water for people

A Systems-Based Approach to Climate-Resilient WASH in the District of Asunción, Cajamarca, Peru

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Funding was generously provided by the Shockwave Foundation.

Executive Summary

In the highlands of northern Peru, the district of Asunción is already experiencing the realities of climate change.

Peru's diverse geography – from the Pacific coast to the Andean highlands to the Amazon rainforest – makes it especially vulnerable to climate change. Each region faces distinct hazards such as glacial retreat, prolonged droughts, and El Niño floods. These threaten water sources and infrastructure, destabilize rural livelihoods, and create cascading social and economic impacts. Without climate resilience, Peru's progress toward universal water, sanitation, and hygiene (WASH) access risks being undone by each new shock.

Since 2013, Water For People has partnered with the local government in the District of Asunción to implement the Everyone Forever model – ensuring every household, school, and health clinic has sustainable WASH services. Building on this foundation, Asunción 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:** restoring degraded recharge areas through planting and harvesting water, reforestation with native species, and source monitoring.
- **Dynamic and inclusive service management:** strengthening the municipal technical area, integrating climate resilience into monitoring and planning, and ensuring representation and participation of women and marginalized groups.
- **Strong infrastructure:** assessing and managing infrastructure assets, improving wastewater treatment, and preparing contingency plans for systems in vulnerable areas.

Key lessons from Asunción emphasize the importance of blending traditional knowledge with modern systems thinking, strengthening local capacity, and institutionalizing resilience through policy and financing. Persistent challenges remain around financing, institutional fragmentation, and ensuring gender and social inclusion.

Asunción's experience demonstrates that even small rural districts can lead on climate adaptation. By systematizing and sharing this work, Water For People and its partners aim to influence national policy, support replication in other municipalities, and contribute to global learning on climate-resilient WASH. Together, these actions aim to ensure that WASH services remain reliable and resilient – even in the face of an uncertain climate future.

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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 variability has intensified, raising temperatures and triggering extreme events such as prolonged droughts, landslides, and floods. These events damage water sources and infrastructure, disrupt services, and sometimes lead to the abandonment of systems altogether. Without climate resilience, there is no sustainability, as progress toward WASH access risks being undone by every new shock.

In Peru, the urgency of climate resilience is amplified by the country's diverse geography. From the arid coast to the Andean highlands to the Amazon rainforest, each region faces distinct climate hazards that interact with local ecosystems and water systems differently. In the mountains, prolonged drought and rising temperatures threaten water recharge zones, while glacier retreat reduces the reliable supply for both highland communities and downstream cities. On the coast, El Niño events bring heavy rainfall, flooding, and landslides that destroy infrastructure. In the Amazon, deforestation and changing rainfall patterns destabilize hydrological cycles and water quality. This geographic diversity makes Peru especially vulnerable, as no single solution works everywhere and communities must continually adapt to various risks.

Agriculture, livestock, fishing, and forestry – the backbone of rural livelihoods – are highly vulnerable to shifts in rainfall and temperature. When production falters, household incomes decline and food insecurity grows, with ripple effects across supply chains and local markets.

The effects go far beyond infrastructure. When systems fail, families turn to unsafe sources, increasing the risk of diarrheal disease and other waterborne illnesses. Flooding often contaminates sanitation facilities, spreading waste and pathogens. Water scarcity can spark conflict over limited sources, straining relationships within and between communities. The economic consequences are equally severe. Agriculture, livestock, fishing, and forestry – the backbone of rural livelihoods – are highly vulnerable to shifts in rainfall and temperature. When production falters, household incomes decline and food insecurity grows, with ripple effects across supply chains and local markets.[1] Climate shocks in WASH, therefore, cascade into public health crises, social instability, and economic losses.

[1] MJ Bustamante Foundation, Climate change in Peru – Amazon, 2021.

> **These impacts reveal a central truth: resilient WASH cannot be achieved through infrastructure alone. Building resilience requires protecting ecosystems, strengthening governance, and ensuring inclusive service management alongside infrastructure investments.**

The Peruvian government has increasingly recognized this connection. National strategies emphasize conserving water sources in the upper parts of watersheds and promoting natural infrastructure to sustain flows. These policies acknowledge that healthy ecosystems underpin water security. Yet the link to the WASH sector remains underdeveloped. Household services must be explicitly integrated into broader climate adaptation efforts to ensure that communities benefit directly.

