



Exploring Hand Washing Technologies: SATO Tap Field Trial - Zambia

SUMMARY

In Zambia, it is estimated that about 90% of the peri-urban population use on-site latrines, most of which are in a poor condition. Sharing of the latrines is also common practice especially for those who do not have a facility on their property, this reflects the situation in most of rural Zambia. This fieldnote highlights the necessity for related sanitation options including simple hand washing setups that can be deployed within the vicinity of latrines for convenient use.

In 2022, UNICEF and LIXIL, under the leadership of the Ministry of Water Development and Sanitation, distributed 15,000 SATO Taps to rural households in Zambia. This initiative aimed to promote better hand hygiene practices aiming at reducing exposure to, and transmission of, diseases. The intervention harnessed ongoing sanitation and hygiene programs and stakeholders to entrench the hand washing habit among the population. The key objective for the partnership was to reduce communicable disease transmission in the COVID/ Post-COVID context.

Findings from the SATO Tap field trial in Zambia are presented here; the trial was conducted within the larger scope of the UNICEF-LIXIL programme to present the technology as a potential option to facilitate better hand hygiene practices by reducing exposure to, and transmission of communicable diseases. The test had following specific objectives:

- **Objective 1:** To test the acceptability of SATO Tap in the Zambian market.
- **Objective 2:** To test the effectiveness of SATO Tap in Zambia.

This Field Note presents the methodological approach to the field test conducted and lessons on how to structure a simple field test. More importantly, it highlights the potential of a simple WASH technology in rural contexts in developing countries.

Feedback obtained from a sample of 63 households showed that generally, the recipients liked the SATO Tap with all household members, three years and above, finding it easy to operate. The taps were also considered durable with two thirds indicating they would buy it, if priced ZMW 10-40 (\$0.50 to \$2.00). Recommendations on how to improve the SATO Tap package were also voiced including widening the water flow hole and including one UV-resistant bottle (1 to 1.5 liter) with the tap.

A detailed market assessment will be required to better understand the market potential of the SATO Tap as well as the supply chain requirements to achieve optimum and widespread uptake.

Introduction

In 2018, UNICEF started a collaboration with the water and housing products manufacturer LIXIL. The partnership, called 'Make a Splash!' aimed at reaching households in developing countries with access to safe, clean toilets and hygiene solutions. The partnership leverages the complementary strengths of both entities to support progress towards Sustainable Development Goal 6, achieving access to adequate and equitable sanitation and hygiene for all and end open defecation by 2030. This partnership promotes safe sanitation and hygiene with communities, while building competitive sanitation markets, through programs that help children and families stop open defecation and access affordable and appealing solutions.¹ One of these products is the SATO Tap.

SATO is a brand developed by LIXIL that provides affordable toilet and hygiene products for communities and households that may not have direct water connections or use onsite sanitation systems. SATO Tap builds on the brand and was developed by LIXIL based on information from UNICEF about rural household needs and challenges in developing countries; it is simply a novel handwashing station that can be used anywhere, even without access to running water.

In an initiative aimed at promoting better hand hygiene practices by reducing exposure to, and transmission of, diseases in Zambia, UNICEF and LIXIL worked with the Ministry of Water Development and Sanitation in 2022 to distribute 15,000 SATO Taps to rural households in Zambia. This collaboration between the key actors and government was very important for various reasons including access to target communities, legitimacy of the intervention in the context of

¹ [LIXIL and UNICEF expand "Make A Splash!" after reaching 2.9 million people with sanitation & hygiene | UNICEF](#)

² <https://www.unicef.org/zambia/water-sanitation-and-hygiene>

³ <https://www.unicef.org/zambia/stories/cholera-threatens-lives-zambia>

⁴ Simple handwashing technologies have been promoted and documented in different parts of the world including in Zambia. Some documented examples can be found using the link

Government-led COVID containment policies and general government and citizen buy-in. The intervention also presented a clear contribution towards preventive management of communicable diseases in the country. UNICEF indicates that poor water, sanitation and hygiene (WASH) are the main causes of infections like cholera and diarrhea, and inadequate WASH continues to be the leading cause of death of children under the age of five. In Zambia, the Demographic and Health Survey (DHS) last conducted in 2018 revealed that only 33 per cent of the population used a basic sanitation service (41 per cent in urban areas, 28 per cent in rural areas).² More recently in January 2023, the Government of Zambia declared a cholera outbreak in the country with at least two districts being affected. More importantly, the Government has identified 20 districts in the country as cholera hotspots with a population of two million at risk.³

