods used were objective and robust, they also encountered key methodological limitations, primarily because the design options were severely limited by being conceived after the programme implementation was over. This underlined the need to include impact evaluation and learning objectives at the design stage of a programme, which would enable more dependable evaluation of the programme’s TOC.

An unexpected finding of the evaluation was how the outcomes of a programme could be affected by its dependency on external factors. In the case of DHaAL, a lack of provision of meals under the MDM on the day of the survey visit not only underestimated the impacts but also highlighted a risk that if meals are not provided regularly, handwashing also will not be carried out regularly – and thus, positive habits might not be formed. Similarly, handwashing after toilet use was negligible because toilet use at school for defecation was itself negligible. Therefore, the success of behaviour change interventions critically depends on the availability, functionality and maintenance of WASH facilities in schools, although local institutions such as SMCs rarely have the required managerial and technical skills in this regard. Therefore, the role of the Government becomes critical to operate and maintain overall WASH systems in schools.

An expected but surprisingly strong finding was that of the large “spillover” effects of DHaAL at children’s homes. Interestingly, the spillover effects were much larger in both absolute and relative terms than some of the direct effects. In particular, the evaluation offers credible proof that children

can persuade households to build and use handwashing facilities, thereby serving as effective change agents.

Altogether, findings of this evaluation support the cautious scaling up of DHaAL in a phased manner, bearing in mind both the enabling factors and potential barriers that should be respectively strengthened or addressed as a part of such scaling-up efforts.

5.2 Lessons Learned

The evaluation of DHaAL provided an important opportunity to learn the following lessons for the WASH sector as a whole, such that these lessons should not be viewed as a critique of the otherwise successful DHaAL pilot:

1. Better Integration of Robust M&E with Pilot Programmes: Pilot programmes are important from the learning perspective and are routinely conducted before scaling up any programme. The evaluation of DHaAL has been rigorous but also retrospective, as noted throughout the report, and thus suffers from critical methodological limitations. In turn, these limitations could have been avoided had the evaluation been conceived at the start of the pilot. In particular, the evaluation had to rely on recall by programme staff and other stakeholders about the programmatic process instead of an objective assessment during the programme implementation.

This lesson is merely a hindsight at this point, but provides an important caveat for future pilots. Rigorous M&E that is learning-focused, as opposed to audit-focused, should be an integral part of pilot programmes. Such integration will require not only involvement of specialist researchers, but also capacity development of implementation partners to effectively implement such an M&E system.

2. Critical Assessment of Dependencies on Partner Schemes in the Design Stage: When a programme is implemented by dovetailing with another programme or using it as a platform, as was the case with DHaAL and the MDM scheme, more explicit recognition should be given to the fact that success of the programme depends on success of partner programmes or schemes. Therefore, design of the programme should consider the effect of such external dependencies and have a viable plan to manage these risks.

3. Importance of Community Involvement: As noted above, for any school-based programme the role of community institutions such as the SMC or Mothers Group will be important. However, the role of community institutions also should be commensurate with capabilities of the communities. In particular, Assam is a unique case because of literal ownership by the community of land and buildings of many schools. In turn, this resulted in much higher community involvement in school-based programmes. However, such a level of involvement and ownership might not be viable elsewhere in India, as discussed previously.

5.3 Recommendations

The following recommendations were based on review of the evaluation findings by SSA, CEE, UNICEF Delhi and UNICEF Assam, and WASH specialists at NEERMAN. These recommendations were further

reviewed by ERG members and finalised in a consultation workshop. The recommendations are listed in approximate order of their stated urgency and importance, but UNICEF and SSA will need to determine final prioritisation based on their needs.

5.3.1 Recommendations to UNICEF

1. Provide technical assistance, documentation and advocacy support to SSA to implement recommendations made to SSA: Several recommendations are made to SSA, as discussed in the next sub-section. UNICEF should advocate with the Government of Assam to secure the necessary policy and programme planning support to SSA to implement these recommendations.

2. Expand the “three-star” approach to group handwashing interventions: Group handwashing interventions such as DHaAL are based on a “three-star concept” of Simple-Scalable-Sustainable handwashing facilities. As this evaluation showed, handwashing habits could be changed even with simple group handwashing units; however, a simple unit will not last more than a few years. Therefore, the design of group handwashing programmes should consider how schools will transition from simple to more robust handwashing units, and how this infrastructure would be maintained.

3. Improve M&E and learning system for pilot projects: UNICEF ICO in recent years published guidelines on the piloting of innovations (UNICEF 2013). In the spirit of these guidelines, more systematic and thorough integration of learning objectives in pilot projects is needed. Specifically, this initiative should result in more detailed, objective, verifiable and target-driven logframes, a professionally designed and implemented M&E system, including baseline, midline and endline surveys; and learning workshops among UNICEF programme staff, implementation partners and internal or external evaluation researchers. Because an M&E system is often internal to the project, the capacity of the implementation partner to implement such a system should be built and included as a part of pilot project design.

