



A Systems-Based Approach to Climate-Resilient WASH in the District of Kamwenge in Uganda

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Executive Summary

Kamwenge District in western Uganda is on the frontlines of the climate crisis.

Increasingly erratic rainfall, prolonged droughts, and flooding are straining water resources, damaging sanitation infrastructure, and threatening public health. These hazards are already testing the resilience of the water, sanitation, and hygiene (WASH) systems built over the past decade.

Since 2013, Water For People has partnered with the Kamwenge District local government to implement the Everyone Forever model – ensuring every community, school, and health clinic has sustainable WASH services. Building on this foundation, Kamwenge has become a focal point for integrating climate resilience into district-wide WASH systems. This approach is grounded in three adaptation aims:

- **Healthy freshwater ecosystems:** protecting and restoring freshwater resources through catchment management, nature-based solutions, and green livelihoods.
- **Dynamic and inclusive service management:** strengthening governance, planning, and utility capacity to respond to climate risks with focus on marginalized populations.
- **Strong infrastructure:** shifting to climate-resilient designs and diversifying energy sources to include solar.

Key achievements include expanded piped water systems, strengthened monitoring platforms, policy compliance enforcement, riverbank stabilization, and the launch of the Mpanga Catchment Investment Program – Uganda's first fund to coordinate upstream and downstream action for source water protection.

Lessons from Kamwenge highlight the importance of robust partnerships, reliable scientific data, and multi-sector collaboration. Persistent challenges remain, including inadequate financing for climate-resilient infrastructure, limited early warning capacity for climate events, and the absence of a completed district-level climate risk assessment.

Looking ahead, Kamwenge will complete its Climate Risk and Vulnerability Assessment, fully integrate adaptation measures into its District Master Plan, advance the Mpanga Catchment Investment Program, and strengthen community capacity to sustain climate-resilient WASH services. These actions aim to secure safe, reliable water and sanitation for all – even in the face of an uncertain climate.



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Tree planting to improve the catchment



Background and Rationale

Why Climate Resilience is Central to WASH

Water For People is adapting its approaches to sustainable water, sanitation, and hygiene (WASH) services to consider climate change because the impacts of climate variability are already being felt across all the countries where we work. Climate change directly affects water quality and quantity, posing serious challenges to water security and our ability to deliver consistent, reliable WASH services. In response, we must ensure that the WASH services we support are protected against climate risks and vulnerabilities, providing the community with the capacity to adapt and cope with hazards arising from extreme weather events like increased flooding and prolonged droughts.


At the heart of Water For People's work are the values of equity, human rights, inclusion, and justice. Climate change disproportionately affects marginalized groups – especially women, children, and people experiencing poverty – and we recognize that sustainable WASH programming cannot be achieved without addressing their specific vulnerabilities. We are therefore committed to designing programs and infrastructure that reflect and respond to the realities of those most at risk.

Failing to address climate change is a significant threat to the sustainability of WASH services. Integrating climate considerations is not just a best practice – it is a risk mitigation strategy. Moreover, this alignment affirms Water For People's commitment to environmental stewardship – an organizational value we hold dear. As climate change is a global crisis, we are responsible for acting as stewards of the environment through our work. This responsibility is reflected in our current organizational strategy 2025-2027, which prioritizes climate resilience as a top priority.¹

Failing to address climate change is a significant threat to the sustainability of WASH services. Integrating climate considerations is not just a best practice – it is a risk mitigation strategy.

Integrating climate resilience as a best practice to mitigate risks also aligns with a clear shift in global WASH financing toward climate resilience. Many development partners and funders are prioritizing climate-smart initiatives. By integrating climate adaptation into our work, we can access and unlock new financing streams essential for scaling impact.

¹ Water For People, [2025-2027 Strategic Plan Executive Summary](#), 2025.



Uganda has identified WASH as a priority sector in its Nationally Determined Contributions (NDCs) due to its high vulnerability to the impacts of climate change.² With increasing climate variability, the country faces rising threats to water resources, sanitation systems, and public health. As a signatory to the Paris Agreement, Uganda is committed to reducing emissions and building resilience, and we, as WASH actors, play a key role in supporting the national government in fulfilling these pledges.

Beyond WASH, climate change is already affecting livelihoods and threatening food security, which ultimately undermines national development and economic growth. Therefore, adapting WASH systems is critical to safeguarding the well-being of communities and sustaining progress. The country has made some strides towards its commitments, including conducting a national climate and vulnerability risk assessment for water and sanitation, providing a framework within which stakeholders can contribute to sector climate resilience, and developing ministry-specific National Adaptation Plans. Ensuring resilient WASH interventions is a core component of Water For People's strategy, and the work in the district of Kamwenge, Uganda, is aligned with the organization's country and global strategy.

