

Monitoring Safely Managed Water and Sanitation Services

Synthesis of Case Studies from Water for Women



About Water for Women

Water for Women supports improved health, gender equality and wellbeing in Asian and Pacific communities through socially inclusive, sustainable and resilient water, sanitation and hygiene (WASH) projects and research. It is the Australian Government's flagship WASH program, delivered as part of Australia's aid program, investing AUD 118.9 million over five years from 2018 to 2022. Water for Women is partnering with civil society organisations and research organisations to deliver 33 projects in 15 countries to support socially inclusive and sustainable WASH projects and research. Knowledge and learning are central to Water for Women and its partners, positioning the Fund as an important contributor to global knowledge development and sharing in inclusive WASH. Water for Women's Learning Agenda promotes collaboration and learning between all partners to support long-term changes to inclusive and resilient WASH policy and practice.

Acknowledgements

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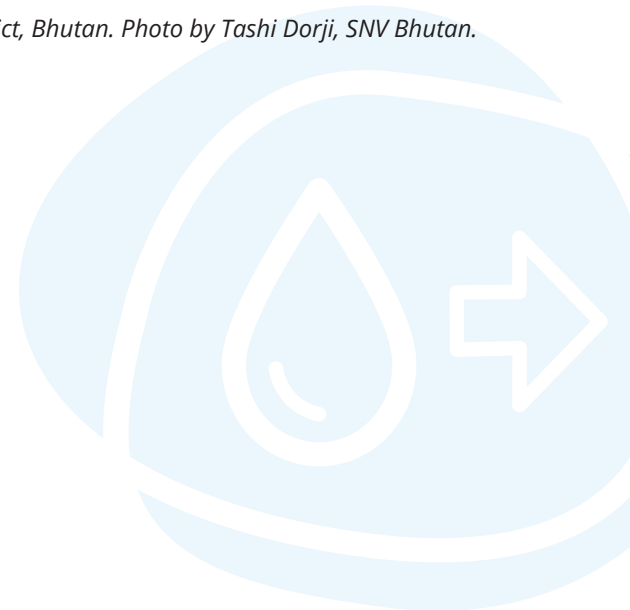
The following partners made extensive contributions to this initiative, in terms of scoping, development of case studies, and the synthesis of findings: SNV Netherlands Development Organisation (SNV); the International WaterCentre of Griffith University (IWC); WaterAid; iDE; the Centre for Advocacy and Research, India (CFAR); Habitat for Humanity (HfH); Thrive Networks; and UTS-ISF. We also recognise their leadership and support for progress towards safely managed water and sanitation services and related monitoring efforts across Asia and the Pacific.

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Front cover: Construction of a pour flush toilet with twin leach pit in Dagana district, Bhutan. Photo by Tashi Dorji, SNV Bhutan.



Summary

Recent reporting on the United Nations Sustainable Development Goals (SDGs) indicates that many countries still lack adequate data to make estimates of the status of 'safely managed' services. This is a particular challenge in Asia and the Pacific, with no estimates of safely managed drinking water for the three relevant regions and no estimate for safely managed sanitation in Oceania.¹ Monitoring this higher level of safely managed water and sanitation services requires a broader set of methods and skills than assessing access to basic services, and approaches vary with facility type and other contextual factors.

Water for Women supports universal access to water, sanitation and hygiene for all in the Asia and Pacific region through 20 projects implemented by civil society organisations (CSOs), and 13 research projects. These projects cover a range of objectives and contexts, and several have developed evidence and practice that can inform monitoring of safely managed services. Water for Women has compiled case studies by project partners on monitoring a range of aspects of safely managed services in urban and rural areas across the region, presented in a report titled '*Monitoring Safely Managed Water and Sanitation Services: Case Studies from Water for Women*'. The aim of this synthesis is to consolidate the knowledge generated by these case studies, and wider discussion amongst partners, to inform broader efforts to improve monitoring of safely managed services in the region.

Box 1. Key insights from Water for Women monitoring of safely managed services

- Additional indicators beyond global monitoring's core indicators are needed to capture the contextual factors in delivering services that protect public health and reduce risks to tolerable levels (e.g. seasonal variations in water quality and frequency of containment emptying).
- Data collection must be tailored to data sources and types of services, including non-piped or distributed infrastructure and services.
- New skills and capacities are needed to support improved monitoring of safely managed services, and to encourage cultures of data use in policy, planning and implementation.

A key purpose of the new higher service standard of 'safely managed' is to ensure that health risks are minimised or mitigated to protect public health for all. The Joint Monitoring Programme (JMP), responsible for monitoring SDGs 6.1 and 6.2 on safely managed water and sanitation respectively, has defined 'safely managed' and developed **core indicators** to assess and compare national progress at a global scale. However, Water for Women's experiences demonstrate the importance of considering the ways in which local conditions affect meaningful use of global indicators, and the potential for **expanded indicators** to usefully inform national, sub-national or program monitoring. For example, in many contexts, seasonal variations influence water quality and availability, and hence single point-in-time data may be misleading. In addition, differences between global and national or program definitions of safe services have implications for understanding the level to which certain services can be considered to protect public health. For instance, some countries do not consider pits or septic tanks that are never emptied to be safe, whereas the JMP indicator classifies contained yet unemptied facilities as safely managed sanitation. Risk-based assessments, such as water safety plans, can inform monitoring priorities and identify how the data can be acted upon. This synthesis unpacks such complexities, as experienced by Water for Women's partners working in varied contexts in Asia and the Pacific, with a view to inform careful use of indicators within and beyond the global monitoring system.

New skills and capacities are needed to enable monitoring of safely managed services and to support use of that data for policy and planning. Safely managed water and sanitation services involve a range of actors, and Water for Women partners found clarification of roles and responsibilities to be an important first step to identify data sources and allocate roles for ongoing data collection at scale. Monitoring more complex aspects of water and sanitation service delivery, such as water

¹SDG regions: Central and Southern Asia; Eastern and South-Eastern Asia; Oceania. [1].

quality or safe containment, requires new methods and additional skills. Engagement of local government in all monitoring steps ensures capacity building in both data collection and analysis. In addition, supporting and enabling local stakeholders to use the data to inform and improve service delivery increases demand and motivation to improve monitoring systems. There are many ways in which CSOs and researchers can contribute to improved monitoring of safely managed services.

