

Exploring Infrastructure Sustainability in School WASH: Longitudinal Lessons from Kolkata

DRINKING WATER

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Since 2013, Splash and the City Level Program of Action (CLPOA) have transformed hundreds of schools in Kolkata with child-friendly toilets, handwashing and drinking water stations, and durable water filtration systems — paired with hygiene and menstrual health education and performance monitoring to sustain use and behavior change.

This learning brief highlights Splash and CLPOA's shared approach to sustaining WASH outcomes through two key mechanisms: a tiered support system and infrastructure key performance indicators (KPIs). Within the tiering model, the team categorized schools by performance and tailored support accordingly, guiding training, maintenance, and follow-up where most needed.

Between 2023 and 2025, the number of top-performing Tier I schools rose significantly, reflecting gains in ownership, functionality, and hygiene practices. The KPI framework, tracking indicators of infrastructure, served as a data-driven tool for monitoring progress, informing the tiering process and adapting support in real time.

To sustain systems post-transition, Splash introduced annual maintenance contracts (AMCs) managed by CLPOA. By mid-2025, nearly all schools had enrolled—an affordable, locally led model ensuring preventative maintenance and rapid repairs. When city co-investment in Project WISE did not materialize, Splash streamlined operations and pivoted toward this partnership-driven approach — creating a durable, scalable model for sustaining WASH outcomes without ongoing government funding.



SUSTAINABILITY: STRATEGY & VISION

Built on Splash's vision of sustainability, the strategy leveraged four key elements to support schools with infrastructure, tools, knowledge, skills and systems to ensure long-term behavior change and facility functionality. Importantly the strategy recognized that not all schools would require the same types of support and aimed to provide tailored and strategic activities for each school.



Tiering & Targeting Activities

Identifying which schools required more assistance and creating tailored action plans to improve the ownership and responsibility of sustaining infrastructure.

1



Infrastructure Maintenance

Ensuring filter maintenance contracts were in place so filters continue to be maintained by a trained local service provider annually and repaired as required.

2



Behavior Change Toolbox

Equipping schools with student and parent films, training guides, updated curriculum and O&M planning guides to train kids on appropriate WASH behaviors and schools on maintenance.

3



Menstrual Health Programming

Delivering a comprehensive menstrual health (MH) program with peer mentoring, male engagement, digital tools, and films ensuring saturation and normative change.

4

Splash's vision of sustainability is to see **WASH facilities functioning independently after transition, schools are connected** to a reliable and affordable maintenance provider and **schools train kids each year** on appropriate WASH behaviors.

ANNUAL WATER FILTER MAINTENANCE CONTRACTS

In Kolkata, the Splash teams supported schools to enter an Annual Maintenance Contract (AMC) with its long-term implementing partner CLPOA at an upfront cost of INR 4000 (\$38) per year, which covered the full cost of two full-time WASH technicians, spare parts, equipment, etc.

In the contracts, the schools continue to receive unlimited break down calls as well as proactive bi-annual preventative maintenance visits for the plumbing lines, handwashing stations, and drinking water stations.

A handful of schools who could not pay the upfront cost entered a contract for on-call services at a nominal charge, in that when they have issues with filter and stations, they would call for service and pay service charges.

By mid-2025, 80% of schools had entered contract services and the remaining 20% had on-call relationships with filter service providers. The project team believes this has been critical in ensuring the sustainability of the water filter infrastructure as project support tapered off.



TIERING: RANK SCHOOLS TO PROVIDE TAILORED SUPPORT

To improve the sustainability of WASH infrastructure and behaviors in schools, the Splash team developed and implemented a school tiering system. This system categorized schools into three tiers based on their performance and sustainability indicators. The assessments were conducted approximately every six months and involved collaboration across field teams, monitoring and evaluation staff, program leads, and technical experts.