Documenting our experiences is essential for influencing national policies and guiding programmatic decisions. Through evidence-based learning, we aim to show what is working – or not – in adapting WASH services to climate change, helping advocate for more climate-resilient investments.

It is also vital to capture how climate change affects water security and demonstrate proven approaches to help close the service gaps. This documentation

² NDCs are core to the Paris Agreement, defining efforts by each country to reduce national emissions and adapt to the impacts of climate change. See [Uganda's NDC from UN Climate Change](#), 2022.

supports accountability and strengthens our ability to attract climate finance by providing concrete evidence of need and effectiveness. Internally, shared learning across districts and regions helps amplify voices and enables coordinated action toward resilience.

This report targets a diverse global and national audience. Internationally, we aim to inform WASH practitioners facing similar climate challenges and funders interested in supporting adaptation. In Uganda, the audience includes policymakers and government institutions at both local and central levels, water utilities and regulators, private sector actors involved in infrastructure, and the public sectors of water and environment services, health, energy, agriculture. Additionally, institutions of higher learning and research bodies are key stakeholders, as they contribute to generating and disseminating knowledge for climate-resilient WASH solutions.

This case is a testament to the critical importance of strong data systems in guiding the adaptation of WASH programs to the realities of climate change. Reliable data not only informs planning but also enables responsive, targeted interventions. Data on aspects such as water quantity and quality, water and sanitation service status, and vulnerability assessments allowed for more informed decisions on adaptations.

The case also demonstrates the value of robust partnerships among government, civil society, and private sector payers in building strong climate-resilient programs.

These partnerships have enabled effective stakeholder mobilization with knowledge, capacity building, and leveraging resources for effective climate-resilient services design, implementation, and sustainability. Key partnerships in Uganda that are essential to scaling climate-resilient WASH solutions include the Directorate of Water Resources Management, Albert and Victoria Water Management Zones, water utilities (National Water and Sewerage Cooperation and Umbrella Authorities), district and other local government, and the respective associations of hand pump mechanics and sanitation masons.

It is also critical to utilize a multi-sector approach for climate-resilient WASH services to be successful. This involved coordination among sectors along the water resources value chain – agriculture and production, environment and natural resources, education, and health. For example, conservation must integrate the critical components that address degradation of freshwater resources while maintaining social and economic resilience. Promoting and enabling alternative income-generating and livelihood options is vital to incentivizing conservation and enhancing a community's capacity to afford and sustain climate-resilient WASH services.

We also see it as critical to engage a multi-sector approach for climate-resilient WASH services to be successful. This involved coordination among sectors along the water resources value chain – agriculture and production, environment and natural resources, education, and health.

Global Framing for Adapting to Climate Change Through an Area-Wide, Systems-Based Approach

We found three overarching themes when assessing the climate challenges faced in all countries where Water For People works. Water and sanitation services increasingly face too much, too little, and more polluted water as described in Figure 1.