As we move towards 2030, Water for Women partners, and others, can continue to assess gaps in national monitoring systems, identify priority indicators for particular contexts, test methods for data collection, and build capacity for monitoring and data use at national and local level. Such actions will help countries in Asia and the Pacific to secure and use data to guide the further development of safely managed water and sanitation services.



Abbreviations

CFAR	Centre for Advocacy and Research, India
CSO	Civil Society Organisation
DHIS2	Druk Health Information System, Bhutan
<i>E. coli</i>	<i>Escherichia coli</i>
FSM	Faecal Sludge Management
HfH	Habitat for Humanity
IWC	International WaterCentre, Griffith University
JMP	Joint Monitoring Programme for Water Supply and Sanitation
PNG	Papua New Guinea
PoC	Point of Collection
PoU	Point of Use
SDG	Sustainable Development Goal
SFD	Shit Flow Diagram
SNV	SNV Netherlands Development Organisation
UNICEF	United Nations Children's Fund
UTS-ISF	University of Technology Sydney, Institute for Sustainable Futures
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

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Why monitor safely managed water and sanitation services?

The objective of safely managed services is to reduce risks to public health and the environment. The term ‘safely managed’ services denotes a new, more ambitious standard of services that was established as part of the Sustainable Development Goals (SDGs). Equitable access to water and sanitation services is a basic human right and reducing the health risks from drinking water and sanitation that is not managed safely is important for reducing the global burden of disease attributed to poor water, sanitation and hygiene (WASH). Safe management in the delivery of water and sanitation services also will also protect water resources, for instance by preventing release of untreated excreta to the environment. Achieving safely managed services may seem like an ambitious objective for countries that have not yet achieved basic access to services. However, striving for this level could permit households with lower service levels to leapfrog directly to safe services. Monitoring how countries are meeting these objectives and tracking change over time is critical to identify gaps or inequalities in services, justify increased investment, prioritise activities and allow for course correction.

SDG 6 aims to ‘ensure availability and sustainable management of water and sanitation for all’ and has safely managed services at its core [1]. The World Health Organization/United Nations Children’s Fund (WHO/UNICEF) Joint Monitoring Programme (JMP) is responsible for reporting on global progress towards the targets of safely managed drinking water (SDG6.1) and safely managed sanitation (SDG6.2), which are defined as:

- 6.1: Drinking water from an improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination.
- 6.2: Households that use an improved sanitation facility that is not shared, and the excreta are safely disposed of in situ or removed and treated off-site [1].

For global reporting, the JMP has defined a set of **core indicators** to allow consistent and comparable estimates of national progress against these targets [2]. Given their commitments to the SDGs, all countries should be able to report against these core indicators. To monitor this higher service level requires consideration of broader data than previous monitoring of access to basic facilities. Compared with assessment of basic access, safely managed water indicators include assessment of water availability and testing of water quality, while the sanitation indicator includes monitoring of excreta from toilet to ultimate disposal. These indicators cannot rely on household questionnaires alone; additional methods and data sources are needed but are often unavailable. The recent JMP assessment could not estimate prevalence of safely managed drinking water for any of the Asia Pacific regions, and there were no estimates of prevalence of safely managed sanitation for the Oceania region. Complexities in data availability increase when services are not provided by a specific authority, such as for on-site sanitation and non-piped water supply, because administrative data rarely covers these service types. These distributed or decentralised services are common in low- and middle-income countries in the Asia Pacific region, creating data gaps on safely managed services, without which it is difficult to track progress or identify priorities.

“Monitoring WASH progress is complex. This complexity can lead to confusion amongst stakeholders on what to measure, how to measure, and how to interpret the results.”

WaterAid

Water for Women's experience in monitoring safely managed services

Water for Women, delivered as part of Australia's aid program, supports water, sanitation and hygiene for all in the Asia and Pacific region through 20 projects implemented by civil society organisations (CSOs) and 13 research projects. While the individual objectives of these projects are varied, they all support four core Fund outcomes, one of which is aligned with the SDG target of 'increased equitable, universal access to and use of sustainable WASH services, particularly for marginalised communities and community members'. These projects cover a range of objectives and contexts, and several have developed evidence and practice that can inform monitoring of safely managed services.

Through a discrete learning initiative, under the Water for Women Learning Agenda, partners have brought together the methods, experiences, and lessons from monitoring safely managed services within Water for Women's projects and research to share with others working in the region and those monitoring safely managed services globally. The initiative compiled case studies written by Water for Women partners on monitoring different aspects of safely managed services in urban and rural areas in the Asia Pacific region. These aspects of safely managed service monitoring are shown in Table 1, and six of these are presented as case studies in the accompanying case study report. This report synthesises the key findings from the learning initiative, including findings from a workshop with broader Water for Women partners. Key topics covered in this report include definition of indicators and methods of monitoring safely managed water and sanitation services in different contexts, and ways to strengthen the enabling environment for ongoing monitoring at scale.

Table 1. Summary of the monitoring experiences of Water for Women's partners that informed this synthesis.

Partner	Scope	Key areas of experience monitoring safely managed services
iDE	Rural sanitation – Cambodia	<ul style="list-style-type: none"> Data from product sales, including follow-up review Household-driven monitoring of pit filling to assess when emptying is required Assessment of household's faecal sludge management (FSM) knowledge, preferences, practices and behaviours
IWC	Water and sanitation – Solomon Islands	<ul style="list-style-type: none"> Core versus expanded indicators Water quality monitoring, considering point of collection and point of use Seasonal variations in water Management of child faeces
SNV	Rural sanitation – Lao PDR, Bhutan, Nepal, global	<ul style="list-style-type: none"> Expanded rural indicators Timely emptying of onsite sanitation Use of monitoring data and monitoring inequalities
SNV	Rural sanitation – Bhutan	<ul style="list-style-type: none"> Combining program data, national data and expert knowledge Challenges with integrating monitoring of safely managed sanitation into national systems
Thrive Networks	Water and sanitation – Vietnam, Cambodia	<ul style="list-style-type: none"> Building capacity to monitor within community groups and community service providers Integrating monitoring into stakeholders' processes
UTS-ISF	Urban water – Indonesia	<ul style="list-style-type: none"> Water quality and water availability monitoring Seasonal variations and multiple sources
WaterAid	Water and sanitation – Papua New Guinea	<ul style="list-style-type: none"> Mobile data collection Complexity of analysis of safely managed Household water quality testing Monitoring inequalities
CFAR	Urban sanitation – India	<ul style="list-style-type: none"> Community and service provider involvement in and use of monitoring Data collection for use in service delivery and monitoring sanitation practices, behaviour and emptying demand
Habitat for Humanity	Water and sanitation – Fiji	<ul style="list-style-type: none"> Community and school WASH monitoring Capacity and responsibility for monitoring

