Sato tap prototype test:
Bangladesh & India

MAKE A SPLASH!

SATO
Smart, fresh toilets

Photo credit: Jackline Bwana.

1. Introduction and motivations

In 2018, UNICEF and LIXIL launched Make a Splash!, a shared-value partnership to promote better sanitation and hygiene, developing a solid working relationship focused on strengthening market solutions in selected countries.

The onset of the global COVID-19 pandemic placed a spotlight on the need for improved hygiene in the home and public places and has spurred innovation by public health authorities, civil society organizations, and the private sector. SATO, a brand of LIXIL that caters to low-income communities with innovative sanitation and hygiene solutions, started ideating on a new handwashing station based on newly prioritized plans to develop a hand hygiene product.

Through a well- established line of communication, UNICEF shared insights of emerging trends and needs for hand hygiene products from over 100 countries where they operate. SATO combined this with its own market intelligence and other partner inputs and built design prototypes. These incorporated standard SATO features including water savings, simplicity, and affordability. UNICEF provided feedback and contributed to the design process with its sector knowledge, expertise, and information of existing handwashing solutions,

The final design was named SATO Tap and LIXIL went on to fabricating industrial molds working through the pandemic lockdowns and produced the first testing units used for this study. The SATO Tap is a unique handwashing device that can be attached to most locally available plastic bottles and allows handwashing with as little as 100ml. It minimizes the quantity of water dispensed for handwashing, providing the user with a steady flow of water that is easy to switch on and off.

Both institutions developed a trial protocol and carried out joint product testing of the final prototype in five markets – Bangladesh, India, Tanzania, Kenya, and Ethiopia, to assess the SATO Tap's suitability and viability as a solution to increase the demand for hand hygiene. The results have been compiled in this report.

In Ethiopia, Kenya and Tanzania, the trial was led by mWater using the Make a Splash! Partnership monitoring system. It applies an innovative model of data collection by employing a network of youth citizen reporters who are paid to carry out surveys on demand, using mobile data collection app on their smartphones. This approach is well suited to rapid evaluations because the youth citizen reporters were already trained and familiar with the targeted regions, having conducted several rounds of household surveys over the past year.

In Bangladesh and India, UNICEF teams used the joint protocol and led the implementation and reporting of the trial.

LIXIL and UNICEF are grateful for the work of the UNICEF country office teams in Bangladesh, India, Ethiopia, Kenya and Tanzania and the SATO teams across Africa and Asia who were all instrumental to this study. This report wouldn’t be possible without them.

2. Methodology

The study design was based on the following objectives:

1. To collect feedback from potential users to determine whether the SATO Handwashing product is fit for purpose, perceptions on usability, functionality, accessibility and appeal.
2. To collect feedback from retailers to understand their perceptions of the tap from a market perspective and determine their willingness and the feasibility of making this product available in the local market.

Household data was collected by enrolling target households that lack handwashing facilities in a 1-week trial of the SATO tap following a demonstration of how to use it. A pre-survey was conducted to understand initial impressions of the device. Retailer data was collected beginning with a demonstration of the tap and followed by a set of questions to determine the suggested retail price and perceptions of retailers regarding potential sales of the tap and willingness to stock it.

2.1 Sampling

In India, 39 households were selected in two regions, Maharashtra and Bihar, with the goal of including a wide variety of demographics, including households with children under 5, elderly members, and persons living with disabilities. Study locations included both rural and urban areas. The location in Bihar, Jehanabad, is situated in the south, predominantly rural and experiences water shortages during the summer months. Households were selected from a lower income demographic. In Maharashtra, households were selected from an urban informal settlement where disruption to water supply was common, as well as a rural, tribal area. It is worth noting that in Maharashtra, the study was conducted in two phases as the local UNICEF team received several SATO taps from LIXIL ahead of Global Handwashing Day and were encouraged to distribute them as part of the initial testing phase. As a result, the study timeframe and protocol differed from that of households enrolled as part of the official study. In Bangladesh, participants were selected from a rural and urban area in the district of Satkhira. The retailer survey targeted shops selling plastic goods or kitchen/homeware items in the same areas as the sampled households. Retailers were not interviewed in Maharashtra as these were closed during the time of the study due to Covid-19 restrictions. In Bangladesh, retailers did not take part in the retailer survey. Table 1 shows sample size in each area.