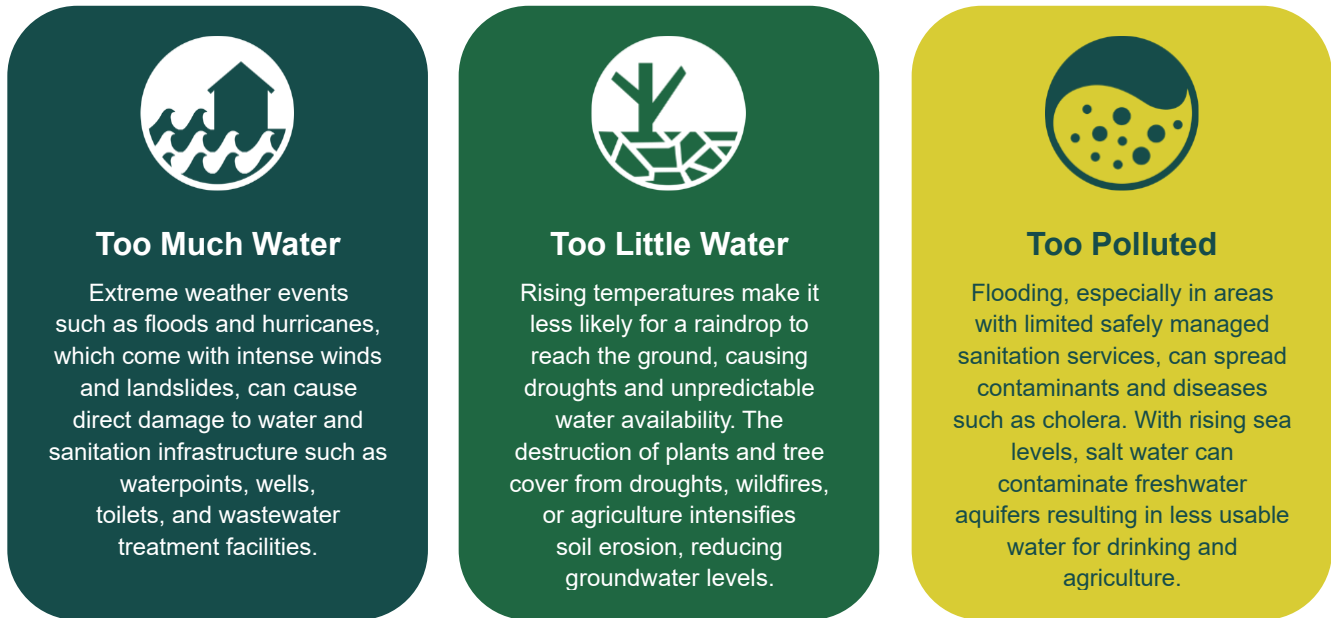


Figure 1: Physical climate change impacts on WASH services.³

While these challenges are physical, the solutions are rarely physical. We have found that identifying solutions requires the same systems perspective we have been using for the past 15 years, which considers the building blocks shown in Figure 2.

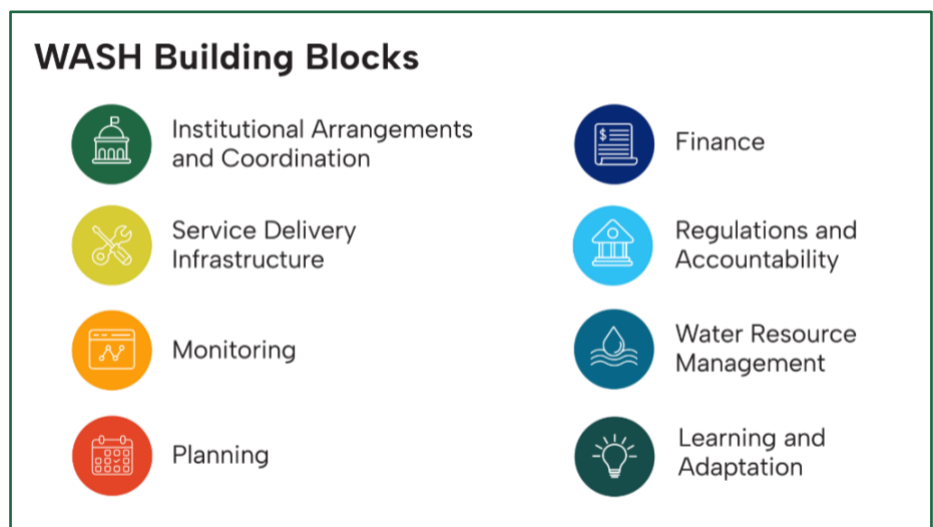


Figure 2: WASH Systems Building Blocks. Adapted from Agenda for Change.

³ IRC and Water For People, [Climate Change, WRM, and WASH: Working Paper](#), 2021.

Climate challenges and solutions align with building blocks in different ways. For example:

- **Institutional coordination** might need new connection points between various water-related sectors, such as the environment and agriculture.
- **Monitoring** systems might require greater frequency to understand shifting seasonal patterns or service disruptions.
- **Regulations** might need to shift design standards so infrastructure can withstand new and changing risks.

Understanding risks comes from considering the unique hazards, vulnerabilities, and exposures of a WASH system in a specific geography – all of which have proven helpful for identifying the most impactful strategies for adapting to climate resilience.

Three components of risk:



Hazard:	Vulnerability:	Exposure:
A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury, or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, and environmental damage.	The characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard.	People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.

Strategies we have identified fall into three categories, or adaptation aims, as defined in the following table.

Table 1: Three aims for adapting WASH services to climate change



Healthy freshwater ecosystems that protect and restore freshwater ecosystems, which can strengthen climate defenses and restore a natural balance that benefits WASH services.



Dynamic and inclusive service management that actively manages risks on a real-time basis to maintain continuity of services with a focus on disproportionately impacted populations. Opportunities to manage more dynamically can be identified across all of the building blocks.



Strong infrastructure that withstands stress and shock based on climate risk analysis to secure inclusive accessibility, while also recognizing that infrastructure alone will not deliver resilience services.

As described in the adaptation aims table, strategies expand beyond technology and infrastructure and center more on human and environmental dimensions of resilience.

Water For People’s global approach to climate resilience has evolved over several years as different communities, teams, and partners have faced challenges, and it is a work in progress. Most recently, this approach has been validated by its alignment with the sector-wide definition of climate-resilient WASH:

“Climate-Resilient WASH 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.”⁴

⁴ Sanitation and Water for All, [Definition of climate-resilient water sanitation and hygiene services](#), 2024.

