



**WASH
MAINTENANCE
TOOLKIT**
FOR SUSTAINABLE SYSTEMS

100%
FOR THE CHILDREN



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1. Executive summary



This toolkit provides practical guidance for designing, implementing, and managing WASH systems that remain functional, inclusive, and sustainable over time. While access to WASH infrastructure has improved, many systems fail after construction due to **lack of local ownership, weak maintenance systems, unclear responsibilities, limited operational capacity, and the exclusion of key user groups**. These challenges show that WASH systems are not only technical, but also depend on strong social and governance structures. This toolkit addresses these gaps by supporting a **shift from short-term infrastructure delivery to long-term system sustainability**. The toolkit aims to fill knowledge gaps related to maintenance, scalability, and long-term operation, while providing practical guidance for implementation and knowledge sharing, strengthening ownership, and fostering collaboration among stakeholders.

Designed as a modular and flexible resource, it can be used across different project phases and adapted to specific contexts, supporting practitioners in delivering WASH systems that are not only built, but effectively used, maintained, and sustained over time.

2. Introduction

PURPOSE OF THE TOOLKIT

Access to safe water, sanitation, and hygiene (WASH) is essential for health, dignity, and environmental protection. While global access has improved, many systems fail after construction, limiting long-term impact and sustainability.

Evidence shows this challenge is widespread: 30–40% of rural water systems in sub-Saharan Africa are non-functional at any time, often due to weak maintenance systems, unclear responsibilities, and limited local capacity. Similar patterns are seen across sanitation and hygiene services, which frequently deteriorate without sustained financial, technical, and community support.

Common challenges include:

- Insufficient maintenance planning
- Unclear operational responsibilities
- Limited stakeholder engagement
- Exclusion of key user groups

If not addressed early, these issues lead to system failure.

This toolkit responds by focusing on long-term system performance, ownership, and coordination. It provides practical guidance to integrate maintenance planning, inclusive participation, and capacity building throughout the project lifecycle. By combining technical and social perspectives, it supports WASH systems that are functional, locally managed, and responsive to user needs over time.

The toolkit aims to:

- Address gaps in maintenance, scalability, and long-term operation
- Strengthen capacity and local ownership
- Promote collaboration across stakeholders
- Support inclusive and accessible design
- Provide practical tools for implementation, monitoring, and learning

TARGET AUDIENCE

First of all, thank YOU for working with providing WASH services to those who need them. This toolkit is designed for private companies, practitioners, and field staff who are directly involved in planning, implementing, and improving WASH services, particularly in resource-constrained or emergency settings.

This toolkit is designed for practitioners involved in WASH projects, including:

- Engineering and consulting companies
- NGOs and implementing partners
- Development partners and donors
- Local authorities

HOW WAS THE TOOLKIT DEVELOPED?

The toolkit was developed through collaboration between engineering professionals and social development practitioners, combining technical expertise with field experience to create a practical resource for sustainable WASH systems.

CORE PRINCIPLES

The toolkit is flexible and adaptable to different contexts and project stages. It is structured around three core pillars:

1. Feasibility and Context Assessment

Understanding the local context, stakeholders, governance structures, and existing systems

2. Technical Design and Implementation

Designing adaptable, maintainable solutions and managing construction processes

3. Capacity Building and Social Engagement

Strengthening ownership, inclusion, and long-term system management

HOW TO USE THIS TOOLKIT

This toolkit is designed as a practical, modular resource that can be used across different phases of a WASH project, from feasibility and design to implementation, operation, and maintenance. Users can follow the toolkit step-by-step or navigate directly to the sections most relevant to their needs.

To support practical application, the toolkit includes a range of tools and frameworks that guide analysis, decision-making, and implementation.

THESE INCLUDE:

- **Frameworks** that help structure thinking and link problems to sustainable solutions
- **Mapping tools** to guide you in ensuring proper understanding of the context and system dynamics
- **Checklists and toolboxes** that support planning, assessment, and implementation
- **Case examples** that illustrate real challenges
- **System cards and solution approaches** that provide technical and operational guidance

These tools are designed to be flexible and adaptable. They can be used individually or combined, depending on the project context, and are intended to support both technical and non-technical users in making context specific decisions.



3. STEP 1

FEASIBILITY & CONTEXT ASSESSMENT

A feasibility study is essential to ensure the efficiency of WASH projects, particularly in informal settlements where conditions are complex and services are limited. These areas are often characterised by insecure land tenure, limited access to water and sanitation, high population density, and informal governance structures. The feasibility phase begins with a pre-mission analysis to gather socio-economic and environmental data, including demographics, existing infrastructure, and community needs.

This should be followed by collaboration with local NGOs and authorities to conduct a detailed fact-finding mission. Post-mission, findings must be synthesised to inform technical design. The feasibility phase ensures that investment decisions consider costs, benefits, maintenance, and long-term sustainability holistically, rather than focusing only on construction.*

A feasibility study is not only a technical exercise. It determines whether a system will:

BE MAINTAINED

BE USED

BE SUSTAINED

TOOLBOX: Feasibility Preparation

Before starting fieldwork:

- Assess environmental, social, and governance context
- Identify key stakeholders
- Understand user needs
- Review infrastructure conditions
- Clarify roles between partners

3.1 LOCAL CONTEXT ANALYSIS

Successful WASH projects require a shared understanding of the local context, stakeholder landscape, and system conditions. Infrastructure does not operate in isolation; it is embedded in social, institutional, and environmental systems.

FRAMEWORK: LOCAL CONTEXT SYSTEM LENS

WASH systems operate within four interconnected layers:

- Users: students, teachers, communities, vulnerable groups
- Social system: norms, behaviours, perceptions, safety
- Governance: roles, responsibilities, accountability
- Infrastructure: pipes, pumps, toilets, drainage

*Citation: UN-Habitat (2015). Habitat III Issue Papers: Informal Settlements; WHO & UNICEF (2023). Progress on Household Drinking Water, Sanitation and Hygiene 2000-2022.

