

Water, Sanitation, and Hygiene services within the Framework of the Global Goal on Adaptation

Executive Summary

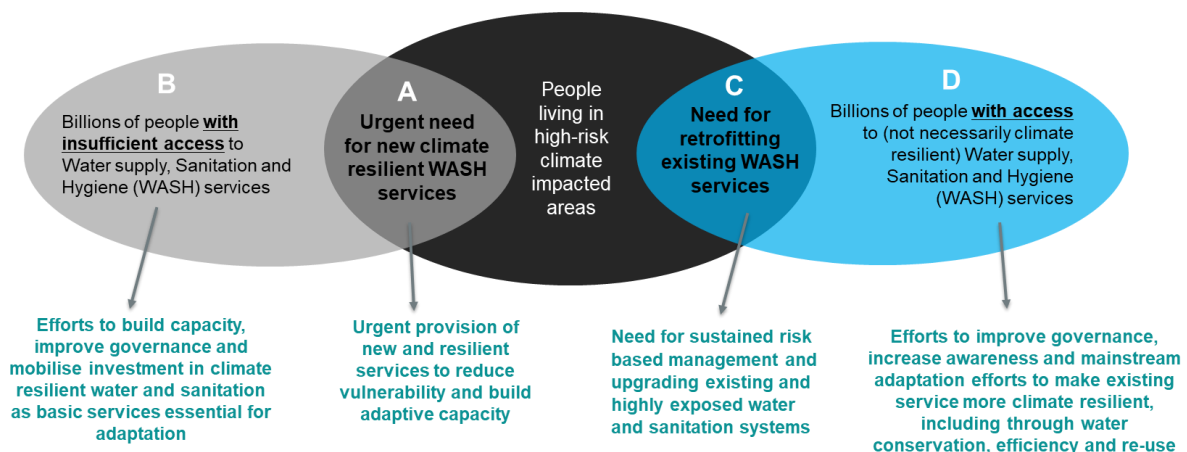
This paper is a concerted effort by international partners working towards universal access to safe drinking water, sanitation and hygiene services under the umbrella of the Sanitation and Water for All Partnership (SWA) and aims at providing an input to the Glasgow–Sharm el-Sheikh (GlaSS) work programme on how climate-resilient water, sanitation and hygiene services can be integrated in the ‘water’ theme within the Global Goal on Adaptation (GGA) Framework.

Water, Sanitation and hygiene services are key to ensure water security and global adaptation. Indeed, there is no water security or adaptive capacity if populations have no access to safe, sufficient and affordable water to meet essential needs for drinking, sanitation and hygiene, to safeguard health and well-being, and to fulfil basic human rights. This is aligned with IPCC’s conclusion that the most effective measures to address patterns of risks due to climate change and reduce near-term vulnerability are “programs that implement and improve basic public health measures such as provision of clean water and sanitation [...]” (IPCC, 2014)

However, climate change impacts upon water, sanitation and hygiene service provision decreasing health outcomes, limiting socio-economic development, and increasing political fragility:

- Water scarcity and droughts negatively impact health, well-being and economic productivity
- Heavy rainfall, extreme storms and floods lead to water contamination
- Ice melting represents an unsustainable drinking source for many millions
- Sea level rise leads to freshwater salinization in coastal areas

Outlining key strategies for climate resilient water, sanitation and hygiene services can be a great starting point and baseline within the water theme of the GGA Framework for enhancing efforts to mainstream adaptation in national priority areas:



- A) Reducing vulnerability in areas with high climate risk exposure and insufficient water and sanitation services.**
- B) Ensuring that progress towards the achievement of universal access to water, sanitation and hygiene contributes to climate adaptation.**
- C) Ensuring that existing water, sanitation and hygiene systems in areas highly exposed to climate risks embrace risk-based management and are retrofitted and upgraded.**
- D) Fostering water conservation, efficiency and reuse throughout existing water, sanitation and hygiene systems.**

While it can potentially be beyond the scope of the GGA Framework, there are also huge and untapped opportunities for mitigation linked to both new and existing water, sanitation and hygiene services.

Based on the described water, sanitation and hygiene adaptation strategies (A, B, C, and D), main global adaptation targets can be set to be achieved by an established year (e.g., coinciding with the end of the second Global Stocktake in 2028):

- All communities living in the overlap of insufficient water, sanitation and hygiene access and high climate hazard exposure have been targeted with climate resilient water, sanitation and hygiene services
- All new water, sanitation and hygiene systems for those with insufficient access are planned, built, and operated on the basis of a climate risk analysis
- All existing water, sanitation and hygiene systems in areas highly exposed to climate hazards have been upgraded and retrofitted
- All countries halve the proportion of untreated wastewater substantially increasing recycling, safe reuse
- All countries implement water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

The UNICEF-WHO [Joint Monitoring Programme \(JMP\)](#) is responsible for monitoring the global SDG indicators for targets on drinking-water, sanitation and hygiene. The JMP maintains extensive global databases and is currently undertaking expert consultations to identify opportunities for enhanced national and global monitoring of climate resilience in the sector. As discussed among water, sanitation and hygiene partners, and while JMP advances work on metrics and indicators, this paper shares with the GlaSS work programme some initial ideas and principles for consideration on how to monitor the proposed global water, sanitation and hygiene adaptation targets. Further submissions and inputs can be shared with the GlaSS work programme in advance of the upcoming workshops and COP28 to assist and support the finalization of the water, sanitation and hygiene related aspects of the GGA framework.