Water For People's approach in Peru addresses this gap, especially in rural areas. Through the Everyone Forever model, we work with municipalities and communities to strengthen all the factors that sustain services – institutional capacity, financing, planning, monitoring, and technical support – while connecting them to the ecosystems that supply water. This means protecting recharge areas, reviving ancestral practices, and embedding climate risk management into district-level planning.

The case of Asunción demonstrates how these principles can be put into action. A decade ago, nearly one in five households lacked improved water services. Today, coverage and service quality have improved dramatically after a sustained partnership with the municipality and community water boards. At the same time, Asunción has faced recurring droughts, floods, and landslides that threaten these gains. By integrating climate resilience into its WASH systems, the district is working to expand services and secure them against an uncertain climate future.

Documenting climate change adaptation experiences is essential as different geographic areas may be exposed to similar hazards, and governments and communities can learn from each other about how different types of adaptations work. Sharing experiences allows solutions tested in one context to be scaled in another. It helps influence decision-makers to improve policies, strengthens prevention and early warning strategies, and ensures that ancestral and local knowledge about climate adaptation is not lost but built upon.

Therefore, this case study is aimed at global WASH stakeholders confronting climate challenges and our partners in Peru's WASH sector, including government agencies, local organizations, and private actors. By sharing Asunción's example, we encourage stakeholders to consider adaptations beyond traditional WASH infrastructure and to take a more active role in protecting the freshwater ecosystems on which services depend. Ultimately, the purpose of this work is to deepen the understanding of how water and climate change are inseparably linked, and to encourage collaboration among those facing similar risks.

> **We invite readers to harness ancestral and local knowledge for conserving water sources, to implement planting and harvesting activities that restore natural ecosystems, and to adopt climate resilience assessments of water systems to guide decision-making. Only through this combination of innovation, tradition, and systems thinking can WASH services remain reliable in the face of a changing climate.**

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.[2]

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.

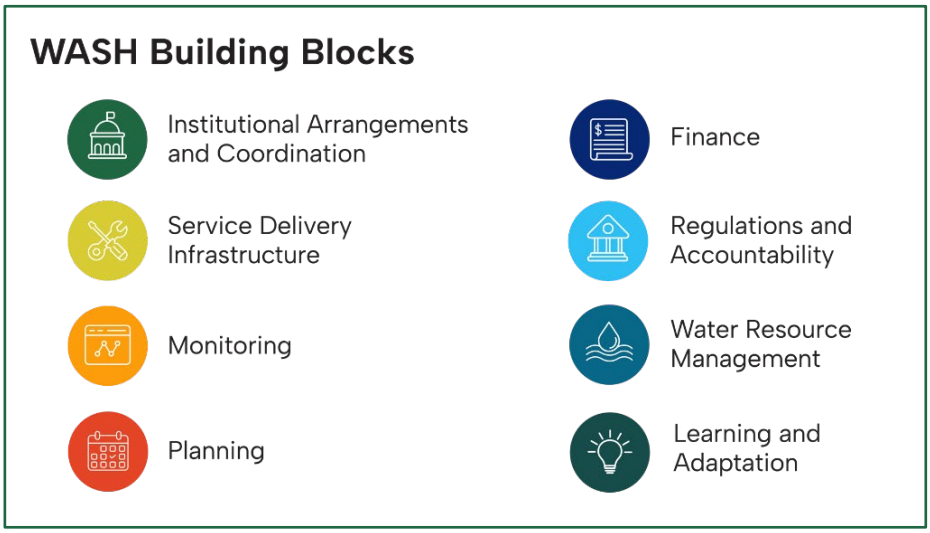

Figure 2: WASH Systems Building Blocks. Adapted from Agenda for Change.

[2] 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 to adapt WASH services go 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."* [3]

[3] Sanitation and Water for All, Definition of climate-resilient water sanitation and hygiene services, 2024.

National Context: Peru

Peru is a country of striking geographic diversity, with the Pacific coast, the Andes mountains, and the Amazon rainforest each presenting unique water challenges. This varied landscape is central to why the country is so vulnerable to climate change.