Table 1: Sample size

Country	Location	Characteristics	# Households	# Retailers
Bangladesh	Lafsa Union, Satkhira Sadar	rural	5	n/a
	Satkhira municipality	urban	4	n/a
India	Maharashtra	urban informal settlement, prone to water shortages	12	n/a
		rural village	7	n/a
	Bihar	Rural village, water scarce in summer	20	6

2.2 Data collection and analysis

Three qualitative question guides were developed by UNICEF. A pre- and post-survey for households (Annex 1 and 2) and a question guide for retailers (Annex 3).

In Bihar, pre- and post-survey tools were translated into Hindi. A local LIXIL representative carried out a product demonstration to show the UNICEF team how the device was intended to be used. UNICEF then held a training with partners working in the target areas on the data collection process and tools. Following data collection, information was compiled and entered into the format outlined in Annex 4. In Maharashtra, UNICEF oriented the local partners to conduct the research following a product demonstration. There were 4 partners engaged by UNICEF who reached out to stakeholders living in a rural-tribal community and urban informal settlement.

Responses were coded and analysed based on the frequency of a particular response theme and in certain instances disaggregated by area where there were significant differences. For certain themes data has been represented in graphic form to demonstrate differences between and within contexts but given the small sample and qualitative nature of the study, these are not statistically significant interpretations. All personally identifying information of respondents was removed from the dataset.

2.3 Risks and limitations

The applicability of these results is limited due to the small sample size of 48 households and 6 retailers and thus additional market research should be conducted to validate and elaborate on findings from the current study.

3. Household Results

A total of 47 households participated in the study. The demographic profile of participants is presented in Table 2.

Table 2: Household demographics

Characteristic	Bangladesh	Maharashtra	Bihar
Total households	9	19	20
Households with children under 5		15	3
Households with elderly members		15	1
Households with persons living with disabilities		3	3
Average household size			8

3.1 Pre-survey feedback

At the onset of the study, selected households were presented with the SATO tap and the enumerators demonstrated how to use it. Households also received 2 bars of soap in each location to facilitate use of the device.

3.1.1 First impressions

In India, the initial impressions when households first received the SATO tap were positive. All study participants said the SATO tap design was attractive and potentially useful in several settings, including households. The majority of respondents remarked that it appeared easy to operate, particularly for children given the size of the device. Participants in Bihar felt that it was durable but too small whereas some households in Maharashtra thought that it might have durability issues given that it was made of plastic.

3.1.2 Use Case

When asked how they might use the product, all respondents in India mentioned they would use it for handwashing at critical times including before eating, after using the toilet and after carrying out manual work. In terms of where participants would position the device, some said "near the handpump" to make it easier to fill, while others felt that it would be most useful at the entrance of the house to enable handwashing after returning from being outside of the home. Some felt that because it was plastic, it might catch fire and thus would place it far from the kitchen area. Participants thought that all family members would be able to use it, including young children. Respondents would expect to buy this type of product at crockery and plasticware retailers as well as hardware stores and stationary shops. Plastic PET bottles (1L) were readily available and could be obtained at low cost (2-5 Rupees or .03-.07 USD) or no cost if empty.

3.1.3 Water Access

In Maharashtra, water was available in the majority of households - either piped directly into the household or at community level. In Bihar, water was available to all participants either through personal wells or via a government programme where water was piped into their household free of charge. Average water use ranged from 500 - 1000 Litres per day.

3.1.4 Current handwashing practice and facilities

Households were asked about current handwashing practices and whether they had existing handwashing facilities. In Bihar, respondents used soap and water for handwashing, mostly after defecation and before eating. Buckets were the most common facilities used for handwashing. Some households also used the handpump directly to wash their hands. Data on current handwashing practices and facilities was not collected in Maharashtra nor Bangladesh.

