Guidance note

Monitoring the contribution of water, sanitation and hygiene to community resilience to climate change

UTS Institute for Sustainable Futures,
UNICEF East Asia and Pacific Regional Office and
Global Water Partnership

Photo credit: Diana Gonzalez Botero (UTS-ISF)

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The University of Technology Sydney - Institute for Sustainable Futures (UTS-ISF) conducts applied research on sustainable futures, including to support water and sanitation policy and practice in Asia and the Pacific. UTS-ISF provide partners with technical expertise on climate change; planning and governance; gender equality and inclusion; public health; water resources management; monitoring. www.isf.uts.edu.au

UNICEF East Asia and the Pacific Regional Office (EAPRO) works in 13 East Asian countries and 14 Pacific countries and territories to help provide access to clean water and reliable sanitation, and to promote basic hygiene practices that keep children safe from infectious diseases. UNICEF EAPRO partner with governments, civil society organizations and communities themselves to construct and rehabilitate WASH facilities, bringing climate-resilient services straight to children in need.

The Global Water Partnership (GWP) is a global multi-stakeholder network and intergovernmental organisation dedicated to advancing the governance, financing, and sustainable management of water resources. With over 2,800 partner organisations in more than 180 countries, and operating through 13 Regional Water Partnerships, GWP mobilises partnerships, knowledge, and investments for climate-resilient water security.

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Contents

1 Introduction

1.1 Background

Resilience across all development sectors, including water, sanitation and hygiene (WASH), must be strengthened to address the evolving risks of climate change. There is no blueprint for achieving community resilience to climate change in all contexts, but incremental improvements to resilience can be made through more integrated development efforts, embracing interlinkages between and across sectors.

The United Nations Framework Convention on Climate Change (UNFCCC) Global Goal for Adaptation agreed in 2024 recognises the need for progress across several key domains, setting seven thematic targets to measure worldwide progress in climate adaptation. The first target covers climate-resilient water supply and sanitation; the remaining targets include food, health, ecosystems, infrastructure, poverty and cultural heritage, many of which have close interconnections with WASH.

As a basic human need, access to WASH is foundational to societal development and must be secured and sustained despite climate impacts on water and sanitation infrastructure, services and systems. In addition, approaching WASH services with a wider focus on community resilience can not only ensure that all people have access to safely managed WASH services, but also build overall resilience of urban and rural communities, particularly in low- and middle-income countries (LMICs). Overall community resilience in turn can strengthen WASH services and systems, creating mutually beneficial feedback loops.

While it is known that WASH services contribute to broader community resilience, including through improved health and wellbeing and environmental protection, wider community resilience outcomes are rarely systematically monitored. This creates an evidence gap regarding the full impact of WASH services and interventions beyond their primary goal of ensuring universal, safely managed services.

1.2 Aim of this guidance note

This guidance note is intended to support **development agencies with a WASH focus** and other stakeholders involved in community development to create processes to monitor how WASH interventions contribute to community resilience to climate change.

WASH **interventions** refer to projects or programmes designed to strengthen WASH service delivery and service delivery systems. Although parts of the guidance in this note also apply to the ongoing monitoring of WASH services (e.g. by a government agency), the guidance is structured around a bounded intervention that may be implemented by either governmental or non-governmental stakeholders (see Box 1 for further explanation of these differences).

The guidance note is also structured to inform the **design or proposal phase** of an existing WASH intervention. The guidance can also be used to inform the ideation of new WASH interventions or to enhance the effectiveness of implementation of existing interventions to contribute to wider community resilience, since monitoring and planning cycles are closely interconnected. Further, although the guidance is designed for WASH interventions in LMICs, the guidance may also be relevant to other contexts, including in high-income countries also facing increasing climate impacts.

Box 1: Intervention monitoring versus sector monitoring
This guidance note is intended primarily for monitoring how a specific WASH *intervention* contributes to broader community resilience, and it is important therefore to differentiate intervention monitoring from on-going monitoring efforts, particularly in the context of ensuring WASH programming strengthens WASH systems and wider government-led systems.

Government systems and sector monitoring: WASH service authorities at national and local level commonly have a mandate to routinely monitor ongoing service delivery. Those monitoring systems are generally confined to a focus on WASH, covering aspects such as levels of access, quality, reliability and continuity of services, including in the face of climate change. It is also possible that through health or environment agencies, WASH sector monitoring may also include broader aspects, such as water-borne disease and environmental health. Meanwhile, other government agencies are likely to be responsible for other sectors and aspects of community resilience, for instance, concerning food security or education. These government-led monitoring systems are critical, and should be supported, and therefore when working through this guidance, wherever possible, it is suggested to consider alignment with government systems, to support the design, data collection and analysis from these essential systems.

Intervention or program monitoring: This type of monitoring is associated with interventions or programs that have a defined time-scale, and a theory of change or program logic that articulates the change to which efforts aim to contribute. This guidance note is best used in connection to a discrete WASH intervention, and incorporates advice to align to government monitoring systems.

Monitoring how WASH interventions contribute to community resilience to climate change can serve to strengthen resilience outcomes, since tracking progress and systematically collecting, analysing and responding to information on this contribution can facilitate on-going learning and guide WASH implementation to **maximise positive impacts on community resilience**.

Further, there are additional specific reasons for a focus on monitoring the contribution of WASH interventions to community resilience. Such monitoring can:

- Support feedback loops on the effectiveness of efforts to broaden WASH intervention strategies beyond secure, safely managed WASH services
- Provide evidence for investment in WASH as part of climate change adaptation strategies and climate financing, as well as demonstrate how WASH supports the achievement of wider resilience strategy and policy targets
- Support intra-sectoral (e.g. WASH-WRM) and cross-sectoral (e.g. food and energy security) collaboration on climate change adaptation, addressing tendencies for siloed spaces and enabling more integrated approaches
- Tracking progress towards adaptation goals at local, regional, national or global levels, including the Global Goal on Adaptation (see Box 2)

This guidance note articulates a **five-step iterative process for WASH stakeholders** to monitor how a WASH intervention contributes to broader aspects of community resilience, those that lie beyond contributing to safely managed WASH services and infrastructure. Engaging in this process enables WASH stakeholders to generate strategic evidence that enhances program design, investment, and cross-sectoral collaboration. By reflecting on and documenting the broader impacts of WASH interventions to community resilience to climate change, stakeholders can improve the impact of WASH interventions on community resilience, build a more compelling narrative, influence policy frameworks, and position WASH interventions as a critical contributor to climate adaptation and sustainable development strategies.

This work forms part of the **Strategic Framework for WASH Climate Resilient Development**, produced under a collaboration between the Global Water Partnership (GWP) and UNICEF. This strategic framework (Figure 1) advances sector thinking on WASH and climate change and is centred around four quadrants of activity. Specifically, this guidance notes lies within the '*monitor and move forward*' step, but also relates to the '*deliver solutions*' steps of community resilience and WASH.

Figure 1. GWP and UNICEF's Strategic Framework for WASH Climate Resilience

A preliminary form of this guidance was piloted in 2024 with three UNICEF country offices: Papua New Guinea (PNG), Cambodia and Timor-Leste. These focused respectively on links of UNICEF's WASH interventions to wider aspects of community resilience to climate change: (i) links with peace and security in PNG; (ii) links with energy security in Cambodia; and (iii) links with water conservation in Timor-Leste. Illustrations from this piloting process are referenced throughout this guidance note.

Box 2: Coordinating efforts to achieve the thematic targets of the global goal on adaptation

The UNFCCC Global Goal on Adaptation offers a framework to measure program across multiple thematic domains, requiring integrated efforts across the adaptation cycle and strengthened coordination of monitoring across sectors.

Through the Global Goal on Adaptation, countries are encouraged to increase ambition and enhance adaptation action and support towards the achievement of the following targets by 2030, and progressively beyond:

a. Water: Climate induced water scarcity; resilience to water-related hazards; climate-resilient water supply, climate-resilient sanitation; safe and affordable potable water
b. Food: Climate-resilient food and agricultural production; Climate resilient supply and distribution of food; Sustainable and regenerative production; Equitable access to adequate food and nutrition for all
c. Health: Resilience against climate change related health impacts; climate-resilient health services; Climate-related morbidity and mortality
d. Ecosystems: Reduced climate impacts on ecosystems and biodiversity; accelerating use of ecosystem-based adaptation and nature-based solutions: management, enhancement, restoration and conservation and protection of terrestrial, inland water, mountain, marine and coastal ecosystems
e. Infrastructure: Resilience of infrastructure and human settlements to climate change impacts to ensure basic and continuous essential services for all, and minimizing climate-related impacts on infrastructure and human settlements;
f. Poverty: Substantially reducing the adverse effects of climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all;
g. Cultural heritage: Protecting cultural heritage from the impacts of climate-related risks; adaptive strategies for preserving cultural practices and heritage sites; designing climate-resilient infrastructure, guided by traditional knowledge, Indigenous Peoples' knowledge and local knowledge systems.