- Along the coast, El Niño events regularly bring torrential rains, floods, and landslides that overwhelm infrastructure. Specifically, the infrastructure linked to drinking water and sanitation in 18 regions of the country could be at risk due to mudslides.[4] Based on this information, a plan has been developed to monitor maps of water and sanitation systems at risk to support decision-making.

- In the mountains, prolonged drought and glacier retreat reduce water supply, while rising temperatures push agriculture into fragile recharge zones. With 68% of the world's tropical glaciers, deglaciation has implications for water availability in communities in the highlands and urban populations in the lowlands.[5]

- In the Amazon rainforest, releasing greenhouse gases (GHGs) from forest burning contributes to global climate change, accounting for 47% of Peru's total net carbon dioxide emissions.[6] The deforestation and shifting rainfall patterns alter hydrological cycles, threatening water quality and quantity. Because hazards differ so dramatically by geography, the impacts of climate change on WASH services are not uniform but take many different and overlapping forms.

Peru has a population of 34 million people, of whom more than 3 million (9%) lack basic access to drinking water, and more than 7 million (22%) lack access to basic sanitation.[7] The gaps are especially stark in rural areas, where only 23% of the population has access to safely managed water.

The provision of services in the country is organized according to population size. Large urban areas are served by Water and Sanitation Service Providers (EPS). In contrast, "small towns" with populations between 2,001 and 15,000 are served by municipalities, either through Municipal Management Units (UGM) or through Communal Organizations (JASS). This organization can be seen in Table 2.

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[4] National Superintendent of Sanitation Services, Infraestructura de saneamiento podría estar en riesgo ante la activación de quebradas y lluvias, 2025.
[5] INAIGEM, Inventario Nacional de Glaciares y Lagunas de Origen Glaciar, 2023.
[6] MJ Bustamante Foundation, Climate change in Peru – Amazon, 2010.
[7] JMP, Household data – Peru – 2022 – service levels, 2022.

Scope	Population Range	Type of WASH Service Provider	Number of Providers
Urban	> 15,000 inhabitants	EPS – Water and Sanitation Service Providers	50
	2,001 - 15,000 inhabitants “Small towns”	Municipalities UGM – Municipal Management Units • Specialized operator	403
Rural	< 2,000 inhabitants	Municipal Management Units (UGM)	27,155
		Communal organization • JASS – Sanitation Services Administration Board • Association • Others	

Table 2: Distribution of WASH service providers at urban and rural levels in Peru

There are more than 27,000 rural providers across the country, most with limited technical, financial, and human capacity. This fragmentation makes it difficult to ensure reliable support, particularly in emergencies. Municipal management units are often under-resourced, while many JASS depend on volunteers who may lack formal training. Tariffs rarely cover full operation and maintenance costs. These systemic weaknesses make services especially vulnerable to climate shocks. Drought reduces the supply for drinking water systems and limits the effectiveness of wastewater treatment plants. Heavy rains and landslides destroy intakes, pipelines, and even entire systems. **With limited reserves and weak coordination, local providers struggle to repair damage or adapt.**

National assessments of the WASH sector have highlighted these vulnerabilities, noting that institutions are fragmented, monitoring systems are incomplete, and financing is insufficient. Information systems exist but are poorly integrated, making it difficult to track risks and allocate resources effectively. Local governments often lack the capacity to access or execute budgets, leaving rural systems particularly exposed. Infrastructure design also varies widely in appropriateness for local conditions, with limited incorporation of climate risks. Water For People conducted a national assessment of the WASH sector in 2021 and confirmed these gaps. These findings reinforced how climate change magnifies existing weaknesses and underscored the need for systems strengthening alongside climate adaptation.

The Government of Peru has taken important steps to address these challenges. Its updated Nationally Determined Contributions include commitments to both mitigation and adaptation, with water identified as a priority sector.[8] The National Climate Change Adaptation Plan[9] emphasizes protecting headwater ecosystems, improving water supply reliability, and prioritizing vulnerable populations. While these strategies increasingly acknowledge that healthy ecosystems underpin water security, the link to household-level WASH services remains underdeveloped.