Sustainability was envisioned as the ability of schools to maintain WASH standards independently after external support ended. The team identified key indicators such as functional water filters and sanitation facilities, soap availability, active child clubs, menstrual hygiene support, student hygiene practices, parental involvement, and school ownership of WASH responsibilities.

Schools were assigned to **Tier I**, **II**, or **III**. The tiering process was based on school-level routine monitoring, team observations, and emphasized honest, constructive assessment.

- **Tier I:** High-performing schools needing minimal support.
- **Tier II:** Medium-performing schools needing nudges and refresher training.
- **Tier III:** Low-performing schools requiring intensive support and engagement.

Tailored action plans were developed for each tier. For example, **Tier III** schools received repeated training and frequent visits.

The approach led to measurable improvements as can be seen in the alluvial map in **Figure 1**. For example, Between May 2023 and December 2025, the number of **Tier I** schools rose from 130 to 345.

The experience highlighted the importance of leadership and staff motivation. It also revealed that performance could decline with changes in key personnel. Ultimately, the tiering system provided a strategic framework for resource allocation and long-term sustainability planning.

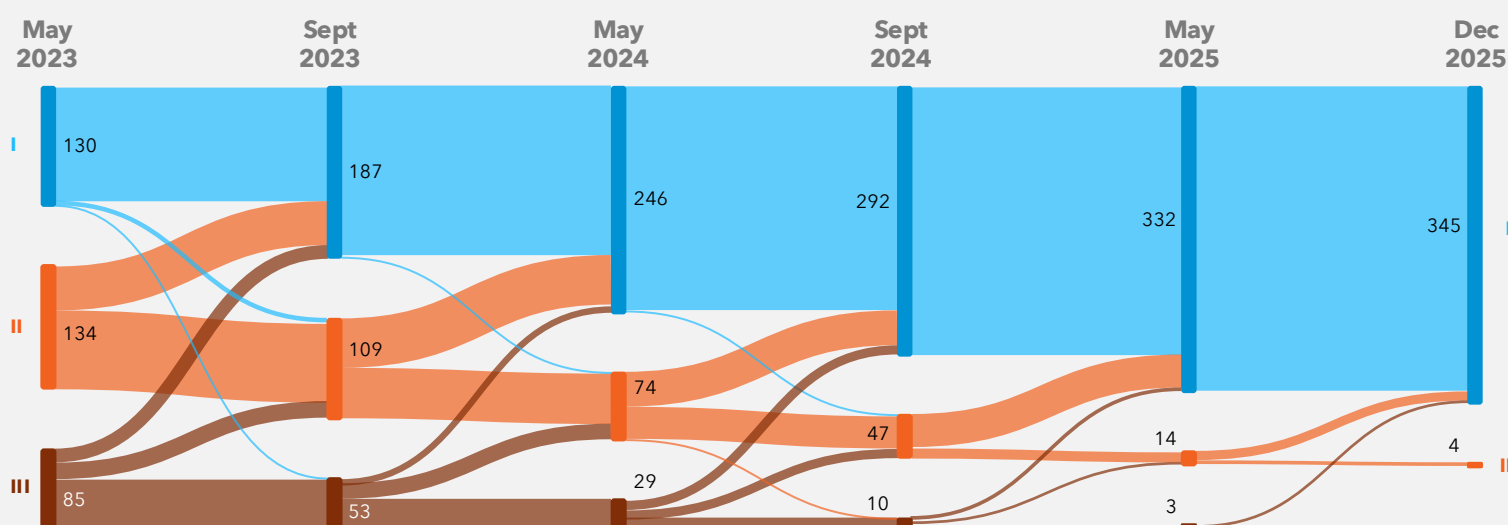


Figure 1: Alluvial Map indicating the relative proportion of the schools by tier over time.



TIERING IN PRACTICE

As part of the tiering process, the Splash team created a tailored plan for all schools, with particular emphasis on schools in **Tier II** and **III**.

The tiering approach was adapted in May 2023. Based on the tiering and targeted intervention plans, the Splash team then worked with schools for about five months; revisiting the tiering process in September 2023. This process was then repeated three more times bringing most schools up to **Tier I**.

