TECHNICAL SUMMARY

Operations & Maintenance Pilot Study Report

Results from a Three-Arm Experimental Trial in Addis Ababa

In 2019, Splash International (hereafter referred to as Splash) set out to reach every government school in Addis Ababa with full water, sanitation, hygiene (WASH), and menstrual health coverage. We know from experience and from sector research that having a robust O&M (Operations & Maintenance) strategy is key to the sustainability of WASH infrastructure. At the same time, a strong local supply chain is essential to enable schools to access spare parts after the project's implementation phase.

Program sustainability is one of the major areas of focus for Splash and was specifically highlighted as a cross-cutting theme for Project WISE. All our interventions are designed and implemented with the goal of long-term usability. Splash is refining and further developing our infrastructure O&M strategies to help schools and the Addis Ababa Bureau of Education (BoE) sustain our interventions long after Project WISE (WASH In Schools for Everyone) is complete.

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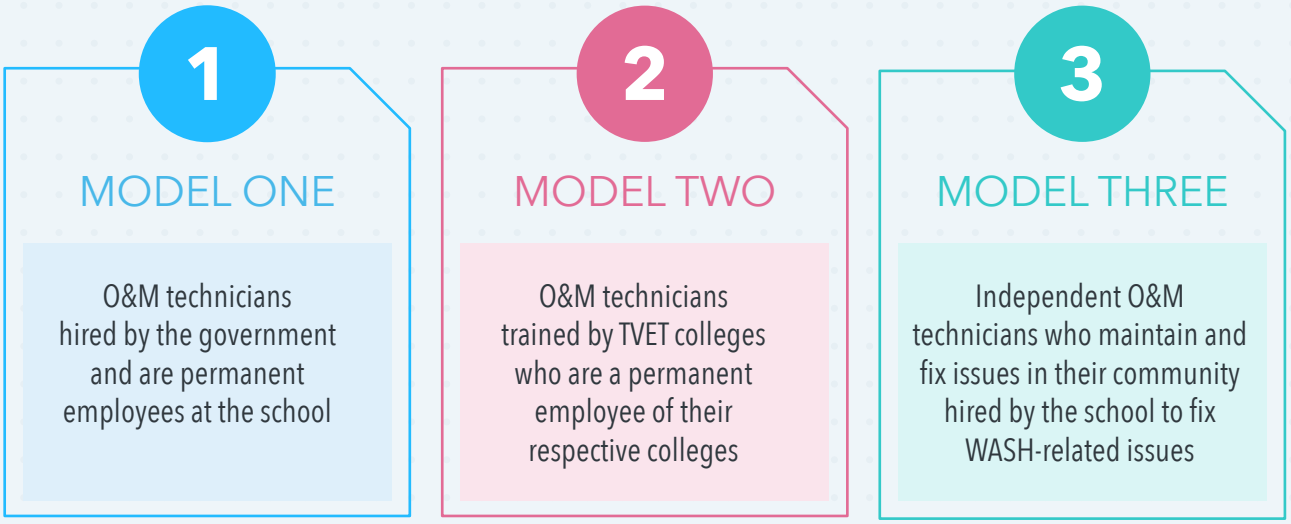
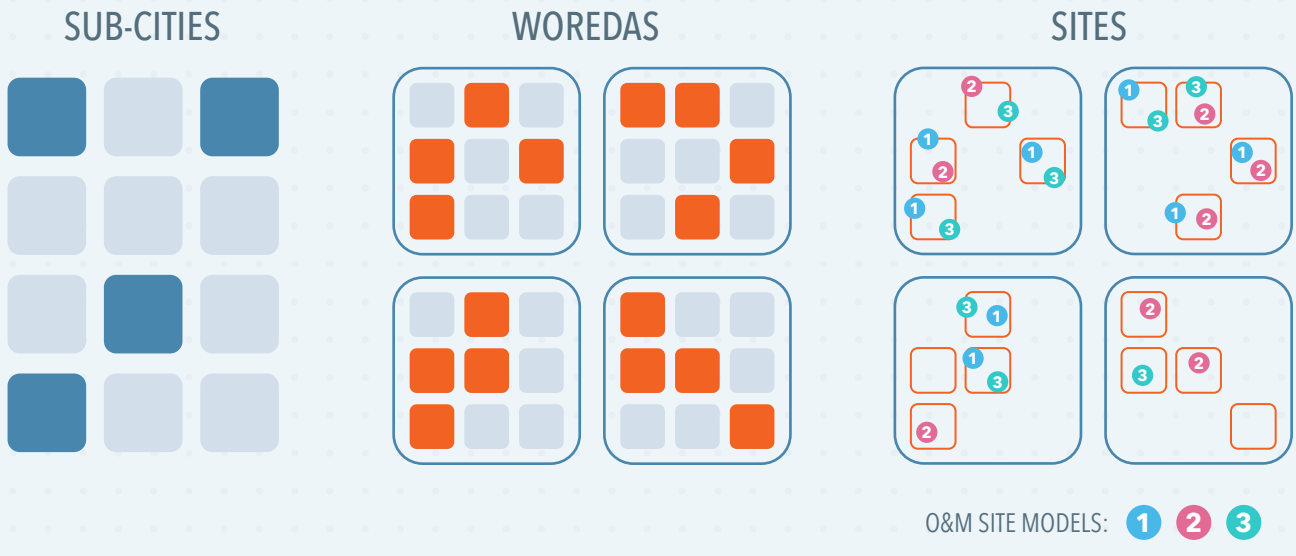
FIGURE 1. O&M Models for WASH Infrastructure Pilot Study