With the salient conditions leading to pre-disposition to water-borne diseases like cholera, driven particularly by poor sanitation conditions and frequent flashfloods during rainy season, capacity building of communities for preventive measures is important. Access to basic sanitation facilities and techniques such as simple but effective handwashing tools is very important in this regard. There are many styles of hand washing devices but for any device to be marketed efficiently, several crucial factors must come into play (in approximate order of importance):⁴

- **Availability** – There must be a supply chain with traders selling in rural areas;
- **Affordability** – It must be inexpensive (affordable to the rural poor);
- **Durability** – It must last for at least a year (preferably longer);
- **Functionality** – It must wash the hands easily and adequately (without contamination);
- **Aspirational** – If it looks good, then it becomes desirable to rural households.

[Handwashing Stations Database - The Global Handwashing Partnership](#)

In the past various hand washing devices have been trialed / used in rural Zambian settings:

- Buckets with tap (+/- stand)
- Tippy tap
- Dip and splash, Pressure bottle, bottle with stick
- Clay pots / calabashes
- Pushtap and SATO Tap

All have unique advantages and disadvantages. The Zambian “*Kalingalinga*” bucket is the “Rolls Royce” of hand washing devices but due to price it is rarely found among rural households. The *Tippytap*, as well as *Dip and Splash*, *Pressure Bottle*, *Bottles with Stick-plug*, all use discarded plastic bottles, but the plastic deteriorates in the sunlight and can be damaged by animals or stolen. Where these bottles are scarce, rural households often prefer using them as fishing buoys, or oil / liquor containers.

The *Pushtap* is very cheap and hygienic but not widely known or available. Clay pots and empty calabashes are seen only where these materials prevail.

The question is – is there consumer demand for the SATO Tap in rural areas?

Methodology

15,000 SATO Taps were distributed by UNICEF in 2022 to 26 rural districts and 3 refugee settlements in 8 provinces of Zambia. Each district received 500 taps. The stakeholders therein (LAs⁵, D-WASHes⁶, RHCs⁷) distributed the SATO Taps as part of on-going GRZ programs such as *Scaling up Nutrition and Community Led Total Sanitation*, free to households. The districts were at varying stages of these programs and, in consequence, a systematic approach to distribution was not possible.

At the time, Oxford Policy Management (OPM) Ltd and Anscombe Ground Water (AGW) were conducting Sanitation Marketing workshops in these districts, which included the hands-on training of Masons to build stronger, longer-lasting lined toilets using various economical designs - refer to Ref (1) and (2).

⁵ Local authorities

⁶ District Water, Sanitation and Hygiene Education

Figure 1: Low-cost lining – suited to wet, unstable sand found in Western Province (one of 5 different designs)



To ensure the SATO Tap demand assessment was not missed, the OPM contract was extended to assess the rural response. The assessment was conducted between March and August 2023.

UNICEF, OPM and the Ministry of Water Development and Sanitation proactively designed questionnaires and in April 2023 the OPM consulting team visited 5 districts over 5 provinces where distribution was reported to be complete.

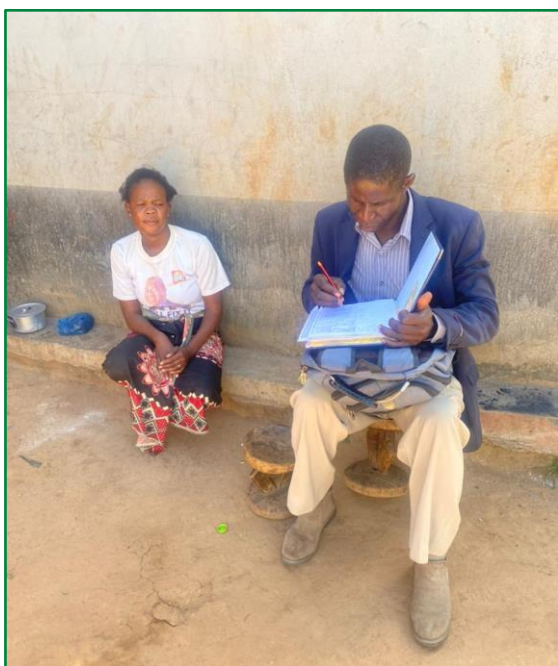
The districts visited and the number of interviews conducted in each district are summarized in the following table:

Table 1: Districts visited and interviews.