Adapting indicators to suit the local context

The JMP team's global monitoring relies on national estimates against core indicators. These are a minimum set of common indicators required to make consistent and comparable estimates of countries' water and sanitation services. These need to be localised in two ways: firstly, the **definitions need to be reviewed and understood within local context**. For example, the local terminology of water supply or sanitation facilities need to align with the categories used in the JMP indicators. In Solomon Islands, the International WaterCentre (IWC) noted that the JMP terms were not easily interpreted because enumerators and respondents were unable to define their own toilets in relation to the global categories. National survey questions may not have been updated to align with the JMP criteria, as occurred in the 2017 census in Fiji, limiting the use of this data for estimates of safely managed services. Mapping how national indicators and data align with JMP core indicators and response categories was an important initial step in identifying data availability and monitoring gaps for safely managed services, as SNV Netherlands Development Organisation (SNV) did in Bhutan.

Secondly, **monitoring needs to be localised so that it is able to meet national and sub-national data requirements** while reporting against the global indicators. It is recognised that the core indicators do not capture all aspects of water and sanitation risks, and **expanded indicators** may be necessary to inform national, sub-national or program targets or planning. Monitoring should therefore be able to meet both global and local data needs, which may result in disparities between global and national estimates if expanded indicators or national definitions differ from the core set used in JMP estimates. Awareness of safely managed targets was reported to be low in some countries, particularly at the sub-national level, and most countries had not yet integrated safely managed water targets into national policies. The role of monitoring data in building awareness and informing decisions is discussed below in the section on creating an enabling environment.

Partners considered the suitability of core indicators to adequately assess safely managed services, and many found that they were insufficient for understanding the actual risks of services in the contexts they are used. Core indicators are limited to the minimum necessary that can be consistently monitored across the breadth of country contexts globally. More detailed indicators and context-specific assessments conducted through project monitoring found important variabilities in data that impact the availability and sustainability of and access to safely managed services.



Mr Dzung Ngo, Thrive Networks/East Meets West, Vietnam

Household water connection, Trung Nghia village, Thach Bang town, Ha Tinh province, Vietnam.

Across the case studies, some common contextual factors that benefited from expanded indicators or adapted monitoring approaches were:

- **Decentralised or household level services** (e.g. onsite sanitation, household groundwater wells or rainwater tanks) were common in the Fund partner program areas. The function of these services differs to those provided via centralised systems, requiring different methods, indicators and data sources, requiring more household scale data as administrative data was unavailable.
- **Seasonal weather variations** are common in the tropical regions of Asia and the Pacific and affect safely managed water supply significantly. Examples are the availability and quality of rainwater supply in Solomons Islands and groundwater in Bekasi, Indonesia.
- **Geographic diversity**, large variations in services, and difficult access to remote areas or islands requires that indicators and methods are adaptable to a breadth of conditions (see Box 2).

Box 2. Diverse conditions in Melanesia (IWC)

Melanesia is a geographically and linguistically diverse region, and access around the region's archipelagos can be extremely challenging. These challenges constrain not only the expansion of basic and safely managed WASH services but the ability of governments to monitor and evaluate service levels in rural Melanesia. This diversity requires consideration of how the indicators apply and are interpreted in different contexts and data collection methods that are suitable for remote, difficult-to-reach areas.

In many countries, the mapping of current methods against JMP indicators found current data sources were insufficient to report against all safely managed service indicators, particularly on drinking water contamination. For piped water sources, data on contamination at the source can come from administrative or regulatory data, which is not the case for non-piped water facilities that require monitoring at a household or community level. Non-piped supplies are common in Central and Southern Asia, Oceania and in the South-East Asian countries included in these case studies. Data gaps were also common for the safe management of excreta from onsite sanitation systems, particularly the emptying, transport, disposal and treatment steps that can be provided by government, community or private sector providers. The case studies demonstrated a range of data collection tools and approaches and lessons from field testing them can inform scaling of data collection in their country or application to other contexts. A workshop held at the end of the learning initiative also identified how CSOs and researchers can support progress on appropriate definitions, indicators and methods for monitoring safely managed services (see Box 3).

Box 3. How CSOs and researchers can support definitions, indicators, and methods: Key findings from workshop with Water for Women partners

- Help identify and translate JMP indicators to simple and robust indicators relevant to the local context based on practical experience and evidence.
- Support coordination amongst stakeholders on definitions and indicators of safely managed services to build consistent and comparable data.
- Adapt data collection tools to suit the context, including advocating for different tools where standard approaches do not fit.
- Share practical tested approaches to monitoring that are scalable and can inform national guidelines, target setting, or national monitoring systems.

The following sections present insights from partners on monitoring safely managed water supply, including water availability and water quality, followed by a focus on safely managed sanitation services.

Monitoring safely managed water supply

To be considered 'safely managed' according to the JMP monitoring definition, a water service must be:

- accessible on the premises,
- available in sufficient quantities when needed, and
- free from contamination.

Given scarce data, the JMP makes estimates when data is available for water quality and at least one other indicator. For the Asia Pacific context of the Fund, regional estimates of safely managed water supply were not available for Oceania and Eastern and South-Eastern Asia due to too few countries having national estimates [1]. The partners reported that the type of water facility affected the availability of data and the suitability of monitoring methods. While the JMP often relies on data from water utilities and regulators, the University of Technology Sydney, Institute for Sustainable Futures' (UTS-ISF) work in Indonesia noted that this data only covered piped services and was insufficient for tracking safely managed self-supply water services, namely private wells and boreholes that are common in urban areas. These findings were also reported for many low- and middle-income countries in the recent JMP Water Quality report [3]. Access to piped water supply in Oceania and Central and Southern Asia was lower than the global average, and whilst the South and South-East Asian regions have high access (73% piped), access to piped water in the countries included in partner case studies was much lower (Cambodia 32%, Indonesia 35%, Vietnam 48%). Hence, monitoring non-piped services in these countries is important.



