

STUDY / WASH IN SCHOOLS

A review and compilation of tools, approaches, platforms, and networks for improving WASH in schools programming





hands4health project

hands4health is a research project to develop, test and evaluate a systemic approach to improve WASH services for schools and health care facilities not connected to a functional water supply system. The project is implemented in four specific contexts by 10 consortium members led by the University of Applied Sciences and Arts Northwestern Switzerland (FHNW).

Systemic approach

The systemic approach is a methodology for tackling water, sanitation and hygiene (WASH) challenges, focusing on strengthening actors and existing systems in the local context. It combines technology, management, monitoring and behaviour change concepts into well-designed interventions oriented towards rethinking the entire WASH system and aimed at achieving systemic change. The systemic approach takes into consideration the needs of users and implementers in a specific context, with the goal to make WASH interventions more effective and sustainable.

This document is part of a series of tools that make up the systemic approach. More information about the systemic approach is available here:
› <https://hands4health.dev/systemic-approach>

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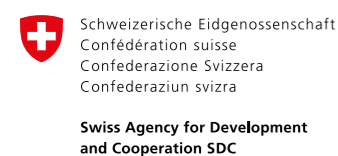
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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	05
2. INTRODUCTION, BACKGROUND AND PURPOSE	06
3. REVIEW SCOPE AND RESEARCH QUESTIONS	06
4. METHODS	07
5. RESULTS	08
5.1 WASH in schools tools	08
5.2 WASH in on-schools settings tools	12
5.3 Non-WASH school tools	13
5.4 Special situations	14
5.5 Relevant WASH in schools networks	15
6. DISCUSSION AND RECOMMENDATIONS	16
APPENDICES	18
Appendix A – Keywords for literature review on WASH in schools	19
Appendix B – Search strategy	19
Appendix C – Key informants contacted	20
Appendix D – Analysis categories and definitions	21
IMPRINT	23

1. Executive summary

In 2019, an estimated 31% of schools lacked a basic water service, 37% lacked a basic sanitation service, and 43% lacked a basic hygiene service. Adequate WASH services in schools are important to improve health, educational, and developmental outcomes for children. While there is evidence describing the importance of these outcomes, there are no compilations of approaches, tools, platforms, and networks for planning and implementing WASH in schools (WINS) programming that can be used to realize benefits for school children.

This paper summarizes 77 tools and approaches that were identified from a review of WINS, WASH, and educational sector documents. Fifty-nine documents (77%) were relevant to WINS, 13 (17%) were relevant to WASH (non-schools), and five (6%) were relevant to schools (non-WASH).

While no tool comprehensively addresses WASH in schools programming – from planning, implementation, monitoring and evaluation, and sustainability – there are several that can be used as building blocks for useful and effective contextually relevant programming. The WHO standards for WASH in schools provide a benchmark for assessing levels of service. Hardware, behavior change, and management interventions can be reviewed, cataloged, selected, adapted, and applied to the local context from several available resources and toolkits. Indicators for monitoring should be appropriately selected, including the WHO / UNICEF core indicators for WASH in schools. Additional indicators should be collated from available tools and resources and integrated into program monitoring to measure and track patterns, levels, and trends of management practices, budgets, and sustainability factors. These can be analyzed and evaluated to identify improvement opportunities. Interventions, monitoring, and programming can be used within the UNICEF Three Star Approach and Fit for Schools – useful improvement frameworks for WINS. WINS programming would benefit from the adoption of principles from implementation science and continuous quality improvement (CQI) – where interventions and implementation are adjusted and adapted for the local context; and monitoring data are used to drive cycles of programmatic improvement.

At least six networks and platforms were identified that are associated with WINS that can be used to disseminate findings and recommendations.

2. Introduction, background, and purpose

Basic water, sanitation, and hygiene services (WASH) in schools are important to ensure the health, safety, and well-being of children. In 2019, an estimated 31% of schools lacked a basic water service, 37% lacked a basic sanitation service, and 43% lacked a basic hygiene service (JMP). To achieve the Sustainable Development Goal (SDG) of universal access to WASH in schools by 2030, the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) estimate that a four-to-seven-fold increase in the current rate of progress will be needed.

Achieving universal access to WASH in schools by 2030 will require increased financial investments, improved coordination of relevant actors, application of effective tools and approaches, and describing evidence of successful (and failed) implementation of interventions. Many tools, applications, and approaches for improving WASH in schools have been developed, however there is no compilation and analysis of these tools; and mapping of opportunities to apply them across contexts.