Introduction to Mapping Approaches

To understand this complexity, multiple mapping tools must be used together. Each mapping answers a different question:

Mapping Type	Key Question	Why it matters
Stakeholder	Who is involved?	Ensures engagement
Governance	Who decides?	Prevents system failure
Safeguarding	Who is at risk?	Ensures safety
Inclusion	Who is excluded?	Ensures access
Technical	What exists?	Ensures feasibility

These mappings should be conducted through a combination of:

- Community consultations and focus groups
- Interviews and surveys
- Field observations
- Engagement with local authorities and organisations

STAKEHOLDER MAPPING

Stakeholder mapping identifies the actors who influence planning, implementation, and maintenance of WASH systems, as well as their roles and level of influence.

Stakeholders may include:

- Local authorities and government bodies
- Community leaders and organisations
- Schools, teachers, students, and parents
- NGOs and service providers
- Local businesses and informal actors

It is important to recognise that decision-making is not always formal – informal leaders often play a key role.

TOOL: Stakeholder Mapping Checklist

- Identify local actors
- Identify informal leaders
- Identify service providers
- Identify users
- Map influence and responsibility

In the case of the public school Ayani Primary School, located in Kibera, one of Africa's largest informal settlements, the school community itself represents a major stakeholder group. The school hosts approximately 1,500 students and is supported by a staff of teachers and support personnel. However, the mission report revealed that the school does not currently employ a dedicated technical maintenance worker and instead relies on external contractors for repairs and maintenance.

RESULT:

The potential result had been delayed repairs and system deterioration

LESSON:

Unclear ownership can lead to system failure. Early stakeholder engagement strengthens coordination, builds trust, and supports long-term ownership.

In informal settlements, sanitation facilities often lack accessible design features, which highlights the importance of including people with disabilities as key stakeholders in WASH planning. Inclusive WASH infrastructure must consider the needs and experiences of all users, particularly those who may otherwise be excluded from decision-making processes. The feasibility study in Kibera identified significant accessibility barriers in school environments, including lack of ramps, narrow doorways, and sanitation facilities that cannot be used independently by wheelchair users. These physical barriers prevent children with disabilities from accessing sanitation safely and with dignity, but they also reflect gaps in stakeholder engagement and representation. Stakeholder mapping should therefore actively identify and include persons with disabilities, caregivers, and relevant advocacy groups to ensure their needs are reflected in both infrastructure design and community engagement processes. This includes planning for accessible toilets, appropriate pathways, and adequate space and support structures.

GOVERNANCE MAPPING

Governance mapping helps clarify who is responsible for what across the system lifecycle, reducing risks linked to unclear accountability. In many WASH systems, responsibilities are shared between schools, local authorities, and external partners.

Key elements to map:

- Who owns the infrastructure
- Who manages daily operation and maintenance
- Who finances repairs and operational costs
- Which authorities regulate services
- How responsibilities are shared
- Risks of fragmented governance

Framework: Governance Structure reflection questions

- **Design** → Who approves?
- **Construction** → Who manages?
- **Operation** → Who runs daily?
- **Maintenance** → Who fixes?
- **Finance** → Who pays?
- **Accountability** → Who is responsible?

Risks if governance is unclear

- No maintenance
- Delayed repairs
- System collapse



The governance mapping diagram below illustrates how ownership, operations, funding, and regulation must be clearly distributed across actors.

Component	Stage/Function	Key Question	Lead Actor(s)	Risk if Unclear
Ownership	Infrastructure	Who owns the system?	Local Authority / School	No one takes responsibility; neglect
Design	Planning	Who approves the design?	Government / Authority	Poor design, not fit for use
Construction	Implementation	Who manages construction?	Contractor / Authority	Low-quality infrastructure
Operations	Daily Use	Who manages daily operation?	School staff / Caretaker	Poor hygiene, misuse
Maintenance	Repairs & Upkeep	Who fixes breakdowns?	Local Authority / Private sector	Delayed or no repairs
Funding	Finance (O&M)	Who pays for operations & repairs?	Government / Donors	No maintenance due to lack of funds
Regulation	Oversight	Who sets and enforces rules?	Ministries / Local Authorities	Unsafe or substandard services
Coordination	Role Sharing	How are responsibilities shared?	All stakeholders	Gaps or duplication
Accountability	Responsibility	Who is ultimately responsible?	Assigned Authority	Blame shifting, inaction

SAFEGUARDING RISK MAPPING

Safeguarding ensures that WASH facilities are safe, accessible, and appropriate for all users, particularly vulnerable groups such as girls, children, and people with disabilities. It refers to the policies, practices, and measures put in place to protect individuals from harm, abuse, exploitation, and neglect, while promoting their safety, dignity, and wellbeing. It is a structured process used to identify, assess, and mitigate risks that may affect users when accessing WASH facilities. Please find more information about Child Protection and Safeguarding here: childprotectionnetwork.dk/resources

Safeguarding risk mapping should identify and assess potential risks associated with WASH facilities, including:

- **Physical risks:** unsafe infrastructure, poor lighting, lack of privacy, unsafe access routes
- **Social risks:** harassment, exclusion, unsafe interactions, risks of violence or bullying
- **Environmental risks:** flooding, contamination, poorly maintained surroundings

COMMON SAFETY ISSUES

1. Poor lighting
2. Lack of privacy
3. Unsafe access routes
4. Harassment risks
5. Flooding and contamination
6. Risks of vandalism

HOW TO CONDUCT A SAFEGUARDING RISK MAPPING

Safeguarding risk mapping should be carried out during the feasibility and design phase and involve technical teams, users, and members of the surrounding community to ensure that real safety concerns are taken into consideration before moving forward.

STEP 1: Map users

Identify who will use the facilities and who may be particularly at risk (e.g. girls, young children, people with disabilities, minority groups). Consider differences in age, gender, and abilities.

STEP 2: Map spaces

Identify key locations in and around the planned infrastructure, including toilets, water points, access routes, school perimeters, and surrounding areas where users travel or gather.

STEP 3: Identify risks (participatory safety mapping exercises)

Assess physical, social, and environmental risks in each space through observation and consultation.

To ensure that lived experiences and perceptions of safety are captured, combine technical assessment with participatory exercises involving intended users of the WASH facilities.

EXERCISE 1: Colour-coded safety mapping

1. Ask participants to walk around the school and surrounding areas.
2. Provide them with colour-coded stones:
 - **Green** = feel safe
 - **Yellow** = feel somewhat unsafe
 - **Red** = feel very unsafe
3. Participants place the stones in locations that reflect how safe they feel in each space.