Districts visited	Province	Number of households interviewed
Monze	Southern	12
Kalabo	Western	8
Solwezi	Northwestern	16
Mwansabombwe	Luapula	14
Chinsali	Muchinga	13
Total		63

⁷ Rural Health Clinics

Figure 2: Householder responding to survey (Interviewer: Alfred Mungamelo)



Key questions covered by the team were:

- Where and how was the SATO Tap set-up and used?
- Which household member has been using the SATO Tap and how frequently?
- How easy is the SATO Tap to operate and what challenges are faced?
- What part of hand and/or arm is used to operate the SATO Tap?
- How effective is the SATO Tap for family handwashing?
- What did people like and dislike regarding the SATO Tap and its day-to-day usage?
- Did people think the community would use or buy the SATO Tap?
- How much would households be prepared to pay for the SATO Tap?

Assumptions and Limitations of the assessment

This assessment was faced by the following assumptions, limitations and challenges:

- **SATO Tap familiarity:** In assessing comparative quality (effectiveness and

efficiency) of the SATO Taps, the evaluation assumed that the households were already familiar with other hand washing techniques or innovations.

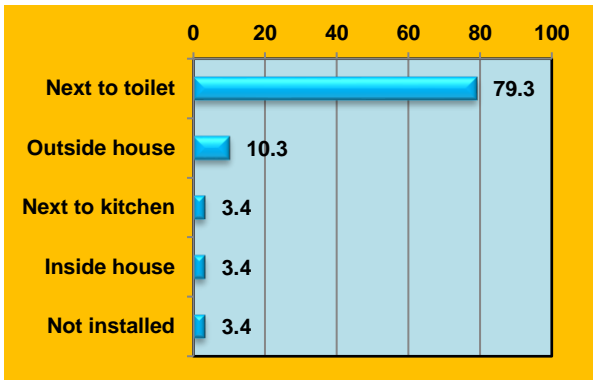
- **Limited sample size:** the study targeted only 63 households across five provinces. This sample size, although well targeted, is not statistically representative of attaining the right level of validity but was sufficient to give an indication of general trends in application of SATO Tap across the provinces. The challenge was related largely to lack of availability of resources to conduct a full-scale evaluation; the cost-benefit analysis of a full statistical evaluation was also considered, and a larger study considered not feasible.
- **Varying degrees of implementation across the provinces:** This is one of the key limitations/challenges of the assessment as some of the households were still at a very early stage of implementation to provide sufficient feedback necessary for comprehensive conclusions as a significant number had not received their SATO Taps.
- **The study was only limited to households** but did not assess the application of SATO Tap in public spaces like schools, places of worship and other communicable disease hotspots.

Results

Position where the SATO Tap is set up in the household

Nearly 80 per cent of households (46/58) positioned the SATO Tap by the toilet (which was usually a pit toilet outside the house).

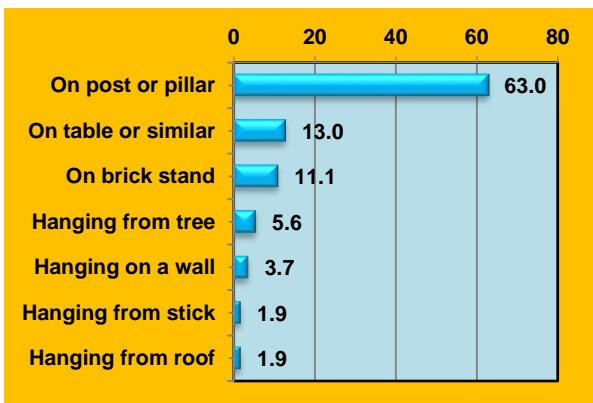
Figure 3: SATO TAP Set-up Position
58 Respondents (Users), % occurrence



SATO Tap Mounting Method

Most households (63 per cent, or 34/54 households) had placed it on a sturdy pole anchored in the ground, 24 per cent (13/54) on a table or brick stand. When asked for comments, seven per cent (4/58) said SATO Tap could not be used on the ground.