The purpose of this report is to comprehensively review approaches, tools, platforms, and networks related to WASH in schools, with an emphasis on schools that use "off-grid" water supplies (hereafter, the review will be referenced in shorthand as the review on WASH in schools or WINS). The findings from this review will be used to guide the hands4health project consortium toward the development of a holistic approach to improved WASH in schools with off-grid water supplies.

3. Review scope and research questions

The hands4health (h4h) consortium intends to evaluate existing elements of hand hygiene approaches in schools and potentially build on them (or develop them further) to obtain simple, yet effective tools for planning and implementing WASH improvements (rather than develop new approaches).

The hands4health project is focused on four countries: Nigeria, Burkina Faso, Mali, and Occupied Palestinian Territories. Tools, approaches, platforms, and networks that are available in these areas are of particular interest, but the geographic scope of the study is global (i.e., not limited to low- and middle-income countries). The consortium is also interested in emergency settings such as IDP camps, but the approaches should be applicable in low- and middle-income country contexts.

RESEARCH QUESTIONS

This study has four primary research questions:

01

Which approaches, tools, platforms and networks exist for planning and implementing hardware and software improvements, as well as operation and management (O&M) concepts, in schools, with a focus on WASH? (Primary research question)

a) Which of these elements are particularly relevant for schools not connected to a functional water supply (off-grid)?

02

Are there holistic approaches for planning WASH (or hygiene only) improvements in other settings which might be adapted for the needs of schools?

03

Are there holistic approaches for planning and implementing hardware and software improvements for schools, not related to WASH, which might be adapted to WASH needs?

04

Which combination of tools, resources, platforms, and networks is most likely needed to ensure sustainable provision of WASH, particularly hand hygiene, in schools with off-grid water supplies?

4. Methods

Search terms

Non-systematic literature searches of grey literature and peer-reviewed literature were conducted to explore research questions one (existing tools for WINS), two (existing tools for WASH in non-school settings), and three (existing tools for non-WASH improvements in schools). *A list of search terms used is listed in Appendix A.*

Search strategy

Searches were primarily conducted with Google, Google Scholar, and PubMed. A collection of relevant gray literature data repositories (which have been used in other relevant WASH-related systematic reviews) was reviewed for relevant literature. Targeted Google searches were conducted to identify additional relevant non-journal tools, assessments, and literature. *Search strategy details are available in Appendix B.*

Inclusion criteria

For this review, different inclusion criteria were used based on the type of tool identified and the corresponding search/research question. For tools on WASH in schools, any relevant tool, approach, or platform was included. For WASH in non-school settings and for non-WASH school-based tools, platforms, and approaches, only tools that could be broadly applied to a school WASH context were included (i.e., the tool or approach could be broadly adapted, integrated, or applied for a school WASH context). Because of the anticipated large corpus of results, tools published from 2010 and more recently were prioritized.

Expert review

A list of expert informants was developed and refined based on the results of the literature search. Informants reviewed a draft of the database and were asked to comment on additional tools and resources to add. Interviews with informants were conducted to provide feedback and help ensure that the list of tools is comprehensive. *The expert informant list is available in Appendix C.*

Analytical approach

A list of tools, platforms, networks and relevant metadata were compiled into a catalog (Excel spreadsheet) for reference. Detailed analysis categories are listed in *Appendix D and in the catalog ReadMe file.*

Tools were categorized based on their relevance to different WASH programming project phases (as defined by the h4h consortium).

Assessment and training: baseline understanding of the WASH situation and context in schools (needs assessments, guidelines, planning documents, training resources).

Improvement of infrastructure, management and safety, behavior change: interventions of novel, successful low-cost infrastructure management, safety and behavior change and facility management.

Monitoring and Evaluation: tools (instruments, indicators, frameworks) to measure the status, levels, and trends of the interventions and associated factors of WASH in schools.

Sustainability and progressive improvement towards safely managed water supply, sanitation, and hygiene: strategies and approaches to ensure sustainability of WASH interventions.

Data and evidence sharing and management: Platforms and approaches to share data and evidence from WASH in schools.

Key tools, important contextual tools, and notable gaps were identified for each project phase and visualized in a table.

5. Results

Seventy-seven tools, platforms, and approaches were identified from a review of documents in the WINS, WASH, and educational sectors. Fifty-nine documents (77%) were relevant to WINS, 13 (17%) were relevant to WASH (non-schools), and five (6%) were relevant to schools (non-WASH). These are summarized by research question topic in Tables 1, 2, and 3.