Bart Verweij, SNV Lao PDR

Quality, design and management of technology options play a role in managing the risk of groundwater pollution.

Key lessons and considerations for monitoring safely managed water supply are outlined below (summarised in Box 4), focusing on the criteria of 'availability' and 'free from contamination' (by monitoring water quality). Monitoring of 'accessibility on premises', which is well understood and presents few challenges to monitoring, was not discussed in the case studies. The case studies collectively demonstrated that the core questions may not adequately assess the status of safely managed services due to i) inadequate consideration of seasonal variations and ii) misrepresentation of the relative safety of drinking water if quality at both point of collection (PoC) and point of use (PoU) are not considered.

Box 4. Key considerations for monitoring safely managed water supply in Asia and the Pacific

- Seasonal changes affect both availability and quality, some understanding of the variability is important to interpret and assess the reliability of results.
- Water quality sampled from PoU and PoC can be very different, sampling both is recommended.
- How and what gets monitored must weigh-up cost, capacity and accessibility in remote and low-resource settings.
- Risk assessments, such as water safety plans, can inform monitoring priorities and identify how the data can be acted upon.

Monitoring water availability

The JMP core question for assessing water availability in household surveys is whether the household had sufficient quantities of drinking water when needed in the last month. In the case studies, this question was found to be inadequate to provide a nuanced picture, given the known variations in water availability between wet and dry seasons common in these tropical regions. IWC assessed safely managed water service levels in Solomon Islands and found in the dry season only 7% of households had access to safely managed drinking water, compared to 23% in the wet season (Figure 1). This was due to both changes in availability and water quality in the dry season. IWC found that the seasonal basis on which national estimates are made was often unclear. This hampered comparison of service levels and implies the need for additional questions to capture availability throughout the year. Since self-supply groundwater in Indonesia is susceptible to seasonal changes in availability, UTS-ISF captured monthly water availability data through phone interviews to assess changes in water availability over time. This data showed that single point-in-time monitoring risked misrepresenting the extent of safely managed services.

**Comparison of SDG6.1 water service levels using expanded indicator JMP XW11.
Dry and Wet Season Sources Population from all Dadala households (n = 84)**

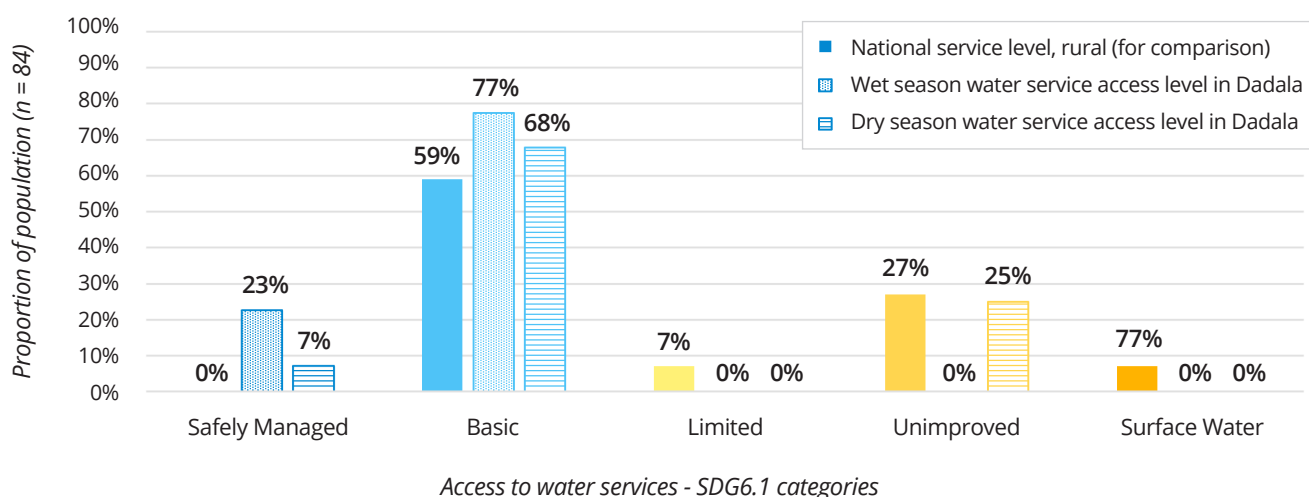


Figure 1. IWC's assessment of the impact of seasonality on safely managed service levels.

Partners found consideration of non-drinking water supplies to be important when assessing availability, particularly for households without piped water supply that relied on multiple water sources for different needs, which also varied seasonally. Due to smaller volumes of water needed for drinking and that bottled water was used by 34% of households, UTS-ISF's monthly monitoring in Indonesia found most households were able to meet drinking water needs in drier months, but over 30% lacked sufficient water for non-drinking purposes. While the JMP suggests expanded indicators for availability, including hours of water available per day, reasons why the water was unavailable and a question identifying the main source in dry and wet seasons, these questions remain insufficient to accurately determine availability in contexts where multiple supplies are used and are affected by seasonal variation. As IWC noted, differences in wet and dry season water services will become increasingly important in a changing and increasingly extreme climate (e.g. more protracted periods of drought, coupled with shorter, more intense periods of rainfall).

Monitoring water quality

In global monitoring, drinking water is considered ‘free from contamination’ if no *Escherichia coli* (*E. coli*) is detected in a 100mL sample and, where relevant, if it meets WHO standards for arsenic and fluoride. The core question requires sampling at the source or PoC of water supply [2]. However, given increasing data indicating that microbial water quality can deteriorate significantly between collection and the point of use (PoU, e.g. a glass of drinking water), the latest standardised testing methods suggests sampling at both PoC and PoU [3].

Both the IWC and UTS-ISF case studies (see Figure 2) demonstrated a significant difference in quality between PoC and PoU, and recommended sampling both to adequately assess the safety of water supplies. IWC’s monitoring in Solomon Islands found 60% of samples were worse at PoU than PoC, which was assumed to be due to poor hygiene practices related to water storage containers. In contrast, households surveyed by UTS-ISF in Indonesia commonly reported boiling water sourced from self-supply wells, substantially improving its quality between PoC and PoU. These experiences support the imperative to sample and test both PoC and PoU to determine where improvement efforts should be targeted.