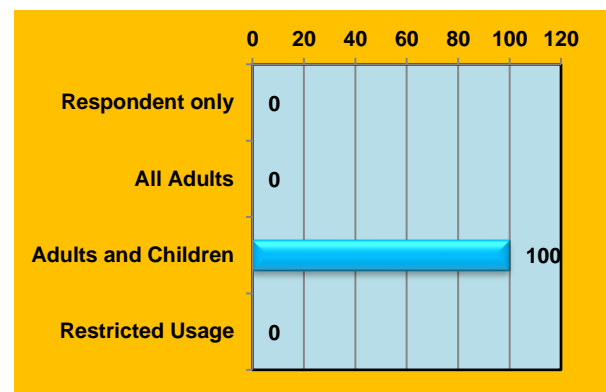
Figure 4: SATO TAP Set-up Mounting, 54 Respondents (Users), % occurrence



Who uses the SATO Tap?

All households reported usage by 3-year-old children and older. Five per cent (3/58) reported toddlers struggled to use the SATO Tap whilst others mentioned that after a few attempts even those of 2 ½ could use it.

Figure 5: SATO TAP Usage Analysis, 56 Respondents (Users), % occurrence



Ease-of-operation

Figure 6: SATO TAP Usage Comments
58 Respondents (Users), % occurrence

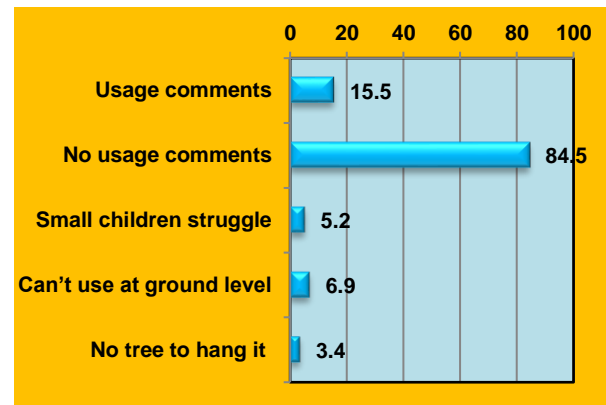


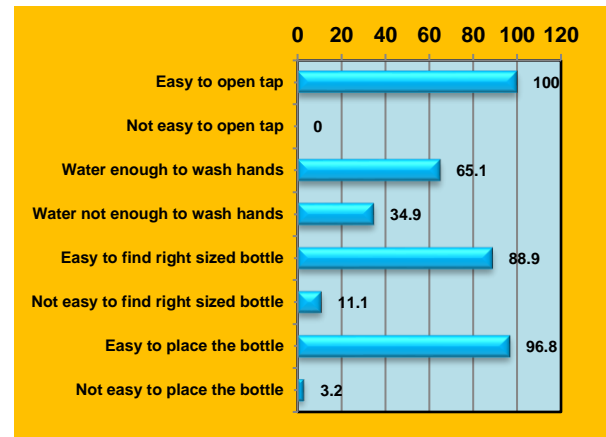
Figure 7: Users of Sato Tap



Operational Challenges Reported

All users found operating the SATO Tap simple but 35 per cent (22 of 63) thought that water flow was not sufficient to wash their hands properly hole. In some areas the bottles are scarce and used for activities regarded as more “important” (11 per cent i.e.7/ 63).

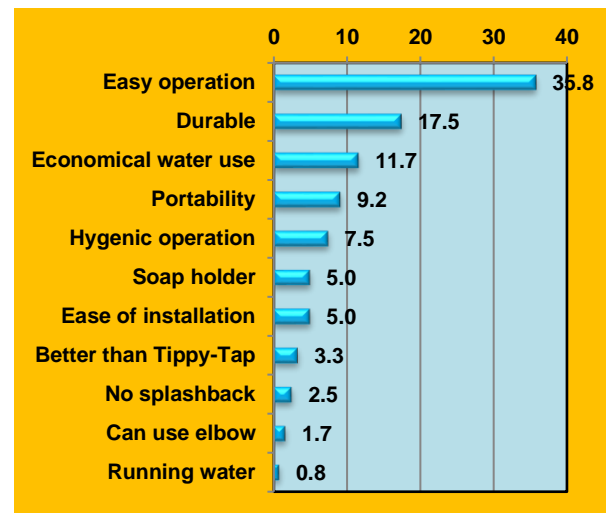
Figure 8: SATO TAP Operation, 63 Respondents (Users), % occurrence



SATO Tap reported Likes

There were 130 appreciation comments made. Ease of operation and durability were the chief likes. Water economy and hygienic operation were also appreciated by many. Adult users tended to compare the SATO Tap to the fragility of the Tippy-Tap (and the bottles which quickly crack and disintegrate in sunlight). The portability of the SATO Tap was also considered important as the risk of nighttime theft of bottles is high in some areas such as where there are trading centers, “lodging” or fishing communities.