5.1 WASH in schools tools

RESEARCH QUESTION 01

Tools used for WASH in schools are listed in Table 1 (n=59). Twelve primarily addressed the assessment phase (21%), 27 primarily addressed the improvement phase (47%), 11 primarily addressed the monitoring and evaluation phase (19%), and eight primarily addressed the sustainability phase (14%).

Tools addressing the assessment and training phase included distance learning courses for WINS, the Water, Sanitation and Hygiene Standards for Schools in Low-cost Settings developed by the WHO, and school infrastructure checklists.

Tools highlighting the improvement and implementation project phase include the WASHaLOT handwashing facility guide, the Handwashing Compendium for Low Resource Settings developed by IDS, the Three Star Approach for WASH in Schools developed by UNICEF, and the Water, Sanitation, and Hygiene in Schools Toolkit developed for the US Peace Corps. These tools emphasize hardware and software interventions primarily around hand hygiene and menstrual hygiene management and include a variety of implementation approaches and strategies for monitoring.

Tools that address monitoring and evaluation include the WHO/UNICEF JMP core indicators for WASH in schools, FACET, the sustainability and effectiveness of school WASH projects toolkit, and the World Vision 14 country evaluation. The JMP resource provides core indicators for WASH services in schools that should be a component of any monitoring and sustainability program. The World Vision evaluation and the WHO standards for schools provide useful supplemental indicators to measure different aspects of sustainability, including important parameters around the design of infrastructure, management, budgeting, and operations and maintenance.

The WASH in schools indicators from the World Vision evaluation have been used in a statistical evaluation to identify factors associated with higher levels of WASH services. This evaluation found that schools that did not share their water point with a community, had a parent-teacher association that supported WaSH, or had support from an external WaSH program were more likely to have access to basic, continuous, on-premises water service versus worse access. Schools with an on-premises water point, water available on the day of survey, a health club, or handwashing stations near toilets were more likely to have a basic sanitation service versus a lower service. Schools with limited or basic sanitation, health clubs, an MHM curriculum, a designated MHM focal person, or school funds for WaSH were more likely to have MHM materials. The study concludes that improved institutional management and external support, accountability mechanisms, and enhanced training and hygiene curriculum will support sustained WaSH service delivery in schools in LMICs.

Tools that primarily addressed the sustainability phase included operations and maintenance (O&M) guidelines for school WASH facilities, O&M guidelines for specific technologies (e.g., handwashing stations), and tools for budgeting. There were some case studies addressing sustainability.

A tool that provides an overall framework for improvement is the Fit for School Approach.

This approach is based on the principles of simplicity, sustainability, scalability, and systems thinking. The approach describes a partnership model with national governments, a process for leveraging existing systems, a package of evidence-based low-cost WINS interventions, and use of a school-based management model.

Another tool that provides an overall improvement model for WINS is the UNICEF Three Star Approach.

The Three Star Approach argues that schools and their associated communities “can and should create the minimum conditions for healthy, hygiene-promoting schools using local resources.” It provides a simple, scalable, and sustainable framework to make progressive improvements in service, where the star goals can be achieved with low-cost improvements. The approach has been demonstrated and/or adapted in several countries, including the Philippines, Fiji, the Solomon Islands, Vanuatu, Cambodia, Laos, and Indonesia. UNICEF is in the process of developing an acceleration strategy for WASH in schools and adding a fourth star which will include climate resilience and adding to the tool to assess effectiveness.