This visual mapping helps identify patterns of perceived safety and risk and creates an accessible way to initiate discussions about why certain areas feel unsafe. It is particularly useful for uncovering hidden or context-specific risks related to WASH facilities, such as lack of privacy, poor lighting, or exposure to harassment.

EXERCISE 2: Peer-to-peer safety letter

1. Ask participants to imagine a new student or peer of the same age who has just arrived at the school or in the community.
2. Invite them to write a short letter to this peer, explaining how to safely navigate the environment.
3. Encourage them to describe:
 - Where it is safe to go and why
 - Where it may feel unsafe or risky
 - What times of day certain places feel more or less safe
 - What precautions or behaviours they would recommend

This exercise allows participants to express perceptions of safety indirectly, which can be particularly helpful when discussing sensitive issues. It often reveals social norms, hidden risks, and everyday coping strategies that may not emerge through direct questioning.

SYNTHESISING FINDINGS

After conducting the exercises, facilitate a group discussion to identify recurring themes and map the locations mentioned. Combine insights from these participatory methods with technical observations to assess how infrastructure design, location, visibility, and patterns of use may create or reduce risks (e.g. hidden areas, lack of lighting, overcrowding, or exposure to harassment). Also consider risks related to misuse or vandalism of facilities.

STEP 4: Define mitigation measures

Propose appropriate design, operational, and behavioural solutions to reduce identified risks. This may include improved lighting, gender-segregated facilities, locks and privacy measures, safe access routes, supervision, community engagement, or relocation of infrastructure.

STEP 5: Assign responsibility

Clearly define who is responsible for implementing, monitoring, and maintaining each mitigation measure to ensure accountability and sustainability. The process should be participatory and context-specific, using methods such as community consultations, focus group discussions (including separate groups for girls and boys where appropriate), and field observations to capture lived experiences and perceptions of safety.

For more practical tools and detailed guidance on safeguarding and child protection approaches, you can access more free resources here: childprotectionnetwork.dk/resources. These resources provide additional methodologies for risk identification, participation, and safeguarding integration in programme design.



INCLUSION AND ACCESSIBILITY

Inclusive WASH systems ensure that all users can access facilities safely, independently, and with dignity.

Barriers are often environmental rather than personal:

- Stairs can block access
- Narrow doors exclude users
- Poor design limits usability
- Ground level and terrain can also affect accessibility

TOOL: Accessibility Reflection

- Can all users access facilities independently?
- Are paths safe and clear?
- Are facilities usable for children with disabilities?

Inclusive design should include:

- Accessible infrastructure (ramps, space, layout)
- Participation of diverse user groups in consultations
- Accessible information and communication

CASE EXAMPLE: Accessibility Barriers

In informal settlements, sanitation facilities often lack accessible design features. Inclusive WASH infrastructure must consider the needs of all users, including people with disabilities. The feasibility study in Kibera highlighted major accessibility barriers in school environments, including lack of ramps, narrow doorways, and sanitation facilities that cannot be used independently by wheelchair users.

These physical barriers often prevent children with disabilities from accessing sanitation facilities safely and with dignity. Inclusive design should therefore be integrated into both infrastructure planning and community engagement processes. This includes designing accessible toilets, ensuring appropriate pathways, and providing adequate space and support structures.

Inclusive User Consultations

Beyond physical infrastructure, inclusive engagement also means ensuring that different user groups are actively involved in consultations and decision-making processes.

By including diverse perspectives, project teams can better understand varying needs and develop solutions that are equitable and accessible. Technical functionality does not guarantee use. WASH solutions must be informed by social context and user perceptions to ensure they are accepted, accessible, and sustainable.

4. STEP 2 TECHNICAL DESIGN & IMPLEMENTATION

The purpose of the feasibility phase is not only data collection; it is decision-making.

All findings must directly inform:

- Technical design
- Governance structures
- Capacity building strategies

A well-conducted feasibility study ensures that WASH systems are:

- Technically appropriate
- Socially accepted
- Locally managed
- Sustainable over time

4.1 FROM PROBLEM IDENTIFICATION TO SOLUTION DESIGN

Successful WASH projects require a shared understanding of the local context, stakeholder landscape, and system conditions. Infrastructure does not operate in isolation; it is embedded in social, institutional, and environmental systems.

Identifying solvable challenges

Technical design should always begin with problem identification, grounded in both technical evidence and user experience. This requires moving beyond assumptions and systematically understanding how systems are actually used, managed, and maintained in practice.

KEY INPUTS:

- Site visits
- Technical inspections
- User feedback
- Questionnaires
- Operational observations

These inputs should be combined to triangulate findings. For example, user feedback may highlight issues of reliability or access, while technical inspections may reveal underlying causes such as poor maintenance, inadequate infrastructure capacity, or design limitations.

Observations can also uncover non-technical factors, such as unclear ownership or informal management arrangements, which directly affect system performance.

A useful way to structure this process is through the following framework:

FRAMEWORK: PROBLEM ► DESIGN ► SUSTAINABILITY

PROBLEM IDENTIFIED: *What is not working, for whom, and under what conditions?*



TECHNICAL CAUSE UNDERSTOOD: *What are the underlying technical and operational reasons?*



DESIGN ADAPTED TO CONTEXT: *How can the solution respond to real usage patterns, stakeholder roles, and inclusion needs?*



MAINTENANCE INTEGRATED: *Who is responsible, and what systems, resources, and capacities are required for ongoing operation?*



SYSTEM REMAINS FUNCTIONAL: *Can the system continue to operate effectively, equitably, and safely over time?*

This framework should be applied throughout the project cycle, making sure that technical design is combined with evidence, stakeholder engagement and consider the sustainability of the project in the long term.

WASH systems often fail not because they are poorly built, but because they are not designed for real operating conditions. In practice, systems must function under:

- High user pressure
- Limited maintenance capacity
- Intermittent water and energy supply
- Environmental and spatial constraints

Many failures are caused by design limitations, not construction quality:

- Flat pipelines can cause stagnation and blockages
- Poorly maintained tanks may lead to access to unsafe and inaccessible water
- Lack of ventilation make unusable sanitation facilities for people creating hygienic hazard

Design must move beyond “what can be built” to focus on what can be maintained, operated, and sustained over time. A strong technical design therefore builds on the findings from Stakeholder, Governance, Safeguarding, and Inclusion Mappings, which provide critical context on who is involved, how systems are managed, what risks exist, and whose needs must be addressed.