Additional targets are also set covering the adaptation cycle, including **Impact, vulnerability and risk assessment** informs national adaptation plans, policy instruments, and planning processes and/or strategies and multi-hazard early warning systems, climate information services for risk reduction and systematic observation are established; as well as **planning** and **implementation** and **monitoring, evaluation and learning** of national adaptation efforts.

Source: UNFCCC. Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA), 15 March 2024, FCCC/PA/CMA/2023/16/Add.1 https://unfccc.int/documents/637073

1.3 When to use this guidance note

This guidance note is best used by WASH program and project implementers who are at the outset of working on a concept or proposal for a WASH intervention, to support thinking towards design of climate resilient WASH interventions that achieve wider impact. Using the guidance at this planning stage is ideal given that budget and other resources will need to be allocated to the monitoring activities, which may be more difficult to do if a program has already been designed and implemented. However, WASH stakeholders may also 'retrofit' this guidance and its concepts to existing programming to identify important areas to monitor and to make strategic improvements that might achieve greater community resilience to climate change.

The guidance supports implementers to expand their existing theory of change and monitoring framework to connect a specific WASH intervention to measurable outcomes expected to contribute to community resilience. The guidance provides practical steps for planning to ensure monitoring is appropriate for each intervention context.

By completing the guidance note steps, users will gain:

- A clear articulation of how their WASH intervention enhances community resilience to climate change
- A tailored monitoring approach with relevant indicators
- Insight into how to refine and improve contributions to community resilience
- The ability to demonstrate impact to stakeholders and funders

1.4 Determinants of community resilience to climate change

This guidance draws on a comprehensive literature review on the determinants of community resilience and previous efforts to measure community resilience, including opportunities and challenges for monitoring.[1] The study included review of academic studies that canvas the breadth of proposed determinants of community resilience, aid and development organisational frameworks on community resilience, and critiques of the concept of community resilience. A key finding of that literature review was the contested nature of community resilience to climate change, with no agreed common framework for its measurement across academic literature or amongst practitioner frameworks, a reliance on measures and literature focused on the Global North, and limited robust validation of proposed indicators.

In addition, the concept of "community" in the context of monitoring resilience-building can be problematic for several reasons. One such issue is that the "community" is often poorly defined. Traditional definitions based on geographic proximity may not be appropriate for monitoring resilience outcomes, due to internal heterogeneity and power dynamics. Depending on the nature of the project or program, it may be more appropriate to define the community (or communities) benefiting from resilience-building in terms of shared identity (e.g. women with disabilities) or shared experience (e.g. people who use shared sanitation facilities in informal settlements). Annex 2 lists additional common challenges with the concept of community resilience and their potential implications for monitoring WASH program contributions.

Researchers and practitioners claim that a wide breadth of determinants contribute to or are essential for community resilience. Across the literature reviewed, there is convergence around **five domains** of interconnected social, economic, institutional, infrastructural, and environmental determinants (Table 1).

- **Social**: Determinants relating to the capacity of individuals or groups of people to effectively and equitably respond to climate risks, uncertainty, and environmental stressors in general.
- **Economic**: Determinants relating to the availability of financial or economic resources for individuals, households, communities, and governments.

[1] Willetts, J., Rodgers, D., Kohlitz, J., Medina Valenzuela, A. *Determinants of community resilience to climate change and the contribution of water, sanitation and hygiene*. 2024. Prepared for UNICEF East Asia and the Pacific Regional Office by UTS-ISF

- **Institutional**: Determinants relating to the performance of governing bodies and provision of social welfare generally or in relation to climate risk preparedness, response, or recovery
- **Infrastructural**: Determinants relating to the provisioning of physical assets and delivery of essential public or social services
- **Environmental**: Determinants relating to the protection, preservation, or restoration of ecosystems and environmental resources.

Table 1. Determinants of community resilience to climate change organised in five domains

Social	Economic	Institutional	Infrastructural	Environmental
1. Health and wellbeing 2. Food security 3. Basic needs met 4. Capacity to anticipate risks 5. Capacity to innovate 6. Individual attitudes and motivations 7. Collective capacity 8. Social justice and equality	9. Financial resources at household level 10. Government financial resources 11. Private sector/ businesses 12. Sustainable, diverse and secure livelihoods	13. Good governance at the community level 14. Good governance at the state level 15. Climate/disaster preparedness planning 16. Climate/disaster response and recovery 17. Social protection 18. Inter- and intra-sectoral collaboration and networking	19. Secure, safely managed water and sanitation infrastructure and services 20. Secure transport infrastructure and services 21. Secure energy, telecommunications and ICT infrastructure and services 22. Secure healthcare infrastructure and services 23. Secure education infrastructure and services 24. Secure community services 25. Emergency response infrastructure	26. Environmental quality 27. Environmental protection

It should be noted that Table 1 is *just one way* to articulate and group such determinants, based on the literature review, and does not represent the only way such determinants can be defined and organised.

A diversity of proposed determinants may arise, in part, due to differing definitions and approaches to measuring resilience and practical limitations of what can be measured. In addition, the review of academic literature demonstrated that **little empirical evidence exists to validate the relative importance of each determinant for community resilience** which itself has a multiplicity of definitions. Yet, although evidence of the essential ingredients for community resilience is minimal, it may still be posited that any contributions of WASH towards building the proposed determinants of community resilience are likely positive and have potential to enhance resilience, even if the community resilience outcomes are difficult to prove.

Many of these determinants of community resilience are encapsulated in the Global Goal on Adaptation thematic targets, which includes a focus on water, food, health, ecosystems, infrastructure, poverty, and cultural heritage as well as the adaptation cycle (see Box 2). Achieving these thematic targets requires both sectoral and integrated adaptation efforts.

1.5 Relationship between WASH and determinants of community resilience

As a basic public service, **secure safely managed WASH services are foundational to community resilience to climate change**. Without addressing this basic daily need, communities, particularly women, girls and marginalised groups, are unlikely to be 'resilient' to climate shocks and stresses that impact other aspects of their lives.

Ensuring WASH services can function in the face of climate change is therefore a key imperative, hence the importance of **climate-resilient WASH interventions** for making WASH services climate-resilient. Most disasters are experienced through water (floods, droughts etc.), and the hydrological cycle is intensified by changing temperatures, affecting water quantity and quality in rural and urban areas.[2] Climate hazards disrupt community water and sanitation services, and cause deterioration and failure of infrastructure.

The sector definition of climate-resilient water, sanitation and hygiene services launched at the 29th Conference of the Parties (COP29) in 2024 was developed through a collaborative process led by Sanitation and Water for All (SWA).[3] It notes amongst its five dimensions the contribution of WASH to wider societal resilience, alongside four other dimensions concerning WASH infrastructure, service provision, governance and service authorities and water-related ecosystems.

> *Climate resilient water, sanitation and hygiene services anticipate, respond to, cope with, recover from, adapt to or transform based on climate-related events, trends and disturbances, all while striving to achieve and maintain universal and equitable access to safely managed services, even in the face of an unstable and uncertain climate, where possible and appropriate, minimising emissions, and paying special attention to the most exposed vulnerable groups.*
>
> Sanitation and Water for All (2024) definition of climate-resilient water, sanitation and hygiene services

Based on existing evidence across decades of research that links water, sanitation and hygiene and health as well as environmental quality, there are **three key determinants of community resilience where any climate-resilient WASH intervention would normally be expected to contribute**:

a) health and well-being

b) secure safely managed water and sanitation infrastructure and services

c) environmental quality (particularly sanitation services).

However, WASH interventions can have a wider scope than just WASH services, and **can intentionally contribute to a wider set of determinants of community resilience**, for instance, towards food security, social justice and equality, or climate and disaster preparedness planning (see Figure 2). Equally, there is a range of determinants which lie beyond the scope of WASH programming, and towards which a climate resilient WASH intervention would be expected to have limited or no contribution.