In relation to cross-cutting considerations for the GGA Framework, the IPCC Working Group II's most updated report (2022) expresses that integrated multi-sectoral strategies that address social inequities (e.g., gender, ethnicity) and social protection of low-income groups will increase the effectiveness of adaptation responses for water and food security. The IPCC Working Group II also expresses high confidence on the fact that continued investment in general health systems and in systems enhancing health protection is an effective adaptation strategy in the short to medium term.

If the global response to the threat of climate change needs to be addressed in the context of sustainable development and efforts to eradicate poverty, as the climate Paris Agreement aims, a much closer collaboration between water and climate is urgently needed. The synergies and common grounds between SDG 6 targets to achieve “universal access to water and sanitation”, SDG 13 targets on “climate action”, and the GGA Framework, must foster ways in which climate and water planners identify water, sanitation and hygiene adaptation priorities.

The stakeholders developing this joint submission strongly recommend that the GGA Framework incorporates strategies and metrics highlighting the applicability of water, sanitation and hygiene services to water security and global adaptation efforts. We are also willing to continue supporting the GlaSS work programme with the important endeavour of framing and operationalizing the GGA.

1. Introduction

Article 7, the Global Goal on Adaptation (GGA), was established by Parties to the Paris Agreement for enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change with a view to contributing to sustainable development and ensuring an adequate adaptation response.

At COP26 in Glasgow, a comprehensive two-year Glasgow–Sharm el-Sheikh (GlaSS) work programme on the GGA was established and launched to pave the way forward for operationalization by COP28. At COP27 in Sharm El Sheikh, Parties decided to initiate the development of a framework for the GGA to be undertaken through a structured approach containing a set of dimensions, themes¹ and cross-cutting considerations. The framework, once consolidated, will guide the achievement of the global goal on adaptation and the review of overall progress in achieving it.

This paper is a concerted effort by international partners working towards universal access to safe drinking water, sanitation and hygiene services (WASH)² under the umbrella of the Sanitation and Water for All Partnership (SWA) and aims at providing an input to the GlaSS work programme on how climate-resilient water, sanitation and hygiene services can be integrated in the ‘water’ theme within the GGA Framework, noting that these services are also an essential component for the ‘settlements and key infrastructure’, ‘health’ and ‘poverty and livelihoods’ themes. The rationale for a strong inclusion of these services as part of the GGA framework is that climate change clearly impacts these essential services, exposing vulnerable populations to greater levels of risk. Therefore, building adaptive and resilient water, sanitation and hygiene services is an essential component of building global adaptation.

The document starts by providing an overview of how water, sanitation and hygiene services fit in the context of water security and global adaptation. The following section highlights the impact of climate change upon these services: decreasing health outcomes, limiting socio-economic development, and increasing political fragility. Having clearly established the role that water, sanitation and hygiene services play within the context of climate adaptation, the document then proposes key strategies for the inclusion of such services in solutions. Initial considerations for target-setting and illustrative metrics for the GGA Framework are suggested, followed by cross-cutting considerations that relate water, sanitation and hygiene services to health, food security, and gender.

A similar structural approach as that proposed in this document could be followed by stakeholders supporting the provision of other essential services (e.g., health, education, nutrition).

Box 1. Key concepts and definitions related to water, sanitation and hygiene (WASH) services

[SDG 6](#) aims at ensuring availability and sustainable management of water and sanitation for all and includes ambitious targets for “achieving universal and equitable access to safe and affordable drinking water” (target 6.1), and “equitable sanitation and hygiene for all” (target 6.2) by 2030. Key related definitions to monitor progress³:

Drinking Water: refers to water used, or intended to be available for use, by humans for drinking, cooking, food preparation, personal hygiene and other essential domestic purposes.

- **Improved water sources:** those with the potential to deliver safe water by nature of their design and construction.
- **Basic service:** Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing.

¹ Water; food and agriculture; cities, settlements and key infrastructure; health; poverty and livelihoods; terrestrial and freshwater ecosystems; and oceans and coastal ecosystems; tangible cultural heritage; mountain regions; and biodiversity. See [Decision 3/CMA.4](#)

² Global Water Partnership (GWP); International Federation of Private Water Operators (AquaFed); Joint Monitoring Programme (WHO-UNICEF); Netherlands Ministry of Infrastructure and Water Management; Sanitation and Water for All (SWA); Stockholm International Water Institute (SIWI); Toilet Board Coalition; United Kingdom Foreign, Commonwealth and Development Office (FCDO); United Nations Children Fund (UNICEF); University Of Technology Sydney; Water For People; WaterAid; World Health Organization (WHO).

³ [Monitoring | JMP \(washdata.org\)](#)

- **Safely managed service**: Drinking water from an improved water source that is accessible on premises, available when needed, and free from faecal and priority chemical contamination.

Sanitation: refers to the provision of facilities and services for the safe management and disposal of human urine and faeces.

- **Improved sanitation facilities**: those designed to hygienically separate excreta from human contact.
- **Basic service**: Use of improved facilities which are not shared with other households.
- **Safely managed service**: Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or removed and treated offsite.

Hygiene: refers to the conditions and practices that help maintain health and prevent spread of disease including handwashing, food hygiene, and menstrual hygiene management.

- **Handwashing facility**: a fixed or mobile device designed to contain, transport or regulate the flow of water to facilitate handwashing.
- **Basic hygiene service**: handwashing facility with soap and water available at home.