TABLE 1. WASH IN SCHOOLS (WINS) TOOLS IDENTIFIED THROUGH THE REVIEW

TOOL, RESOURCE, METHOD, APPROACH	AUTHOR(S)/ DEVELOPER(S)	YEAR
➤ Assessing the sustainability & effectiveness of school WASH projects: A toolkit	Emory University	2010
➤ Blue Schools – Linking WASH in schools with environmental education and practice, Catalogue of Practical Exercises	Leclert, L., Moser, D., Brogan, J., Mertenat, A., Harrison, J.	2018
➤ Checklist: Minimum Standards for Inclusive, MHM-Friendly Latrines	IFRC	2019
➤ Clean Hands, Good Toilet, Happy Family! Hygiene Promotion Guidelines and Tools. Western Pacific Sanitation Marketing and Innovation Project	Live & Learn Environmental Education	2017
➤ Cleaning, Disinfection, and Hand Hygiene in Schools – a Toolkit for School Administrators	CDC	2021
➤ Compendium of WASH in Schools Facilities in Emergencies	UNICEF	2012
➤ Core questions and indicators for monitoring WASH in Schools in the Sustainable Development Goals	WHO, UNICEF	2018
➤ FACET	Terres des Hommes & EAWAG	n.d.
➤ Field Guide: The Three Star Approach for WASH in Schools	UNICEF	2013
➤ Fit for school	GIZ	2014
➤ Group Washing Facilities - Assembly Instructions & Maintenance.	GIZ	2016
➤ Guidelines for the provision of safe water and sanitation facilities in schools	UNESCO	2004
➤ Handwashing compendium for Low resource settings	IDS	2020
➤ Kiribati WASH in Schools Toolkit	Live and Learn	2016
➤ Life Skills-Based Hygiene Education	Postma, L., Getkate, R., van Wijk, C. (IRC)	2004
➤ Low-Cost Group WASH Facilities: A scalable Solution for Hygiene Promotion in Primary Schools? – Functionality Assessment of a new Design Approach	Siewert M.	2015
➤ Maintaining the Momentum: Advancing Health, Learning and Equity through WASH in Schools	UNICEF	2014
➤ Making Children Fit For School - Transforming Schools Into Healthy Places	GIZ	2019
➤ Manual for Teachers for the Implementation of the Essential Health Care Program in Schools	Monse, B., Naliponguit, E., Benzian, H. Helderemann, W.	2014
➤ Menstrual Cup Intervention in Adjumani District Uganda – Final Implementation Report	WoMena Uganda	2019
➤ Menstrual Hygiene Management Toolkit	SPLASH	2015

>> TABLE 1. WASH IN SCHOOLS (WINS) TOOLS IDENTIFIED THROUGH THE REVIEW

TOOL, RESOURCE, METHOD, APPROACH	AUTHOR(S)/ DEVELOPER(S)	YEAR
> Monitoring and evaluation of WASH in schools programs: lessons from implementing organizations	Deroo, Walter, Graham	2015
> Operation and Maintenance Manual for public schools	Theis S., Magar K.	2019
> Raising Even more Clean Hands	UNICEF	2012
> Sanitary Survey Checklists. WASH Safety Planning. Technical Toolkit for Kiribati Schools	UNICEF	n.d.
> Scaling Up Group Handwashing in Schools – Compendium of Group Washing Facilities Across the Globe	UNICEF, GIZ	2016
> School WASH Facilities Operations and Maintenance Guidelines	WASHplus	2015
> School-Led Total Sanitation: School Facilitator Training Guide	Ministry of Education, Science and Technology, Malawi	2015
> Surveillance of water, sanitation and hygiene in schools: a practical tool	WHO	2019
> Teacher's Guide to Integrating WASH in Schools	WASHplus	2015
> Technical Guide for Construction of School Sanitation Facilities in Nigeria	Federal Ministry of Education (Nigeria), UNICEF	n.d.
> Technical Guide for Handwashing Facilities in Public Places and Building	Knight et al (WaterAid)	2020
> The potential of school-based WASH programming to support children as agents of change in rural Zambian households	Winter et al	2021
> Toolkit on hygiene, sanitation and water in schools	World Bank	2005
> Training Manual – Good water, sanitation and environmental hygiene practices for primary schools	Shafeeqa, F., Shazna, M., Glen, E., Henderson, R.	2008
> UNHCR WASH Monitoring System – Schools	UNHCR	2022
> UNICEF 'Improving WASH facilities in prioritized schools in the West Bank and Gaza Strip (2012–2014)' Project	UNICEF / consultants	2014
> Using Environmental Nudges to improve Handwashing with Soap among School Children – A Resource Guide for rapidly deployable Interventions for use as an interim Measure during School Reopenings	Watson J. and Dreibelbis R.	2020
> WASH in schools budgeting tool	Freeman Research Group (SWASH+ Project)	2019
> WASH in Schools Distance-Learning Course	UNICEF and Emory	2012
> WASH in Schools for Girls E-Course	Emory University	2015
> WASH in Schools Implementation Guidelines	Live and Learn	n.d.