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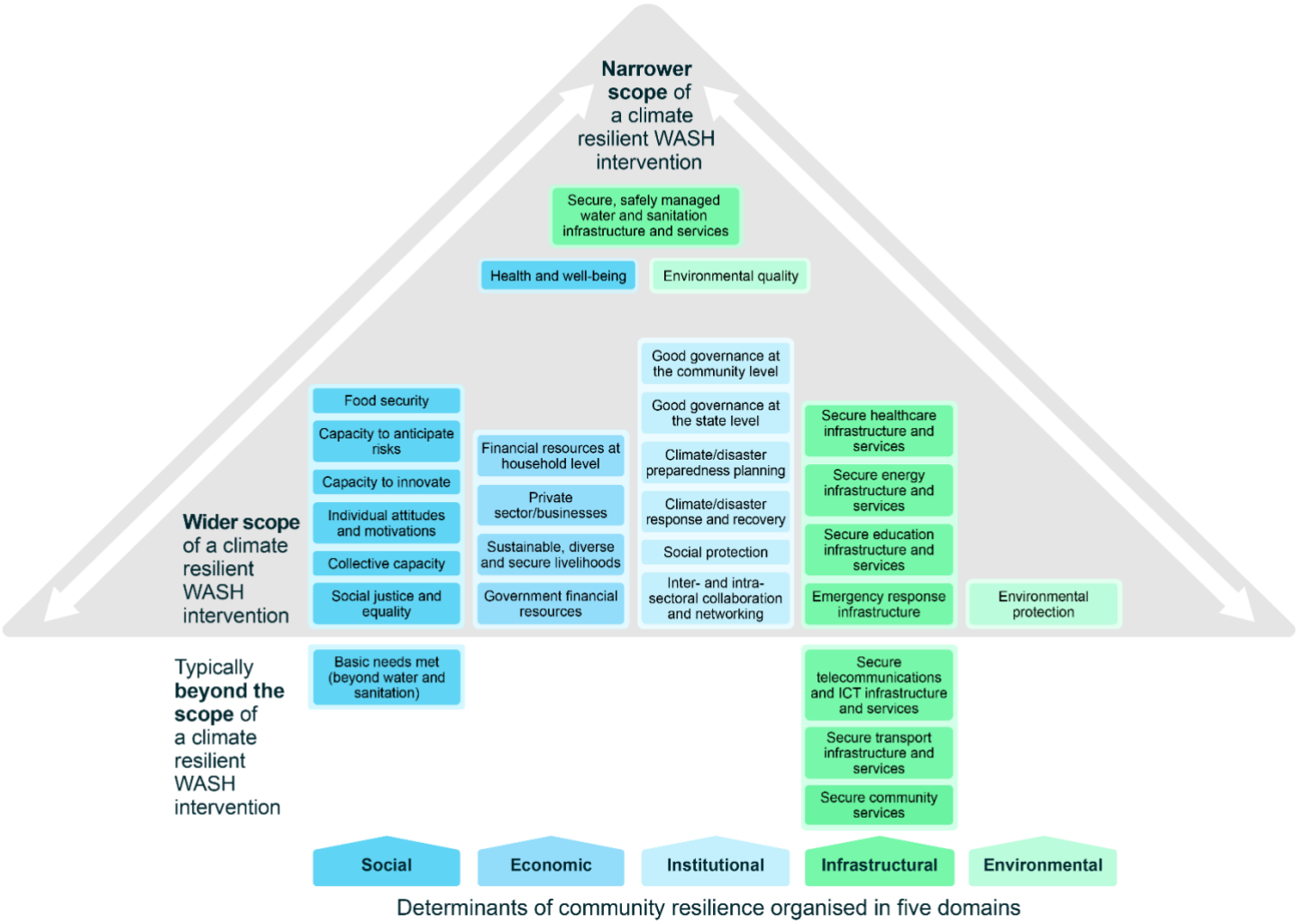
[2] Caretta, M.A., A. Mukherji, M. Arfanuzzaman, R.A. Betts, A. Gelfan, Y. Hirabayashi, T.K. Lissner, J. Liu, E. Lopez Gunn, R. Morgan, S. Mwanga, and S. Supratid, 2022: Water. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 551–712, doi:10.1017/9781009325844.006.

[3] Sanitation and water for all. Definition of Climate-Resilient Water Sanitation and Hygiene Services (2024). https://www.sanitationandwaterforall.org/sites/default/files/2024-11/ClimateResilientWASH_DefinitionPaper_final_0.pdf

Figure 2. Varied scopes of climate-resilient WASH interventions and their linkage to determinants of community resilience



To illustrate how narrower or wider scoped WASH interventions contribute to community resilience, examples are provided in Box 3. These examples illustrate how core WASH interventions, for example, just improving sanitation, can avoid major health and social impacts associated with cholera outbreaks that undermine community resilience. Moreover, Box 3 provides examples of WASH interventions that include intentional efforts to address other areas beyond WASH as an explicit part of a WASH intervention, demonstrating a broader scope of intervention.

A broader scope of WASH interventions shifts development practice towards increasingly multi-sectoral approaches, whilst also maintaining a core focus on strengthening WASH systems. This is aligned with view of the IPCC who state that: "*The feasibility and effectiveness of* [adaptation] *options increase with integrated, multi-sectoral solutions…"* and "*Maladaptation can be avoided by flexible, multi-sectoral, inclusive, long-term planning and implementation of adaptation actions, with co-benefits to many sectors and systems.*"[4]

[4] IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001

Box 3: Narrow and broader WASH interventions and their linkage to community resilience determinants

Narrowly framed WASH interventions may provide critical contributions to community resilience to climate change. Community health is a key determinant of resilience, and sanitation plays a critical role in protecting it. One example of the link between sanitation and health is cholera. **Cholera outbreaks undermine community resilience** by overwhelming local health systems, causing illness and death that reduce household income, eroding trust in public institutions, and disrupting school attendance and work productivity. Climate-resilient sanitation is essential for preventing cholera outbreaks, as flooding can spread excreta and dry conditions can hinder hygiene practices, both of which increase the risk of cholera transmission. Analysis of 4.9 million cholera cases over 2020-2021 in 234 countries and territories demonstrated that 97% of cases came from 31 of the 34 countries with the lowest levels of combined water and sanitation services (UNICEF, personal communication, 2025).

WASH interventions can also contribute to wider determinants of community resilience, depending on their design and approach. As an example, WASH interventions can **contribute to social justice and equality** in relevant communities, through adopting approaches that prioritise gender equality, disability and social inclusion (GEDSI). The Australian Government's Water for Women is an illustration of such work, supporting civil society organisations to incorporate GEDSI-transformative practice[5] in their climate resilient WASH interventions in Asia and the Pacific. Monitoring tools, including both qualitative approaches and quantitative approaches (namely qualKit[6] and WASH gender quality measure WASH-GEM[7]), were developed to track wider contributions to gender equality and social inclusion. Principles were also developed to support disability inclusive climate resilient approaches.[8]

Another example is a WASH intervention that explicitly targeted the **link between sanitation, ecosystem health, and fishing livelihoods and food production.** Addressing safe management of sanitation in fishing communities can prevent nutrients and other pollutants from harming local ecosystems. Sanitation-related pollution can damage aquatic ecosystems that these fishing communities rely on for food and income[9]. Such ecosystems, which are already under threat from rising temperatures and ocean acidification caused by climate change, are further degraded when intense rainfall events cause sanitation systems to overflow or discharge untreated waste nearby. Climate-resilient sanitation solutions can help prevent harmful human waste from entering these ecosystems, allowing them to continue supporting community resilience by providing essential food and income sources, especially as other livelihoods and food systems come under threat.

[5] UTS-ISF for Water for Women. Towards Transformation in GEDSI WASH Continuum (2025) https://www.waterforwomenfund.org/en/learning-and-resources/towards-transformation-in-gedsi-wash-continuum.aspx

[6] UTS-ISF for Water for Women. Exploring GESI Change qualkit (2022) https://waterforwomen.uts.edu.au/qualkit/

[7] UTS-ISF for Water for Women. Water, Sanitation, and Hygiene Gender Equality Measure (WASH-GEM) (2021) https://sites.google.com/uts.edu.au/washgem/home

[8] See Wilbur, J., Ruuska, D., Diba, S.A., Ul Alam, M., Upoma, TA., Akter, J, Nawaz, S (2025) Advancing equity: Principles for climate-resilient disability inclusive water, sanitation and hygiene. DOI: https://doi.org/10.17037/PUBS.04674714 and https://www.waterforwomenfund.org/en/learning-and-resources/disability-inclusion-and-wash.aspx

[9] Fred, T., Lebu, S., Kwiringira, A., Kesande, M., Makena, M.E., Nanyondo Semanda, J. and Manga, M., 2024. An urgent call for resilient WASH solutions at fish landing sites. *PLOS Water*, *3*(10), p.e0000305.