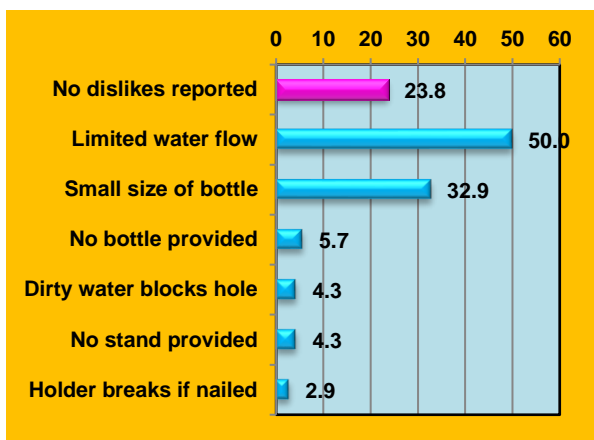
Figure 9: SATO TAP - Likes reported, 120 Comments (Users), % occurrence



SATO Tap Dislikes

There were 70 comments related to dislike of the SATO Tap. Half of these comments concerned poor water flow and a quarter were comments on the small volume of the water bottle. Other dislikes were site specific such as very dirty water from an unprotected water source – which blocked the hole (one comment only)

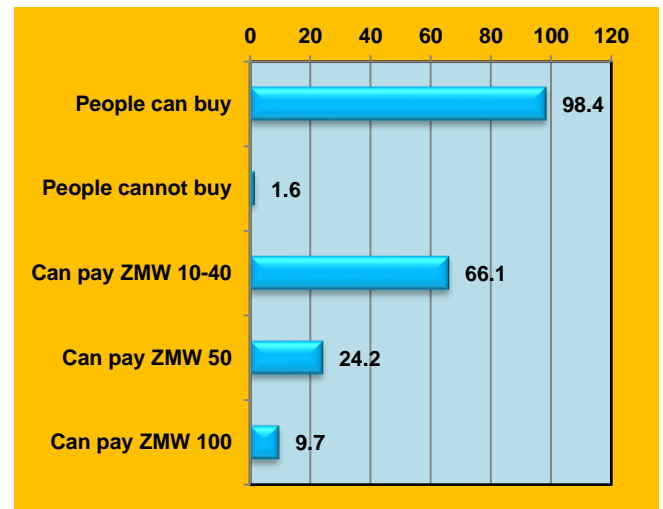
Figure 10: SATO TAP - Dislikes reported 63 Users, 70 Comments (Users), % occurrence



Marketability

The households had received their taps free of charge in 2022 and nearly all interviewed (98 per cent, 61/ 62) said they would buy one if it were locally available. 66 per cent of respondents (41/62) said they would be willing to pay ZMW 10 to 40 (\$ 0.5 – 2.0). 24per cent said they could manage ZMW 50 (\$2.50). Very few (only 10 per cent, 6/62) said they would pay more than this.

Figure 11: SATO TAP - Marketability (HH perspective) 62 Respondents (Users), % occurrence



Lessons Learned on the demand for SATO Tap

- 1. People living in rural areas liked the SATO Tap**, particularly its' ease-of-use, effectiveness (hygiene), durability, and full-family usage. Some liked it because it did not splash the feet as noticed with some other devices.
- 2. Some individuals voiced concerns over low water flow.** Some suggested a larger discharge hole and some even physically enlarged the hole – to achieve a better flow rate.
- 3. In Zambia plastic bottles can be scarce in some remote areas, have many uses already and, will quickly become brittle and break in strong sunlight.** Some respondents suggested that a **one or two liter bottle should be provided with the SATO Tap.** Ideally this would be made of UV resistant plastic.
- 4. Instruction was needed on set-up position and style.** District stakeholders such as education, health, and local authority government staff, as well as builders/masons, area pump minders, etc., all needed to be involved to recommend best

practices on usage. In those districts where the D-WASHE was involved in distribution / set-up it was noted that the SATO Tap trial was more successful. For example, the tap was more likely to be:

- Set-up on a plank nailed on a pole which was anchored into a hole in the ground.
- Mounted neither too high nor too low – so all users of all sizes could benefit
- Positioned near the toilet
- Awarded to households as an incentive to build a lined toilet (particularly if the household was failing to act on words alone)

5. Further field assessments of new devices might be beneficial, by involving an agent to distribute them in the same style with the same instructions in all locations.