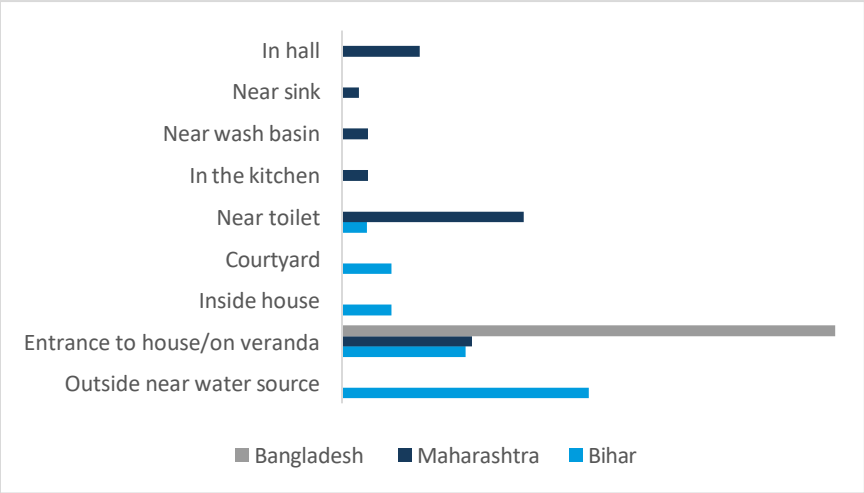
3.2 Post Survey Feedback

A week following the distribution of the SATO tap, households were interviewed a second time to understand their perceptions and experiences using the device.

3.2.1 Placement of the product

In Bihar, India, half of the households placed the SATO tap outside the house near the well or piped water source (figure 1)[1]. Respondents felt that being close to a water source made filling the handwashing facility easier. Other families placed it outside on the veranda to enable handwashing upon entry into the house whereas a few families placed it inside the house to prevent theft while a few others preferred to keep it outside in the courtyard. Only one household said they placed the device near the toilet whereas in Maharashtra, several participants positioned the tap near the toilets. The second most cited area in Maharashtra was at the house entrance followed by in the hall, near the kitchen, wash basin, sink and hallway. In Bangladesh, all of the participants placed the product at the entrance to the house.

Figure 1: Placement of SATO tap, India and Bangladesh

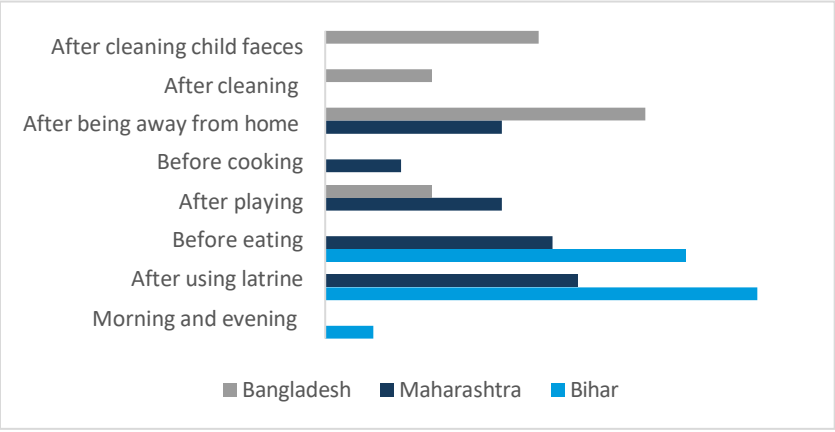


[1]Graphs are based on qualitative data and not statistically significant.

3.2.2 Use of the product

Across the three contexts, the device was used specifically for handwashing and in approximately half of the households, by the entire family. In other households the participants said the device was mostly used by children, elderly and visitors. Respondents said that children enjoyed the novel device and were eager to use it. In India, the most common times for using the product were after using the latrine and before eating (figure 2). In Bangladesh, the device was used more frequently after being out in public and after cleaning child faeces. Some households also used it after cleaning. In Maharashtra and Bangladesh, the device was used by children for handwashing after playing.

Figure 2: When was the SATO tap used?