By integrating these perspectives, technical solutions are more likely to reflect real operating conditions rather than ideal assumptions. In many contexts, infrastructure systems face challenges such as uneven distribution of services, inconsistent functionality, unclear management responsibilities, and gaps in coordination between actors.

Facilities may exist but not function reliably, or may be concentrated in certain areas while others remain underserved. These realities highlight that technical performance is not only determined by design specifications, but also by governance, management, and equitable user access.

A strong technical design takes the **Stakeholder, Governance, Safeguarding and Inclusion Mappings** into account to ensure that:

- Systems function under real conditions
- Infrastructure can be maintained locally
- Failures can be prevented or quickly repaired
- Systems can adapt over time

CASE EXAMPLE: Pipeline Failure in Informal Settlements

In many underserved school and community systems, pipelines become clogged, causing wastewater to overflow near sanitation facilities. This is often not due to poor construction, but to a mismatch between design and use. Pipes installed without sufficient slope prevent proper gravity flow, while everyday practices such as disposal of solid waste into toilets accelerate blockages. Over time, this leads to system failure, unpleasant conditions, and health risks.

SOLUTION APPROACH:

- Redesign pipe gradients to ensure proper flow
- Include access points for cleaning and maintenance
- Combine technical fixes with user awareness and behaviour change

4.2 TECHNICAL & OPERATIONAL ASSESSMENT

Technical systems are often designed without fully understanding:

Barriers are often environmental rather than personal:

- The condition of existing infrastructure
- The reliability of water and energy systems
- How users interact with the system daily

CASE EXAMPLE: Groundwater Constraints (Kibera)

In Kibera, one of Africa's largest informal settlements, a school relied on a borehole connected to a storage tank for cleaning and flushing. However, the water was unsuitable for drinking due to high fluoride levels.

At the same time, continuous pumping combined with nearby boreholes risked lowering the water table. Frequent power outages also disrupted pumping, resulting in inconsistent water availability throughout the day.

Key takeaway:

WASH systems must be designed with careful consideration of both water availability and water quality - not just the presence of water.

This includes accounting for resource limitations, fluctuations in supply, water safety, and operational constraints such as energy and infrastructure to ensure reliable and sustainable solutions.

4.3 DESIGN CONSTRAINTS & FEASIBILITY CONSIDERATIONS

Infrastructure functionality

Systems often fail because they are not designed for:

- Local maintenance capacity
- Daily operation realities
- User behaviour

Common issues include:

- Lack of access for cleaning or repair
- Dependence on external technicians
- Misuse (e.g. waste in toilets, water wastage, vandalism)

Solution approach:

- Design systems that are easy to maintain locally
- Reduce unnecessary technical complexity
- Use durable and user-friendly components
- Combine technical design with behaviour change and awareness

TOOLBOX: Technical & Operational Planning

1

WATER SOURCE & SUSTAINABILITY

- Assess groundwater availability and over-extraction risks
- Test water quality (e.g. fluoride)
- Define sustainable use and monitoring

2

WATER SUPPLY & RELIABILITY

- Design sufficient storage capacity
- Include alternative supply options
- Plan for intermittent supply conditions to tackle water shortage

3

INFRASTRUCTURE DESIGN & FUNCTIONALITY

- Ensure correct pipe gradients
- Prevent stagnation and contamination
- Design cleanable and accessible tanks
- Ensure ventilation in sanitation systems

4

OPERATION & MAINTENANCE

- Ensure systems can be maintained locally
- Establish maintenance routines

5

CAPACITY & OWNERSHIP

- Train local users
- Assign responsibilities

6

BEHAVIOUR & USE

- Address misuse risks
- Integrate awareness and behaviour change

CARD TOOL: Groundwater Pump Planning

FUNCTION

- Extract groundwater
- Supply storage systems

KEY RISKS

- Over-abstraction
- Fluoride contamination
- Energy dependency
- Unregulated use

DESIGN SOLUTIONS

- Size storage tanks appropriately
- Define pump schedules
- Integrate backup energy solutions
- Monitor usage

OPERATIONAL SOLUTIONS

- Assign responsibility
- Monitor extraction
- Prevent continuous pumping

GOOD PRACTICE

- Combine pump and storage
- Align usage with recharge rates

4.4 CONSTRUCTION PLANNING & IMPLEMENTATION

Even well-designed systems can fail if implementation is weak. Construction phases often lack coordination, quality control, or local engagement.

PHASE	KEY ACTIVITIES
1. PRE-CONSTRUCTION	Tendering, Planning, Stakeholder alignment
2. DURING CONSTRUCTION	Site supervision, Quality assurance, Reporting, Local engagement
3. POST-CONSTRUCTION	Handover, Training, Maintenance setup

4.5 POST-CONSTRUCTION & LOCAL ANCHORING

Many WASH systems fail after construction because maintenance is not embedded locally. Without clear roles, routines, and capacity, systems quickly deteriorate.

Local anchoring is essential for long-term sustainability of WASH systems. This requires trained local staff and users, clear maintenance routines,

and well-defined reporting and accountability mechanisms. Continuous training and knowledge transfer ensure that capacity is maintained over time. When management is anchored at the school or community level, with support from local authorities or WASH champions, ownership is strengthened. This helps ensure that systems remain functional, safe, and sustainable, even with minimal external support.

SOLUTION FRAMEWORK: LOCAL MAINTENANCE SYSTEMS

1. DEFINE RESPONSIBILITY	Assign maintenance roles Identify a "go-to" person
2. ESTABLISH ROUTINES	Daily cleaning Weekly checks Scheduled inspections
3. BUILD CAPACITY	Train staff and users Provide refresher training
4. CREATE SYSTEMS	Reporting mechanisms Documentation Monitoring



5. STEP 3 CAPACITY BUILDING & SOCIAL ENGAGEMENT

Sustainable WASH systems depend not only on infrastructure, but on the people who use, manage, and maintain them. Without adequate knowledge, engagement, and ownership, even well-designed systems can quickly fall into disrepair.