2 Five-step process to plan for monitoring

Overview

This section articulates the five-step guidance for development of a monitoring approach to capture the contribution of WASH interventions to community resilience to climate change. The five steps are:

1. **Define the purpose** of monitoring WASH contributions to community resilience: Assists in clarifying the core rationale and designing a monitoring approach that is fit-for-purpose.

2. **Identify relevant key determinants of community resilience** to which the WASH intervention will contribute: Supports considered, strategic selection of a subset of determinants to give focus.

3. **Develop a theory of change** of how the project will strengthen the determinants of community resilience: Articulates the actions and actors that will build community resilience in relation to a WASH intervention. This theory would extend and evolve an existing intervention theory of change.

4. **Assess the level of rigour and evidence** needed to achieve the purpose: Assists in planning the relevant resources and technical expertise that will need to be committed to monitoring.

5. **Design the monitoring approach, indicators and methods:** Involves integrating considerations from the other steps into an overall project or program monitoring system.

Figure 3. Diagram outlining the five-step process to plan for monitoring the contribution of WASH interventions to community resilience

Importantly, the five steps are to be carried out in an **iterative manner** rather than in a strict linear sequence, with ongoing reflection of how WASH activities are enhancing resilience, and how such effects could be maximised. The process is iterative because new insights often emerge at each step, prompting reflection and reconsideration of previous decisions. Moreover, as specific areas of community resilience are monitored over time, understanding of how effectively the WASH intervention activities are contributing to these areas will emerge, creating opportunities to modify the WASH intervention to even better address community resilience gaps and improve community resilience outcomes.

Step 1: Define the purpose of the monitoring

Getting clear on the purpose for monitoring a given WASH intervention's contribution to community resilience is essential for designing a fit-for-purpose approach. The process of articulating purpose as a first step importantly prompts early dialogue among WASH actors and relevant stakeholders to express their individual objectives for monitoring, so that all can then move forward with a unified strategy.

Clarify why and how WASH contributions to community resilience are worth monitoring. You may consider:

To what extent are contributions to community resilience already integrated into the WASH project design?: Some WASH projects have a targeted scope, focused on strengthening of WASH systems and delivery of WASH services. Other WASH interventions are designed with interlinkages with other broader domains and sectors, whether that be peace and security, energy security or water resources management or other areas. The starting point will likely influence the chosen level of ambition in areas to monitor.

How would the monitoring information be used? Monitoring contributions to community resilience will generate information that extends beyond the normal scope of typical WASH programming, and hence it is important to consider who the information is being collected for and when and how it would be used. All too often, monitoring and evaluation efforts and information are not utilised to the extent intended. Hence strategic and realistic considerations on data-use are an important first step:

- What decisions could monitoring information inform? Are these strategic or operational decisions?
- What are current capacities to analyse, document and communicate project monitoring information?
- Who do you expect to be the main users of information produced through monitoring?

What is your main purpose to monitoring WASH contributions to community resilience?

- **Advocacy**: Monitoring can generate evidence that demonstrates the role of WASH in building community resilience to climate change. Evidence-based advocacy creates a more compelling case to policymakers and planners for prioritising WASH in community resilience and development planning. It can also elevate the achievements of WASH in resilience strategy and policy targets.
- **Planning for climate adaptation investments**: Monitoring can generate evidence, which is increasingly required to secure competitive climate financing. To access financing, a strong climate rationale is required, as well as tracking of outcomes. Organisations that can demonstrate how their WASH interventions specifically connect to resilience are better positioned to secure climate funding as monitoring can identify and ideally quantify benefits in ways that satisfy climate finance requirements for measurable impact.
- **Program improvement for wider impact**: Structured monitoring can create feedback loops that can drive better implementation of a WASH solution, in a way that optimises for wider impact. An adaptive approach ensures WASH programs evolve to address emerging opportunities and challenges.
- **Intra-sectoral and cross-sectoral relationships**: Monitoring can highlight how WASH connects to water resources management, and to other sectors like agriculture, education and energy. These links can foster collaboration across traditionally siloed sectors and enable more integrated approaches on climate change adaptation
- **Donor requirements**: Donors may require that climate programming extend beyond sectoral work.

Consider if the above questions prompted any implications for design of a monitoring approach.

Each of these purposes would require a different level of investment, scientific rigour, methodology and scope. The different purposes are not mutually exclusive, and more than one purpose can be supported depending on the design of the monitoring approach.

Box 4: Defining a purpose for monitoring WASH contributions to community resilience in Cambodia

UNICEF Cambodia and UTS-ISF considered how the collection of information on WASH contributions to community resilience might be beneficial during a pilot of this guidance note. It was noted that much of the discourse in Cambodia on climate change centred on renewable energy and reduction of greenhouse gases. Government authorities and development donors did not always see a connection between WASH and renewable energy, so WASH was often left out of climate change strategies.

The pilot team therefore decided a primary purpose of monitoring was advocacy. Highlighting the links between WASH and renewable energy could be valuable in demonstrating the role of WASH in responses to climate change. Identifying this purpose informed subsequent decisions in the pilot, including a decision to focus on qualitative methods and collection of targeted quantitative data, and to include government-established indicators relating to renewable energy.

Photo credit: UTS-ISF/Cambodia/Jeremy Kohlitz

Step 2: Identify relevant key determinants of community resilience

Researchers and practitioners have identified a wide range of attributes, traits, processes, and actions that build community resilience (referred to in this guidance note as the determinants of community resilience). In this context, "contributing" to a determinant means that the activities of a WASH project or program help to strengthen or enhance that determinant, which in turn supports community resilience.

A WASH project or program can feasibly contribute to many of these determinants through various pathways, depending on the intervention's orientation and scope. However, no single WASH project is likely to have the resources, or the need, to track contributions to all possible determinants. It is therefore important to **strategically select a subset of determinants to focus on**.

Community resilience determinants are shown in Table 2. Using this table, it is helpful to first develop a **longlist of potential determinants to monitor**, then refine this to a shortlist, and finally identify a small number of priority determinants for inclusion in monitoring.

To create a longlist of potential determinants, review Table 2 in relation to the planned WASH project. Strike out any determinants that appear to be irrelevant to the project, or that do not align with the overall purpose of monitoring as defined in Step 1: Define the purpose of the monitoring . It may be useful to do this exercise in a group setting to capture a variety of perspectives.

Table 2. Summary of key domains and areas of measurement of community resilience based on review

Domain	Community resilience determinant	Illustrative ways in which WASH can contribute
SOCIAL	• **Health and well-being**: Improved physical and/or mental health and overall happiness and well-being	• Access to secure, safely managed water and sanitation services and sound hygiene practices reduces the disease burden and support a clean, comfortable, and dignified environment • WASH interventions that support access to sanitation can reduce stress related to open defecation and support privacy and safety in accessing toilets in support of well-being, particularly of women and girls.
	• **Food security**: A secure and reliable supply of safe, nutritious and affordable foods that meets dietary needs and preferences.	• Enhanced water availability associated with safely managed water services (additional water for irrigation) and safe wastewater and sludge reuse can increase local food production
	• **Basic needs met**: Shelter, clothing and other basic needs for survival (Note: needs beyond water and sanitation, which is covered in infrastructural below).	• *Beyond scope of most WASH interventions*
	• **Capacity to anticipate risks**: Individual, household or community access to information and knowledge on climate risks; technical skills and knowledge to interpret climate information; knowledge on how to prepare for climate risks; traditional ecological and social knowledge pertaining to climate risks	• Climate-resilient WASH approaches (including Water Safety Planning and Sanitation Safety Planning) incorporate climate risk assessment processes for climate-induced risks, as these approaches may build the capacity of individuals, communities, or organisations to plan for climate risks to other types of infrastructure and services
	• **Capacity to innovate**: Individuals, household or communities taking on a forward-thinking mindset towards the long-term; Openness to experimentation and innovation; Adaptiveness and flexibility	• WASH innovations that are novel to communities (e.g. nature-based solution interventions, greywater reuse systems for gardens, composting toilets) may stimulate interest and openness to innovations in other sectors