In Maharashtra, some of the households were located in an area prone to water shortages. In this context people responded positively to the device in terms of its ability to conserve water and its usefulness during times of the day when water was not available through the piped network.

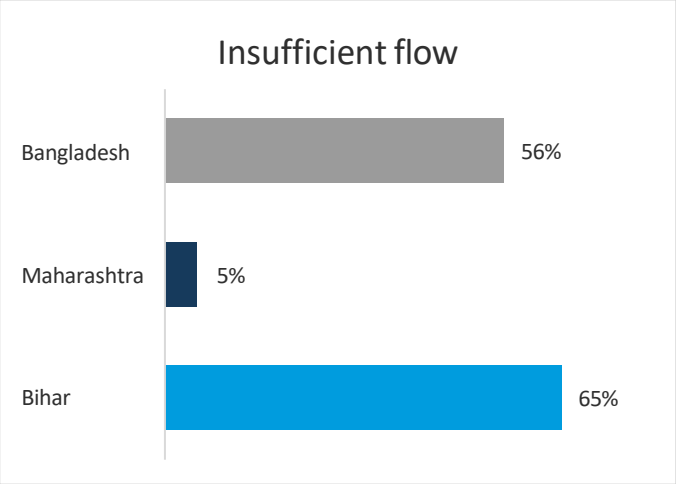
"*The product was very helpful for the household, mostly when the water supply was not available during the daytime*." (respondent, Appar, Pune, Maharashtra)

3.2.3 Product functionality

i) Water dispensing mechanism

When asked about the water dispensing mechanism, the answer was dependent on the location. The majority of respondents in Maharashtra felt the flow was sufficient for handwashing as it conserved water (figure 3). Given that the study was conducted in areas of water scarcity or where piped water supply were inconsistent, the water conservation aspect was seen as a positive attribute. In contrast, more than half the respondents in Bihar, where water scarcity is seasonal, felt the flow was insufficient.

Figure 3: Flow rate



This could be due to the fact that, when water is available, people used piped water or handpumps for handwashing where the flow rate was higher. Similarly, in Bangladesh, half of the participants felt the flow was insufficient.

ii) Filling frequency

In Bihar, nearly all households re-filled the bottle an average of 2-3 times per day, independent of household size. Data on filling frequency from Bangladesh and Maharashtra was not available.

iii) Grey water disposal

Grey water disposal varied between contexts. In Bangladesh, all respondents used a bucket to catch grey water while in Maharashtra and Bihar, the majority of study participants let the water run onto the ground or into an existing drain. Only two households in Bihar and one in Maharashtra used a bucket to catch the runoff.

iv) Durability

The majority of households in Bangladesh and Bihar felt that the SATO tap was durable and would last a year or more. Other respondents felt the product wouldn't last beyond 6 months as they felt the plastic could break with frequent use by children.

3.2.4 User experience

Feedback from most households regarding the SATO tap was generally positive (figure 4). The majority of users thought it was easy to use for everyone in the family, including children and the elderly. In all three contexts, most people said the product was attractive. Other positive feedback included that it saved water, children loved to use it, it impressed visitors and

neighbours and it made handwashing easier to do given that it could be placed within the household, making it more accessible. The few households that were critical of the product felt that it was difficult to use, the refill bottles were too small, it was unstable on the surface it was placed on and difficult for children to use intuitively (without instruction). One respondent also noted that it was difficult to use for one of her family members who was living with a physical disability.

Figure 4: User feedback

3.2.5 Demonstration

Towards the end of the interview, the respondent was asked if they could demonstrate how they use the SATO Tap. Nearly all of respondents in Bangladesh and Bihar (80%) were able to convincingly demonstrate use of the product suggesting they had used it regularly during the period of the trial.

3.2.7 Consumer recommendations

Finally, at the end of the interview, respondents were provided an opportunity to suggest ways to improve the SATO tap. As mentioned earlier, participants in all three contexts suggested that the flow be increased (figure 5). Several households suggested that the device be modified to accommodate a larger bottle which would decrease the refilling frequency and allow for use over a longer period between fillings. Several people liked the blue colour but a few respondents in Bangladesh suggested that the device be multi-coloured and one person in India said they preferred red. There were some issues with leaking in Maharashtra which participants said needed to be resolved and a few people said the device could be made more durable and sold with a grey water collection unit.