Peru's diverse geography exposes communities to a wide range of climate hazards, while fragmented service delivery and limited institutional capacity heighten vulnerability. National policies provide an important foundation, but translating them into resilient household services remains a pressing challenge – particularly in rural areas where the majority of gaps persist.

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] Government of Peru, National Determined Contributions of Peru, 2020.
[9] Government of Peru, National Climate Change Adaptation Plan, 2021.

District Context: Asunción

Water For People has partnered with the Asunción local government to implement the Everyone Forever model since 2013, working to ensure sustainable water, sanitation, and hygiene services for every household, school, and health clinic.

Asunción is a rural district in the department of Cajamarca, 69 km (43 miles) south of the city of Cajamarca, at an altitude of 2,229 meters (7,313 feet) above sea level. The district has a population of around 13,000, organized into over 4,000 households.

Families here depend primarily on agriculture, with wheat, barley, potatoes, corn, and cherimoya as key crops, alongside livestock and small-scale tourism. The landscape is mountainous, with elevations reaching nearly 4,000 meters (13,123 feet) and steep slopes that complicate both farming and infrastructure development.

When Water For People began partnering in Asuncion, WASH services were uneven. 17% of rural households lacked access to improved water services. Many systems were run by community water boards (JASS), but only one-third had trained operators, and although most charged user fees, revenues were insufficient to cover operation and maintenance. The municipality, while responsible under national law, had limited capacity, and planning was reactive rather than strategic.

Over the past decade, sustained collaboration has changed the district. By 2024, just six households remained unserved, and all communities had intermediate or high levels of service – up from only 55% a decade earlier. Household water service coverage increased from 75% in 2017 to more than 96% in 2024. Service providers now have trained operators, improved technical assistance, and 100% cost-recovery practices through household fees.

According to research conducted by Agenda for Change in the district in 2022, “There are two important distinctions at this level: first, previously unconnected households are accessing improved services, and second, previously connected households are continuing to access improved services.”[10]

[10] Fogelberg & Lockwood, Case Study: Systems Strengthening Research from Asunción, Perú, 2022.

Asunción's progress has been recognized beyond the district. A 2025 review by the Ministry of Housing, Construction and Sanitation noted that Asunción's water and sanitation management indicators outperform the regional average, benefiting rural populations through the combined efforts of the municipality, community organizations, private partners, and the state.[11] Compared to neighboring districts, Asunción stands out: while most districts in Cajamarca have only one WASH staff member at the municipal level, Asunción employs four; all of its JASS operators are trained (compared to just 24% regionally); and nearly three-quarters of its providers report adequate access to technical assistance, far higher than the regional average of 13% as seen below in Table 3.

Metrics	Asunción	Regional Reference (127 Districts)
Number of WASH employees in the district	4 employees	75% of districts only have one employee
Service providers charge a fee	100%	80%
Service providers have a trained operator	100%	24%
Service providers have good or adequate access to technical assistance	73%	13%

Table 3: Summary of Asunción's performance in terms of key competencies

Today, Asunción is regarded as a benchmark district for sustainable WASH in rural Peru. Yet this progress exists alongside growing climate pressures that continue to test the resilience of services. Understanding how the district has responded to these challenges provides critical insights for other municipalities facing similar risks.

[11] National Survey of Budget Programs, https://www.gob.pe/institucion/inei/campaigns/8603-national-survey-of-budget-programs-enapres, 2025.

District Climate Risks

Climate risks to WASH services in Asunción

Climate change is reshaping Asunción's water landscape. Once characterized by distinct rainy and dry seasons, the district now experiences blurred patterns. These distortions, often linked to El Niño, strain already limited resources and destabilize rural livelihoods.

The district receives about 700 millimeters (27.5 inches) of rainfall each year, most concentrated between October and April. Its water supply depends heavily on springs and surface sources in the upper basin, yet these sources are increasingly vulnerable. Years of land degradation have reduced the soil's ability to absorb and retain water, accelerating runoff and erosion. Agricultural pressures push farming higher up the slopes, threatening fragile recharge areas and weakening ecosystems that sustain local water systems.