National Context: Uganda

The disparity between rural and urban WASH access in Uganda remains significant. While 45% of the urban population has access to safely managed water services, only 9% of rural residents enjoy the same. For sanitation, 22% of the urban population has access to safely managed facilities compared to 16% in rural areas. Hygiene access also shows a gap, with 47% of urban dwellers and just 25% of rural households having basic hygiene services. This uneven progress underscores the need to prioritize rural resilience and accelerate investments in underserved areas.⁵

Uganda's primary climate hazards that can stall or reverse progress in WASH service delivery include droughts, floods, and heat waves. The water and sanitation access technologies used by a majority of the country's population – namely shallow wells, springs, and pit latrines – are very vulnerable to these hazards. Shallow wells and springs are prone to dwindling water quantities during droughts and water quality deterioration during floods, and pit latrines can be damaged during these floods. Worse still, the impacts of climate change on WASH services disproportionately affect women and children as they bear more of the burden of carrying water for long distances when routine supplies are interrupted by the hazards.⁶



Floods can contaminate shallow water sources, as seen from above in Kabarole District.

Climate change affects finance by rendering service providers financially vulnerable.⁷ Service providers' sustainability is impacted by low revenue collections and increased costs of providing the WASH services because of infrastructure damage and service chain interruptions. Climate change can damage infrastructure technologies and designs, reducing their performance. This disrupts inclusive planning, as certain community members – such as people experiencing poverty, women, and children – are often affected the most. It also impacts water resources and the environment by harming ecosystem health and increasing water demand. Inadequate data and ineffective monitoring and assessment of climate risks all jeopardize the ability of the country and district to build a rationale for supporting climate funds mobilization. In addition, the integration of WASH in climate-specific programs and projects is still minimal in the country compared to the inverse; this would be one way of

⁵ WHO-UNICEF Joint Monitoring Programme (JMP), [Uganda Household Monitoring Data](#), 2022.

⁶ UNICEF, [Field Note: Developing the Climate Rationale for Climate Resilient WASH Services in Uganda](#), 2023.

⁷ Ministry of Water and Environment, [Climate and Vulnerability Risk Assessment for Water and Sanitation in Uganda](#) (no link available), 2022.

leveraging resources. Compounding this issue, the district staff's capacity to write winning climate proposals is inadequate, thus affecting the funding of climate-resilient WASH.

The WASH system in Uganda faces several weaknesses that undermine climate resilience and the ability to absorb shocks. Government offices are often understaffed, poorly trained, and slow to respond to climate stresses like erratic rainfall and drought. Infrastructure standards in the country are also outdated. Regulation by the Water Utilities Regulation Department of the Ministry of Water and Environment supports service providers in adapting to climate change. Still, weak enforcement of regulations and delays in approving critical policies hinder investment in climate-resilient services. Regulations for water resources management and source protection are insufficient. Finance for climate-resilient WASH is also lacking. **Uganda lacks a comprehensive financing strategy, relying heavily on development partners, and may face further strain as climate change diverts resources to disaster response, leaving fewer resources for long-term infrastructure investment.**

Uganda's updated NDCs highlight water and sanitation, the environment and ecosystems, forestry, and health as priority sectors for adaptation — underscoring their critical vulnerabilities to climate change. Additionally, the NDC stipulates adaptation actions for the water and sanitation sector: ensuring resilient access to water supply for domestic and productive purposes, the promotion of sustainable water harvesting and storage, increasing sanitation and wastewater treatment infrastructure and services coverage, and scaling up integrated water resource management approaches and water use efficiency.⁸



Everyone means that every community, family, school, and clinic in the districts where we work has access to safe and reliable WASH services.

To ensure these services are sustainable, **Forever** means that the institutions, built on strong government partnership and co-financing from the start, are in place for services to continue without Water For People's continued direct support.

⁸ Ugandan Ministry of Water and Environment, [Updated NDC in fulfilment of the Paris Agreement](#), 2022.

District Context: Kamwenge

Climate Change Impacts on WASH Services in Kamwenge District

Water For People has partnered with the Kamwenge District local government to implement the Everyone Forever model since 2013. This work has focused on developing piped water systems for households, communities, and public institutions; building sanitation infrastructure and providing hygiene education in schools and health facilities; and promoting sanitation and hygiene practices in households – **all to ensure sustainable WASH services for the entire district.**



To date, 96% of the households in Kamwenge have some form of sanitation, with 15% being safely managed and 72% limited. 72% of the households have access to an improved water source, with 15% being safely managed, 30% basic, and 26% limited. These outcomes reflect the dedicated efforts of Water For People, Kamwenge District Local Government, and other implementing partners in the district.