Note: *Safely managed drinking water and sanitation services are not necessarily climate-resilient. Additional measures will be required to maintain service levels in the context of climate-related shocks and stresses.*

Climate resilient drinking water, sanitation and hygiene services: refers to services which are resilient to climate-related shocks and stresses and incorporate the following:

- **Climate risk analysis**: identification of impacts of climate variability and change (including extreme weather events) in the performance of water, sanitation and hygiene systems and associated behaviours.
- **Preventive measures**: infrastructure is designed to cope with and respond to climate-related shocks and stresses (e.g., elevated infrastructures in flood-prone areas, additional water storage capacities, additional treatment capacity etc.).
- **Resilient management/service delivery models**: are financially sustainable and sufficiently robust and flexible to cope with crisis, consider different climatic scenarios and thresholds, and incorporate redundancy (e.g., ready to provide alternative service solutions) to ensure continuity of the services (and reestablishment of services following extreme events), and to prioritise a risk-based approach (for instance, applying water/sanitation safety plans).
- **Environmental considerations**: (e.g., sustainable use, protection and management of surface and groundwater resources in the context of climate change, resilient waste management) and **social considerations** (e.g., local and indigenous adaptation knowledge, differentiated impacts on different populations) are observed and standards/regulations in place followed.
- **Contributions to community resilience**: are considered in the design of water, sanitation and hygiene interventions through capacity development and by fostering additional contributions such as (but not limited to) income generation, food, energy and ecosystem resilience.
- **Greenhouse gas emissions**: the impact of the service/system is considered in terms of greenhouse emissions and (when feasible) use renewable energy sources and reduce energy demands.

2. Water, Sanitation and Hygiene Services in the Context of Water Security and Global Adaptation

The UN Water working definition of water security refers to "the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability."⁴

There are four key dimensions to water security implicit in that definition (see figure 1 below), and all relate, in one way or another, to water, sanitation and hygiene services and systems. Indeed, there is no water security or adaptive capacity if populations have no access to safe, sufficient and affordable water to meet essential needs for drinking, sanitation and hygiene, to safeguard health and well-being, and to fulfil basic human rights. Human well-being cannot be addressed when the risk of intense weather events and slow onset changes to climate threaten the availability and/or reliable provision of water, sanitation, and hygiene services. Effective sanitation services that prevent groundwater or freshwater contamination are also foundational to safeguarding the health of rivers and oceans which support healthy populations and livelihoods.



Figure 1. Water Security Infographic (UN Water, 2013)⁵

⁴ [Water Security & the Global Water Agenda A UN-Water Analytical Brief](#). United Nations University, 2013

⁵ <https://www.unwater.org/publications/what-water-security-infographic>

Another important aspect of the UN-Water framing for water security is ensuring that populations are resilient to climate-related hazards. This introduces the concept of community resilience: *the understanding that there are no climate-resilient populations that do not have resilient access to water and sanitation services*. This concept is supported by the IPCC's conclusion that the most effective measures to address patterns of risks due to climate change and reduce near-term vulnerability are “programs that implement and improve basic public health measures such as provision of clean water and sanitation [...]”⁶ This is where WATER, SANITATION AND HYGIENE and water security most strongly show their dependency upon each other: Upstream water conditions, including safe treatment of waste and promotion of ecosystem health, are necessary to safeguard downstream biodiversity, ecosystem services and the water resources necessary for resilient populations.

3. Climate change impacts upon water, sanitation and hygiene services: decreasing health outcomes, limiting socio-economic development, and increasing political fragility

Water is the primary medium through which we feel the effects of climate change. Its impacts on water, sanitation and hygiene services have a huge negative effect on communities, who legitimately expect their governments, local authorities and other stakeholders like the private sector, to provide for solutions. Increased hydrological variability, water scarcity, and extreme weather events disrupt all points along the water to wastewater chain e.g., water treatment, storage supply and wastewater collection. Water and sanitation services to all users, people, industry, agriculture are all jeopardized, and public health is put at huge risk. A lack of finance to put preventative measures in place and increase resilience of utilities and service providers simply increases these risks. Countries that are unprepared to deal with changes in climate and corresponding increased levels of water scarcity and/or extreme weather events potentially face having to find billions of dollars every year for repairing and/or restoring such services.

The IPCC⁷ expresses high confidence that the future global burden of climate-sensitive diseases and conditions will depend not only on emissions but also adaptation pathways and the efficacy of public health systems, and sanitation services. Projections under mid-range emissions scenarios show an additional 250,000 deaths per year by 2050 (compared to 1961–1990) due to malaria, heat, childhood undernutrition and diarrhoea (high confidence). Mortality and morbidity will continue to escalate as exposures become more frequent and intense, putting additional strain on health and economic systems (high confidence), reducing capacity to respond, particularly in resource poor regions. Vulnerable groups include young children, pregnant women, indigenous peoples, those with pre-existing diseases, physical labourers and those in low socioeconomic conditions (high confidence). Therefore, how communities are prepared to deal with these changes will make a big difference in public health outcomes.

The following points summarize key impacts of climate change on water, sanitation and hygiene services and how that limits socio-economic development.

a) Water scarcity and droughts negatively impact health, well-being and economic productivity

In areas impacted by increasing droughts, water services and water for livelihoods is compromised, raising huge stress, especially for those that are already facing marginalisation. Less water available and less nutritious food because of limited crop production make productivity decline due to illness or weakness. In rural areas children and women will often have to walk long or longer distances to collect water, missing out on other important activities (i.e., education and/or economic livelihood activities). In urban areas, drought may mean spending much more on water and potentially food, reducing funds available for other expenditures.

⁶ [Climate Change 2014: Impacts, Adaptation, and Vulnerability Part A: Global and Sectoral Aspects](#) Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. 2014.

