HAND FACE SPACE SURFACE

THE PASSWORD TO A HEALTHY SCHOOL

# Assessing water consumption of different handwashing facility designs

18 November 2022

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

HBCC Hygiene & Behaviour Change Coalition

UKaid from the British people

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# Outline

- Background
- Rationale and study aims
- Materials and Methods
- Findings
- Conclusions and key takeaways

# Only 58% of schools globally have access to basic hygiene services

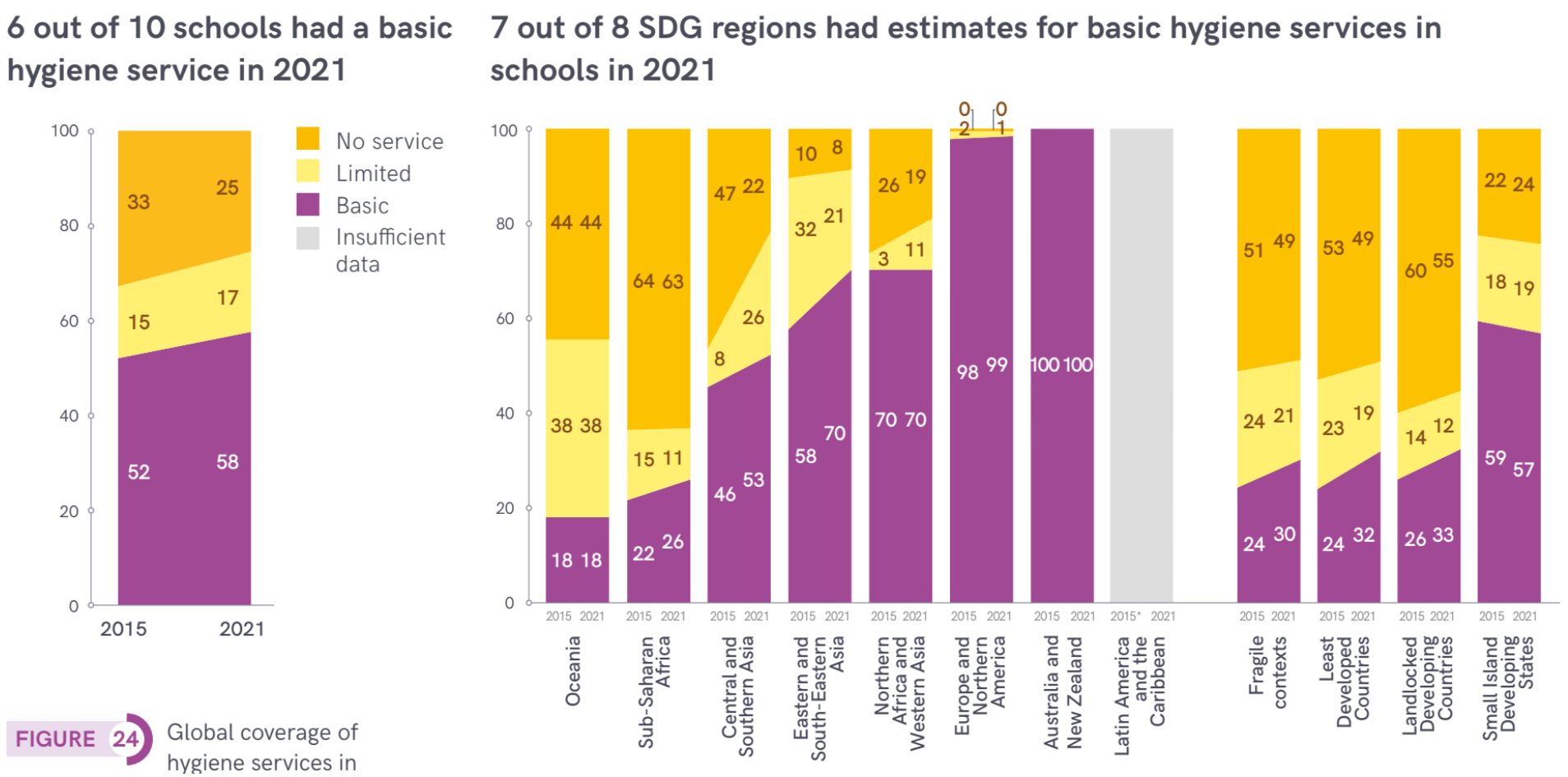
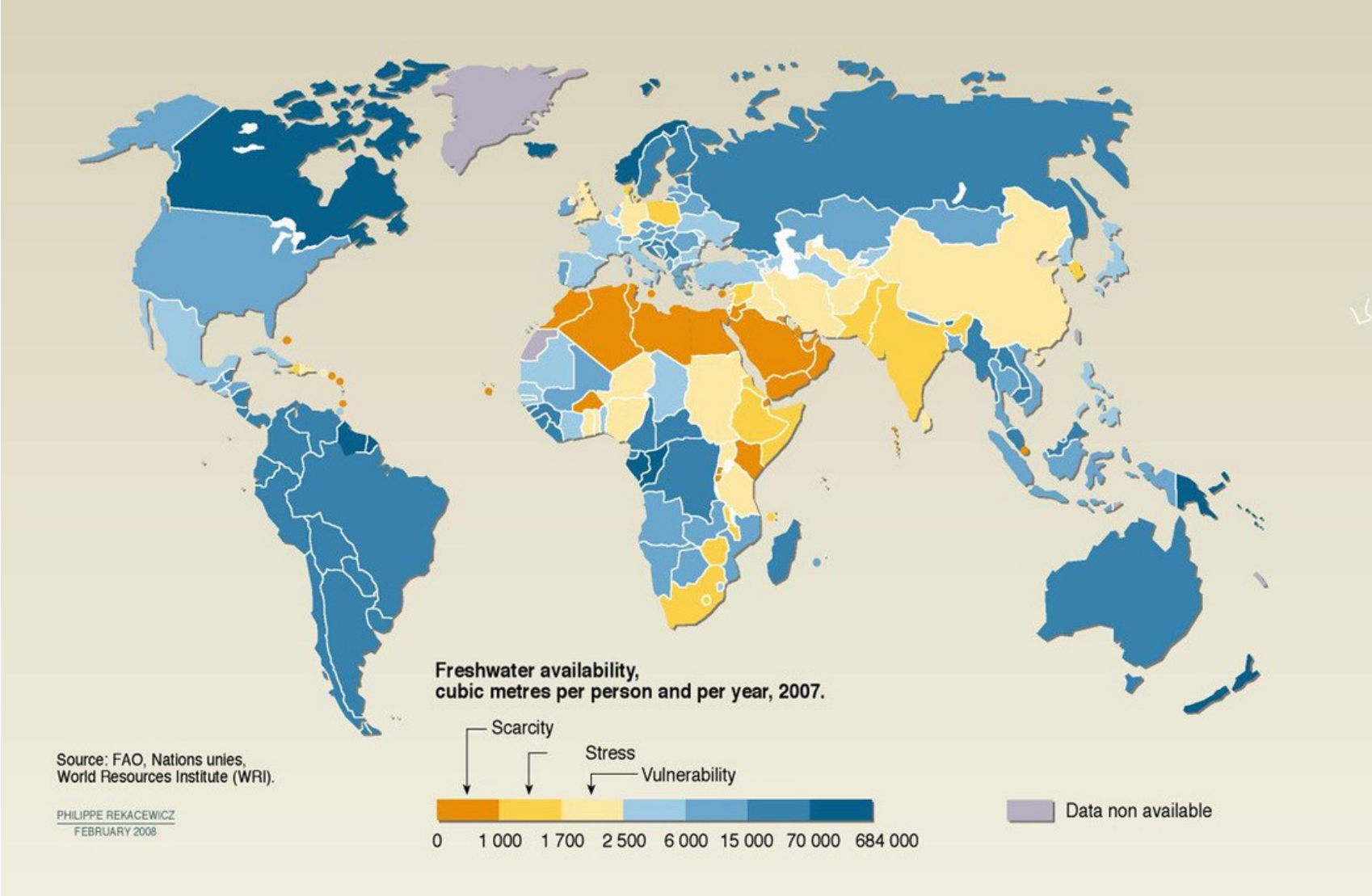