Capacity building and social engagement should therefore be integrated throughout the entire project lifecycle. The objective is to ensure that users understand the system, feel responsible for it, and have the skills to operate and maintain it over time.

5.1 AWARENESS & BEHAVIOUR CHANGE

WASH systems are only effective if they are used correctly. In many cases, misuse or lack of awareness leads to rapid deterioration of infrastructure, reduced hygiene outcomes, and health risks. Awareness activities should therefore target all user groups students, teachers, parents, and community members and focus on practical, everyday behaviours.

CHECKLIST: AWARENESS & BEHAVIOUR CHANGE

- Conduct baseline assessments to understand existing knowledge and practices
- Deliver hygiene education sessions (handwashing, sanitation, waste management)
- Use school campaigns and peer-to-peer learning approaches
- Develop visual tools (posters, signage, student artwork)
- Conduct follow-up assessments to measure progress

THE YOUTH WASH CHAMPIONS MANUAL

is freely available for use and adaptation, supporting organisations, schools, and practitioners in strengthening youth engagement in WASH. It can be accessed here: <https://100pct.org/wordpress/wp-content/uploads/Youth-WASH-Champions-Facilitators-Guide-2026.pdf>

This open-access approach reflects a commitment to sharing practical tools and knowledge to promote safe, inclusive, and sustainable WASH practices.

MENSTRUAL HEALTH MANAGEMENT (MHM)

Menstrual health management is essential to ensure that girls can access education safely and with dignity. Inadequate facilities often lead to absenteeism, as girls may avoid school when they cannot manage menstruation privately and safely.

Facilities should therefore provide:

- Private and secure spaces
- Functional locks and adequate lighting
- Access to water for washing
- Safe disposal systems

Awareness activities should also address stigma and ensure that menstruation is understood as a normal biological process by both girls and boys.

CHECKLIST: INCLUSIVE DESIGN

- Ensure step-free access (ramps, no barriers)
- Provide wide doors and accessible layouts
- Include handrails and support structures
- Design accessible water points and taps
- Use clear and visible signage

TOOL: Accessibility Reflection

- Can all users access facilities independently?
- Are paths safe and easy to navigate?
- Are facilities usable for children with disabilities?

Inclusive participation

Inclusion also requires that all user groups are involved in decision-making. Engaging children, parents, teachers, and people with disabilities in consultations helps ensure that solutions reflect real needs and avoid unintended exclusion.

5.3 OWNERSHIP & GOVERNANCE

Defining roles and responsibilities

A common reason for WASH system failure is the absence of clear ownership. When responsibilities are not defined, maintenance is delayed, and infrastructure deteriorates over time. Ownership must therefore be actively built through engagement, clear roles, and accountability mechanisms.

CHECKLIST: OWNERSHIP & GOVERNANCE

- Define roles for cleaning, maintenance, and monitoring
- Assign responsibility to specific individuals or groups
- Integrate local governance structures
- Establish accountability and reporting mechanisms
- Engage users throughout planning and implementation

TOOL: Governance & Reporting Tree Exercise

To strengthen ownership and accountability, a practical exercise can be used to map how issues are reported and resolved within the system. Participants (e.g. students, teachers, caretakers, and community members) work together to create a "Governance Tree" or reporting flowchart that shows:

- **What to report** (e.g. broken toilets, lack of water, blockages)
- **Who to report to** (e.g. teachers, caretakers, local authorities)
- **How to report** (verbal, written, suggestion box)

This visual tool helps clarify **roles, responsibilities, and communication pathways**, ensuring that problems are addressed quickly and do not escalate. It also reinforces that **everyone has a role in maintaining the system**. The final output can be displayed near facilities to guide users and support daily operation.

Building ownership in practice

Ownership is strengthened when users are involved from the beginning of the project and understand how the system works. Schools, community groups, and local authorities should all play a role in managing and maintaining facilities.

5.4 TRAINING & CAPACITY DEVELOPMENT

Training is essential to ensure that users can operate, maintain, and sustain WASH systems. However, one-time training is not sufficient, and capacity building must be continuous. A good start makes a strong difference, but refresher trainings and reinforcement over time are encouraged for a lasting impact.

CHECKLIST: OWNERSHIP & GOVERNANCE

- Conduct baseline assessments (students, teachers, parents)
- Identify knowledge gaps
- Develop targeted training modules or simply use the Youth Wash Champions manuals that can be accessed for free here: <https://100pct.org/wordpress/wp-content/uploads/Youth-WASH-Champions-Facilitators-Guide-2026.pdf>
- Deliver training before and after construction
- Provide regular refresher sessions

TRAINING APPROACH

Training should be adapted to different project stages:

Pre-construction

- Site safety
- Child safeguarding
- Inclusion considerations
- Stakeholder roles and coordination
- Governance structures and responsibilities
- Basic technical understanding of planned systems

During construction

- Site safety procedures
- Child safeguarding in and around construction areas
- Community awareness and engagement
- Monitoring of risks and reporting mechanisms

Post-construction

- Facility use and hygiene practices
- Maintenance procedures
- Waste management
- Reporting systems and accountability
- Ongoing inclusion and accessibility use

WASH CHAMPIONS & YOUTH ENGAGEMENT

Youth engagement can significantly improve long-term outcomes. Programmes such as WASH Champions empower students to promote hygiene practices, monitor facilities, and influence peer behaviour. By positioning young people as active contributors rather than passive users, these approaches strengthen both behaviour change and long-term ownership.

It is recommended that youth engagement activities are informed by the mapping approaches described earlier in this toolkit (Stakeholder, Safeguarding, Inclusion, and Governance). This ensures that WASH Champions initiatives respond to real needs, risks, and user dynamics within the school and community.

Activities may include:

- Hygiene campaigns
- Waste management monitoring
- Creating signage and awareness materials
- Reporting system issues and supporting maintenance

The Youth WASH Champions approach also emphasises that students can act as agents of change, helping to identify barriers, promote inclusion, and improve accountability within WASH systems. Through participatory activities, students build awareness, leadership skills, and a sense of responsibility for maintaining safe and inclusive facilities.