⁷ [IPCC Sixth Assessment Report. Working Group II. Technical Summary \(2022\)](#).

Lack of adequate water quantity also inhibits good sanitation and hygiene practices. As water supplies are rationed to meet a family's immediate survival needs (i.e., drinking and food preparation) practices such as handwashing and toilet cleaning are often minimized in order to conserve water, leading to increased occurrences of diseases. Also, insufficient water particularly affects sewerage sanitation systems and therefore waste treatment, and disposal. The disruption of water-based sanitation systems leads to an increase in open defecation with greater pollution of the surrounding environment and increased waterborne diseases. The risk of gender-based violence for women, girls and non-binary individuals who may have to resort to open defecation increases.

When drought persists, families are forced to migrate to areas with more resources and economic opportunity, leading to displacement at best, and, in some cases, conflict within households or across demands for water usage.

Lack or insufficient water during drought periods in institutional settings such as health care facilities and schools, or at work, further aggravate the negative impacts on health, well-being and economic productivity.

b) Heavy rainfall, extreme storms and floods lead to water contamination

Flooding and increased precipitation can be deadly in areas with unsafe or insufficient water and sanitation services, or where open defecation is practiced. Floods can inundate, destroy or damage infrastructure such as water distribution points and toilets. When sewer systems, latrines and toilets are flooded and damaged, they can contaminate water supplies, making water deadly to drink. Peaks in diarrheal mortality and morbidity are commonly associated with seasonal rains, flooding and extreme weather. Indeed, the latest IPCC work group II report (2022) concludes that heavy rainfall events (high confidence) and flooding (medium confidence) are associated with increased water-borne diseases, particularly diarrheal diseases, including cholera (very high confidence) and other gastrointestinal infections (high confidence) in high-, middle and low-income countries. Water insecurity and inadequate water, sanitation and hygiene increase disease risk (high confidence).

Recurring floods can cause communities to abandon safe sanitation and hygiene practices and return to defecating in the open, which can further increase waterborne disease outbreaks and pollution of the surrounding environment including water sources and freshwater ecosystems.

c) Ice melting represents an unsustainable drinking source for many millions.

Ice and snow cover is decreasing significantly in most regions because of global warming. Melting snow, glaciers and sea ice impact access to water in the present and greatly threaten to change water sources in the future since many communities rely on meltwater for their water supply of essential household water needs. Indeed, in the Andes Mountains in South America and in High Mountain Asia, glacier melt is a major source of drinking water and irrigation for several hundred million people⁸. As ice melts, it not only contributes to rising sea levels but also depletes other freshwater resources. Warming temperatures in circumpolar regions can lead to introduction of new waterborne diseases for indigenous and remote communities relying on traditional water sources. Coupled with melting permafrost, housing conditions and lack of infrastructure in remote locations, the risks to traditional water collection and existing water systems for circumpolar populations is significant.

d) Sea level rise leads to freshwater salinization in coastal areas.

Rising sea levels can lead to saltwater infiltrating freshwater sources, rendering the water undrinkable. Rising sea levels are already having a major impact, particularly in low-lying coastal areas and Small Island Developing States, which, when combined, are home to at least 25 per cent of the world's population⁹. These regions have less than 10 per cent of the global renewable water supply, leaving populations dependent on groundwater sources – which are highly vulnerable to the impacts of

⁸ NASA Global Climate Change online article "[Ice Melt Linked to Accelerated Regional Freshwater Depletion](#)" accessed on April 28th 2023.

⁹ Parry, Martin, et al., eds., *Climate Change 2007: Impacts, adaptation and vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, 2007, p. 414.

salinization.¹⁰ The latest IPCC WGII report concludes that risks to water security will occur as early as 2030 or earlier for small island states.

4. The Contribution of Water Supply, Sanitation and Hygiene to Adaptation

Access to water and sanitation is not only a human right but a critical entry point to sustainable environmental, social and economic development. It reduces community vulnerability to climate impacts, thereby closing gender gaps, improving education, and enhancing human health and wellbeing.

The most vulnerable regions are those characterized by the compound challenges of high levels of poverty, a significant population without access to services such as water and sanitation, wealth and gender inequalities, and governance challenges. Within those, it is the marginalized communities have the most urgent need for improved adaptive capacity. Climate risks additionally extend to those currently having access to water, sanitation and hygiene services, as in many cases they are not climate resilient.

Outlining key strategies for climate resilient water, sanitation and hygiene services can be a great starting point and baseline within the water theme of the GGA Framework for enhancing efforts to mainstream adaptation in national priority areas.

Box 2. Key water supply, sanitation and hygiene related conclusions by IPCC WGII Sixth Assessment Report (2022)

- Adaptation options that are feasible and effective to the 3.4 billion people living in rural areas around the world and who are especially vulnerable to climate change must include the provision of basic services, such as water and sanitation (high confidence).
- In urban settings, infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow-onset events, with resulting economic losses, disruptions of services and impacts to well-being (high confidence).
- The burden of diseases could be reduced, and resilience increased, through strengthening access to water and sanitation (high confidence).
- Weak governance, unequal access to safe water and sanitation services and a lack of infrastructure and financing all reduce adaptation capacity and deepen vulnerability (high confidence).
- The greatest gaps between policy and action are in failures to manage adaptation of social infrastructure (e.g., community facilities, services and networks) and failure to address complex interconnected risks for example in the food–energy–water–health nexus.
- Strengthened health, education and basic social services are vital for improving population well-being and supporting climate resilient development (high confidence).