Activities included on the action plans included follow-up technical training, additional awareness building activities, meetings with school authorities and child cabinets, targeted visits to meet with staff, and support to schools to build water filter maintenance contracts is illustrated in **Figure 2**.

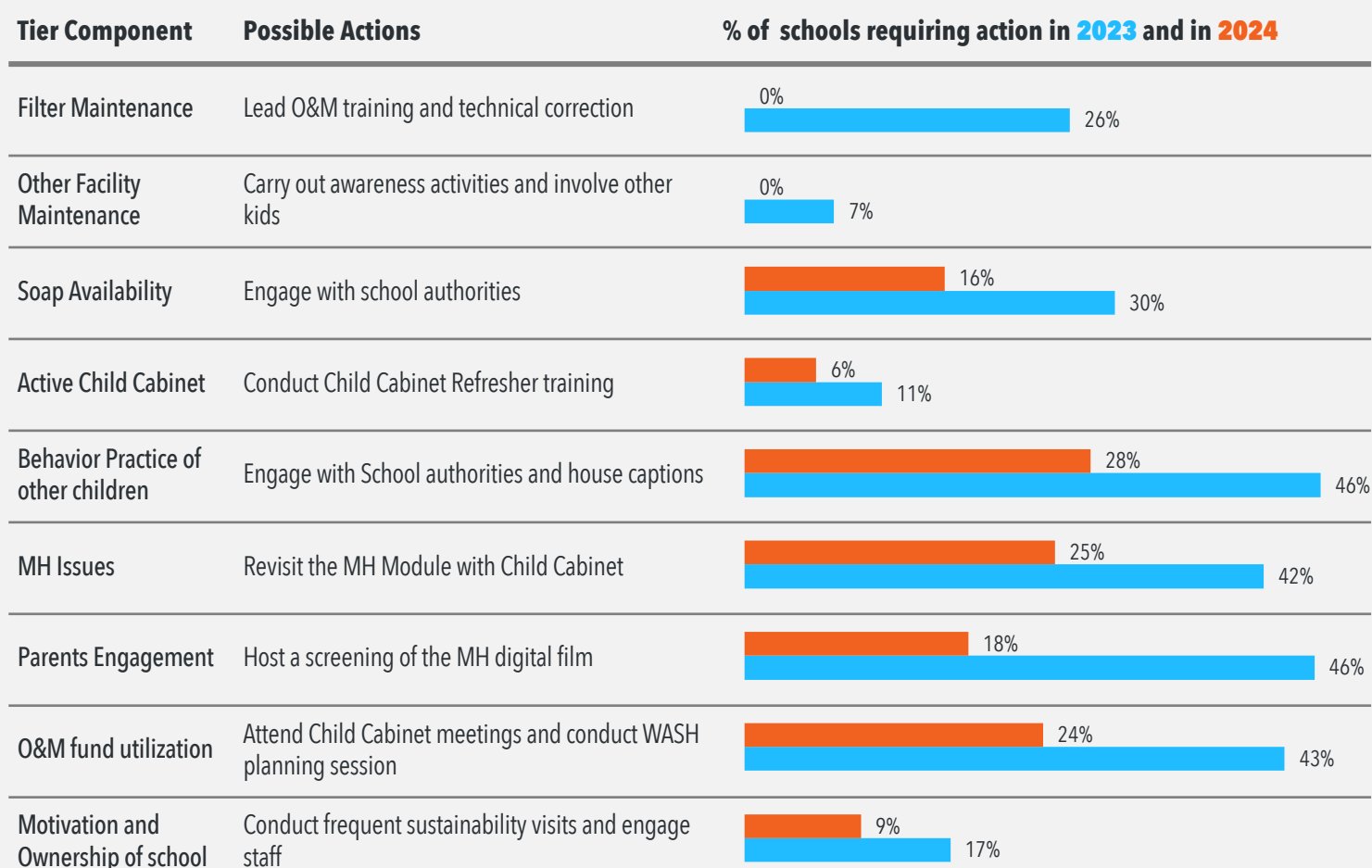


Figure 2: Example of a Tier III school's dashboard and action plan



BACKGROUND: INDICATORS TO TRACK INFRASTRUCTURE SUSTAINABILITY

To best understand the impact of the sustainability strategies, the Splash team designed a concise set of key performance indicators (KPIs) to help track intermediate impact and sustainability metrics over time. Splash uses 10 infrastructure and functionality indicators and several additional indicators related to the presence of clubs and of specific behaviors such as handwashing. Specific infrastructure indicators are below in **Box 1**.

The indicators were compiled monthly into a scorecard and used both in the tiering process and as a monthly discussion rubric to track process, inform strategy adaptations and inspire the team. A sample scorecard is shown in **Figure 3**.

Kolkata Project WISE: as of August 2025			RM1 vs. RM2 (2025)	ROUTINE MONITORING (June to August 2025)	RM2 vs. RM3 (2025)
KPI NAME	SPECIFIC INDICATOR	All			
INFRASTRUCTURE	Water Filter Functionality	% of sites where all water filter meets functionality criteria	1%	91%	1%
	Drinking Stations w/ Flowing Water	% of sites with at least 100% of DW stations have water flowing at a sufficient # of taps	4%	89%	5%
	Drinking Station Tap Functionality	% of sites with at least 100% of DW stations that have a sufficient # of functional taps	1%	97%	0%
	Drinking Station No Operational Issues	% of sites with at least 100% of DW stations that have no issues other than water flow or taps	5%	89%	-8%
	Handwashing Stations w/ Flowing Water	% of sites with at least 100% of HW stations have water flowing at a sufficient # of taps	11%	90%	0%
	Handwashing Station Tap Functionality	% of sites with at least 100% of HW stations that have a sufficient # of functional taps	10%	97%	-3%
	Handwashing Station No Operational Issues	% of sites with at least 100% of HW stations that have no issues other than water flow or taps	6%	86%	-8%