>> TABLE 1. WASH IN SCHOOLS (WINS) TOOLS IDENTIFIED THROUGH THE REVIEW

TOOL, RESOURCE, METHOD, APPROACH	AUTHOR(S)/ DEVELOPER(S)	YEAR
> WASH in Schools Massive Open Online Courses – Accelerating WINS	SEAMEO INNOTECH, GIZ and the Department of Education (Philippines)	n.d.
> WASH in Schools Massive Open Online Courses – Leading WINS	SEAMEO INNOTECH, GIZ and the Department of Education (Philippines)	n.d.
> WASH in Schools Monitoring Tool	UNICEF	2011
> WASH in Schools Target Challenge	Rotary	2020
> WASH Visual Aids for Emergencies and Development	UNICEF	2012
> WASHaLOT 3.0 Installation, Operation & Maintenance User's Guide	Madrid, F., Monse, B., Schlenk, J.C.	2021
> WASHaLOT Field Guide: Prefabricated Group Washing Facility for Schools	Fit for School	2015
> WASH-Friendly Schools: A training resource for SPLASH use	USAID WASHPlus	2014
> WASH-Friendly Schools: A Training Resource for SPLASH Use	WASHplus	2014
> Water, sanitation and hygiene (WASH) in schools: results from a process evaluation of the National Sanitation Campaign in Tanzania	Prince Antwi-Agyei; Anyitike Mwakitalima; Amour Seleman; Filemoni Tenu; Theresia Kwiwite; Stephen Kiberiti; Elisa Roma	2017
> Water, Sanitation and Hygiene for School Children in Emergencies. A Guidebook for Teachers	UNICEF	2011
> Water, sanitation and hygiene in schools: a journey towards Swachh Odisha	UNICEF, Odisha School Education Programme Authority and IRC	2020
> Water, Sanitation and Hygiene Standards for Schools in Low-cost Settings	WHO	2009
> Water, Sanitation, and Hygiene in Schools Toolkit	Peace Corps (USA)	2017
> WinS Checklist Covid-19	WinS Network	2020
> WinS Models that Work	Republic of Uganda	2020
> World Vision WaSH in 14 countries	UNC and World Vision	2016

5.2 WASH in non-school settings tools

RESEARCH QUESTION 02

Most of the relevant WASH in non-school settings tools included monitoring instruments to assess WASH in emergency contexts, enabling environment factors, and MEL. An example relevant for WINS is Anderson et al, 2021 which described the application of continuous quality improvement (CQI) and the plan-do-study-act (PDSA) method to demonstrate opportunities to improve water quality at the point of use. Another relevant tool is the RANAS model, a systematic method for behavior changes in WASH.

TABLE 2. WASH TOOLS USED IN NON-SCHOOL SETTINGS IDENTIFIED THROUGH THE REVIEW

TOOL, RESOURCE, METHOD, APPROACH	AUTHOR(S)/ DEVELOPER(S)	YEAR
➤ Assessment of Behaviour Change and Communication Programmes: TNUSSP Phase I	TNUSSP	2018
➤ Compendium of accessible WASH technologies	Jones, H., Wilbur, J.	2014
➤ Continuous Quality Improvement (Plan Do Study Act)	UNC and World Vision	2021
➤ District-wide approach to WASH	Agenda for Change	2017
➤ Global Humanitarian WASH Guidance 2019-2021	Save the Children UK	2019
➤ Menstrual Hygiene Management - National Guidelines (India)	Ministry of Drinking Water and Sanitation (India)	2015
➤ Monitoring Menstrual Health and Hygiene: Measuring Progress for Girls on Menstruation	Sommer, M., Zulaika, G., Schmitt, M., Gruer, C.	2019
➤ Rapid Methods for Assessing WASH Services in Emergency Settings	UNHCR	2017
➤ Systematic behavior change in water, sanitation and hygiene. A practical guide using the RANAS approach. Version 1.1.	Mosler, H.-J., & Contzen, N.	2016
➤ WASH and health working together: A 'how-to' guide for Neglected Tropical Disease programmes	WHO	2019
➤ WASH Bottleneck Analysis Tool (WASH BAT)	UNICEF	2018
➤ WASH Interventions in Urban Slums of Jaipur City in the Context COVID-19	Khastagir, S.	2021
➤ WPDx	Global Water Challenge	2021

5.3 Non-WASH school tools

RESEARCH QUESTION 03

There were several useful non-WASH tools used in schools (or tools where WASH was not the primary emphasis). These tools describe opportunities to couple WASH interventions within a broader educational toolkit framework.

TABLE 3. NON-WASH SCHOOL TOOLS IDENTIFIED THROUGH THE REVIEW

TOOL, RESOURCE, METHOD, APPROACH	AUTHOR(S)/ DEVELOPER(S)	YEAR
➤ Commit to Clean Toolkit	Healthy Schools, Healthy People	2020
➤ Happy Schools guide and toolkit: a resource for happiness, learners' well-being and social and emotional learning	UNESCO	2021
➤ Schools, agencies, systems For Resilience, Equity, Safety and Health (FRESH)	WHO, UNESCO, UNICEF, The World Bank	2021
➤ Teachers' Handbook for Inclusive School Health and Nutrition	School Health Integrated Programme	2018
➤ The Good School Toolkit	Raising Voices	2020

5.4 Special situations

Two special situations were analyzed from the available tools identified through the review: off-grid water supplies and emergency settings.