FIGURE 24 Global coverage of hygiene services in

*Source: WHO & UNICEF (2022).* Progress on drinking water, sanitation and hygiene in schools: 2000-2021 data update

Water scarcity has been among the most pressing issues in Africa and some areas in Asia.

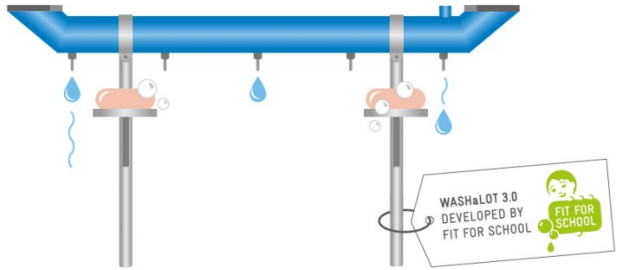


# Research question

- In terms of water consumption, which of the handwashing facility designs is more suitable for water resource-limited settings?

# Study aims

- To assess and compare the amount of water consumption per handwashing event of different handwashing facility designs, specifically:
  - Improvised conventional tap (faucet)
  - WASHaLOT
  - HappyTap (Labobo)
  - SATO Tap





# Handwashing facility designs

# Controlled setting (pilot)

## Procedure

- 30 adult participants (ages 22-65 y/o)
- Participants followed the WHO standard handwashing protocol
- Participants were instructed to wash their hands at each handwashing station (and close the tap during the leathering process)
- Handwashing duration and water usage were measured
- The flow rate (ml per second) of each handwashing facility was measured also without participants (reference)

## Measurement of water consumption

- Estimated by the amount of water used per facility after 5 handwashing events.
- Amount of water refilled into the handwashing facility (in ml) after a set of 5 handwashing events. The refilled water was measured using a measuring cup.
- A flow meter (Brand: Lamco) was used for the conventional tap
- 6 data points (of 5 events each) per facility
- **Water consumption per event = amount of water displacement / 5**