Splash conducted a pilot study comparing three different O&M models for WASH infrastructure at 24 sampled school sites. The main objective of the study was to determine which of the three O&M models performs the best across several performance criteria, including labor and materials costs, downtime, and ease of communication and scheduling. Moreover, we aim to develop a city-wide O&M strategy to reduce system downtime, ensure services remain functional, and strengthen our current implementation modality in schools.

Splash tested the viability of third-party O&M service provider models and local spare part supply chain options. The study seeks to identify mechanisms to enhance school administration's accountability towards functional and sustainable water supply and the proper utilization of services. Lastly, the Splash team collated and summarized the challenges related to the role and effectiveness of the private sector in ensuring a functional supply chain for the school WASH infrastructure. The study concludes with a set of recommendations to be used by Splash, and other stakeholders, in developing s scalable strategy for O&M.

FIGURE 2. O&M Pilot Study Sample Design



Methods

Splash provided technical training in each of the three models included in the study. The school O&M technicians, local artisans, and TVET technicians were all trained on theoretical and practical aspects of O&M. Training topics included identification of infrastructure issues, troubleshooting common issues related to infrastructure, and practical demonstrations on how to resolve issues. Additionally, focal persons at each of the sites included in the pilot study were provided a general overview of O&M, how to record issues on the log sheet; and how to communicate with local artisan, TVET technicians and Splash O&M team members before the study period.

Spare parts were provided by Splash for technicians in all three models during the study period to reduce confounding factors affecting model comparisons. However, tools required for maintenance were provided only for school technicians (Model 1) since local artisans and TVET technicians were well equipped with their own tools. A log sheet was used by the focal person(s) at each school to record issues requiring maintenance and/or materials required to fix the problem, as well as the time required for the school technician/TVET/local artisansto address the issue (i.e., downtime).

Twenty-four sample schools/sites were selected from the set of KGs, Primary and Secondary schools included in Splash's Project WISE intervention sites. To control for geographic and water availability differences, four sub-cities were randomly selected from the 11 sub-cities included in Addis Ababa Project WISE site list and four woredas were randomly selected from each sub city. Within each Woreda, two sites were selected using purposive sampling based on the availability of water and electricity at the site for at least three days per week, Splash has completed the full Project WISE intervention; and major WASH infrastructure are in good condition at the onset of the pilot study. Other criteria for selection of sampled sites included the site having an average number of beneficiaries and number of WASH-related infrastructure, sites with a good performance record based on analysis by the Splash O&M team, sites near TVET colleges (Model 2) and the nearby presence of a local artisan (Model 3); and sites expressing interest in, and cooperation for, this pilot study.