The Youth WASH Champions Facilitators Guide provides practical, activity-based tools to engage students in safeguarding, hygiene promotion, inclusion, and system monitoring. It supports educators and practitioners

in building youth-led approaches that improve both facility use and long-term sustainability. Download the manual for free here: <https://100pct.org/wordpress/wp-content/uploads/Youth-WASH-Champions-Facilitators-Guide-2026.pdf>

The manual includes interactive exercises such as:

- Risk mapping and safeguarding activities
- Hygiene education and behaviour change tools
- Reporting systems (e.g. governance/reporting tree)
- Inclusion-focused activities (e.g. barrier identification exercises)

CASE INSIGHT: AYANY PRIMARY SCHOOL IN KIBERA

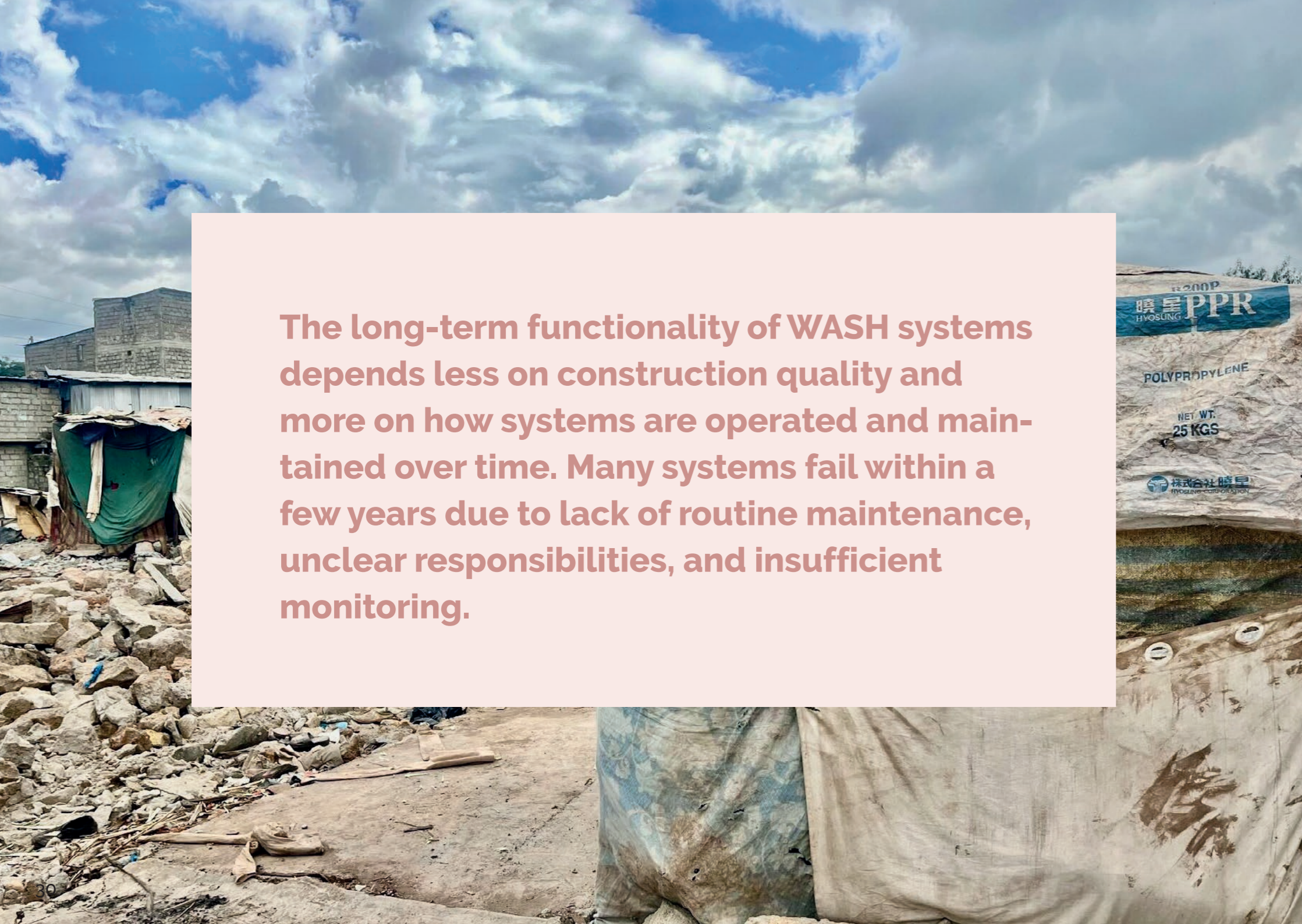
Where students were actively engaged in WASH activities, facilities were better maintained and hygiene practices improved, strengthening both behaviour change and a sense of ownership. Capacity building should also extend beyond schools: engaging parents, teachers, and community leaders helps reinforce positive behaviours and ensures that WASH practices are sustained in everyday life.

SUSTAINABILITY IN PRACTICE

Long-term functionality depends on combining infrastructure with continuous engagement and clear systems

- Establish regular cleaning routines
- Assign maintenance responsibilities
- Set up reporting systems in collaboration with the users
- Provide ongoing training
- Maintain active community involvement





The long-term functionality of WASH systems depends less on construction quality and more on how systems are operated and maintained over time. Many systems fail within a few years due to lack of routine maintenance, unclear responsibilities, and insufficient monitoring.

6. MAINTENANCE, RISK MITIGATION AND RESILIENCE

A sustainable maintenance system must therefore be:

- **Structured** → with clear routines and procedures
- **Continuous** → not reactive but preventive
- **Locally owned** → managed by trained users and institutions

6.1 SYSTEM COMPONENTS MAINTENANCE

PIPES

Pipelines are essential for water distribution and wastewater flow, but they are highly vulnerable to failure if not properly designed and maintained

Common problems

- in informal settlements and other vulnerable communities
- Flat gradients preventing gravity flow
 - Blockages due to sediment or waste
 - Misuse (solid waste disposal)
- In several systems, poorly sloped pipes combined with misuse have led to stagnation, overflow, and eventual system breakdown.