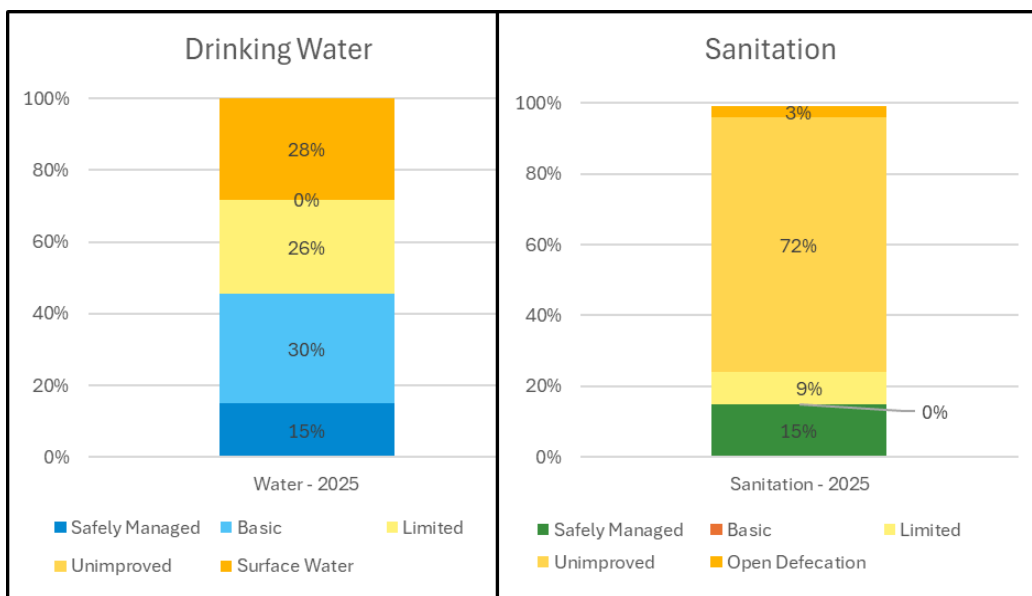


Figure 3: 2025 Kamwenge household water and sanitation levels of service,
Source: Water For People Level of Service Data, 2025

System Strengths and Weaknesses

In line with the national building blocks assessment, Kamwenge District presents a stronger and more coherent WASH system in several areas critical for climate resilience. Kamwenge demonstrates strong institutional structure and management, with all piped systems legally managed by the National Water and Sewerage Corporation (NWSC) and Mid Western Umbrella of Water and Sanitation (MWUWS), and the District Water Engineer's office is fully staffed and actively engaged in monitoring. The district service management and monitoring are supported by up-to-date asset analyses, a strategic plan for sustainable coverage, and functional district coordination platforms that meet regularly to reflect on WASH service delivery.

Sector finance remains a limiting factor, closely mirroring national weaknesses. The district has estimated capital maintenance and direct support costs, but available budgets fall short, especially in 111 schools and health facilities. Service providers in Kamwenge face similar revenue shortfalls, with tariffs insufficient to cover operations and maintenance. Despite adoption of business practices like escrow accounts for capital maintenance, sustainable financing remains fragile. While Kamwenge District excels in governance and monitoring compared to national benchmarks, it shares the country's broader vulnerabilities in financing climate-resilient WASH services – highlighting a critical area for policy and investment focus.

Environmental degradation and climate hazards have also limited the progress toward universal services. The district's geographic position within the Mpanga catchment makes it highly susceptible to flooding, siltation, and sedimentation loading of surface water – given that the river is a consequence of poor land use practices and encroachment in the districts upstream of Kamwenge, namely Kabarole, Fort Portal City, and Kyenjojo. The upstream areas are characterized by significant runoff and erosion, contributing to the downstream hazards. Hydrologically, the transboundary nature of River Mpanga further compounds the risks for Kamwenge, exposing the district to environmental shocks from upstream catchments. In addition, many of the hazards faced in the area – such as deforestation, poor agricultural practices, and settlement in high-risk zones – are driven by human activities, making social and demographic dynamics a crucial part of the hazard profile.⁹

Strengths:

- Strong institutional structure and management
- Active monitoring
- Effective planning and coordination

Weaknesses:

- Inadequate sector financing
- Environmental degradation and hazards
- Human-driven environmental risks

⁹ Ugandan Ministry of Water and Environment, [Mpanga Catchment Management Plan](#), 2015.

District Climate Risks

Climate Risks to WASH Services in Kamwenge

There has not been a climate risk assessment for Kamwenge District. However, the issues identified by the national-level risk assessment correspond with those in Kamwenge. Plans are underway by Water For People in partnership with the Climate Change Unit of the Directorate of Water Resources Management to conduct a climate risk and vulnerability assessment for Kamwenge to inform science-based, climate-resilient WASH programming.