Figure 12: The SATO Tap with counterpoise lever operated by elbow, wrist or back of hand



Figure 13: Female head-of-household using her SATO Tap



Figure 14: SATO Tap suspended from a tree branch using twine through four casting holes in base



Discussion

As stated in the Introduction, there are multiple factors which need to be met for an item to gain acceptance in a rural area. Our analysis found that while small changes could be made, the SATO Tap is *durable, functional and aspirational*. However, larger efforts would have to be made to make the product *available and affordable*.

From this review it seems rural users were pleased with the functionality, durability and aspirational factors related to the SATO Tap. However, there is scope for improvement. The following adjustments are suggested:

- Slightly increase hole diameter by 1mm or so to improve rate of water flow;
- Provide a one to two-liter UV resistant bottle.

Our analysis found that the SATO Tap, complete with UV-resistant bottle, would need to be sold for under ZMW 500 (\$2.50), to be affordable in rural districts.

At this point, beyond this trial distribution from UNICEF, the SATO Tap is not available in rural Zambia.

Our review found that the districts have plenty of willing retailers: Hardware outlets, small shops, trained people such as Environmental Health Technicians, Area Pump Minders, Masons or even independent peddlers. All can promote water and sanitation technologies and items in the rural areas. However, the drop-out rate for pump minders and masons is high because they fail to make a living repairing hand pumps or building toilets and tend to discontinue or change career. Those that survive in their trade often double-up or are entrepreneurs who include rural bartering as part of their strategy. For example, pump minders are often also masons or CLTS⁸ trainers, or run

village banking schemes, or sell useful items on their travels within the wards and communities.

A thorough hand washing and hygiene products market assessment is required to determine if it is possible to sell aspirational WASH items in rural areas in a way that is profitable to retailers too, such as:

- SATO products, such as SATO Taps, or SATO Pans;
- 5 / 10-liter buckets with lids and lever taps;
- Washable sanitary pads;
- Washing soaps and pastes;
- Small mirrors, small solar lights;
- Cheap toilet linings suited to sandy locations.

Currently there is no supply chain to widely distribute such items in quantity into the district capital, let alone, to a ward or community retailer.

Other interventions seeding stocks of WASH products such as water treatment chemicals or spares for hand pumps into larger district hardware or grocery outlets (along with supplier details and guidance on selling price) have been successful in Zambia

Conclusion

The SATO Tap distribution was successful, and uptake was high, with most households having installed the device received.

For the WASH sector more broadly, there is a need to support district and sub-district entrepreneurs (e.g., health technicians, APMs, toilet masons and others) so that they can market SATO Tap in the rural communities as they go about their core businesses. Support would include:

- Identification of marketable WASH items;
- Supply line information and contacts for the product;
- Seed stock interventions to ensure continuous supply to meet demand;

⁸ Community-Led Total Sanitation approach

- Training on marketing approaches and how they can communicate availability and usage of the products;
- Considerations for training or directions on installation and usage.

To promote hand hygiene practices in Zambia, the introduction of SATO Taps could be implemented alongside other industry wide interventions. For example, there is a need to re-create CLTS / SLTS⁹ training manual modules on:

- Handwashing technologies (e.g., SATO Tap)
- Recommended cost-effective, toilet lining based on soil type and condition;
- Sanitation retailers (Masons, APMs¹⁰, etc.) and the service and products these individuals offer.

Local retailers and shop keepers often mention that travelling within the district is very challenging and an obstacle to sanitation marketing. Provision of bicycle or motorcycles as an incentive for outstanding retailers would be a solution.

References

(1) OPM, Jun., 2021. Sanitation and Hygiene Promotion in (rural) Zambia. Incl., Situation Assessment; Feasibility Study; and Concept Note. Produced for UNICEF by Oxford Policy Management Ltd., UK. LRPS/2019/9158516

(2) OPM, Aug., 2021. Sanitation and Hygiene Technologies: Mason and Stakeholder Training Manual in 2 volumes. Produced for UNICEF by Oxford Policy Management Ltd., UK. LRPS/2019/9158516

(3) [LIXIL and UNICEF expand “Make A Splash!” after reaching 2.9 million people with sanitation & hygiene | UNICEF](#)

Photo Credits

Photos mainly sourced from the field phase of the SATO Tap assessment.

⁹ School-Led Total Sanitation approach

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¹⁰ Area Pump Minders

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