Through consultations, and as a concerted effort among water, sanitation and hygiene partners, the following figure has been developed to illustrate key adaptation strategies. This concept has been adopted by the Green Climate Fund (GCF) in the recently released GCF Water Security Guidelines¹¹, and it is suggested that, seeking complementarity, the GGA framework adopts a similar approach. Other stakeholders working on the provision of other essential services (e.g., health, education, nutrition) could adopt a similar approach.

¹⁰ Ibid. p.179

¹¹ [gcf-water-sector-project-design-guidelines-part-2-feb-20.pdf \(greenclimate.fund\)](https://www.greenclimate.fund/gcf-water-sector-project-design-guidelines-part-2-feb-20.pdf)

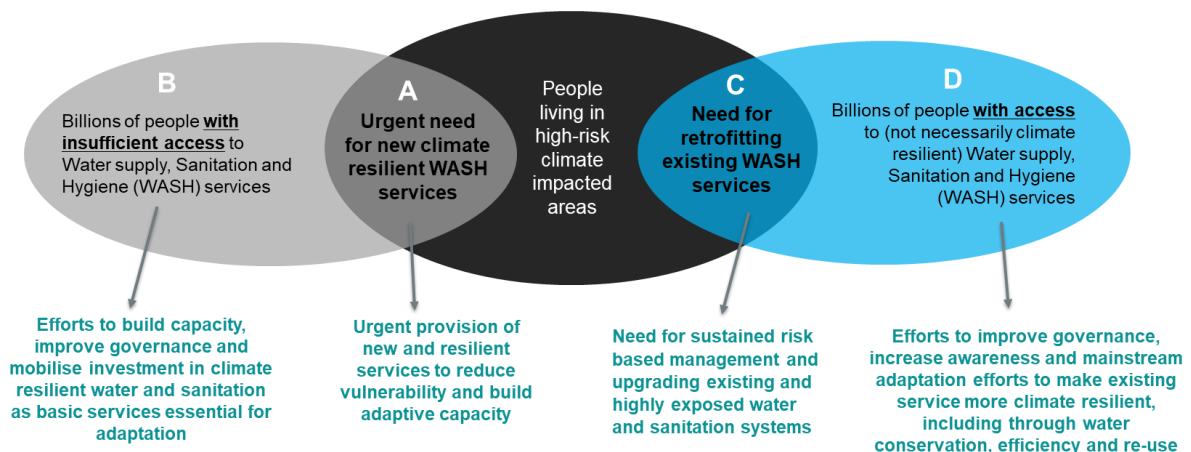


Figure 2. Water, Sanitation and Hygiene Adaptation strategies according to access and hazard exposure levels

Below is a description of **key adaptation strategies to solutions within water supply, sanitation and hygiene**. An important observation to all of them is that they should target not only infrastructure but key enabling environment aspects related to policy, institutional arrangements, financing, planning-monitoring, and capacity development¹².

The following 4 points correspond to the 4 shadowed areas (A, B, C, D) of the figure above and explain the water supply, sanitation and hygiene adaptation strategies:

A) Reducing vulnerability in areas with high climate risk exposure and insufficient water and sanitation services. As a reference, it has been estimated¹³ that 1.42 billion people live in areas affected by high or extremely-high “water vulnerability”, defined as a combination of low access and physical water scarcity. For them, the provision and sustained management of resilient water, sanitation and hygiene services reduces community vulnerability to climate change and is a critical component of adaptive capacity and resilience. As highlighted by IPCC (see Box 2), putting in place resilient water and sanitation services (see proposed parameters in Box 1) produce short and long-term positive economic impacts upon household incomes, help prevent migration, and create resilient environments against the spread of global health pandemics. Therefore, urgent efforts by countries are needed to map/identify and then prioritize the areas where high exposure to climate hazards overlap with low access to water, sanitation and hygiene. This is particularly important in the least developed countries (e.g., those that have contributed least to climate change) as they overwhelmingly lag behind in terms of access to these essential services, and at the same time will have the most immediate impact and positive contribution towards global adaptation.

B) Ensuring that progress towards the achievement of universal access to water, sanitation and hygiene contributes to climate adaptation. The sustainable development agenda is calling for the achievement in the next seven years of universal access to safe drinking water, sanitation and hygiene services by 2030. Currently, 2 billion people have no access to safely managed water, 3.6 billion people lack access to safely managed sanitation and 2.3 billion people lack access to basic handwashing facilities at home¹⁴. To avoid maladaptation, and maximize opportunities for mitigation, climate action is inseparable from sustainable development of water, sanitation and hygiene services. Adaptation efforts need to ensure that the new systems for those currently with

¹² Countries can assess their adaptation needs against these enabling environment “building blocks” through the checklists (see page 10-13) of SWA Briefing Note “[Adapting to climate change and fostering a low carbon water and sanitation sector](#)”

¹³ UNICEF. [Reimagining WASH: water security for All](#). 2021.

¹⁴ WHO and UNICEF. [Progress on Household Drinking Water, Sanitation and Hygiene 2000-2020: Five Years into the SDGs](#) . 2021

insufficient access are planned, built, and operated with attention to resilience in the face of a changing climate.