Solution approach / design level

- Ensure proper pipe gradient for gravity flow
- Include inspection and cleaning access points

Operational level:

- Conduct quarterly inspections
- Perform semi-annual flushing (water or air pressure)
- Monitor flow and pressure

Behaviour level:

- Prevent disposal of solid waste into pipes
- Reinforce correct usage practices

MANHOLES

Manholes provide access for inspection and maintenance but are often neglected, leading to severe operational issues.

Common problems

- Sludge accumulation and blockages
- Overflow due to lack of cleaning
- Safety risks (open or damaged covers)

In some cases, manholes have been found completely blocked, causing wastewater to remain on-site and creating health hazards.

Solution approach

- Clean the effluent manholes weekly after a visual inspection of the chambers.
- Conduct quarterly inspections
- Perform semi-annual cleaning (high-pressure or vacuum)
- Repair structural damage immediately
- Maintain spare covers to prevent exposure and dumping

Safety is critical:

- Use PPE, secure the area, and train staff on safe handling procedures.
- Use a scum pole (a PVC pipe with a white cloth at the end) to measure scum depth. A stain on the cloth indicates the scum layer thickness.
- Use a sludge pole (a clear plastic tube) to measure sludge depth by inserting it into the tank and checking for solids.
- Record measurements and track changes over time.

PUMPS

Pumps are critical for water abstraction and distribution but are prone to mechanical and operational failure.

Common problems

- Wear and misalignment
- Overloading or continuous operation
- Power interruptions.

Solution approach

- Monthly inspections (noise, vibration, alignment)
- Regular cleaning and servicing
- Annual calibration
- Maintain operational logbooks

Pumps should always be operated according to manufacturer guidelines and adapted to local energy conditions.

WATER SOURCE (GROUNDWATER)

Groundwater is often the main water source but requires careful monitoring.

Common problems

- Over-abstraction lowering water levels
- Contamination (e.g. fluoride, bacteria)
- Poor protection of boreholes

Solution approach

- Conduct biannual water quality testing
- Monitor groundwater levels and usage
- Protect source areas (clean surroundings, fencing)
- Establish usage policies

SEPTIC TANK

Septic systems provide decentralized treatment, which is very relevant in informal settlements and other vulnerable communities, but require strict maintenance.

Common problems

- Sludge buildup and overflow
- Misuse (non-biodegradable waste)
- Lack of regular pumping

In some cases, manholes have been found completely blocked, causing wastewater to remain on-site and creating health hazards.

Important !!!

- Do NOT use unverified additives
- Do NOT dispose of non-biodegradable waste
- Always use licensed professionals for emptying, pumping and deep cleaning

Solution approach

- Inspect quarterly (structure, sludge levels, flow)
- Pump every 3–5 years or earlier if needed
- Measure sludge and scum levels regularly
- Educate users on proper use
- Pump immediately if sludge or scum layers reach 3 inches below the outlet
- pipe or occupy more than 25% of the tank's volume.

BIOGAS

Biogas systems offer resource recovery but require higher operational control.

Common problems

- System complexity
- Gas leaks and safety risks
- Poor operation affecting efficiency

Solution approach

- Monthly inspections (tanks, pipes, pressure)
- Continuous monitoring of gas production
- Regular cleaning to prevent clogging
- Annual professional servicing

Operators must be trained, and strict safety procedures must be followed due to flammable gas risks.



6.1 SYSTEM COMPONENTS MAINTENANCE

Effective operation and maintenance must be **preventive, not reactive**. Regular inspections and structured monitoring help detect issues early, reduce costly failures, and extend the lifespan of WASH systems. However, even well-designed maintenance systems fail when **roles and responsibilities are unclear**, leading to gaps in accountability and delayed action. **Sustainable operation depends on three elements working together: regular monitoring, clear responsibilities, and effective reporting systems.**

MAINTENANCE & MONITORING

A structured maintenance system should combine routine activities with technical oversight. Typical schedules include:

- **Daily:** Cleaning and basic upkeep
- **Weekly:** Checks for visible issues (leaks, blockages, damage)
- **Monthly/Quarterly:** Technical inspections of system performance
- **Annually:** Servicing of key components

To support this, monitoring systems and logbooks should be used to track system performance, record issues, and ensure follow-up. Consistent monitoring enables early detection of recurring problems and supports better decision-making.

ROLES AND RESPONSIBILITIES

Clear ownership is essential for sustainable operation. Maintenance systems break down when **responsibilities are not clearly assigned**.

A strong management setup should:

- **Assign clear roles** for cleaning, monitoring, and repairs
- Identify a **designated “go-to” person** responsible for oversight
- **Integrate stakeholders**, including schools, communities, and local authorities

At the same time, capacity building is critical. Maintenance staff, caretakers, and users should be trained to:

- Conduct routine inspections
- Identify early signs of failure
- Perform basic repairs

Regular **refresher training** is important to ensure continuity, especially in contexts with staff turnover.

REPORTING SYSTEMS

Without effective reporting, problems remain unnoticed and can escalate into system failures.

A functional system should:

- Establish simple and accessible reporting channels
- Ensure clear and rapid response mechanisms
- Track and analyse recurring issues to prevent repeated failures

6.3 SAFETY & EMERGENCY PROCEDURES

Maintenance activities involve risks, especially around wastewater systems.

EMERGENCY RESPONSE PLANNING

Systems must be prepared for failures such as:

- Pipe bursts
- Pump failures
- Flooding
- Sanitation overflows
- Gas leaks (biogas systems)

SOLUTION APPROACH

- Define emergency procedures
- Assign responsibilities
- Conduct regular drills
- Use PPE (gloves, masks, protective gear)
- Secure maintenance areas
- Train staff on safety procedures



7. KEY LEARNINGS & RECOMMENDATIONS

1. Strengthen planning, management, and user engagement

Many WASH systems in vulnerable environments fail not because of technical design alone, but due to gaps in planning, management, and user engagement. Common causes of failure include the absence of clear maintenance plans, unclear roles and responsibilities, limited involvement of users, and the implementation of overly complex systems that are difficult to operate in local contexts.

2. Define clear roles, responsibilities, and maintenance systems

These challenges often lead to systems that deteriorate quickly or stop functioning altogether. Addressing this requires establishing clear responsibilities, structured management approaches, and ensuring that maintenance is planned and actionable from the outset.