Hazards	Vulnerabilities	Exposure
<ul style="list-style-type: none"> • Flooding • Droughts • Mudslides 	<ul style="list-style-type: none"> • Inadequate financing for adapted infrastructure and services for the most vulnerable • Lack of surveillance and early warning systems to aid related disaster preparedness • Inadequate data on trends of the hazards, as well as on water resources stock to aid hazards prediction, responsive water resources allocation, and planning • Non-climate resilient water and sanitation infrastructure with shallow wells, protected springs, and pit latrines • Inadequate multisectoral approach to addressing climate change and related capacities at the district level • Lack of district-specific climate risk and vulnerability assessments 	<ul style="list-style-type: none"> • Water supply infrastructure (hand pumps and springs) • Piped water supply services, i.e., affected by both reduction in quality and quantity • Roads • Sanitation and hygiene facilities, especially with those using ordinary pit latrines which is 80% of Ugandan households¹⁰

¹⁰ Ministry of Water and Environment, Climate and Vulnerability Risk Assessment for Water and Sanitation in Uganda (no link available), 2022.

Identifying these risks has been primarily done through national risk assessments, which are documented in Catchment Management Plans¹¹ and the Catchment Investment Program's prefeasibility assessments. While these documents highlight the hazards affecting Kamwenge, there has not yet been a district-specific assessment. Observations at the district level corroborate the findings from these national assessments. However, a climate risk assessment for the district is planned. It will be completed by the end of September 2025 in collaboration with the Climate Unit of the Ministry of Water and Environment.

Adaptation Strategies

Priority Adaptations that Respond to Climate Risks in Kamwenge, Uganda

To effectively respond to climate risks, we are focused on strengthening the capacities of various stakeholders. This includes equipping teams with the new skills required to manage emerging risks – whether related to designs, technical operations, financing, human resources, or contingency planning. Capacity development ensures that WASH systems remain functional and adaptive in a changing climate.

The following tables identify specific adaptations and areas of capacity building that we are prioritizing to respond to climate risks in Kamwenge. Adaptation strategies have been identified through formal processes, including catchment management planning, national climate risk assessments, Nationally Determined Contributions, and the Kamwenge District Climate Risk and Vulnerability Assessment underway. These processes aim to integrate climate risks and adaptation measures into district master plans, ensuring a structured approach to resilience building.



Adaptation Aim: Healthy Freshwater Ecosystems

Implemented Activity:

- Catchment-based management planning where Water For People has supported the Albert Water Management Zone in conducting Catchment Management Committee meetings to review progress of the Mpanga Catchment Management Plan and support the development of the Rushango subcatchment management plan. This aimed to map water resource issues and prescribe remedies for preserving water quality and quantity.

¹¹ Ugandan Ministry of Water and Environment, Mpanga Catchment Management Plan, 2015.

- Promoting alternative green livelihood options such as fisheries, apiaries, and tree nurseries.
- Surface water monitoring using river flow gauges and real-time groundwater level monitoring devices. This aims to inform water resources management decision-making on allocation depending on available quantities.
- Promote and implement nature-based solutions, including establishing community tree nurseries, planting and growing trees, stabilizing riverbanks by planting trees and bamboo, and restoring wetlands. These aim to regulate flows and reduce flooding, erosion, and sedimentation of water sources to prevent pollution and contamination.
- Assessing the feasibility of a Catchment Investment Program for the Mpanga River, aimed at establishing robust governance and financing mechanisms to determine whether nature-based solutions are the best-suited remedy to the water resources issues. This would address flooding, erosion, and sedimentation, thus addressing water quality and quantity issues
- Water demand studies and related trends analysis for water resources availability, usage, and allocation within the catchment from 2023 to 2063. This was meant to address the water shortage due to competing demands that could lead to over-abstraction.¹²

Future Activity:

- Conservation intervention impacts mapping
- District and catchment level climate risk assessment
- Completion of the feasibility phase and implementation of the Catchment Investment Program

¹² Water For People and Albert Water Management Zone, [Assessment of Water Resources Availability, Allocation and Management Along River Mpanga](#), 2023.



**Adaptation
Aim: More
dynamic and
inclusive
service
management**

Implemented Activity:

- Policy compliance and implementation
- Management systems strengthening
- Vulnerability assessment
- Conservation laws and policies are enforced by district officials aimed at fostering compliance
- Strengthening the capacity of the utilities (NWSC & MWUWS) to ensure a 24/7 supply by real-time attention to defects in infrastructure
- Capacity strengthening of the private sector in service provision along the safe sanitation value chain

Future Activity:

- Continuing the Climate Risk and Vulnerability Assessments
- Development of District Climate Risk and Vulnerability Assessment guidelines in collaboration with the Ministry of Water and Environment Climate Change Department
- Support districts to develop District Climate Change Action Plans
- Economic empowerment of women and other vulnerable groups
- Planning and implementation of sustainable WASH strategies for those living in poverty



**Adaptation
Aim: Stronger
infrastructure**

Implemented Activity:

- Alternative water technology options for the vulnerable, such as ferrocement rainwater tanks that are a more affordable option for extra storage
- Well-anchored piped water distribution lines to prevent failure from erosion during extreme weather events
- Alternative low-cost sanitation technology options for vulnerable households