C) Ensuring that existing water, sanitation and hygiene systems in areas highly exposed to climate risks embrace risk-based management and are retrofitted and upgraded. As a result of climate change, and other compounding stresses such as increasing demand, inefficient operations, insufficient tariff revenue and the deterioration of infrastructure, water and sanitation utilities and service providers particularly in the global south are already facing challenges to ensure the sustainable and resilient provision of water and sanitation services. Indeed, it is estimated¹⁵ that 38% of urban land will be in high frequency flood zones, and 13% in drylands; hence, 2.2 billion people could be living in urban areas and exposed to these climate hazards. There, as well as in rural areas, existing water and sanitation systems in locations highly exposed to climate risks need to adopt more sustainable finance and operational strategies that can enable a risk-based management approach. The measures could include retrofitting and upgrading infrastructure through the explicit consideration and internalization of the risks and opportunities that alternative climate change scenarios are likely to imply for their operation and maintenance. In practical terms, this means integrating climate change risks, and opportunities for mitigation, into the initial design, operation, and management of the existing infrastructure through well informed life cycle costing that considers climate risks.

D) Fostering water conservation, efficiency and reuse throughout existing water, sanitation and hygiene systems. As global water scarcity is intensifying, economizing on water use is a critical aspect of any effective climate response. There are opportunities for different forms of recycling of wastewater at different scales and for different reuse purposes such as groundwater recharge or irrigation. Also, given that a significant percentage of urban water consumption is for household use, reducing this through water demand management interventions (e.g., efficient appliances, grey water recycling, rainwater harvesting, water consumption metering, leakage reduction, etc.) will reduce overall water demand under different climate scenarios. Significant water savings can be achieved in developed countries particularly through reductions in water consumption from consumer behavioral changes. Social instruments such as awareness-raising, information, and educational campaigns (importantly considering children and youth as agents of change), can be used to encourage behavioral changes (e.g., time spent showering).

While it can potentially be beyond the scope of the GGA Framework, there are also huge and untapped opportunities for mitigation linked to both new and existing water, sanitation and hygiene services: integrating water and energy efficiency and incorporating the use of renewable energy (e.g., solar and wind energy) into water and sanitation infrastructure can have significant impacts¹⁶. The expansion of sanitation solutions for those who currently lack sanitation services should be viewed as an opportunity to significantly reduce direct GHG emissions, with a view to optimizing the entire faecal sludge management service chain, from the collection and transport of sludge to the final end-use or disposal of treated sludge. As more people transition from open defecation to limited or basic on-site sanitation, default standard approaches that contribute to more GHG emissions (i.e., septic tanks or pit latrines not separating urine) are likely to be utilized. Finally, it has become increasingly evident that waste water treatment plants worldwide have the potential to be energy-neutral or energy-positive facilities (i.e., the energy needs of the facility are satisfied entirely by self-generation, with the potential to produce more energy than needed through energy recovery improvements). It can be concluded then, that adaptation efforts can be coupled with mitigation approaches to help accelerate resilient safely managed water and sanitation that additionally ensure newer, emission-efficient services.

¹⁵ Güneralp B, Güneralp İ, Liu Y. [Changing global patterns of urban exposure to flood and drought hazards](#). *Glob Environ Chang* [Internet]. 2015;31:217–25

¹⁶ The released Key Messages and Executive Summary of the forthcoming SIWI report, the essential drop to reach Net-Zero: Unpacking freshwater's role in climate change mitigation, highlights that "water and sanitation management can reduce GHG emissions. Climate mitigation planning and action should include the substantial emission reduction potential in drinking water and sanitation services [...]".

5. Water, Sanitation and Hygiene Target-setting and Initial Metrics for the GGA Framework

Based on the strategies described above, main water, sanitation and hygiene global adaptation targets can be set to be achieved by an established year (e.g., coinciding with the end of the second Global Stocktake in 2028):

- All communities living in the overlap of insufficient water, sanitation and hygiene access* and high climate hazard exposure have been targeted with climate resilient water, sanitation and hygiene services* (see clarifications* in the table below)
- All new water, sanitation and hygiene systems for those with insufficient access are planned, built, and operated on the basis of a climate risk analysis.
- All existing water, sanitation and hygiene systems in areas highly exposed to climate hazards* have been upgraded and retrofitted (see clarifications* in the table below)
- All countries halve the proportion of untreated wastewater substantially increasing recycling, safe reuse
- All countries implement water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

The UNICEF-WHO [Joint Monitoring Programme \(JMP\)](#) has reported country, regional and global estimates of progress on WASH since 1990 and is responsible for monitoring the global SDG indicators for targets 6.1 and 6.2 on drinking-water, sanitation and hygiene. The JMP maintains extensive global databases and is currently undertaking expert consultations to identify opportunities for enhanced national and global monitoring of climate resilience in the sector. The JMP can support the efforts by the GlaSS in the development of the GGA Framework, including targets, metrics and indicators for climate-resilient WASH services.

As discussed among water, sanitation and hygiene partners, and while JMP advances work on metrics and indicators, the table below aims at sharing with the GlaSS work programme some initial ideas and principles for consideration. Further submissions and inputs can be shared with the GlaSS work programme in advance of the upcoming workshops and COP28 to assist and support the finalization of the water, sanitation and hygiene related aspects of the GGA framework.