	• **Individual attitudes and motivations**: People's individually held beliefs, risk perceptions, perceptions of self-efficacy, and opinions in relation to climate change that motivate them to act.	• Community training on responding to climate change risks to WASH could develop people's overall attitudes and motivations towards addressing climate change and its impacts in general.
	• **Collective capacity**: Community cohesion, trust, conflict management, and caring for one another; social capital	• Community-led Total Sanitation initiatives that mobilise community members to help one another eliminate open defecation despite climate impacts could build overall social capital that benefits other aspects of community life. Similarly, community management of water or sanitation services could build relationships and wider collective capacity • Integrated efforts to address conflicts related to WASH (concerning water sources, pollution etc.) can contribute to improved overall conflict management
	• **Social justice and equality**: Empowerment and meaningful participation of disadvantaged groups including women; Inclusive decision-making; Equitable resource allocation; gender equality	• Access to safely managed water close to home or in homes can liberate girls and women from the task of collection, and enable them to pursue an education, contributing to equality and empowerment, and affordable pricing schemes for water and sanitation services can reduce financial or physical burden for vulnerable households[10]. • Gender-responsive or gender-transformative approaches to WASH can shift gender dynamics towards greater gender equality, and similarly concerning disability and social inclusion
ECONOMIC	• **Financial resources at household level**: Household access to cash, remittances, membership to formal or informal savings accounts, liquid assets, formal or informal lending and borrowing, cash and non-cash transfers	• Safely managed water and sanitation access can reduce waterborne illness and increase productivity, and time saved from fetching water can be used for income generation
	• **Government financial resources**: Local or central government access to revenue, cash, credit, liquid assets, formal lending and borrowing, cash and non-cash transfers	• Adequate tariff collection and appropriate financing models can support water and sanitation services to contribute revenue, noting that re-investment in asset management and long-term service delivery is essential and should not be compromised in doing so.
	• **Private sector/businesses**: Establishment of new businesses or enterprises; Increased profitability, revenue growth, growth margin, net income, cash flow, customer satisfaction, customer retention, brand recognition, return on investment, employee satisfaction and retention, or operational efficiency of businesses	• Climate resilient WASH initiatives can support the establishment or improvement of small-scale enterprises for provisioning water and/or sanitation that build skills in entrepreneuship and create jobs • Small businesses (e.g. restaurants) can improve their operations with increased access to safely managed WASH services.
	• **Sustainable, diverse and secure livelihoods**: Ability of	• Safely managed water and sanitation services can enable communities to create

[10] Stockholm International Water Institute. Policy brief: connecting the SDGs through resilience water management (2019). https://siwi.org/wp-content/uploads/2019/07/hlpf_sdg_june_19_webb.pdf

	households or individuals to earn income and "make a living" in diverse ways that are secure and viable over the long-term	new livelihoods, such as small-scale food-processing, restaurants, laundry and cleaning, and other income generating activities that require small amounts of reliable and clean water.
INSTITUTIONAL	• **Good governance at community level**: Transparent, accountable, participatory, responsive and non-discriminatory decision-making at the community level; Good financial management; Adaptive governance	• Community-managed WASH systems can strengthen budgeting, fee collection, and expenditure tracking, which builds local capacity for good financial management that can benefit other types of infrastructure and services.
	• **Good governance at the state level**: Transparent, accountable, participatory, non-discriminatory, responsive and lawful decision-making; Good fiscal management; Strong legal and regulatory systems; Making data and information available; Planning for equity and sustainability; Adaptive governance	• WASH monitoring systems might demonstrate how governments can generate data on access, quality, and infrastructure, which can be shared publicly to inform state policy and planning • Systems strengthening approaches to WASH can build institutional capacity, promote transparency and provide exemplary practice replicable in other sectors
	• **Climate/disaster preparedness planning**: Provision and use of early warning systems; dissemination of weather and climate information; Development of disaster and climate risk preparedness plans; Evacuation plans; Vulnerability and risk mapping	• WASH assessments could contribute to building capacity on carrying out risk, vulnerability, or resilience assessments for informing targeted interventions and resource allocation that could be applied in other sectors.
	• **Climate/disaster response and recovery**: Financial mechanisms for supporting disaster response or recovery; Coordination during disaster response or recovery; Emergency response resources	• WASH disaster recovery mechanisms (e.g. rapid response clusters) may be utilised for general disaster response or contribute to the development of thinking and practice on overall disaster response • WASH interventions could promote multi-sectoral emergency response mechanisms
	• **Social protection**: Social safety nets; Social insurance; Labour market protection; Legal frameworks and mechanisms for citizens to claim rights	• WASH can be bundled with other social protection and cash transfer schemes • WASH services may improve shock responsiveness during emergencies including climate disasters by protecting vulnerable populations • WASH interventions used to advocate for the human rights to water and sanitation and the human right to a healthy living environment in an era of climate change can inform the development of other mechanisms for citizens to climate rights in other sectors
	• **Inter- and intra- sectoral collaboration and networking**: Collaboration and networking between agencies/departments/individuals responsible for water, sanitation and hygiene with those from intra-sectoral areas (e.g. water resources management) and	• WASH interventions can act as a catalyst for collaboration, encouraging coordinated action across sectors and between engaged groups to achieve shared goals

	inter-sectoral areas (e.g. energy, agriculture).	
INFRASTRUCTURAL	• **Secure, safely managed water and sanitation infrastructure and services**: Access to safely managed water and/or sanitation services	• Climate resilient WASH interventions inherently strengthen water and sanitation infrastructure, access or services, including strengthening the systems that underpin these services
	• **Secure energy infrastructure and services**: Access to reliable sources of energy	• Water systems powered by decentralised renewable energy sources can reduce demand on central energy grid and reduce energy costs for households
	• **Secure transport infrastructure and services**: Access to reliable and safe transportation	• *Beyond scope of most WASH interventions*
	• **Secure telecommunications and ICT infrastructure and services**: Access to reliable telecommunications and information and communication technologies	• *Beyond scope of most WASH interventions*
	• **Secure healthcare infrastructure and services**: Access to preventive, promotive, curative, rehabilitative and palliative health services delivered through health care facilities.	• Safely managed WASH in healthcare facilities is essential for infection prevention, and adequate sanitation and water quality can reduce the risk of vulnerable, sick or injured patients being exposed to pathogens
	• **Secure education infrastructure and services**: Access to reliable education services delivered through education institutions	• WASH facilities in schools, particularly gender-sensitive facilities, promote dignity, safety, school attendance, and equal participation in education
	• **Secure community services**: Access to other community services not mentioned elsewhere such as policing, homelessness services, nutrition and food services, domestic violence and suicide prevention services, legal services, recycling services, and arts and cultural services.	• *Beyond scope of most WASH interventions*
	• **Emergency response infrastructure**: Evacuation facilities and shelter points; Emergency response vehicles and technologies	• Emergency and gender-sensitive sanitation facilities (e.g. mobile toilets, handwashing stations) and a safely managed water supply can maintain hygiene and dignity in crowded shelters, hence enhancing the willingness of women and other people to evacuate to such shelters, and the overall effectiveness of emergency responses.

ENVIRONMENTAL	• **Environmental quality**: Environmentally safe water, soil and air quality; Biodiversity; Healthy ecosystems	• Safely managed sanitation systems (e.g. latrines with safely managed sludge and effluent treatment, sewage treatment) can improve water quality, support healthy water ecosystems and provide organic fertiliser to improve soil health
	• **Environmental protection**: Land use and pollution regulations; Erosion management; Biodiversity loss prevention; Sustainable natural resource management practices; Ecosystems regeneration and restoration; Establishment of conservation and protected areas; Wildlife protection and anti-poaching	• Water resource protections (e.g. protected water catchment zones) for preventing water contamination can also contribute to the protection and restoration of local flora and fauna. • Nature-based solutions for water conservation may support enhanced water availability for domestic water supply as well as recharge ground and surface water, and support secondary treatment processes in waste water treatment.

To refine the longlist to a shortlist, consider several factors – some of which may relate to the overarching purpose of monitoring WASH contributions to community resilience as outlined in Step 1:

- **Known constraints or enablers of community resilience**: Certain determinants may already be known to hinder or support resilience in the target context (e.g. conflicts are a well-known barrier to community resilience in PNG). A WASH project may be intentionally designed to address weak determinants or to strengthen those that are already effective. Such determinants may be identified through existing situational analyses or new assessments.
- **Opportunities for collaboration with non-WASH partners**: Many determinants align with the mandates of other sectors adjacent to WASH, such as water resources management or agriculture and livelihoods. Selecting determinants related to these sectors may support in the development of intra-sectoral and inter-sectoral partnerships for more holistic approaches to building community resilience.
- **Stakeholder priorities**: Donors, implementing organisations, and national governments (via policies and strategies) may already have established priorities for strengthening community resilience. Communities themselves may also articulate their own priorities through consultation processes. Choosing determinants that align with these stated priorities can improve relevance and buy-in.
- **Quick wins or strong evidence base**: It may be easier to contribute to certain determinants where there is already strong evidence of a WASH-related impact (e.g. improved school attendance through WASH provisioning in schools), or where progress has already been made in linking WASH to certain determinants. In such cases, selecting these determinants can build on an existing evidence base.