Figure 5: Consumer recommendations

4. Retailer Feedback

As per the protocol (Annex 3), retailers located in the household study areas were interviewed to understand their perceptions of the product and willingness to sell it. A total of 6 retailers were interviewed in Bihar.

4.1 Availability of bottles

When asked about the availability of PET bottles, retailers said that 1L bottles were readily available at the local markets. 2L bottles however were not available locally and could only be purchased in Jehanabad town, the administrative headquarters of the district in Bihar state, located approximately 20km from the study location.

4.2 Recommendations

After examining the SATO tap, approximately half of the retailers suggested some improvements be made. These included a larger sized reservoir and increased flow. The remaining vendors thought the product was fine in its original form.

5. Key findings

The SATO tap prototype testing generated useful information from households and retailers that can help inform possible design improvements for the product and promotion of handwashing practice. By conducting the evaluation in different contexts in Bangladesh and India, the study uncovered important lessons for both UNICEF and LIXIL regarding consumer preferences and marketing potential. Below is a summary of key findings:

1. **Households found the SATO Tap attractive and easy to use for all members of the family, including children and the elderly.** Key points mentioned were that the device was fun and easy for children to use, the Tap's portability and the fact that it could be placed anywhere within the household making handwashing easier and more accessible.
2. **Households had to refill the Tap on average two or three times per day, several respondents suggested increasing the capacity or size of the device.** Many respondents would like to see the reservoir volume increased, however according to retailers, 2L bottles may be difficult to find locally in some locations and thus it is not clear where larger bottles would be obtained unless they were sold as part of the unit.
3. **In water scarce areas, the low water use of the SATO Tap was seen as a positive attribute.** The study included areas in India where water shortages and breaks in water provision were common and, in this context, water conservation was an important attribute of the product. In other areas, some of which also experienced water scarcity during certain months of the year, most respondents requested a **higher flow rate** and a **larger reservoir capacity**.
4. **Positioning handwashing facilities in strategic locations can facilitate practice.** The positioning of the SATO tap varied across contexts. In some contexts, the Tap was placed next to the toilet to facilitate handwashing after using the toilet. In other households, it was placed at the entrance to the home to facilitate handwashing after being out in public, particularly in Bangladesh. To make filling the bottle easier, several households in Bihar placed the Tap next to the water source. Although it is not clear whether the placement of the device had an

impact on handwashing behaviour at specific times in this study, placement of handwashing facilities in strategic locations can disrupt the setting in a positive way, serving as a reminder and make uptake of the behaviour easier and more likely. Any marketing of the SATO tap should include a handwashing promotion component which considers positioning.

In conclusion, findings suggest that programme models to promote the SATO Tap should be adapted to consumer preferences and market conditions of a particular context. For example, in drought prone, water scarce areas, the Sato tap's current flow rate is ideal for economising water and this aspect should be promoted. However, in other areas, where the insufficient flow rate was viewed as a design flaw, the device could be geared towards a different audience, targeting young children or the elderly. Alternatively, the slow flow rate could be promoted as a positive attribute and a means to ensure 20 seconds of handwashing. Additional consumer research is needed to better understand consumer needs and preferences in each context and whether tweaks in market messaging will suffice or whether modifications to increase the flow rate are required to meet consumer preferences. More detailed market research is also recommended to better understand the marketing potential of the SATO tap in South Asia as well as the availability of the larger size bottles which don't appear to be locally available outside of major commercial centres and urban areas, particularly in India.

Overall, the response of users to the device was positive and most respondents felt that the SATO tap was a useful product for the entire family, including children and the elderly. With some considerations to the marketing strategy and/or adaptations to the device design, the tap could be an attractive product option for handwashing. The SATO tap has the potential to improve handwashing practice at critical times if sufficient market and consumer research is conducted to inform a comprehensive social marketing approach to promote the device and the desired behaviours.