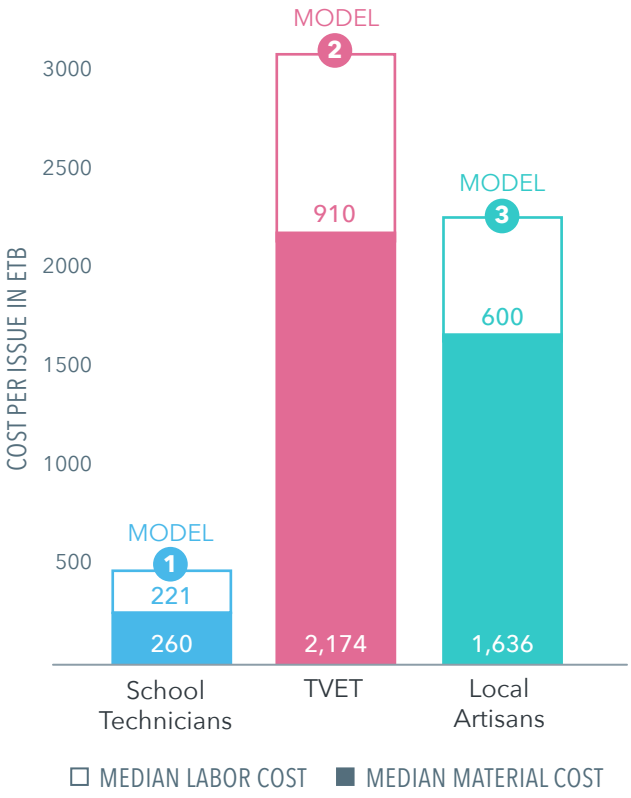
We have two primary components to our O&M Pilot study analysis corresponding to the types of data we gathered to evaluate the three models under the pilot study. The first component is a descriptive analysis using the data gathered in the maintenance log sheets. We focused on comparing the types of issues identified and fixed, the down time, the reasons for not fixing the issues on time, the materials required for fixing issues, the cost of maintaining issues and, who conducted the maintenance across the three models. The second component is a thematic analysis of the qualitative focus group discussions with stakeholders involved in the O&M pilot. We looked at common themes related to down time, sustainability, positive and negative experiences, factors affecting successful implementation and achievements and best practices. In this analysis, we have also included insights from the weekly data quality review (DQR) visits conducted by the MLE team throughout the study.

Results

School technicians fixed more issues than TVETs and local artisans, but they were simpler issues to fix

Overall, we see that school technicians were able to address considerably more issues compared to TVETs and local artisans. This is likely a result of the proximity of school technicians to the issues at the school but is also driven by the fact that most issues needing attention at the school are relatively minor, and the schools were hesitant to notify a TVET technician or a local artisan to address simpler issues in Model 2 and Model 3 sites, respectively. There was a tendency for TVETs and local artisans to wait until several issues needed addressed, rather than coming to the site for minor issues.

FIGURE 3. O&M Costs in ETB, by School and Model



School technicians are less expensive than TVETs and local artisans

We found that school technicians have the lowest costs – in terms of materials and labor – when looking at more common issues related to drinking and handwashing stations and water pipelines. The median cost per issue for school technicians is 444 ETB, compared to 3,054 ETB and 1,944 ETB for TVETs and local artisans, respectively. It is not possible to say whether TVETs or local artisans are more affordable for issues related to pumps or water tankers because there are very few observations to base the analysis on.

School technicians can respond more quickly to issues, resulting in less downtime, so long as spare parts and tools are readily available

It is clear from the logbook analysis, as well as from the focus group discussions, that school technicians were able to address issues in a much timelier manner compared to TVET technicians and local artisan. The median number of days it took to fix an issue is less than one day for school technicians, compared to two and four days for TVETs and local artisan, respectively. When looking at the average number of days, the trend is the same - 1.3 days for school technicians, 8.9 days for TVETs and 16.6 days for local artisan.