# Real life school setting

## Procedure

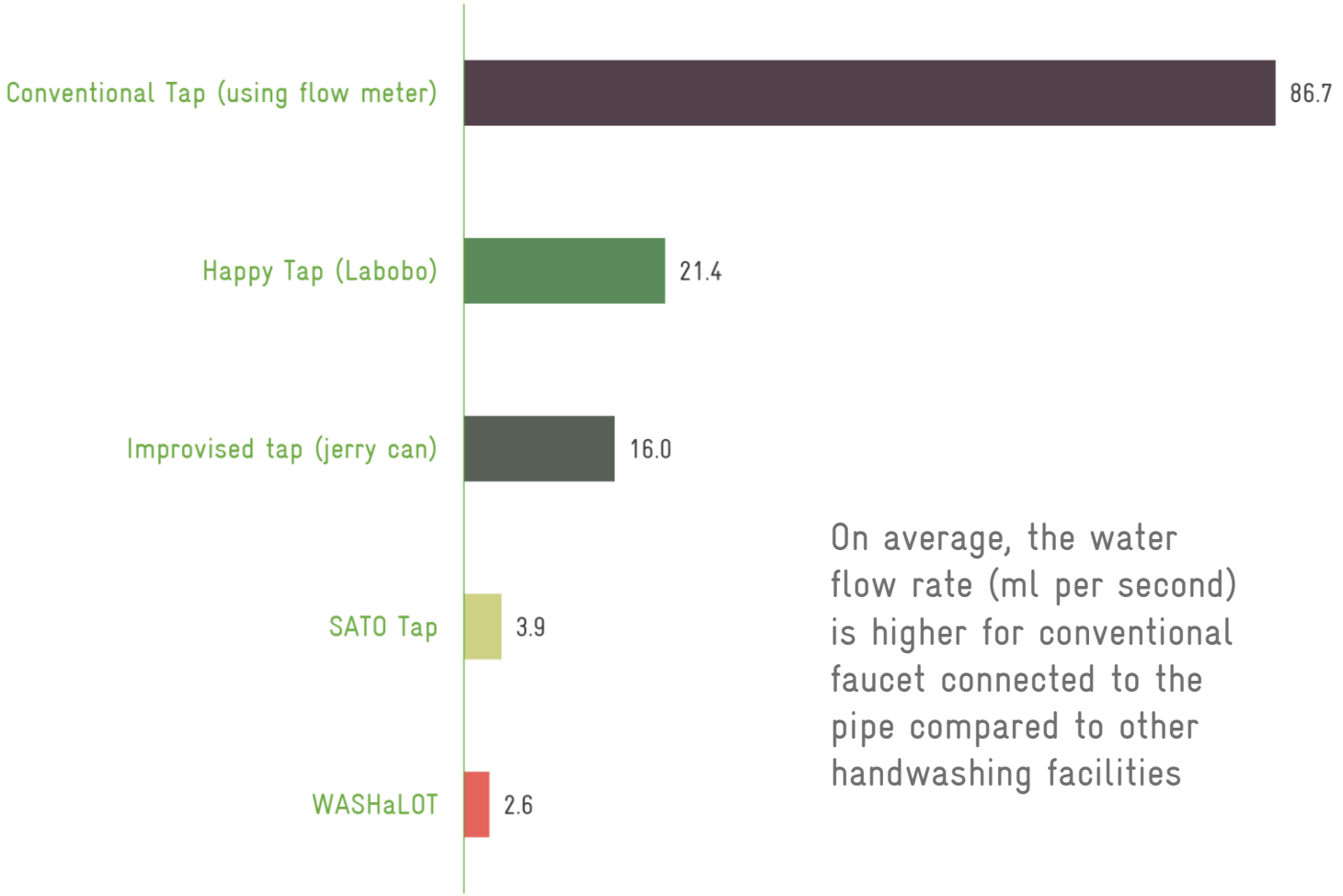
- Criteria: 2 large elementary schools (>1500 enrollees)
- Set-up and installed the 4 handwashing facilities in the 4 strategic locations (entrance, near the toilets, near canteen/ near classrooms)
- Kids freely washed their hands, without instructions and minimal interference
- An observer (who kept distance) counted the number of handwashing events and measured the water consumption by refilling the facilities per morning/afternoon shift

## Measurement of water consumption

- Estimated by the amount of water that was used per facility after the class shift (AM/PM shift) divided by no. of handwashing events.
- The amount of water refilled into the handwashing facility was measured (at the end of the class shift). Refilled water was measured using a measuring cup (expressed in ml).
- 8 data points per facility (4 half days for the 2 schools, each facility changed location after half day)