Off-grid water supplies. There were no tools identified that explicitly addressed off-grid water supplies. Most tools described both off grid and gridded supplies, so most of these interventions and monitoring tools can be applied to rural settings.

Emergency settings. There were seven toolkits identified that addressed WASH and WASH in schools in emergency contexts. Some of these tools focused on methods for assessment and monitoring of WASH in emergency contexts. UNICEF developed two useful resource compendiums that describe interventions, monitoring, and how to transition from emergency to recovery phases.

TOOL, RESOURCE, METHOD, APPROACH	AUTHOR(S)/ DEVELOPER(S)	YEAR
› Checklist: Minimum Standards for Inclusive, MHM-Friendly Latrines	IFRC	2019
› Compendium of WASH in Schools Facilities in Emergencies	UNICEF	2012
› UNHCR WASH Monitoring System – Schools	UNHCR	2022
› WASH Visual Aids for Emergencies and Development	UNICEF	2012
› Water, Sanitation and Hygiene for School Children in Emergencies. A Guidebook for Teachers	UNICEF	2011
› Global Humanitarian WASH Guidance 2019–2021	Save the Children UK	2019
› Rapid Methods for Assessing WASH Services in Emergency Settings	UNHCR	2017

5.5 Relevant WASH in schools networks

Six networks were identified that focus on WASH in schools (Table 5) that could be used to target disseminations of the findings of this review and facilitate communities of practice around the issue of WINS programming improvements.

TOOL, RESOURCE, METHOD, APPROACH	WEBSITE
› Water Integrity Network	https://www.waterintegritynetwork.net
› Fit for School	https://fitforschool.international
› WASH in Schools Network	https://www.winsnetwork.org
› Live & Learn Environmental Education	https://livelearn.org
› WASH in schools index	https://www.washinschoolsindex.com/library
› Blue School Community of Practice	https://waterconsortium.ch/mailling-lists

6. Discussion and Recommendations

This paper summarizes and describes 77 tools, platforms, and approaches that were identified from a review of documents in the WINS, WASH, and educational sectors. Fifty-nine documents (77%) were relevant to WINS, 13 (17%) were relevant to WASH (non-schools), and five (6%) were relevant to schools (non-WASH).

While none of the tools can be used alone to address the WASH in schools programming “lifecycle” i.e., from planning, implementation, monitoring and evaluation, and sustainability; there are several tools that can be adapted and used in combination for useful and effective programming (Table 6).

Two overall frameworks that can be used and adapted are the **Fit for School Framework** and the **Three Star Approach for WASH in schools**. Fit for School provides an evidence-based approach for implementing low-cost WINS solutions with simplicity, sustainability, scalability, and systems thinking. The Three Star Approach describes a ladder approach by which schools can progress from one to three stars (corresponding to a robust WASH in schools program) using simple, scalable, and sustainable approaches. The approach uses healthy competition (schools receive a star rating based on their performance for the basis of comparison) and the three-star approach links to community efforts.

In addition to Fit for School, there are several available tools and resources that describe WASH hardware and software interventions and implementation approaches in schools. These primarily include handwashing resources such as the **WASHaLOT handwashing facility guide**, the **Handwashing Compendium for Low Resource Settings**, and the **Compendium of accessible WASH technologies**. Notable limitations are catalogs of water and sanitation interventions for schools.

Hardware interventions and implementation approaches should be cataloged and reviewed with local implementing partners and adapted as appropriate for the local context – considering spatial factors, school-level management, and sub-national and national enabling environment factors. These hardware interventions can be embedded within the Three Star Approach framework – coupling hardware and software interventions.

For behavior change, the **RANAS approach** provides an evidence-based framework for systematic behavior change in WASH. Additional specialized interventions include **Blue Schools**, **Sesame Street WASH Up**, and the **MHM Toolkit**. Depending on the context and intervention necessary, these are several useful and interesting behavior change approaches to deploy in school settings.

Many of the tools and approaches described also contain strategies for management. Other notable management intervention tools include the **Teacher’s Guide to Integrating WASH in schools** and the **WASH in schools budgeting tool** developed by Emory University. A notable gap of this review was a limited catalog of evidence-based management strategies to sustain school WASH interventions.