- Policy compliance on banning low-cost, prone-to-contamination water supply technologies, i.e., shallow wells and improved and ordinary springs that are liable to contamination and much more physical damage in extreme weather events
- Climate-resilient household and public institution toilets, including lined, emptiable, and reusable toilet facilities
- Hybrid water pumping energy sources, such as solar and diesel, and gradually shifting to green energy pumping, such as hydroelectric and solar

Future Activity:

- Contingency planning
- More deliberate integration of redundancy
- Community sensitization to enhance vigilance

Groups such as women, youths, children in schools, and those living in affected ecosystems were involved in identifying various adaptations. Their inclusion ensures that the specific vulnerabilities and needs of these populations are addressed. They participated in initial awareness and planning meetings and were prioritized for green enterprises such as beekeeping, tree nursery business, and fish farming. However, much more needs to be done to address vulnerability and help communities cope with the impacts. This requires a deliberate, sustainable strategy to make WASH services truly affordable, enhancing people's ability to pay.

The Mpanga Catchment Investment Program (CIP)

In partnership with the Nature for Water Facility, Water For People commenced engagements to establish the Mpanga CIP to bring together water catchment, health, and WASH actors for collective and coordinated decision-making on effective and equitable water resources management. Together, the stakeholders are following a science-based approach to sustainable and equitable use of water resources in the Mpanga catchment. The engagement has been approved by the Directorate of Water Resources Management and the Albert Water Management Zone. Water For People, IRC, and Join For Water have been identified as core partners.



[Watch for more on the Mpanga Catchment](#)

The CIP will take a science-based approach through pre-feasibility, feasibility, design, and implementation, with each stage involving stakeholder engagement and science-based analysis of water security challenges and a remedial portfolio of nature-based solutions. The pre-feasibility stage is complete, and stakeholders have agreed to move forward with the feasibility stage.

The CIP is leading:

- Collaborative decision-making, implementation, and financing mechanisms for nature-based solutions to support critical ecosystem services in upstream catchment areas.
- Addressing water security challenges and benefits, such as carbon sequestration.
- Building effective partnerships and strengthened governance that unlock collective impact and funding.
- Locally led adaptation through engagement of both upstream and downstream stakeholders.
- Streamline restoration interventions by prescribing effective nature-based solutions for the specific water security and biodiversity conservation challenges identified in the pre-feasibility and feasibility stages. The catalogue of proposed nature-based solutions at the prefeasibility phase includes agroforestry, reforestation, conservation tillage, water and soil erosion control measures.

Integrating Climate Into Planning

Integrating Climate Risks and Adaptation into District Master Plans

Climate risk assessments and adaptation strategies that are integrated into district master planning is key to promoting risk-based planning as an ongoing practice and permanent shift versus a one-off project. Demonstrating this, the Kamwenge District master plan now has a Water Resources Management and Climate chapter. Political leadership has played a role through participation in consultative meetings, supporting enforcement to ensure compliance, monitoring implementation, and enacting relevant legislation. Their involvement is crucial in driving and sustaining climate resilience initiatives.

Water For People is planning to support the district in carrying out a climate risk and vulnerability assessment that will aid in fully adapting the district masterplan through risk definition and integration of mechanisms for enhancing the resilience of WASH infrastructure and services in Kamwenge. Additionally, Water For People will lead in supporting the establishment of the Mpanga Catchment Investment Program, an initiative that will enhance source water protection and improve effective governance and financing mechanisms. Once established, this will be Uganda's first Catchment Investment Program.

In addition to adding a chapter on climate resilience to the plan outline, some assessment and planning tools have been adapted for climate resilience. For example, environmental and social safeguards have been integrated into infrastructure designs, and household sanitation baseline surveys and water resources assessments have been adapted to incorporate climate risk considerations, enhancing the effectiveness of planning and implementation. The results of the climate risk will inform the development of the Kamwenge District Climate Change Action Plan.

Lessons Learned

Lessons Learned and Key Challenges in Integrating Resilience

Key challenges include inadequate financing for effective restoration, insufficient coordination between upstream and downstream stakeholders for collective action, lack of comprehensive data, and difficulties measuring impact for attribution and documentation. Addressing these challenges is essential for the success of climate and vulnerability assessment of resilience efforts.

Three critical learnings, which are highlighted in the case, are the importance of:

Reliable scientific data

for more informed decisions on the most critical adaptations

Robust partnerships

that can enable effective stakeholder mobilization with vertical alignment

Multi-sector approaches

that engage different disciplines and expertise

Looking to the Future

The next steps involve advancing to the feasibility phase of the Catchment Investment Program, conducting catchment-based climate risk and vulnerability assessments, and implementing scientific measurements of restoration impacts with thorough documentation.