# Results

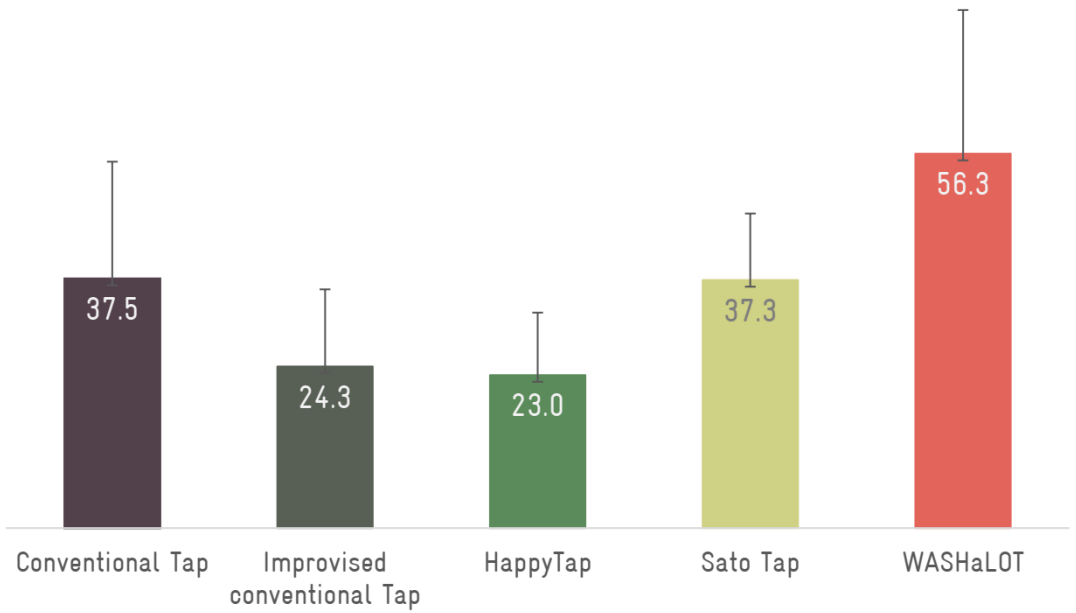
# Flow rate (ml per sec) without handwashing activity




On average, the water flow rate (ml per second) is higher for conventional faucet connected to the pipe compared to other handwashing facilities

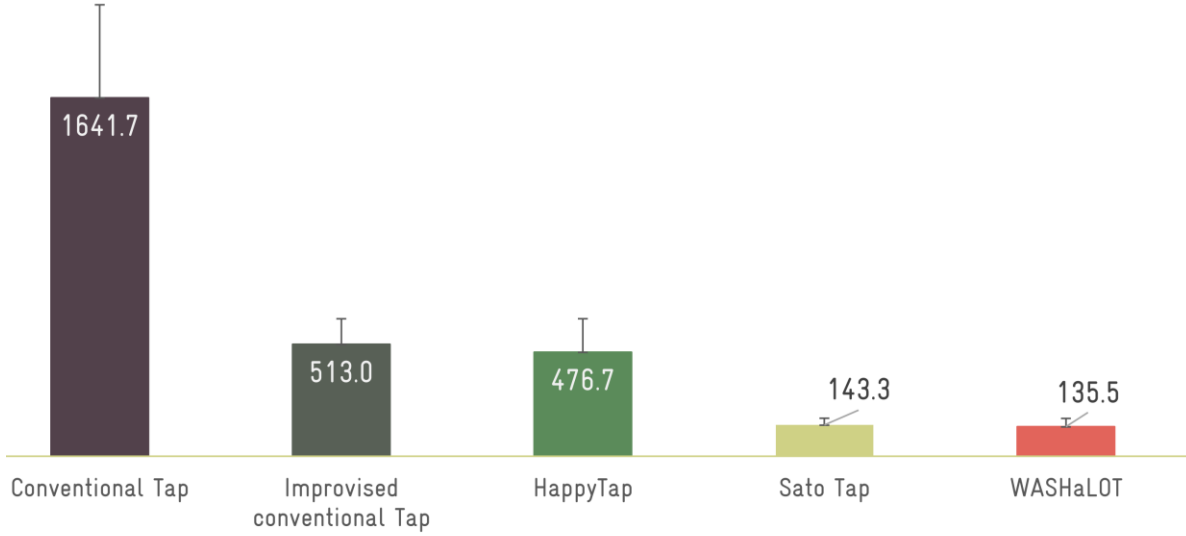
# Water consumption & handwashing duration **in a controlled setting**

Mean handwashing duration (in sec) of the participants by handwashing facility design




** Significant difference p<0.001* (Kruskal-wallis test)

Mean water consumption (in ml) per handwashing event by handwashing facility design




- *Significant difference p<0.001* (Kruskal-wallis test)
- *Post hoc test: all significant, except Improvised faucet vs. HappyTap, and Sato Tap vs. WASHaLOT*