	Toilets w/ Water for Flushing	% of sites with at least 100% of stalls that water available for flushing waste	3%	97%	4%
	Toilet Functionality	% of sites with at least 100% of stalls that meet functionality criteria	0%	100%	0%
HYGIENE	Toilet Cleanliness	% of sites with at least 100% of toilet stalls that are somewhat clean or clean	10%	96%	-4%
	Presence of Soap	% of sites where soap is available at 100% of HW stations with Water Flowing at a sufficient # of taps	5%	16%	-5%
	Handwashing with Soap	% of students who wash both hands with soap before midday meal (available for RM starting Oct 2023 only)	6%	95%	-5%
	Sustainability of Child Hygiene Clubs	% of sites with an active and functional child hygiene club	0%	97%	0%
MH	Girls Toilet Cleanliness - MH waste specific	% of sites with at least 100% of Girls' toilet stalls that are free from improperly disposed MH materials	0%	100%	0%
SITES	# of sites where survey was conducted			70	

Figure 3: Sample of a scorecard printout from Kolkata in August 2025

1. Water Filter Functionality
 % of sites where all water filter meets functionality criteria

2. Drinking Stations with Flowing Water
 % of sites where all DW stations have water flowing at a sufficient # of taps

3. Drinking Station Tap Functionality
 % of sites where all DW stations have a sufficient # of functional taps

4. Drinking Station Structural Issues
 % of where all DW stations have no issues other than water flow or taps

5. Handwashing Stations with Flowing Water
 % of sites where all HW stations have water flowing at a sufficient # of taps

6. Handwashing Station Tap Functionality
 % of sites where all HW stations have a sufficient # of functional taps

7. Handwashing Station Structural Issues
 % of sites where all HW stations have no issues other than water flow or taps

8. Toilets with Water for Flushing
 % of sites where all stalls have water available for flushing waste

9. Toilet Functionality
 % of sites where all stalls meet functionality criteria

10. Toilet Cleanliness
 % of sites where all stalls are somewhat clean or clean

Sample Design
 Stratified cluster random sample where time since the initial Routine Monitoring data collection is the strata, and the site is the unit of observation, resulting in 21-30 sites per round of data collection which is usually every 30 days.