To keep the monitoring scope manageable, it is recommended that only one to three priority determinants be selected. The following questions can help guide final selection:

- How exactly could the WASH intervention contribute to this determinant?
- How significant might the contribution be? At what scale? For whom?
- Is there existing evidence showing a relationship between WASH and this determinant (a literature review may help determine this)?
- Does the contribution align with government or other partner objectives?
- Could the WASH project negatively affect the determinant if the intervention is poorly implemented?
- From a logistical and practical perspective, how easy or difficult would it be to monitor WASH's contribution to this determinant?

The next step is to consider how the priority determinants relate to the WASH project activities and/or actors.

Box 5: Identifying 'collective capacity' as a priority social determinant to enhance community resilience to climate change through a rural WASH project in Papua New Guinea

In May 2024, UNICEF PNG and UTS-ISF trialled this guidance note to better understand how UNICEF PNG could contribute to broader community resilience within a recently commenced WASH project. The project chosen was '*Conflict-sensitive, climate-resilient and child-friendly WASH as a catalyst for peace for children in Papua New Guinea'*,

First, a 'long list' of possible contributions to community resilience was identified, including to: (i) health and well-being; (ii) secure education services; (iii) secure healthcare services; (iv) environmental quality; (v) individual attitudes and motivations related to climate change; (vi) social justice and equality; and (vii) intra-sectoral coordination.

Then, priority determinants were shortlisted. Given the importance of conflict management as an enabler of successful WASH service delivery in rural areas of Papua New Guinea, it was decided that the pilot would focus on monitoring the contributions to '**collective capacity**'. Collective capacity refers to elements of community cohesion, trust, conflict management, caring for one another, and maintenance of social capital, and is asserted to be an important aspect of community resilience to climate change.

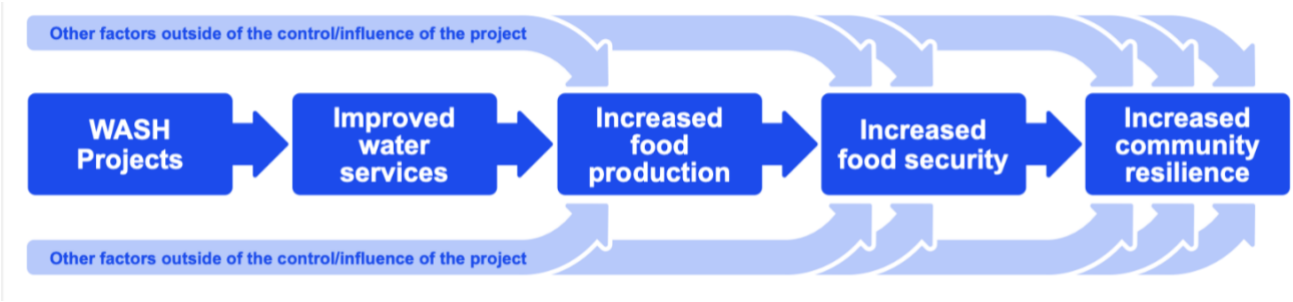
Step 3: Develop a theory of change of how the project will strengthen the determinants

The WASH project or program that you plan to monitor will likely have an associated theory of change (or a similar framework such as a theory of action or logical framework). This theory of change can serve as the basis for articulating how the WASH project's activities are expected to contribute to the priority community resilience determinants. If the project is still in the early phases of planning, this step can be implemented concurrently with the development of a theory of change. Clearly outlining these links creates a foundation for identifying what aspects can be monitored.

There are various ways in which theories of change or similar frameworks represent how a project or program leads to its intended outcomes. Most are grounded in cause-and-effect reasoning, and determinants of community resilience can be integrated as potential outcomes of WASH activities. For

example, Figure 4. illustrates a simplified causal pathway between a WASH project and community resilience via a contribution to food security.

Figure 4. Causal pathway between WASH project activities and community resilience through improved food security



In this example, improved water availability resulting from the WASH project may lead to increased food production in the community. This, in turn, can enhance food security – a factor commonly recognised as a determinant of community resilience. A monitoring approach could aim to collect evidence that supports each step of this pathway.

However, many other factors beyond the project's control or influence also affect each outcome along the pathway. As one moves further along the causal chain, it becomes more difficult to isolate the effects of the WASH project due to an increasing number of confounding factors. As a result, attributing the final outcome, enhanced community resilience, directly to the WASH project is nearly impossible. Therefore, the theory of change should focus on articulating how WASH activities influence outcomes that are closer to the intervention itself (i.e., outcomes closer to the left-hand side of Figure 4).

There are different schools of thought about how these theories of change and outcomes should be conceptualised. Traditional logical frameworks often focus on discrete, tangible outputs, such as the development of strategies or the construction of infrastructure. In contrast, more recent thinking on monitoring and evaluating climate resilience emphasises outcomes expressed as stakeholder actions or behaviours, changes in beneficiary experiences, or the formation of new relationships and networks. It is recommended to focus on the human actors or stakeholders involved in the change process as a way to clarify change processes and provide a clear basis for monitoring.

Further, while Figure 1 shows a singular, linear cause-and-effect relationship, in reality there may be multiple pathways through which WASH activities contribute to the prioirty determinant(s). These pathways may be co-dependent or relevant in only certain contexts. It is good to consider this complexity, but aim to focus on the outlining the pathways that are most robust and relevant to the project sites.

In summary, when articulating the contribution of WASH to community resilience through a theory of change:

- Focus on outcomes that lie within the project's sphere of influence, rather than attempting to trace effects all the way to the broader goal of community resilience
- Frame outcomes in ways that reflect changes in behaviour, actions taken by specific stakeholders, and relationships, rather than just technically oriented tangible outputs
- Consider the variety of pathways in which the project can contribute to outcomes supporting the selected determinants of community resilience, but focus on the most feasible, realistic pathways
- Note that this process is not an exact science, as the relationships between activities and outcomes can be complex and manifold. The real value lies in developing a logic for the desired change and collectively identifying where entry points for monitoring efforts which can best inform programming decisions and provide meaningful evidence.

Box 6: Developing a theory of change for WASH and community water conservation activities in Timor-Leste and their contribution to community resilience

UNICEF Timor-Leste and UTS-ISF trialled this guidance note in November 2024 with a WASH project in a planning phase: community-based water management and conservation in three rural municipalities supported by grassroots permaculture organisation, *Permatil.* Water conservation had been identified as a priority to improve climate resilience of rural water-supply services since a recent national census indicated significant limitations in water availability, with 54% of households experiencing at least one water shortage during the last six months (INETL, 2023).

The UNICEF and UTS-ISF team iteratively carried out Steps 2 and 3 by mapping out the pathways through which planned project activities could contribute to selected determinants of community resilience. These pathways were informed by a retrospective review of a previous project with a similar design, which demonstrated contributions to several social determinants of community resilience (food security, capacity to anticipate risks, capacity to innovate and collective capacity) as well as institutional determinants (good governance at community level, inter- and intra-sectoral collaboration). Such contributions were in addition to the typical contributions to infrastructure (secure water and sanitation infrastructure and services, and secure education and infrastructure and services) and environmental determinants (environmental protection). Based on these pathways a smaller feasible and targeted set of outcomes were identified focused on the 'sphere of influence' of the project, related to the actions of youth mobilisers for water conservation outcomes and of community water management groups.

Photo credit: UTS-ISF/Timor-Leste/Georgina Robinson

Step 4: Assess the level of rigour required

The required resourcing needed to monitor the contributions of a WASH intervention to community resilience depends on the level of evidence and rigour needed. The level of evidence and rigour required is also directed related to the overall purpose of the monitoring. This step provides guidance on key questions to be considered to determine the scope, budget and expertise that will be needed for monitoring the relevant outcomes. A spectrum from low rigour to high rigour is possible, each associated with different methods, strengths, limitations, skills and purposes (see Table 3). To note, it will not be necessary in all cases to prove causality, and this requires scientifically sound impact assessment methods that go beyond typical program monitoring systems.