3. Budget for full lifecycle costs, not just infrastructure

Budgeting practices also play a critical role in system sustainability. A frequent mistake is underestimating long-term maintenance costs while overinvesting in complex infrastructure. When operation and maintenance are not considered from the beginning, systems become financially and technically unsustainable over time. Prioritise

simple, robust, and context-appropriate systems. Effective approaches ultimately require budgeting for full lifecycle costs, prioritising simple and robust systems, and integrating maintenance from the earliest design stages.

4. Apply structured, root-cause-based troubleshooting

Troubleshooting should follow a structured approach that links problems to their root causes and system-level issues. Rather than addressing symptoms alone, it is important to understand how technical failures are often connected to operational gaps and user behaviour.

6. Design for real-world conditions and long-term resilience

To improve long-term sustainability, WASH systems must be designed to respond to real operating conditions, not ideal scenarios. This includes adapting to climate variability (flooding, drought), managing high user density and wear, and functioning under resource constraints such as limited water or unreliable energy. Key recommendations include designing for extreme and variable conditions, incorporating redundancy or backup solutions, and continuously monitoring system performance.





CLOSING REMARKS – 100% FOR THE CHILDREN

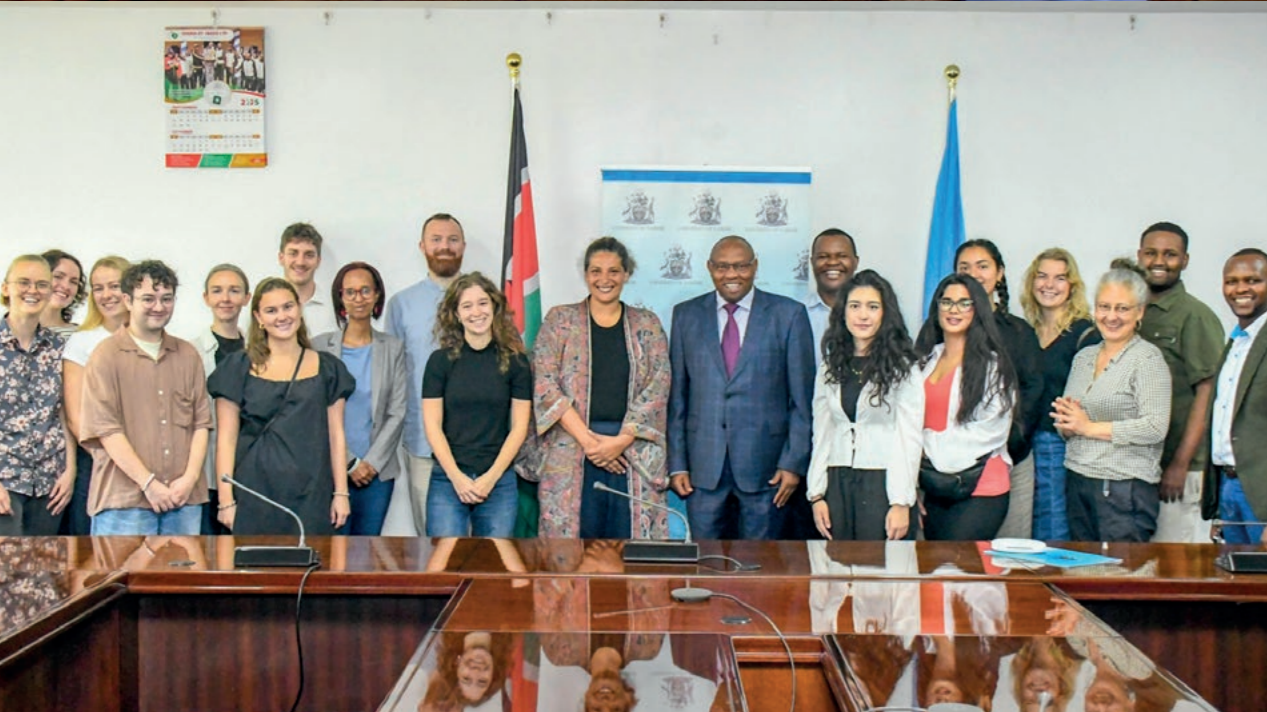
At 100% for the Children, we believe that access to safe and sustainable WASH services is fundamental to health, dignity, and opportunity. In many parts of the world, children lack access to safe, clean sanitation facilities and reliable water sources. However, as this toolkit highlights, the long-term functionality of WASH systems depends not only on how well they are constructed, but on how they are operated, maintained, and owned over time.

Across informal settlements and vulnerable communities, we continue to observe a recurring pattern: well-intended WASH facilities are built, but within a few years, many are no longer in operation. During our feasibility studies in Kibera – one of Africa's largest informal settlements, with an estimated population of 500,000 to 1.5 million people – we have seen numerous systems implemented by different actors that are no longer functioning. This is not due to a lack of effort, but often a lack of long-term planning, clear ownership, and integrated maintenance systems.

We strongly encourage continued investment in WASH infrastructure in underserved areas. At the same time, we emphasize that maintenance, operation, and local ownership must be considered from the very beginning and embedded throughout both design and implementation. Without this, even the most technically sound systems risk failure.

Sustainable WASH solutions require more than infrastructure – they require systems that people can manage, maintain, and take responsibility for over time. This includes clear roles and responsibilities, continuous capacity building, realistic design choices, and ongoing monitoring.

We hope this toolkit supports practitioners, partners, and communities in shifting from short-term delivery to long-term functionality – ensuring that WASH systems are not only built, but continue to serve children safely, reliably, and sustainably for years to come.



@ 2026 100% for the Children

This toolkit was developed with the support of Rambøll Fonden and CISU - Civil Society in Development. Their contribution has been essential in enabling the development of this resource and strengthening sustainable and context-driven approaches to WASH systems and infrastructure.



The toolkit has been developed in collaboration with APDK (Association for the Physically Disabled of Kenya), 100% for the Children Kenya, and Engineers Without Borders (EWB), whose expertise and field experience have been essential in shaping its content.



We would also like to thank the many partners, practitioners, and community members who contributed their knowledge and practical insights. Their input has been invaluable in ensuring that this toolkit is practical, inclusive, and grounded in real-world experience.

This work aligns with the Sustainable Development Goals (SDGs), particularly:





100%
FOR THE CHILDREN