Box 1: Infrastructure Key Performance Indicators in Kolkata



WATER

For Splash supported schools in Project-WISE, a major priority was ensuring a steady flow of clean water for drinking. This was achieved by installing and monitoring water filters and drinking water stations. Overall, water filter and drinking stations remained highly functional over the course of Project-WISE and after project completion, indicating sustainability of results. Importantly, the tiering support activities were successful in increasing the functionality of the filters at lower tier schools, and for structural issues at drinking water stations.

Regression results suggest that Splash water systems had higher functionality if the work happened later in the project (*Project Cohort*) and worse directly after the initial install (*Monitoring Date*), highlight how the project team learned to address challenges.

Table 1. Regression Summary

	1	2	3	4
School Size	—	—	—	—
School Zone	—	—	—	—
School Language	—	—	—	—
Public/private School	—	—	—	—
Student/Teacher Ratio	—	—	—	—
Project Cohort	+++ Cohort 3 ***	+++ Cohort 3 **	+ Cohort 3 **	+++ Cohort 3 *
Initial Tier	—	—	—	—
Tier at Monitoring	—	—	—	-- Tier III *
Monitoring Date	—	—	—	--- Post-install ***

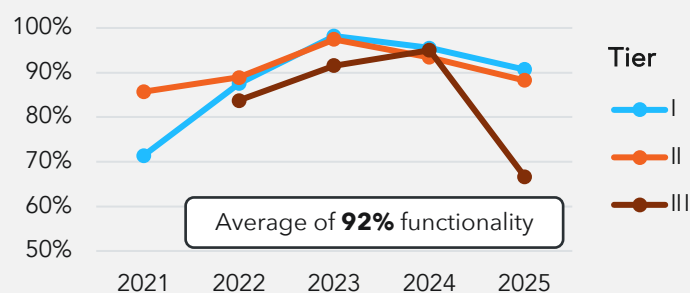
Numbered columns indicate the corresponding KPI. Adjusted $R^2 \approx 0.02-0.08$

+++ Large positive impact. ++ Moderate impact, + Small impact

--- Large negative impact. -- Moderate impact, - Small impact

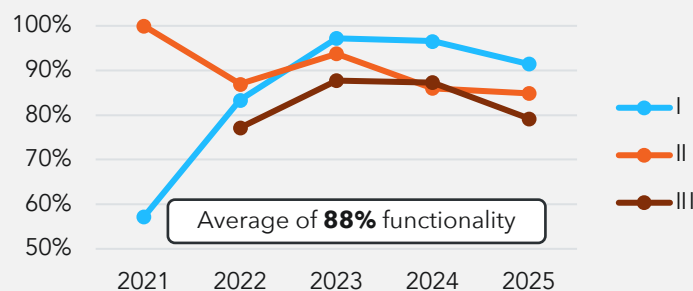
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Significant relationships are indicated

1. Water Filter Functionality

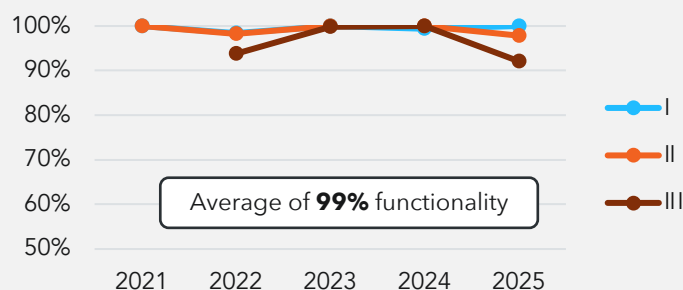


Y-axes have been truncated at 50% across all charts to show more variability across time.