Dion Kombeng, WaterAid PNG

Household water collection, Wewak District, Papua New Guinea.

Comparison of water quality at point of collection (PoC) and point of use (PoU)

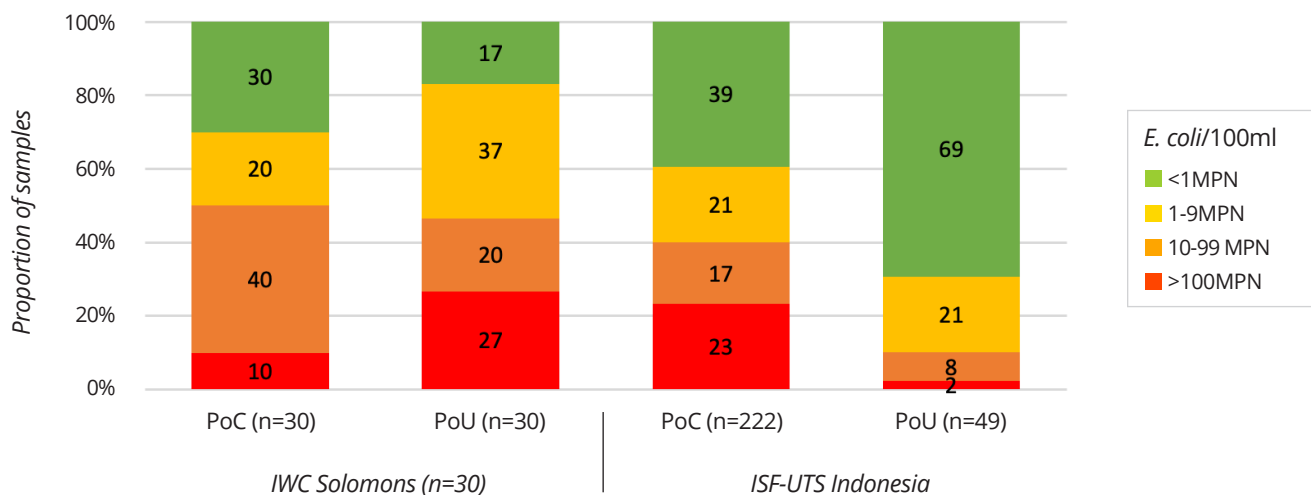


Figure 2. *E. coli* concentration in household drinking water at the point of collection and point of use from UTS-ISF and IWC monitoring.



Water quality testing by community facilitators, Solomon Islands.

Water quality was also found to vary seasonally; for example, the groundwater supply in UTS-ISF's study in Indonesia worsened in the wet season due to increased flooding and rising groundwater, which increased contamination. Whereas in the Solomon Islands, where rainwater and spring-fed reservoirs were common water sources, the water quality declined during the dry season. While annual water quality surveillance data may be available for piped water supplies, for non-piped supplies the one point-in-time sampling common with household surveys only provides a snapshot that is dependent on timing. Hence, the seasonal influence on water quality should be considered for relevant regions and water source types.

A risk-based approach was found to be useful to inform water quality testing procedures. Exhaustive testing of a long list of water quality parameters is not always feasible due to cost, capacity and logistic restraints in some remote or low-resource settings; choices must be made.

In Papua New Guinea (PNG), WaterAid used a risk-based approach to assess the context and select quality parameters. Only *E. coli* was tested, because the other contaminants suggested by the JMP (namely, arsenic and fluoride) were irrelevant for rainwater sources in PNG. Integrating water safety planning or risk assessment with water quality testing was recommended, both to identify what needs to be monitored (PoU/PoC and parameters) and what action can be taken. In PNG, WaterAid supported community groups to monitor water quality at PoC to identify and alleviate upstream contamination as part of their community-based water safety planning process. Meanwhile, IWC found that PoU testing allows for a better understanding of where additional household-level interventions to disrupt contamination pathways might be required.

Across the case studies, roles and responsibilities for data collection varied, as did the methods selected. In some contexts, institutions or community groups were responsible for monitoring PoC, whereas household monitoring was needed for self-supply systems or PoU. For non-piped and self-supply water sources, or remote or island locations, household testing kits are necessary. WaterAid uses AquaGenx Compartmental Bag Test kits, which are lightweight rapid field tests that detect and quantify *E. coli* and total coliforms in a 100 mL sample and have proven to be effective in the tropics. The advantages and disadvantages of various testing methods are summarised in WHO's recent thematic report on drinking water quality [3].

Monitoring safely managed sanitation services

Safely managed sanitation can be achieved through:

- wastewater treated offsite,
- excreta emptied and treated offsite, or
- excreta disposed of onsite.

Monitoring data on safely managed wastewater is widely available, yet there remain significant data gaps on the management of excreta from onsite sanitation (i.e. septic tanks and pit latrines), with no regional estimates possible for excreta emptied and treated offsite. Onsite sanitation is the predominant type of sanitation facility globally, as well as in the Oceania and Central and Southern Asia regions covered by the case studies [1]. Use of onsite systems is increasing faster than sewer connections, even in urban areas. Monitoring safely managed sanitation requires assessment of each step of the service chain, as demonstrated by the shit flow diagram (SFD) developed by SNV for rural sanitation in Bhutan (Figure 3) and various key considerations drawn from the case studies (Box 5).

Box 5. Key considerations for monitoring safely managed sanitation (in Asia Pacific)

- In rural areas of Bhutan and Cambodia, excreta contained and stored in-situ was deemed the most feasible approach to safely managed sanitation due to the lack of emptying and treatment facilities; monitoring it was therefore conducted using household surveys.
- SNV and iDE deemed the frequency of pit emptying and sludge depth to be important expanded indicators for building awareness of safe and sustainable management of sanitation facilities.
- Service provider data from toilet sales or emptying services collected to inform service delivery provision, is also valuable for monitoring.