Table 1. Illustrative potential targets within water, sanitation and hygiene adaptation strategies and initial considerations for metrics

Adaptation Strategy	Target	Comments to Metrics/Indicators	Sources
<p>Reducing vulnerability in areas with high climate risk exposure and insufficient water and sanitation services</p>	<p>By 2028 all communities living in the overlap of insufficient water, sanitation and hygiene access* and high climate hazard exposure have been targeted with climate resilient water, sanitation and hygiene services**.</p>	<p>Target year proposed to coincide with Second Global Stocktake Review (i.e., 2028)</p> <p>Similar targets could be replicated with other essential services within the GGA framework</p> <p>Use of existing SDG 6.1 and 6.2 JMP indicators and monitoring as a starting point.</p> <p>* Insufficient water, sanitation and hygiene access: population without safely managed services (no service, unimproved, limited, basic, as per JMP definitions and as shown on Box 1 of this document)</p> <p>** Climate resilient water, sanitation and hygiene services: as per Box 1 in this document. Its monitoring is to be defined with a set of proxy indicators (work on-going under JMP)</p> <p>Potential additional considerations for metrics can include:</p> <ul style="list-style-type: none"> • Number of countries that have identified (e.g., in NAPs / NDCs and/or WASH strategies) and targeted all the communities living in the overlap of insufficient WASH access and high exposure to different climate hazards (reference thresholds to be defined globally). Note: having data for each of these and the corresponding number of people with/without access would be valuable, as it also helps shine a light on what kinds of investments are needed • Volume of climate adaptation finance invested in these interventions • Number of highly exposed people benefiting from access to climate resilient WASH services / proportion of people living in highly exposed areas that have access to climate resilient services • Percentage change in access to climate resilient WASH services in places below a certain poverty threshold and/or food security threshold 	<p>Existing monitoring and reporting mechanisms for SDG 6 targets 1 and 2. Indicator 6.1.1 Indicator 6.2.1</p> <p>Upcoming new JMP monitoring indicators for climate resilient water, sanitation and hygiene (expected in 2024)</p> <p>Countries own reporting on adaptation measures through NDCs and NAPs</p> <p>Climate finance projects databases including OECD</p> <p>Note: DAC ODA could allow to know what adaptation investments are made in the specific locations/regions targeted as part of this strategy.</p>

<p>Ensuring that all progress towards the achievement of universal access to water, sanitation and hygiene contributes to climate adaptation</p>	<p>By 2028 all new water, sanitation and hygiene systems for those with insufficient access are planned, built, and operated on the basis of a climate risk analysis.</p>	<p>Potential considerations for metrics can include:</p> <ul style="list-style-type: none"> • Number of countries that have developed national and subnational WASH climate risk analysis and understand what are the most critical climate risks to WASH services and communities. Note: another related monitoring aspect is in relation to countries that have put in place capacity building mechanisms to develop climate risk analysis for water, sanitation and hygiene services. • Number of countries where data is collected on a regular basis on the impacts of climate change on water resources and water, sanitation and hygiene services. The country is building a strong causal relationship, and a strong climate rationale • Number of countries that have appraised options to address identified risks (to reduce exposure and vulnerability and/or raise capacity) at national, sub-national and local levels. Note: important to see if those lead to changed investment patterns that account for risks. • Number of people benefited from access to climate-resilient water, sanitation and hygiene services 	<p>National and subnational WASH policies and strategies (to check for climate change and use of risk analysis processes)</p> <p>Existing monitoring and reporting mechanisms for SDG 6 targets 1 and 2. Indicator 6.1.1 Indicator 6.2.1</p> <p>Upcoming new JMP monitoring indicators for climate resilient WASH (expected in 2024)</p> <p>Countries own reporting on adaptation measures through NDCs and NAPs</p> <p>Climate finance projects databases</p>
<p>Ensuring that existing water, sanitation and hygiene systems in areas highly exposed to climate risks embrace risk-based management and are retrofitted and upgraded</p>	<p>By 2028 all existing water, sanitation and hygiene systems in areas highly exposed to climate hazards* have been upgraded and retrofitted</p>	<p>* Exposures levels thresholds to be defined globally).</p> <p>Potential considerations for metrics can include:</p> <ul style="list-style-type: none"> • Number of countries that have identified and upgraded all existing water, sanitation and hygiene services that are highly exposed to different climate hazards • Volume of climate adaptation finance invested in these projects / proportion of climate adaptation finance that is allocated • Number of people benefited from access to resilient and upgraded water, sanitation and hygiene services / number of people benefited by interventions dedicated to improve the climate resilience of their water supply and sanitation systems 	<p>National and subnational water, sanitation and hygiene policies and strategies</p> <p>Water/Sanitation utilities reporting systems</p> <p>Countries own reporting on adaptation measures through NDCs and NAPs</p> <p>Climate finance projects databases</p>

<p>Fostering water conservation, efficiency and reuse throughout existing water, sanitation and hygiene systems</p>	<p>By 2028 all countries halve the proportion of untreated wastewater substantially increasing recycling, safe reuse</p> <p>(Note: this is adapted from SDG 6 target 3)</p> <p>By 2028 all countries implement water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity</p> <p>(Note: this is adapted from SDG 6 target 4)</p>	<p>Strong baseline and consideration of existing SDG6 Indicators:</p> <ul style="list-style-type: none"> Indicator 6.3.1: Proportion of domestic and industrial wastewater flows safely treated Indicator 6.3.2: Proportion of bodies of water with good ambient water quality Indicator 6.4.1: Change in water-use efficiency over time Indicator 6.4.2: Level of water stress: freshwater withdrawal as a proportion of available freshwater resources <p>Potential additional considerations:</p> <ul style="list-style-type: none"> Number of countries that have developed water demand management strategies that factor in the human rights to water and sanitation Volume of climate adaptation finance invested in these projects M3 of water saved per year (compared to baseline) M3 of water reused (compared to baseline) M3 of wastewater recycled and reused People benefited from interventions targeting water conservation, efficiency and reuse 	<p>Existing monitoring and reporting mechanisms for SDG 6 targets 3 and 4.</p> <p>Target 3: Indicator 6.3.1 Wastewater Indicator 6.3.2 Water Quality</p> <p>Target 4. Indicator 6.4.1 Water Use Efficiency Indicator 6.4.2 Water Stress</p> <p>Water/Sanitation utilities reporting systems</p>
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Additional General Metrics for consideration