Table 3. Levels of rigour in monitoring project or program outcomes

Approach	Illustrating potential contributions	Assessing extent of contribution	Proving causality or deep research investigation
Potential methods	Case studies Qualitative methods such as interviews, photovoice etc. Formative evaluation	Mixed methods combining quantitative and qualitative methods Inclusion of literature evidence on linkages Contribution analysis Outcome harvesting	Impact assessment with experimental or quasi-experimental approaches In-depth research (scientific, social sciences etc. depending on focus)
Strengths	Low resource requirement Select areas for which exploration and learning is valuable	Balances rigour, relevance and resources	Independent, objective analysis
Limitations	Potential for 'cherry-picking' positive examples Potential to miss unintended outcomes	Requires careful design (otherwise no more rigorous than case studies)	High resource requirements, maybe unwarranted if links are speculative High skills level requirement for meaningful design
Skills required	Interview skills, communication skills	Depending on the design, quantitative or qualitative research or evaluation skills	High-level research or evaluation skills
Relevant purposes	Internal advocacy Targeted/limited program learning Intrasectoral/intersectoral linkages Donor reporting requirements	External advocacy To assess the extent to which a program is contributing to selected dimensions of community resilience To facilitate access to cimate financing, including climate risk assessment and rationale for action Program learning/program improvement Intrasectoral/intersectoral linkages	Proof of concept of an intervention approach To generate rigourous evidence on the extent to which an intervention is contributing to one or more dimensions of community resilience To inform future intervention and programming choices

Box 7: Selecting the appropriate level of rigour to monitor WASH and water conservation project contributions in Timor-Leste

In Timor-Leste, monitoring the contribition of a community water conservation WASH project could be done to varying levels of rigour, satisfying different purposes, and requiring different levels of resourcing and time. Possible levels of rigour were linked to different purposes and included:

- **In-depth scientific research on causality between water conservation activities and water availability:** To rigourously assess the extent to which a set of nature-based solution activities (building reservoirs, etc.) increase groundwater acquifer recharge requires a longitudinal study over a significant duration, measurement of spring flows ideally using remote sensing and hydrogeological analysis.
- **Assessing extent of contribution to social determinants of community resilience:** Representative household surveys (baseline, midline and endline) would be suitable to assess contributions beyond WASH outcomes such as food production, capacity to anticipate risk, and attitudes towards climate risk preparedness. Inclusion of individual responses would support gendered experiences to be captured within households.
- **Illustrative potential contributions to environmental protection through participatory monitoring**: Community member collection of water-related indicators (e.g. water flow, soil moisture, erosion patterns, water levels in reservoirs) using low-cost methods (e.g. bottle and stopwatch, manual measurements, participatory photography activities) provides a feedback loop to community members.
- **Illustrative potential contributions to social determinants through qualitative study:** Qualitative methods would support monitoring of less tangible aspects of community resilience and the experience of specific groups, such as marginalised households or people with a disability.

Photo credit: UTS-ISF/Timor-Leste/Georgina Robinson

Step 5: Design the monitoring approach, indicators and methods

The final step is to design the overall monitoring approach, including selecting indicators to track the contributions of WASH activities to the priority determinants of community resilience, and identifying methods for collecting data on these indicators. The complete design of a monitoring approach is beyond the scope of this guidance note. However, in most cases, monitoring contributions to resilience determinants should be integrated into the broader project or program monitoring system to leverage existing resources, or in some cases may be incorporated into or draw on existing government monitoring systems.

While conventional best practices for designing effective monitoring systems apply, additional considerations should be taken into account:

- Will monitoring the contributions to the chosen determinants require additional resourcing (e.g. expertise not normally available within the project team, additional budget) beyond what is typically allocated for a WASH project?
- Are there existing government monitoring systems, frameworks or indicators or sectoral norms that the monitoring approach should align with or become part of?
- At what scale are the contributions to community resilience being made (e.g. individual, household, village, commune, etc.) and what are the implications for indicator development?
- Given that many factors may influence a particular determinant (e.g. good governance), what desired outcomes are realistic and feasible within the scope of the project or program and feasible to measure?

Consider how the relevant indicators will be designed, reflecting on the following questions:

- Is collaboration with non-WASH professionals needed to develop sound indicators in other sectors?
- How varied are the project or program contexts (consider climate, socio-economic and other differentiating factors) and the implications of this for indicator design?
- How can social differentiation and inclusion be accounted for? Consider different indicators that may be needed for diverse groups of people?
- Is there a case for participatory design of indicators with particular groups (e.g. government stakeholders, community representatives). Are community consultations needed?
- How available is relevant data likely to be (data may be available from other sectors)?
- What is the capacity for data collection, and who will be collecting data (e.g. project field staff, government counterparts etc.)?
- What are the likely costs and resourcing required?
- What monitoring time-frame is relevant, considering that community resilience outcomes may extend beyond a project or program's timeframe?
- How long are indicators are likely to remain relevant as communities and contexts change?

Links to resources with examples of indicators that could be used for monitoring determinants of community resilience are shown in Annex 1 of this document. Key characteristics of good indicators to consider:

- The indicator and its data requirements can be clearly and completely defined
- The indicator can be measure using affordable data collection tools
- The indicator is clear and easy to understand for relevant stakeholders
- The indicator is SMART - Specific, Measurable, Achievable, Relevant, and Time-bound

Box 8: Indicator areas to monitor WASH project contributions to community cohesion and conflict management in Papua New Guinea

Several indicator areas were suggested by UNICEF and government stakeholders that could be used to monitor progress in conflict reduction specifically in relation to WASH service dynamics:

- Presence and functionality of WASH committees
- Services uninterrupted by conflict
- Proportion of women in committees
- Active involvement of local youth group in WASH-related decision-making
- Active involvement of disabled people's organisations (DPOs) in WASH-related decision-making
- Transparency in financial accounting of WASH
- Whether a water source agreement is in place
- Presence by-laws on water source usage (oral or written) that people are aware of
- Whether conflict reduction was an explicit part of a WASH development/project plan

Beyond assessing WASH-related aspects of social cohesion and conflict management, to understand broader community dynamics, a wider set of indicators are needed.

A relevant guidance note asserts that resilience (within and across individuals, households, community, institutions, state and society) is a product of actions, structures, relationships, networks, and processes, proposing six factors with relevant indicators to monitor them:

1. **Social cohesion**; with indicators on solidarity; unity and identity; levels of community engagement
2. **Responsive leadership, good governance and inclusive politics**; with indicators on perceived role of the government; with indicators on perceived performance of the government, who in government works to improve life in the community; trust in government etc.
3. Access to **economic resources and opportunities**
4. Learnings from **legacies of past conflict**
5. Societal **information and communication networks**; with indicators on how informed respondents feel, ability to talk or organise without fear and propositions to prevent future violence
6. Systems of **law and positive perceptions of justice and safety**: with indicators on sense of security; risks and causes of violence, actors contacted to resolve disputes etc.

Source: Simpson, G., Makoond, A., Vinck, P., and Pham, P.N. Assessing resilience for peace: Guidance note. 2016. Interpeace.

Photo credit: UNICEF/UNI495399/Papua New Guinea

"Conflict is widespread, it's not just [conflict about] water, it's other social services also"

Box 9: Indicators to monitor WASH project contributions to environmental protection in Timor-Leste

The table below includes a range of possible indicators that could be included in monitoring WASH project contributions to the determinants prioritised in the UNICEF Timor-Leste trial of the guidance note: 'environmental protection'. The list is not fully comprehensive, but illustrative of the types of indicators that could be considered.

Determinant of community resilience	Outcome	Potential indicators
Environmental protection	Aldeias (hamlets) have improved water storage and yields from surface water sources and springs, particularly in dry season	• Additional volume of water storage capacity • Proportion of springs with an increasing trend in spring discharge flow in dry season • Proportion of surface water bodies with increased trend in depth in dry season
	Aldeias have improved erosion control and tree cover	• Changes in area of tree coverage • Number and severity of erosion events
	Teachers, students and community members maintain the existing nature-based solutions and conserve water	• Number of communities where nature-based solutions are well-maintained and water conservation practices are sustained

Box 10: Indicators to monitor WASH project contributions to energy security in Cambodia

Improved water systems can contribute to energy security and vice versa. The below table lists possible ways that **solar-powered** rural water systems can contribute to secure energy infrastructure and services and associated indicators. These indicators were developed during and after a pilot of the guidance note with UNICEF in rural Cambodia where rural water systems are often powered through a centralised grid or diesel generators.