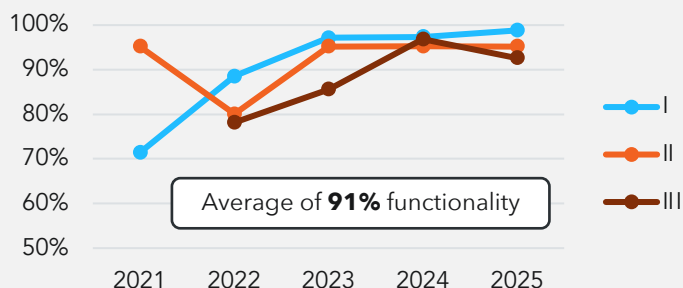
2. Drinking Water Stations with Flowing Water



3. Tap Functionality at Drinking Water Station



4. Drinking Water Stations with no Structural Issues





HANDWASHING

Splash also supported the installation of handwashing stations to improve hand hygiene. Across the indicators, handwashing stations remained highly functional over the course of the project, indicating sustainability of results. In the last round of monitoring, three schools in **Tier III** had reduced handwashing station functionality. We also include the presence of soap which is a non-infrastructure KPI.

Regression results suggest a higher number of influencing factors than for the water indicators. Handwashing infrastructure outcomes were influenced by a variety of factors including school zone, public/private schools, tier, and timing after installation. The presence of soap was also slightly worse at larger schools, but better at Hindi speaking and **Tier I** schools. Additionally soap presence was worse just after the the initial install of stations (*Monitoring Date*).

Table 2. Regression Summary

	5	6	7	Soap
School Size	—	—	—	- Larger ***
School Zone	--- 2 zones *	-- 2 zones **	—	—
School Language	—	—	—	++ Hindi *
Public/private School	--- Private **	—	—	—
Student/Teacher Ratio	—	—	—	—
Project Cohort	—	—	++ Cohort 3 **	—
Initial Tier	—	++ Tier I, II **	—	+++ Tier I ***
Tier at Monitoring	—	-- Tier I *	-- Tier II *	--- Tier II,III *
Monitoring Date	-- Post-install *	-- Mid-project **	-- Post-install *	--- Post-install ***

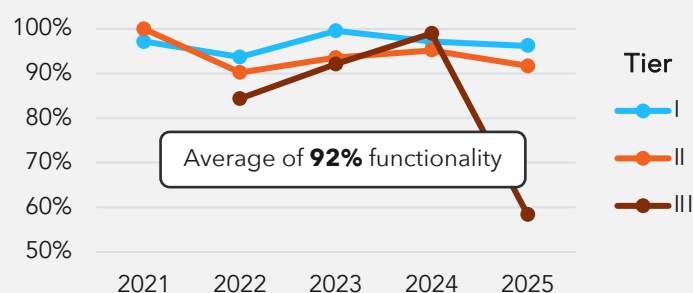
Numbered columns indicate the corresponding KPI. Adjusted $R^2 \approx 0.03-0.23$

+++ Large positive impact. ++ Moderate impact, + Small impact

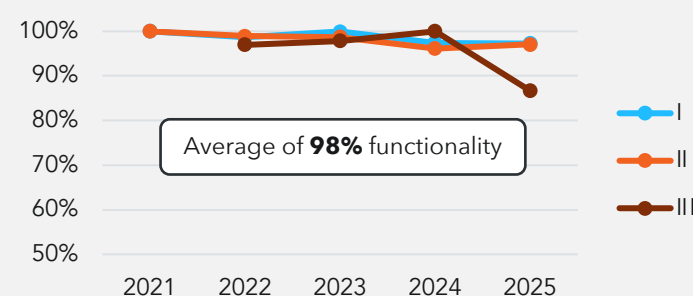
--- Large negative impact. -- Moderate impact, - Small impact