Robust indicators for monitoring and evaluation should be selected and used as part of an overarching framework (i.e., used as part of the Three Star Approach), including the WHO / UNICEF JMP core indicators for WASH in schools. Additional indicators should be collated from available tools that can be used to measure and track management, budgets, sustainability factors, availability of school clubs, etc. The World Vision 14 country evaluation and the Assessing the sustainability and effectiveness of school WASH Projects toolkit provide useful starting points for doing this. These monitoring data can be analyzed to understand and describe potential intervention improvement opportunities.

WASH in schools programming would benefit from the adoption of principles from implementation science and continuous quality improvement – where interventions and implementation are adapted and tweaked for the local context; and monitoring data are used to identify areas of improvement and drive cycles of programmatic improvement over time.

Limitations

There were several limitations to this study. It was not possible to conduct systematic searches; therefore, some tools may not have been captured in this review. The searches were conducted in English resulting in a language bias.

TABLE 6. KEY TOOLS, CONTEXTUAL SUPPORTING TOOLS, AND NOTABLE GAPS OF TOOLS TO IMPROVE WASH IN SCHOOLS PROGRAMMING

PROJECT PHASE	IMPORTANT CONTEXTUAL TOOLS	NOTABLE GAPS
<p>➤ The Three Star Approach for WASH in Schools (UNICEF) Fit for School</p>		
Overarching framework	<ul style="list-style-type: none"> ▸ FRESH Framework 	None
<p>➤ Water, Sanitation and Hygiene Standards for Schools in Low-cost Settings (WHO)</p>		
Assessment and training	<ul style="list-style-type: none"> ▸ WINS distance learning / massive open online courses (MOOCs) 	None
<p>➤ WASHaLOT Field Guide: Prefabricated Group Washing Facility for Schools</p>		
Improvement (hardware interventions)	<ul style="list-style-type: none"> ▸ Handwashing compendium for Low resource settings (IDS) ▸ Compendium of accessible WASH technologies 	Catalogs of water and sanitation interventions for schools
<p>➤ Systematic behavior change in water, sanitation and hygiene. A practical guide using the RANAS approach</p>		
Improvement (behavior change interventions)	<ul style="list-style-type: none"> ▸ Blue Schools ▸ WaSH Up (Sesame Street) ▸ MHM toolkit ▸ Water, Sanitation, and Hygiene in Schools Toolkit (Peace Corps) 	None
<p>➤ Teacher’s Guide to Integrating WASH in Schools</p>		
Improvement (management interventions)	<ul style="list-style-type: none"> ▸ WASH in schools budgeting tool 	Catalog of evidence-based management strategies to sustain school WASH interventions
<p>➤ Core questions and indicators for monitoring WASH in Schools in the Sustainable Development Goals (JMP)</p>		
Monitoring and Evaluation	<ul style="list-style-type: none"> ▸ FACET, mWater, Akvo Flow ▸ World Vision 14 country evaluation ▸ Assessing the sustainability and effectiveness of school WASH Projects (Emory) 	None
<p>➤ Continuous Quality Improvement (Plan Do Study Act)</p>		
Sustainability	<ul style="list-style-type: none"> ▸ School WASH Facilities Operations and Maintenance Guidelines ▸ WASHaLOT 3.0 Installation, Operation & Maintenance User’s Guide 	Few evidence-based examples of improvement methods applied to school settings

Appendices

APPENDIX A

Keywords for literature review on WASH in schools

SEARCH TERMS

Search terms are clustered below by topic. These clusters of terms were used in search strategies in different combinations depending on the needs of the respective research questions.

School

- › School, infrastructure, building, primary, secondary, elementary

Tools and approaches

- › Network, platform, tool, approach, resource
- › Training, capacity building, mentoring, coaching, budget
- › Operations and maintenance, monitor, audit
- › Quality improvement, implementation science, plan do study act (PDSA)

Hygiene

- › Hand hygiene, hand washing, infection prevention and control
- › Water, soap, alcohol-based hand sanitizer, alcohol-based hand rub

Water

- › Borehole, tubewell, well, dug well, protected dug well, standpipe, protected spring, rainwater catchment, improved water source
- › Water quality, E. coli, thermotolerant coliform

Sanitation and environmental health terms

- › Sanitation, toilet, pit latrine

Geographic terms

- › Low- and middle-income countries
- › Low-resource settings
- › Rural

IDP/refugee terms

- › Emergency, refugee camps, internally displaced people

Other non-school settings search terms¹

- › Healthcare facilities (primary healthcare, clinic, hospital)
- › Communities
- › Households
- › WASH in institutions

¹ Terms used from "Monitoring drinking water, sanitation, and hygiene in non-household settings: Priorities for policy and practice" www.sciencedirect.com/science/article/abs/pii/S1438463915000267?via%3Dihub