4. Include, document and monitor gender, social inclusion and equity dimensions in project design and monitoring: The DHaAL pilot selected two out of three blocks with consideration of marginalised tribal populations and thus considered social inclusion aspects in the programme design. However, documentation should more thoroughly discuss how gender, social inclusion and equity issues were addressed at the design stage because it will serve as a proof of gender sensitive program design in evaluations. During the scaling up of DHaAL, the selection of schools under the project can be based on principles of social inclusion and equity, such that the neediest schools and those serving marginalised populations are prioritised. Monitoring systems also should track progress and outcomes by gender and other social categories.

5. Consider a scientifically robust impact evaluation to support scaling-up decisions and programme design: One purpose of this evaluation was for use as advocacy to scale up DHaAL elsewhere in Assam and across India. While the evaluation provided proof that handwashing behaviours could be changed by group handwashing interventions, several key questions remain unanswered for evidence-based scaling up. Example of these questions include: (1) Did group handwashing reduce exposure to pathogens, and how is this exposure moderated by the type of soap, handwashing intensity, and contamination of water used? (2) Will group handwashing programmes improve academic and health outcomes of children? (3) How are effects of group handwashing interventions moderated by factors such as intensity and regularity of “software”

support? These questions could be answered through a well-designed and -implemented experimental impact evaluation of group handwashing programmes of reasonable scale and geographical spread, complemented by supporting qualitative research.

6. Advocate to establish a coordinating WinS-style task force in other states: UNICEF advocacy efforts during scaling up should include establishment of a high-level coordinating body similar to the WinS task force in Assam for effective coordination, decision making and action among various Government departments and external stakeholders in other states. This coordinating body should ideally be headed by an empowered Indian Administrative Services (IAS)-grade officer and hold regular meetings as was the case in Assam.

7. Advocate for expansion of a DHaAL-type programme in pre-primary and secondary schools: Handwashing has been shown to be one of the most efficacious public health interventions to reduce disease among preschool-age children. Also it is usually believed that habits are easier to form (and change) in such young age. Therefore, a programme such as DHaAL would be highly relevant even in the pre-primary Anganwadi system. On the other hand, handwashing habits formed in primary schools may not sustain in secondary schools, which often lack handwashing facilities, as previously discussed. Therefore, a programme that ensures at least the existence of handwashing facilities in secondary schools is needed. Considering the success of DHaAL in changing behaviours, UNICEF could conceptualise and develop a “life-cycle” type of approach to handwashing, from pre-primary to secondary schools.

5.3.2 Recommendations to SSA, Department of Education, Government of Assam

1. Make adequate quantities of handwashing soap available, based on the school population:

As this evaluation has highlighted, published data show 0.35 grams of soap are needed per handwashing event, so that one child would need at least one bar of 100-gram size for 280 handwashing events per academic year.

2. Construct robust group handwashing units: Construction of robust handwashing facilities, as is now under way by SSA, is a good practice and should be continued, but also consider replacing existing group handwashing stations built under DHaAL pilot with robustly constructed handwashing units. While it is evident that a piped water supply might not always be feasible, consider engineering designs to reduce the burden of manually hauling water in such situations. In addition, consider a design modification so that soap can be made securely available at the handwashing station throughout the day, without concern for theft or leakage.

3. Establish an effective and accountable O&M System for WASH in Schools: Consider an O&M system where WASH facility repair requests could be logged, monitored and resolved in a timely manner, using technical and managerial expertise available in the civil engineering cell of SSA or through external contractors. For economies of scale, SSA could consider partnering with other departments such as PHED to establish an integrated WASH system for the entire community, not only schools. The local community could then be given the role of participatory monitoring in this system.

4. Scale up DHaAL “software” along with “hardware”: As a part of ongoing DHaAL scaling-up activities, consider including a module on DHaAL sensitisation and training as a part of annual teacher trainings conducted by SSA. In additionally, sensitisation and training of SMC members,

Mothers Group members and students on WinS and DHaAL activities is needed in the initial phases, followed by refresher trainings, preferably annually. SSA should consider appointing local NGOs or community member for such “software” support activities, along with a nodal resource agency to train and monitor these local support organisations.

5. Set up an electronic monitoring system to track DHaAL implementation: Successfully institutionalising group handwashing would require monitoring and support in the initial period as well as periodic check-ups, as noted above. As a part of their routine school visit activities, SSA block and cluster coordinators could monitor and report on the functionality and use of group handwashing facilities. A smartphone-based electronic reporting system would be most suitable in this regard.

6. Include indicators related to functionality of handwashing facilities in DISE: The annual DISE survey by the Education Department should collect indicators related to: (1) type of functional handwashing facilities available in schools; (2) amount of budget spent on procuring soap or the number of handwashing soaps procured during the academic year; and (3) whether group handwashing is actually practiced by students. Similarly, consider monitoring handwashing facilities in secondary schools to at least document the level of access to handwashing facilities there.

7. Consider more frequent tracking of meal provision under the MDM: This recommendation is based on the unexpected finding of dependency of DHaAL impacts on regularity of meals provided under the MDM, and also because regularity of meals is a key health and education priority for the Government under the RTI Act. The number of days when meals under the MDM scheme are served, and the reasons for any irregularity, should be tracked on at least a quarterly basis. Electronic data collection efforts under the Government’s Digital India initiative could be helpful in this regard.

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