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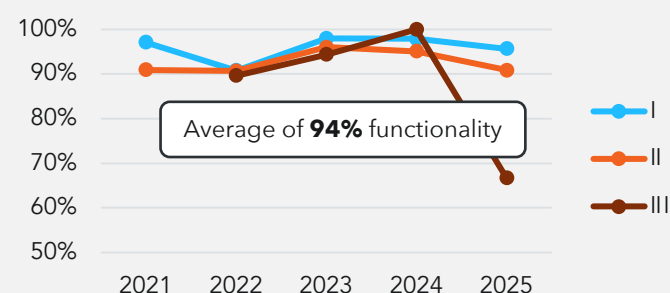
5. Handwashing Stations with Flowing Water



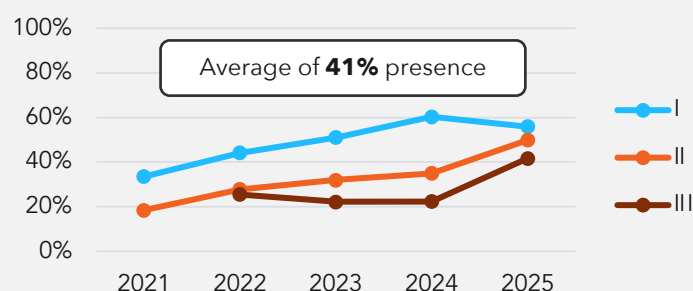
6. Tap Functionality at Handwashing Stations



7. Splash Stations with no Structural Issues



Soap Presence





SANITATION

Lastly, Splash also supported the installation and monitoring of toilets within each of the schools for water flow, functionality and cleanliness. Mirroring the trends of water and handwashing, there was also high and sustained toilet functionality, cleanliness, and water flow. Over time, the toilet indicators showed the highest average functionality rates at over 95%. Just like in the handwashing section, in the last round of monitoring, three schools in **Tier III** had reduced water flow to toilets. However, this was not mirrored in the drinking water flow data.

Regression analysis highlights that toilet water flow and cleanliness were lower in one specific geographic zone. However, toilet functionality was influenced by aspects such as geography, language and timing. Schools who joined later in the project were better off (*Project Cohort*) and functionality was worse just after installation (*Monitoring Date*) and for **Tier III**.

Table 3. Regression Summary

	8	9	10
School Size	—	—	—
School Zone	--- 1 zones *	+++ 4 zones *	--- 1 zones *
School Language	—	--- Odia * ++ Urdu **	—
Public/private School	—	—	—
Student/ Teacher Ratio	—	—	—
Project Cohort	—	++ Cohorts 2,3 *	—
Initial Tier	—	—	—
Tier at Monitoring	—	--- Tier III ***	—
Monitoring Date	—	-- Post-install ***	-- Post-install *

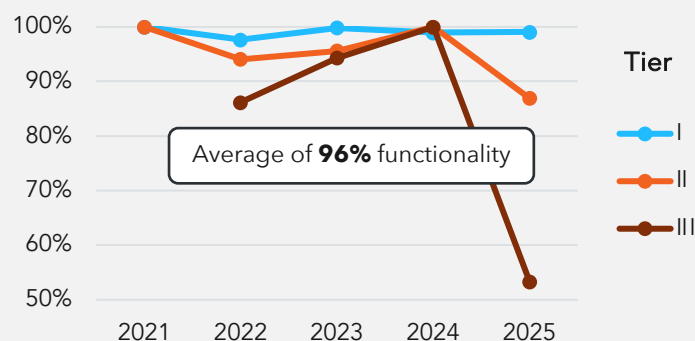
Numbered columns indicate the corresponding KPI. Adjusted $R^2 \approx 0.02-0.13$