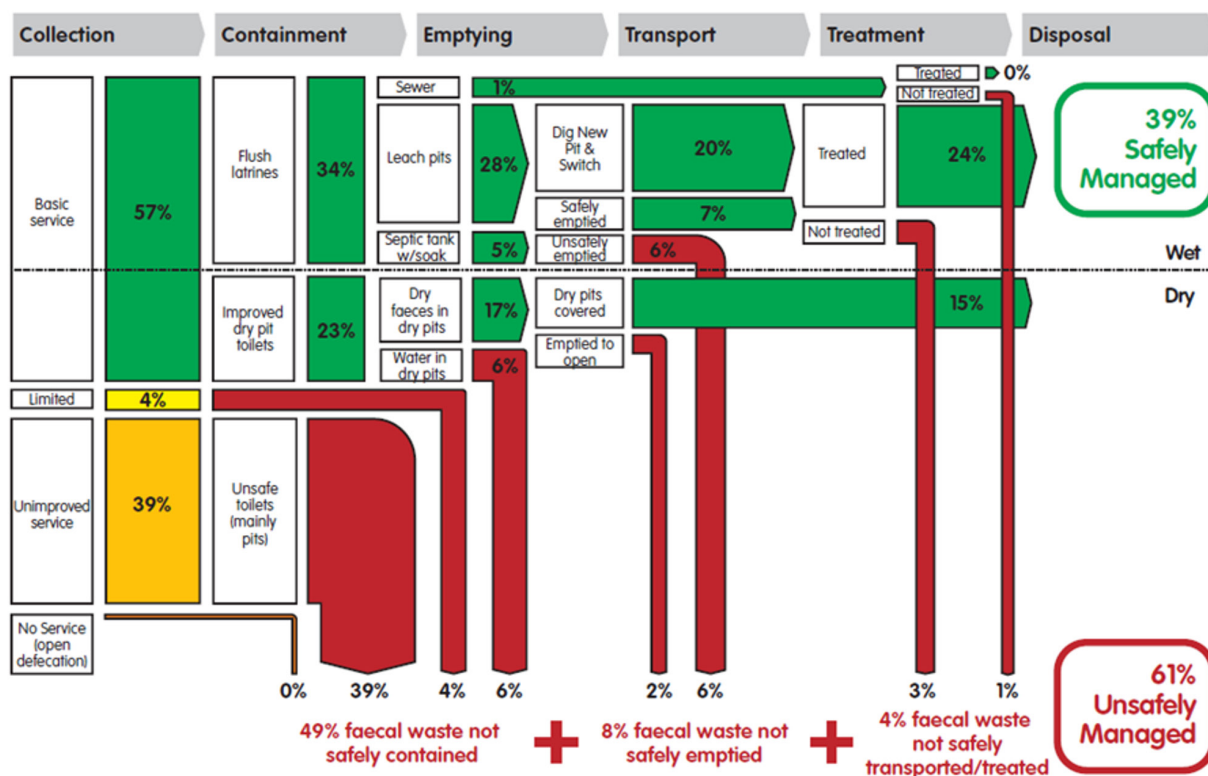


Figure 3. Safely managed sanitation estimates, rural Bhutan [4].

The monitoring presented in the case studies focused on the containment and emptying steps of the service chain, which are predominately assessed at the household scale. Most case studies were focused on rural sanitation, which, as WaterAid states, does not need to be complicated, because many unemptied and contained systems can be considered safely stored in-situ. Monitoring emptying and disposal, as occurs in the Centre for Advocacy and Research (CFAR) and SNV's global projects, is more complex and requires consideration of services at community or city level. Beyond the core indicators, some case studies collected data on behaviours and practices to better understand the reasons for unsafe practices and inform improvement activities. SNV's expanded indicators focus on a risk-based assessment, producing a more in-depth understanding of the extent to which the service is managed safely than is feasible with the core indicators. Monitoring data collected for tracking the installation and household use of an on-site alternating dual pit upgrade FSM solution at scale by iDE, and emptying demand and service delivery by CFAR, were examples of data collected for service provision could also be valuable to inform monitoring of safely managed services.



Toilet construction, Bhutan.

Containment and storage in-situ

Most countries have data on sanitation type and can use household survey data to assess whether toilets are improved and not shared with other households. Once these basic criteria are met, the onsite facility (septic tank, wet or dry pit) is assessed as to whether it adequately contains waste, such that excreta are not overflowing or discharging to the environment (i.e. outlet pipe to drain or overflowing to the surface). SNV assesses expanded indicators including containment facilities' contamination risk to groundwater, their use and maintenance, as well as their age and other aspects associated with emptying frequency. While this synthesis focuses on safely managed service levels, the case studies reported that challenges remain in achieving even basic sanitation. For example, the SFD for rural Bhutan (Figure 3) demonstrates that the highest proportion of unsafe discharges to the environment come from unimproved toilets; in PNG, government priorities and service delivery align with the SDG basic services, but do not yet target the safely managed service level. IWC assessed the management of young children's faeces, which are often disposed of in the open, but rarely considered in national estimates of open defecation.

While most partners monitored various behavioural aspects of sanitation use, SNV's data collection included expanded indicators to assess risks to safe management affecting the users, workers and the environment. These are broader than the JMP core indicators, which – whilst useful for global estimates – are inadequate to inform local-level risk assessments. These additional indicators include aspects of functionality, use and maintenance, the environmental safety of the toilet, timeliness of emptying and occupational health and safety aspects.

To be considered safely stored in-situ, sanitation facilities that are contained can either be emptied and disposed in-situ or never emptied and stored in-situ. This second criterion allows never-emptied septic tanks and pit latrines to be considered stored in-situ and safely managed assuming they meet the containment criteria (i.e. no overflow to drains or environment). As summarised in Box 6, SNV, WaterAid and iDE suggest that the storage or disposal in-situ was the most suitable pathway for safe management of sanitation in these and similar rural areas. For this reason, both SNV, iDE and Thrive Networks promote twin pit latrines as a safe sanitation solution, because they are designed to avoid immediate emptying; the second pit allows extended in-situ storage until the contents are stabilised and safe to handle and use as a soil conditioner [5]. To further validate the efficacy of on-site systems to achieve "safely managed" sanitation, iDE is conducting field assessments at scale to assess the biology of alternating twin pits to understand if they are safe to empty after two years of storage, as advised by WHO [6], and assess how households operate and maintain these systems compared with recommended practices.



Mr Kim Hor, East Meets West

Training of FSM onsite treatment using twin pit household latrine, Kratie province, Cambodia.