FIGURE 4. Median downtime (in days) per issue type by model

	DRINKING STATION	HANDWASHING STATION	WATER FILTER	WATER PIPELINE	PUMP	WATER TANKER	DRAINAGE TUBE	TOTAL
MODEL 1 School Technicians	0.0	0.0	0.0	00		1.0	7.0	0.0
MODEL 2 TVET	1.0	0.0	10.0	4.0		35.5		2.0
MODEL 3 Local Artisans	7.0	4.5	22.0	2.0	1.5	23.0	19.5	4.0
TOTAL	0.0	0.0	0.0	0.0	1.5	2.0	9.0	0.0

There is a local supply of most spare parts and materials, but acquiring high-quality parts in a timely manner will pose a challenge for many schools

Across all three models, there were challenges with timely delivery of parts and materials for fixing issues. While most parts and materials needed are readily available in the local market, most schools face extremely limited budgets for WASH-related O&M and they may not be able to quickly find high-quality materials in a timely manner. Splash provided all materials to the sites included in the O&M pilot, in part to limit confounding factors influencing the comparison of models, but also so that we could better understand what parts and materials are available and which are more difficult to acquire. Except for carbon filters, UFs and controllers, WASH-related spare parts and materials are all available in nearby markets.

Recommendations from the Study

Splash will be developing a full-scale O&M implementation strategy in the coming months, with plans to scale up a city-wide O&M strategy as part of Phase II. The following set of recommendations will be considered when developing Splash's O&M future strategy:

- **Scale up School Technicians citywide.** Scaling up the school technician model across Addis Ababa would be the most affordable, responsive, and reliable way to address most infrastructure issues arising at the school – especially those related to station and tap functionality.
- **Ensure School Technicians earn a competitive wage.** Determining a fair wage that is feasible for schools to pay is going to be critical for the success of the school technician model. In this study, we tested the efficacy of a wage set equal to 35% of the Government's per diem rate. We found that this is likely to be too low, based on feedback from the study participants. If schools are unable to pay a competitive wage, Splash should explore how O&M support to the school changes when School Technicians are able to work on issues outside of the school itself. It is possible that this leads to lower quality (less timely) support to the school, but this should be tested.
- **Advocate for WASH-specific infrastructure budgets with GOE and school Administrators.** Throughout the study, Splash heard that while the schools have an O&M budget, this is not specific to WASH-related infrastructure. Moving forward, Splash should work closely with GOE to advocate for carving out WASH-specific budgets for O&M so the schools can better plan for and carry out critical O&M of WASH-related infrastructure.
- **Link parts suppliers with School Technicians and Administrators.** School administrators, school technicians and connected TVETs should be linked with reliable parts and materials suppliers so they can reliably source parts and materials in a timely manner moving forward. Splash confirmed that apart from a few items, most spare parts are available in the local market, but there is a knowledge gap that Splash can help to fill by curating a list of reliable suppliers and connecting them to relevant stakeholders.
- **Connect schools with TVETs for more complicated O&M issues.** While school technicians were more affordable and responsive for addressing the majority of WASH-related O&M issues, some of the more complicated issues still require support by a more knowledgeable technician. Based on the results of this study, we suggest linking schools with their nearby TVET to provide critical O&M support for more complicated issues. This will require a tender process by school's administration, but this should be rare, since most issues may be solved by the onsite School Technician.

In addition to the programmatic recommendations, the Splash team will be routinely reflecting on a newly developed set of Impact & Sustainability Key Performance Issues (KPIs) that bring together regularly collected routine monitoring data into a set of 14 easy-to-understand infrastructure and behavior change KPIs. This will provide the broader team with up-to-date information on the progress of future O&M-related activities and implementation. Additionally, Splash's WASH Promotion Team – those responsible for routinely visiting schools and providing training and support – will be equipped with a Splash Site Scorecard, that shows site-level information corresponding to the aggregated Impact & Sustainability KPIs. Site scorecards can be used by Splash staff to steer conversations with school focal persons, administrators and school technicians about infrastructure issues and functionality, as well as behavior change club status and toilet cleanliness.