APPENDIX B

Search strategy

PEER REVIEWED LITERATURE SEARCH APPROACH

- › Google Scholar. Results were sorted and reviewed by relevancy
- › PubMed. Results were sorted and reviewed by relevancy

GREY LITERATURE SOURCES REVIEWED

- › CARE
- › Catholic Relief Services
- › Centre for Community Health Research (CCHR)
- › CESVI
- › Engineers Without Borders
- › IRC International Water and Sanitation Centre, WASH in Schools Index, www.washinschoolsindex.com
- › Institute of Education Sciences (ERIC), <https://eric.ed.gov>
- › Millennium Water Alliance (MWA)
- › Médecins Sans Frontières (MSF) / Doctors Without Borders
- › Pan American Health Organization (PAHO) institutional memory database
- › Ranas Mosler
- › RWSN
- › Save the Children, USA
- › Skat Foundation
- › SNV
- › Splash
- › SuSanA
- › Terres des Hommes
- › UN Water Library
- › UNESCO
- › UNICEF
- › United Nations Environment Programme
- › USAID
- › WASH Funders Knowledge Center
- › Water and Sanitation Rotarian Action Group (WASRAG)
- › WaterAid
- › WEDC
- › World Bank Open Knowledge Repository
- › World Bank WSP
- › World Health Organization (WHO)

KEY WASH IN SCHOOLS LITERATURE REVIEWS CONSULTED

- › Water, Sanitation and Hygiene (WASH) in Schools in Low-Income Countries: A Review of Evidence of Impact <https://www.mdpi.com/1660-4601/16/3/359>
- › A Systematic Review: Costing and Financing of Water, Sanitation, and Hygiene (WASH) in Schools <https://www.mdpi.com/1660-4601/14/4/442>
- › Water and Sanitation in Schools: A Systematic Review of the Health and Educational Outcomes <https://www.mdpi.com/1660-4601/9/8/2772>

APPENDIX C

Key informants contacted

- › UNICEF – Irene Amongin, WASH in institutions lead
- › IRC – Elynn Walter
- › Celia McMichael – WASH in schools expert, University of Melbourne
- › Erin Tanner, Education Specialist UNICEF East Asia & Pacific Regional Office
- › Bella Monse, Senior Advisor of GIZ Fit for School, bella.monse@giz.de
- › Margarette Lim – GIZ/ WASH in Schools Network
- › Therese Mahon, WaterAid South Asia
- › Murat Sahin, msahin@unicef.org

APPENDIX D

Analysis categories and definitions

Research Question: Describes which research question the tool is most associated	Improvement (hardware): Tool contains relevant information from improvement phase of projects, specifically related to infrastructure and hardware	Relevance rating (1 high; 5 low): Rate to roughly gauge the relative importance of the tool to other comparator tools
Tool / resource: Name of the tool	Improvement (behavior change): Tool contains relevant information from the improvement phase of projects, specifically related to behavior change	Evaluation: The tool or approach has been externally validated (either in a separate document or the document is an evaluation of a specific tool or approach)
Author(s)/Developer(s): Author and/or developer of the tool	Improvement (management): Tool contains relevant information from the improvement phase of projects, specifically related to management and safety	Link to tool: Weblink to the website or PDF
Year: Year of publication of the associated report for the tool	MEL: Tool contains relevant information from the assessment phase of projects	Notes: Any additional relevant notes for the study
Description: Brief summary or abstract from the report associated with the tool, approach, or method	Sustainability: Tool contains relevant information from the assessment phase of projects	
Language: Language(s)	Sharing: Tool contains relevant information from the assessment phase of projects	
Setting: Applicability of the tool to high or low-and middle income country contexts	Primary phase: Which project phase does the tool primarily address	
Context: Used to differentiate between high income, development, or emergency contexts	Users (teachers, students, parents, implementers, government): For which users is the tool applicable	
Specific geographies: Specific countries where the tool has been used or deployed	Format (software, booklet, paper, etc.): Format of the tool	
Water accessibility (all types or point source only): Whether the tool is applicable to point sources only or all water source types	Pros: Tool strengths	
Assessment: Tool contains relevant information from the assessment phase of projects	Cons: Tool weaknesses	

NOTES

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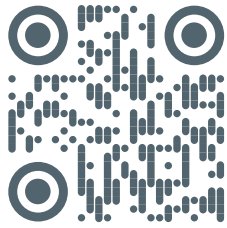


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A research project to improve hand hygiene, water quality and sanitation in health care facilities and primary schools not connected to functional water supply systems