- Number of NDC/NAPs highlighting water, sanitation and hygiene within national priorities
- Increase on Adaptation funding to water, sanitation and hygiene over time through OECD/DAC
- Number of national strategies/plans to provide services to unserved population at risk
- Number of national strategies/plans to improve resilience of existing services
- Number of national strategies on water conservation/reuse/water demand management

6. Water, Sanitation and Hygiene Cross-cutting Considerations for the GGA Framework

The IPCC Working Group II's most updated report (2022) expresses that integrated multi-sectoral strategies that address social inequities (e.g., gender, ethnicity) and social protection of low-income groups will increase the effectiveness of adaptation responses for water and food security (high confidence). The explanation is that multiple interacting factors help to ensure that adaptive communities have water and food security, including: addressing poverty, social inequities, violent conflict, provision of social services such as water and sanitation, social safety nets and vital ecosystem services. Differentiated responses based on water and food security level and climate risk increase effectiveness, such as social protection programmes for extreme events, medium-term responses such as local food procurement for school meals, community seed banks or well construction to build adaptive capacity (medium confidence). Longer term responses include strengthening ecosystem services, local and regional markets, enhanced capacity and reducing systemic gender, land tenure and other social inequalities as part of a rights-based approach (medium confidence). In the urban context, policies that account for social inclusion in governance and rights to green urban spaces will enhance urban agriculture's potential for food and water security and other ecosystem services.

The IPCC Working Group II also expresses high confidence in the fact that continued investment in general health systems and in systems enhancing health protection is an effective adaptation strategy in the short to medium term. The burden of diseases could be reduced and resilience increased through health systems, by strengthening access to water and sanitation (high confidence).

7. Conclusion

If the global response to the threat of climate change needs to be addressed in the context of sustainable development and efforts to eradicate poverty, as the climate Paris Agreement aims, a much closer collaboration between water and climate is urgently needed. The synergies and common grounds between SDG 6 targets to achieve "universal access to water and sanitation", SDG 13 targets on "climate action", and the GGA Framework, must foster ways in which climate and water planners identify water, sanitation and hygiene adaptation priorities. The strategies and approach suggested in this paper could be easily replicated by stakeholders working with the provision of other essential services (e.g., health, nutrition, education), fostering further adaptation synergies and complementarities.

Supporting adaptation and resilient water, sanitation and hygiene services, as well as other essential services, makes sense from an economic perspective for all involved. Resilient water, sanitation and hygiene systems are a key element to ensuring water security and have strong connections to food security and global health. They foster community resilience by reducing human, social, environmental and physical vulnerability. Resilient water, sanitation and hygiene services also contribute to avoiding or reducing conflict in areas affected by water scarcity. It provides an opportunity to policy makers and service providers to rethink access to essential services, adhere to a circular economy and green growth, and improve several pending aspects of service provision.

The stakeholders developing this joint submission strongly recommend that the GGA Framework incorporates strategies and metrics highlighting the applicability of WASH services to water security and global adaptation efforts. We are also willing to continue supporting the GlaSS work programme with the important endeavour of framing and operationalizing the GGA.

Annex 1. Organizations (in alphabetical order) and co-authors of this paper

Global Water Partnership (GWP)

- Lesley Pories. Senior Advisor. Innovative water finance. Systems change. Advocacy & multi-stakeholder engagement

International Federation of Private Water Operators (AquaFed)

- Neil Dhot. Executive Director

Joint Monitoring Programme (WHO-UNICEF)

- Tom Slaymaker. Senior Statistics & Monitoring Specialist (WASH)

Netherlands Ministry of Infrastructure and Water Management

- Robbert Moree. Policy coordinator Water and Climate

Sanitation and Water for All (SWA)

- Lucinda O'Hanlon. Senior Adviser on Policy and Strategy
- Jose Gestí. Senior Adviser on Climate Action

Stockholm International Water Institute (SIWI)

- Alejandro Jimenez. Director Water and Sanitation
- Ricard Gine. Advisor, Sustainable Services, Water and Sanitation

Toilet Board Coalition

- Alexandra Knezovich. Managing Director Engagement

United Kingdom Foreign, Commonwealth and Development Office (FCDO)

- Paul Deverill. Senior Water, Sanitation and Hygiene Adviser
- Andrew Roby. Senior Water Security Adviser

United Nations Children Fund (UNICEF)

- Farai Tunhuma. Headquarters Senior Advisor WASH
- Jorge Alvarez Sala. Headquarters WASH Specialist - Water Supply Sustainability
- Silvia Gaya. East Asia and Pacific Regional Advisor WASH and Environment.

Institute for Sustainable Futures. University Of Technology Sydney (UTS)

- Juliet Willetts. Research Director and Professor

Water For People

- Kelly Latham. Global Advisor, Climate and Water Resources Management

WaterAid

- Kathryn Pharr. Senior Policy Adviser for International Climate Action
- Claire Seaward. Campaigns Director
- Caroline Maxwell. Advocacy Advisor for Water and Climate
- Thérèse Rudebeck. Policy Advisor Climate, WaterAid Sweden
- Tanvi Oza. Regional Technical Lead - Climate Change at WaterAid Australia
- Julie Truelove. Head of Policy & Advocacy, WaterAid Canada
- Adnan Ibne Abdul Qader. Senior Advocacy Officer

World Health Organization (WHO)

- Kate Olive Medicott. Team Lead-sanitation and wastewater