Determinant of community resilience	Outcome	Potential indicators
Secure energy infrastructure and services	Reduced demand on central energy grid	• Number of kilowatt-hours reduced from electric grid during peak hours of demand
	Reduced fossil fuel consumption	• Litres of diesel fuel saved • Estimated reduced emissions through reduced number of kilowatt-hours from electric grid
	Reduced energy costs for households	• Energy expenditures per month for households or community • Energy affordability index
	Energy access	• Proportion of the population connected to electricity

3 Conclusions

Following the steps of this guidance note will support WASH implementers to more effectively track progress, learn from experience, and plan and implement the integrated solutions needed to build community resilience, aligning the scope of WASH interventions to the key contextual constraints to community resilience in specific locations.

WASH remains a foundational element for community resilience and thus in contexts where this basic need is not yet met, sector-specific work is warranted and should be prioritised. This said, integrated solutions will also be increasingly important. In its Sixth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) warned that: "*Most observed adaptation is fragmented, small in scale, incremental, sector-specific, designed to respond to current impacts or near-term risks, and focused more on planning rather than implementation*."[11]

Climate change impacts transcend traditional boundaries of development practice. As global warming continues, piecemeal and sector-specific adaptations may become increasingly ineffective at protecting communities. As such, WASH implementers must evolve their practice to more deliberately leverage its interconnectedness with other systems to realise more transformational adaptations that can more significantly build community resilience to climate change.

The scale and urgency of climate change demands that all development actors shift towards these types of solutions. Such a shift requires WASH implementers to rethink their development aims and goals. This guidance note should be considered as a tool that can support a broader shift in WASH practice to more climate resilient development for all communities. Whilst thinking more broadly, WASH implementers must also preserve the quality, depth and impact of sector-specific work to improve WASH services and systems where they are lacking, as their absence will constrain community resilience to climate change.

Improved monitoring can play a vital role. It supports feedback loops to make adjustments in planning and implementation of project and programs to better address WASH and wider community resilience needs. Such monitoring is necessarily challenging, as the causal chains are complex and take place within an ever-changing dynamic environment, particularly with the onset of larger-scale climate impacts. However, meeting that challenge is essential, and will provide visibility of any unintentional consequences and will capture broader benefits and impacts of WASH programming to community resilience to climate change.

Further work is needed to build from this guidance note, including the following:

- Further collection, experimentation and consolidation of indicators for measuring WASH contributions to each determinant of community resilience
- Strengthening the evidence base on determinants of community resilience in diverse contexts, particularly low-resource settings, since most measurement frameworks were developed with a focus on the Global North
- Documentation and sharing of case studies of monitoring WASH contributions to community resilience in practice, across different determinants of community resilience, and at differing levels of rigour and resources
- Ideation of integrated, multi-sectoral solutions that jointly enhance the resilience of WASH and other community services or infrastructure, and monitoring of these approaches
- Development of approaches for the inclusive co-design of WASH contributions to community resilience with community members and other stakeholders

[11] IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001.

Annex 1 – Resources for indicators

CARE's Framework of milestones and indicators for community-based adaptation lists indicators at the individual, household, local government, and national level addressing categories of climate-resilient livelihoods, disaster risk reduction, capacity development, and underlying causes of vulnerability. Available here.

IFRC's Road map to community resilience explains a process for developing your own indicators to a specific context (page 37) and includes a catalogue of example indicators related to health and wellbeing, basic shelter, food, water and other household needs, social cohesion, economic opportunities, natural assets, and connectedness (page 83). Available here.

Twigg's Characteristics of a disaster-resilient community lists indicators across thematic areas of governance, risk assessment, knowledge and education, risk management and vulnerability reduction, and disaster preparedness and response. Available here.

University of South Carolina's Baseline Resilience Indicators for Communities (BRIC) lists baseline community resilience indicators grouped into six resilience "capitals": social, economic, institutional, infrastructure, community, and environmental. Available here.

Béné et al's metric of food system sustainability uses 27 indicators across the thematic areas of environment, economic, social, and food and nutrition to build a food system sustainability metric. Available here.

Béné's resilience of local food systems and links to food security lists examples of indicators that can be used to assess long-term outcomes of food system resilience (see Table 3). These indicators relate to food security dimensions of food access, food quality, food safety, food availability and nutrition. Available here.

Buzási's Modified scorecard method of evaluating climate aspects of urban transport systems lists indicators for a future assessment of adaptive capacity of urban transportation systems that accounts for certain climate impacts (including higher temperatures and heatwaves (see Table 1), flooding (see Table 2), storms (see

Table 3). It also includes institutional-oriented indicators (see Table 4). Available here.

Paterson et al. Health Care Facilities Resilient to Climate Change Impacts lists climate change resiliency indicators. It shares a toolkit that consists of a checklist for officials who work in areas of emergency management, facilities management and health care services and supply chain management, a facilitator's guide for administering the checklist, and a resource guidebook to inform adaptation. Available here.

Stockholm International Water Institute. Policy brief: connecting the SDGs through resilience water management (2019) offering interconnections of water resilience with other areas. Available here.

Tong et al. Climate disaster resilience of the education sector attempts to measure the level of climatic disaster resilience of schools in Central Vietnam using a set of indicators that relate to five dimensions of physical conditions, human resources, institutional issues, external relationships, and natural conditions (See Table 1). Available here.

UNDRR Disaster Resilience Scorecard for Cities is a tool for local government to self-assess their disaster resilience. The 'Level 1: preliminary level' scrorecard responds to key Sendai Framework targets and indicators. Available here.

UNICEF Guidance Note on Sector-wide Sustainability Check includes an annex of indicators, which whilst sector focused, also include governance-related indicators including accountability. Available here

UN Women and UNESCAP's Gender-Environment indicators in the Asia Pacific provide a range of indicators for the gender nexus with environment (see Annex), relating to natural resources including food, energy and water; sustainable consumption, production and waste; and health, wellbeing and sanitation. Available here.

UN Women and ENEP Empower program indicators for gender, climate change and disasters build on the set of indicators above and list 39 example indicators refined from common themes amoung focus countries in the Asia Pacific (see Table 2). The program also included 'implementation indicators' (see G1 to G5) and a summary of metadata sources. Avaliable here.

UN Women's list of 100 indicators on gender and the environment provides a menu of options for measuring environmental issues from a gender perspective. It includes SDG indicators, Sendai indicators, and indicators from the Asia Pacific set of Gender-Environment Indicators. Available here.

Annex 2 – 'Community resilience' critiques and implications for monitoring

The following table describes how critiques of community resilience could be accommodated in approaches to monitoring community resilience.

Problem	Possible solution	Implications for monitoring contributions to community resilience
Intra-community power dynamics as an internal source of vulnerability	Interventions should seek to understand and address intra-community sources of vulnerability such as unequal power	Indicators that seek to measure intra-community/household power dynamics may be useful.
Elite capture of the benefits from a community resilience intervention	Design solutions with and for specific groups of disadvantaged people.	Data collection methods for measuring indicators should seek input not just from elites and traditional leaders
Heterogeneity within communities means people have differing levels of resilience	Assess, and build resilience in ways that account for this diversity instead of a common approach for everyone at the community level	Indicators may need to be disaggregated across social groups
The complex nature of community resilience makes it difficult to monitor and evaluate	Programs must invest more in thoughtful monitoring and evaluation	Balance needs between capturing nuance and complexity of resilience while being practical for WASH program staff to implement
Governments may use the concept of community resilience to absolve themselves of responsibility	Advocate to government that community resilience is not about leaving communities to fend for themselves	Careful messaging to government partners about community resilience and their responsibilities; Include indicators on government support to communities
Community resilience is linked to/influenced by the resilience of systems at larger scales	Community resilience-building must consider factors beyond the community scale	Establish common and clear boundaries or expand scope
Scoping of community is often poorly defined by programs and lack of consensus on what is a community	Define and operationalize the concept of community before the intervention; Consider alternatives to community based on geographic parameters	Indicators may be disaggregated (or aggregated) along different lines than how the intervention was implemented; Potentially bottom-up approaches to defining some indicators
Communities are dynamic, so levels of resilience change over time	Take a long-term, evolutionary perspective to resilience building through re-doing assessments and adjusting interventions over time	The indicators may need to be framed as losing validity over time, so need to re-measured or the indicators updated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