Box 6. Examples of storage in-situ practices in rural areas

'In rural PNG, many households do not empty their pit latrines but dig a new pit, fill in the old and move their toilet to the new location. The excreta remains in situ, contained and safely managed.' WaterAid

'Safely managed sanitation in most of rural Bhutan can to a large extent only be realised by exploring and promoting options where human excreta is treated and safely disposed in-situ.' SNV

'In rural Cambodia, there are currently no economically or environmentally sustainable solutions for offsite treatment of human waste from full latrine pits. In addition, professional emptying services such as vacuum pumping are generally unavailable and/or expensive to rural latrine-owning households. Therefore, onsite FSM is currently the preferred and recommended solution to achieve safely managed sanitation in rural Cambodia.' iDE

Emptying

The JMP core indicator for emptying only assesses whether the containment has ever been emptied. This is a simplified approach needed to consistently assess emptying globally, since specifying intervals for emptying is difficult given the variety of types, sizes and uses of containments globally. Using risk-based thinking, SNV developed an innovative approach to consider frequency of emptying in their assessment of safely managed sanitation services. This approach uses household and national data to classify whether containments have been emptied within a 'timely emptying' threshold. This threshold aims to inform when tanks and pits would likely reach their design capacity, based on the containment properties typical to that context rather than textbook emptying intervals. Another approach, developed by iDE, is a pit gauge that enables household monitoring of sludge depth. This gauge allows households to determine when emptying is required, nudging them to consider suitable emptying options before an emergency arises.

Another consideration for assessing emptying was that it is an activity or behaviour may change in a short time period. WaterAid's case study highlighted that longitudinal monitoring is important to identify whether systems remain safely managed over time with regard to emptying. iDE also monitors facilities over time, using follow-up questionnaires to assess any functionality issues and maintain high customer satisfaction in those products. This follow-up revealed that some twin pit latrines filled up prior to the minimum two-year storage intended before switching pits, prompting iDE to identify and address the causes of these issues to maintain safe operation and emptying.

Creating an enabling environment for monitoring

Sustainable monitoring at scale is critical to understand whether safely managed water and sanitation services are accessible to all. Water for Women, and its projects and research included in the case studies, strive to strengthen the enabling environment for monitoring to achieve improvements in safely managed services. Another learning initiative under Water for Women's Learning Agenda, led by WaterAid and focused on systems strengthening within the Fund, also found strengthening monitoring was a priority area for most projects. The case studies provide examples of the need for, and approach to, strengthening the enabling environment for improved monitoring of safely managed water and sanitation services.

Building awareness of safely managed services is critical to increasing the demand for improved monitoring systems.

Without data demonstrating the limitations of current water and sanitation services, the issues of poor quality, availability or sustainability of services may not be evident. If stakeholders are not aware of the importance of safely managed services or the extent of monitoring gaps, they may be reluctant to commit to monitoring responsibilities, modify existing surveys or invest in expanded monitoring methods. In PNG's Wewak District, WaterAid indicated that awareness about safely managed services at sub-national level was low and that government officers prioritised only basic services, rather than safely managed services. In Vietnam, Thrive Networks noted that government agencies have not adopted safely managed standards and were only familiar with counting piped water connections or hygienic latrine construction. Building this awareness of the need for expanded monitoring without the data itself is challenging. However, SNV supported stakeholders in Bhutan to use existing data to create a baseline rural sanitation estimate that helped build awareness and demand for increased monitoring (Box 7).

Box 7. Making the most of existing data and knowledge to build demand for monitoring

In Bhutan, SNV co-facilitated a stakeholder workshop with the Public Health Engineering Division and IRC to estimate access to safely managed sanitation in rural areas based on existing data from the census, SNV's multi-year sanitation monitoring data, and the experience and knowledge of a range of stakeholders about the missing steps of the service chain. From this, they developed initial estimates and an SFD (see Figure 3). The baseline data informed the development of national targets and FSM guidelines that are likely to increase the demand for monitoring.

Responsibility for monitoring safely managed water and sanitation services can be complex. Often several actors are involved in different aspects of these services and regulators, if they exist, may only cover the centralised services. Water for Women's partners' experience show how CSOs and researchers can bring stakeholders from a range of sectors together to clarify roles and responsibilities. CSOs can facilitate an assessment of monitoring gaps and through engaging government can support them to identify their monitoring needs and build their ownership of the monitoring process. While stakeholder engagement may focus on those involved in service delivery, it is important to include national statistics departments, or equivalent authorities responsible for national monitoring systems, in the engagement activities to ensure their buy-in for future integration and scale-up.

Capacity for monitoring safely managed services was insufficient, requiring training and use of appropriate data collection technology. Capacity gaps were particularly evident in low-resource settings where existing monitoring had low budget and capacity, and due to the added complexity of the indicators for assessing safely managed services. This challenge increased with the inclusion of indicators such as water quality that require additional training, materials, and effort to obtain data. The capacity of enumerators to accurately understand and assess aspects of safely managed sanitation was poor in Bhutan and Vietnam, often influenced by inherent beliefs in what is 'good' sanitation; training is needed to clarify how safely managed services differ from their beliefs. 'Learning by doing' was a common approach to build capacity across the case studies. Involvement of local government or community representatives (such as the Women's Union in Vietnam and community volunteers in India) in all phases of monitoring was important to build understanding of the methods and quality of data and learn from firsthand experience of the status of and obstacles to safely managed services in their areas. Adapting monitoring tools to suit capacity is also important. For example, in PNG, WaterAid recognised that analysis was a challenge, so integrated automatic analysis of WASH data into their tools.



Training on water quality testing, Baliapata II, Bhubaneswar, India.

Integration of safely managed services monitoring into national monitoring systems is important to enable ongoing nationally representative data collection. An initial step to support integration into national systems was an assessment of how existing monitoring aligned with the SDGs, as detailed earlier. Given existing water and sanitation monitoring already faces the challenge of low budget and capacity, as noted by IWC with respect to Melanesia, the additional indicators to monitor safely managed onsite sanitation need to be selected carefully to balance effort, capacity and cost and ensure that monitoring is not a time and resource burden. CSOs and researchers could test and refine these indicators and methods before making recommendations for scaling up. This was demonstrated in Bhutan, where SNV's monitoring tools were tested in select regions before being scaled up and integrated into national surveys (see Box 8 below). At the workshop for Water for Women partners held online on the 27th of October 2021, the following steps were suggested to inform local or national monitoring systems:

- Advocate to government on the importance of monitoring safely managed services, through workshops or presenting and jointly reflecting on findings
- Support analysis of existing administrative data and help translate it to formats that can be used more easily
- Develop common interpretation and terminology of indicators and approaches for monitoring safely managed services amongst stakeholders in the country.