Plans to replicate and scale this work include documenting and sharing findings with stakeholders through the Water Resources Institute and other forums, organizing learning and reflection sessions among riparian districts of the Mpanga catchment to facilitate cross-learning, and presenting outcomes in respective Catchment Management Committee meetings to promote broader adoption.

Planning and implementing additional scientific water surface and ground resources monitoring mechanisms is another key need in the future. This will result in data availability, enabling rights-based water resources planning and allocation. It would also be a key enabler for evidence-based policy advocacy and influence on such aspects as adequate budget

allocation to climate-resilient infrastructure and services by the national and district local governments, as well as multi-sectoral partnerships and collaboration for the conservation of water resources.

Another key priority for the future is to conduct a climate change risk and vulnerability assessment of Kamwenge District to identify and plan appropriate responses to district-specific climate issues. Looking ahead, there is also a need to carry out a climate vulnerability assessment for all Mpanga catchment riparian districts to support a catchment-based response to climate change, since Kamwenge is part of this wider catchment. This would position Kamwenge within a broader system context and enable the district to address climate-induced hazards and vulnerabilities that cross boundaries, strengthening WASH resilience across all districts in the catchment.

Given that climate change has far-reaching impacts on sustainable WASH service delivery, district masterplans must embed strategies for ensuring the climate resilience of all interventions spelt out in the masterplan. This can be made possible only when the district-specific climate risks and vulnerabilities are known. It is paramount that climate risk and vulnerability assessments are a component of the district master planning process.

While nature-based solutions are effective for restoring degraded water resources and, more so, for protecting the source water of the catchment, they should not be ‘one size fits all’. Detailed scientific assessments are needed to determine which water resource challenges can be addressed by nature-based solutions.

Conclusion

While numerous initiatives have been implemented, they have predominantly been project-based. We look forward to the Mpanga Catchment Investment Program, or water fund, which will enhance resilience. This collaborative program aims to systematically map issues, generate scientific data, and prescribe nature-based solutions to inform effective restoration efforts. The achievement of climate-resilient WASH takes the effort of multiple stakeholders.

Finally, unless we open our eyes and minds to the realities of climate change, we cannot effectively adapt. It is imperative that all our assessments, data collection, and programming are climate aware. Only then can we build a robust, data-driven case for the support needed to ensure sustainable and climate-resilient WASH services for everyone, forever.

References

- Albert Water Management Zone. 2023. *Assessment of Water Resources Availability, Allocation and Management along River Mpanga*. Assessment. Water For People. https://thewashroom.waterforpeople.org/wp-content/uploads/sites/2/2025/08/Final_Report_-_ASSESSMENT-OF-WATER-RESOURCES-AVAILABILITY-ALLOCATION-AND-MANAGEMENT-ALONG-RIVER-MPANGA.pdf.
- Göransson Sandberg, Henning, Ricard Giné, and Wilberforce Kimezere. 2023. *Field Note: Developing the Climate Rationale for Climate Resilient WASH Services in Uganda*. Field Note WASH/FN/23/2023. Case Studies, Lessons Learned, Field Notes. UNICEF. <https://knowledge.unicef.org/wash/resource/field-note-developing-climate-rationale-climate-resilient-wash-services-uganda>.
- IRC, and Water For People. 2021. *Climate Change, WRM, and WASH: IRC and Water For People Working Paper*. Working Paper. Water For People. <https://thewashroom.waterforpeople.org/resources/climate-change-wrm-and-wash-irc-water-for-people-working-position-paper/>.
- JMP. 2022. "Household Data - Uganda - 2022 - Service Levels." WASH Data. <https://washdata.org/data/household#!/dashboard/6845>.
- Ministry of Water and Environment. 2015. *Mpanga Catchment Management Plan*. Consulting Report. Ministry of Water and Environment. <https://www.watershed.nl/wp-content/uploads/sites/2/2020/12/mpanga-catchment-management-plan.pdf>.
- Ministry of Water and Environment. 2022a. *Climate and Vulnerability Risk Assessment for Water and Sanitation in Uganda*.
- Ministry of Water and Environment. 2022b. *Uganda Updated Nationally Determined Contribution (NDC)*. Government of Uganda. https://unfccc.int/sites/default/files/NDC/2022-09/Updated%20NDC%20_Uganda_2022%20Final.pdf.
- Sanitation and Water for All Climate Task Team. 2024. "Definition of Climate-Resilient Water Sanitation and Hygiene Services." Sanitation and Water for All. https://www.sanitationandwaterforall.org/sites/default/files/2024-11/ClimateResilientWASH_DefinitionPaper_final_0.pdf.
- Water For People. 2025. *Strategic Plan 2025-2027: Learning, Adapting, and Growing for Significant Impact*. Strategic Plan. Water For People. https://www.waterforpeople.org/wp-content/uploads/2025/04/Water-For-People_Strategic-Plan-2025-2027_Executive-Summary_December-2024.pdf.