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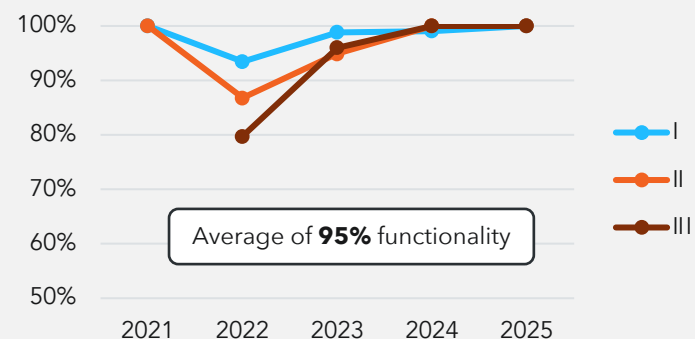
--- Large negative impact. -- Moderate impact, - Small impact

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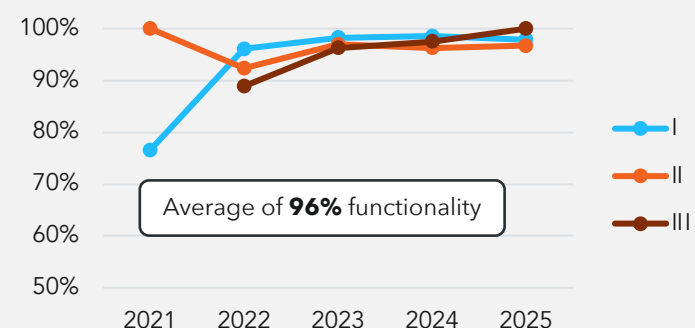
8. Toilets with Water for Flushing



9. Toilet Functionality



10. Toilet Cleanliness





LESSONS & RECOMMENDATIONS

Tiering

- **Tiering requires repeated practice and team experience.** Tiering is an intensive, time-consuming process that improves as team members contribute and gain experience. Repetition helps refine the process and ensures consistent, reliable results over time.
- **Prioritization guides resource allocation.** The tiering process helped to identify high-priority sites, enabling judicious use of resources. By understanding where effort will have the most impact, teams can focus attention strategically.
- **Driving factors can change over time.** Performance is influenced by dynamic factors, and changes can lead to drops in outcomes. For example, sites that were high performing in 2022 declined when key leadership, like the Headmaster, changed. Driving factors are not always constant and must be monitored regularly.
- **Motivation and ownership are key performance drivers.** High motivation and ownership of issues by school authorities strongly influence site performance. Engaged and accountable leadership often compensates for other constraints, making this a critical driver of success.
- **Contextual constraints affect performance, but don't fully determine it.** School strength, such as high enrolment with low staff numbers, can restrain performance even when financial resources are available. However, size alone does not guarantee better outcomes—staff motivation remains a dominant influencing factor.

Sustainability

- **Annual Maintenance Contracts (AMCs) underpin long-term functionality.** Locally managed AMCs with CLPOA have been central to sustaining infrastructure after project transition. By mid-2025, 80% of schools had active contracts covering technicians, spare parts, and preventative maintenance. This affordable model (INR 4,000 / USD 38 per year) ensured consistent filter functionality and rapid repairs, proving that sustainability relies on institutionalized maintenance—not ad-hoc fixes.
- **Local ownership and partnerships drive resilience.** CLPOA's leadership in managing AMCs and providing on-call services for other schools shows the power of empowering local actors to assume operational and financial responsibility. Their commitment, combined with a model that enables cost-recovery, filled the gap left by the city government's non-investment and became a pillar of long-term system strength.
- **Sustaining infrastructure requires technical, behavioral, and managerial inputs.** Success in Kolkata depended on pairing hardware with tools, training, and behavior change programming. This package strengthened school capacity and reinforced daily WASH behaviors, keeping facilities both functional and well-used.
- **Sustainability is achievable without government co-financing.** When city funding did not materialize, Splash streamlined operations and deepened its partnership with CLPOA. The resulting model proved durable, efficient, and replicable—showing that locally contracted maintenance and data-driven management can sustain WASH systems even without public financing.

Further information:

splash.org/our-work/project-wise

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