# Water consumption **in a controlled setting**

Mean amount of water consumed (in ml) by handwashing facility design in a controlled setting

| Type of Handwashing facility | Amount of water consumed (ml) | | |
|---|---|---|---|
| | Mean | SD | p-value |
| Conventional Tap | 1641.7 | 426.1 | <0.0001 |
| Improvised conventional Tap | 513.0 | 116.6 | |
| HappyTap | 476.7 | 153.1 | |
| Sato Tap | 143.3 | 30.9 | |
| WASHaLOT | 135.5 | 37.7 | |

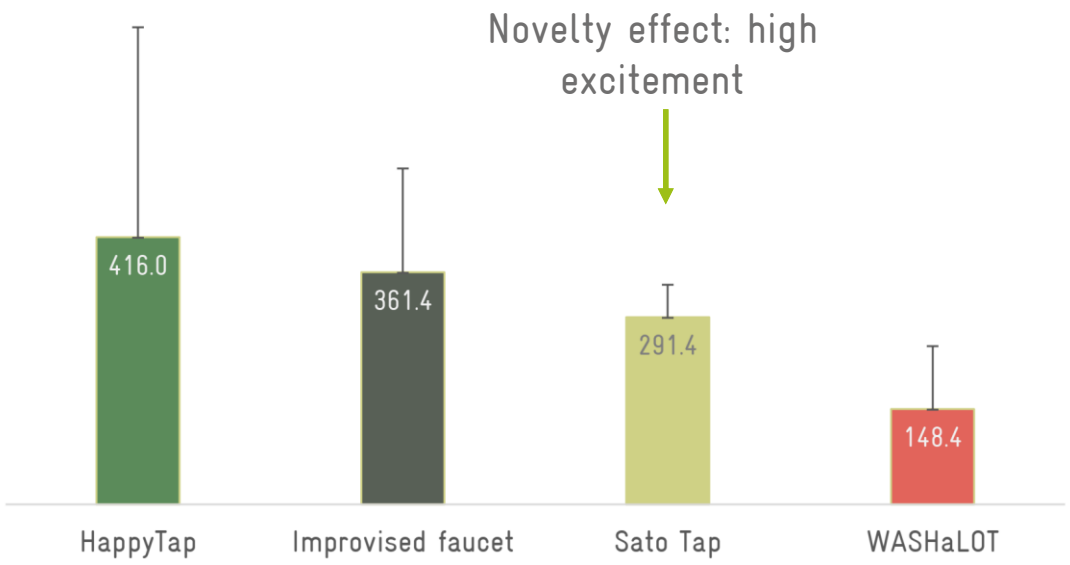
# Water consumption **in a real-life school setting**

Table 1. Total number of handwashing events per handwashing facility design

| Handwashing facility | No. of handwashing events | Mean | SD | p-value |
|---|---|---|---|---|
| Happy Tap | 727 | 416.0 | 326.7 | 0.0156 |
| Improvised conventional tap | 677 | 361.4 | 161.5 | |
| SATO Tap | 997 | 291.4 | 50.5 | |
| WASHaLOT | 622 | 148.4 | 97.9 | |

# Water consumption **in a real-life school setting**

Mean water consumption (in ml) per handwashing event by handwashing facility design in the school setting




**Significant difference p=0.016* (Kruskal-wallis test)
*Post hoc test: water consumption using the WASHaLOT was significantly lower than for the HappyTap, improvised faucet and Sato Tap used*

# Key takeaways

- In a controlled setting, all handwashing facilities consume at least 65 % less water than the conventional tap connected to the pipe.

- WASHaLOT only consumes 10% of the water compared to the conventional tap and it has the least water consumed relative to other handwashing facility designs both in controlled and school settings.

- Sato Tap shows very low water consumption in controlled setting but in real life setting novelty effect leads to excitement of children resulting in higher water consumption due to prolonged handwashing activities and playing with water.

- Additional analyses on the suitability of handwashing design in limited water-resource setting in terms of usability, maintenance, likability, nudging etc. apart from water consumption is recommended.

Thank you!