Box 8. Integrating monitoring of safely managed sanitation into Bhutan's national monitoring system (SNV)

Bhutan's Public Health Engineering Division, in partnership with SNV and UNICEF, have developed survey tools based on SNV and IRC's rural sanitation monitoring tools. However, the government is yet to institute these within the national Druk Health Information System (DHIS2). Change or integration of new information into the DHIS2 takes place every five years, with strict screening procedures. For safely managed sanitation, five additional questions are proposed, but in order to obtain quality data, the enumerators need more training, requiring more time and expense. Work is ongoing, yet it is clear that this is a long-term process, needing support to build buy-in, experience and commitment.



Water users visiting their water scheme structures for scheme functionality and water quality vulnerability assessment, Dailekh District, Nepal.

Use of data to inform improved access to safely managed services by all is the key objective of data collection. While data should be used to identify service improvements and investment decisions, this data use culture does not always exist. At the partner workshop, data was reported to be ‘often sitting idle or not available when needed’, and some decision-makers are not practised in using monitoring data to inform decisions. Advocating the value of monitoring data and its link to service delivery was recommended for informing national, sub-national and community service provision. WaterAid and SNV promoted the monitoring and use of data as part of a risk-based assessment, which includes identification of risk mitigation strategies based on the data. For example, WaterAid noted ‘data on monitoring of water quality at source is part of the community-based water safely planning process in Wewak, PNG, and motivates the community to identify and alleviate causes of contamination’ (see Box 9). The case studies also highlighted the various users of data, including private or community service providers and the households themselves. A culture and practice of data use will support realistic target setting and build demand for improved monitoring systems.

Box 9. Building a data use culture in Wewak, PNG (WaterAid)

In a joint service delivery approach with the district government in Wewak District, WaterAid’s RapidWASH 2.0 monitoring tool aims to ensure that data is entered into a usable system and analysed effectively. Data being available immediately after collection allowed regular reflection sessions with the enumerators and District WASH Coordination Body, which prompted discussions about what needed to be done to improve WASH access.

The results of the district-wide baseline were used to create a costed five-year Wewak District WASH Plan, which was formally launched in March 2020. The plan development was led by the district government, with data supported by WaterAid. The district government is using the plan to allocate funding and prioritise water supply projects.

Conclusion

This synthesis brings together the practical experiences of several Water for Women partners in monitoring safely managed water and sanitation services across a variety of country contexts in Asia and the Pacific. By taking a WASH system strengthening approach, which is fundamental to the achievement of Water for Women's overall objectives, partners used project-level monitoring or research processes to experiment and conducted specific activities to build national or subnational monitoring systems and data use practices. Three main key insights from this work can guide further development of monitoring systems for safely managed services across the region.

Firstly, Water for Women partners' experiences demonstrate the need to use both global monitoring's core JMP indicators and additional complementary indicators. In this way, it is possible to capture important contextual factors for delivering services that are needed to protect public health, such as seasonal variations in water quality in tropical regions and frequency of containment emptying where this is important, such as in dense urban communities. If monitoring is to enable meaningful assessment of whether services are managed safely, then such contextual factors are critical.

Secondly, Water for Women's partners found considerable complexity in the data sources and methods required to monitor safely managed services across varying service types, including non-piped and distributed infrastructure and services such as self-supply water sources and onsite sanitation facilities. This complexity has flow-on implications for who collects data and how it is collected and requires involvement of many different actors. This synthesis report demonstrates how program-scale and subnational-scale monitoring efforts permit the refinement of indicators, methods and roles, which can then be adopted more widely.

Lastly, Water for Women's work identifies the new skills and capacities needed to support improved monitoring of safely managed services, as well as the need for supportive cultures of data use in policy, planning and implementation. Capacity development will be needed to achieve the effective monitoring of safely managed services within the duration of the SDGs until 2030.

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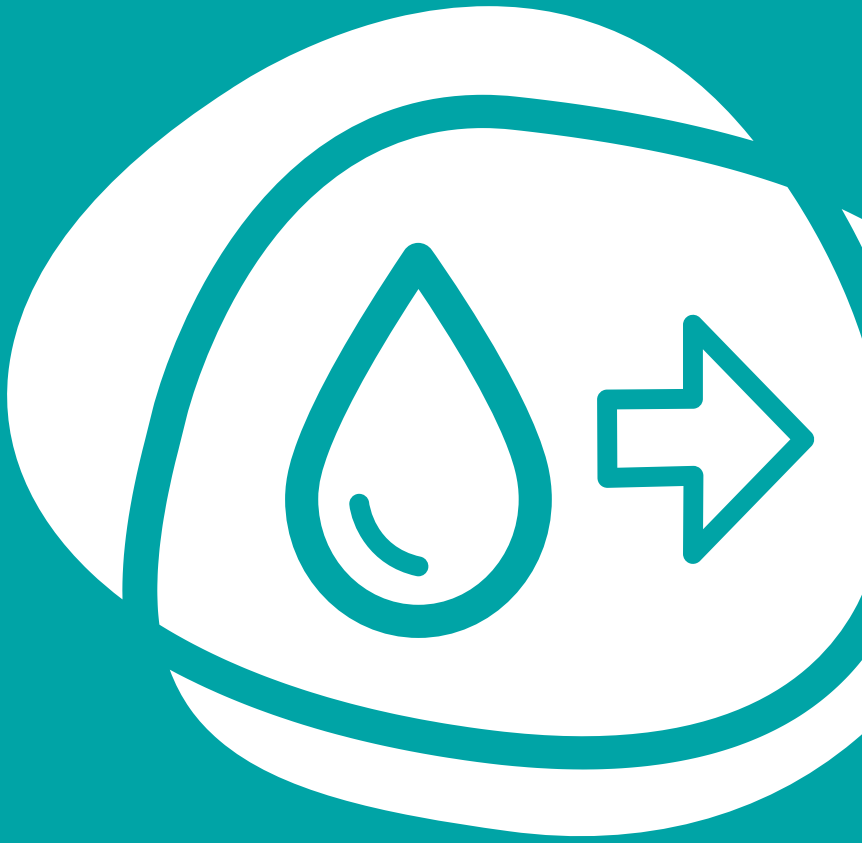
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