> **In response, Water For People is collaborating with the Jequetepeque-Zaña Interregional Basin Water Resources Council to understand better and protect Asunción's headwaters. By cross-referencing national data on water recharge areas with local monitoring, the project has identified priority zones where degradation must be halted and restoration accelerated. This basin-level collaboration ensures that Asunción's local efforts are connected to regional water management strategies.**

Water For People and the municipality have used several tools to assess how these hazards affect services. Annual monitoring has tracked service sustainability since 2015, and in 2024, the district applied the University of Bristol's Climate Resilience Framework to nearly 60% of its water systems. This assessment revealed that 45% of systems have medium to low resilience.

To carry out this assessment, Water For People partnered with local universities, engaging volunteers from the National University of Cajamarca and the Private University of the North. These students, trained in the tool's technical and social dimensions, collected data from across the district. Surveys were designed to capture multiple perspectives: from JASS directors and water system operators to women and older adults representing households and the municipal technical authority. The process became a form of learning, building local understanding of climate risks while generating data to inform future planning.

The overall results of the process assessing the six resilience factors indicate that 45% of water systems have a medium to low level of resilience and require substantial and large-scale improvements in the associated factors, respectively.

Further climate hazards, vulnerabilities, and exposure are captured in the table below.

Hazards	Vulnerabilities	Exposure
The El Niño phenomenon, which frequently causes: • Prolonged droughts are becoming increasingly critical, caused by the distortion of the rainfall pattern (changes in the frequency and intensity of precipitation). • Flooding due to intense rainfall, often at unexpected times. • Mudslides and landslides • Cyclones (historically rare but Yaku occurred in 2023)	• **Environmental:**13 of 45 water systems (29%) are located in areas at risk of flooding or on topography and soil with degradation due to use. • **Physical:** In terms of infrastructure, 34 of the 45 water systems (78%) have a flow rate that varies significantly (too much or too little water) during the dry and rainy seasons, resulting in a lack of rainwater retention in the soil. In 54% of the water systems, access to supplies, spare parts, and inputs was difficult, mainly due to their location in the mountains. • **Social, economic, and human:** In 49% of water systems, there is little understanding of climate risks, or this knowledge needs to be adapted. In 44% of them, there is limited representation of the opinions of diverse social and gender groups in the community organizations that manage the systems. 37% of the systems have limited mechanisms for access to information and participation. Furthermore, most of the population's high dependence on agriculture increases economic and food vulnerability. • **Institutional:** 71% of water system leaders reported a lack of risk management and support programs. 40% reported deficiencies in post-emergency support, and 58% reported deficiencies in intersectoral coordination. • **Financial:** Limited funding is available for both emergency and prevention funds in vulnerable systems and for monitoring water sources. Only 20% of the sources supplying the systems have undergone quality analysis.	• The intakes and transmission lines of water systems, since springs are generally found in significant depressions, steep slopes, and riverbeds or streams. • User population of water systems and respective sources. • Centralized and decentralized sanitation infrastructure systems.

Adaptation Strategies

Priority Adaptations that Respond to Climate Risks in Asunción, Peru

Asunción's response to climate risks has built on a decade of strengthening its WASH systems. Adaptations did not begin only after assessments were completed; many were already underway as communities and the municipality responded to the impacts they were experiencing. Over time, these actions have become more structured, informed by new data, and rooted in inclusive decision-making.

The process has followed three main steps. First, data was generated through annual monitoring of service levels and sustainability using Water For People's internal tools. More recently, this data was expanded through the Climate Resilience Framework, which provided a deeper look at the vulnerabilities of specific water systems. Second, local actors – municipal staff, JASS leaders, and community members – came together to reflect on the findings and identify priority actions. Finally, lessons from other contexts, both in Peru and internationally, were shared and adapted to fit Asunción's needs.

Underlying this approach are three principles of locally led adaptation. Decision-making is delegated to the lowest appropriate level so communities can lead on actions that directly affect them. Investments focus on building local capacity, leaving a lasting institutional legacy rather than short-term fixes. And the process emphasizes building a solid understanding of risk and uncertainty, so strategies can be continually improved as conditions evolve.

Adaptation Aim: Healthy Freshwater Ecosystems

Implemented Activities:

- Planting and harvesting water in recharge areas of water sources in specific communities in Asunción, and developing a guide for implementation in other municipalities.[12]
- Monitoring and tracking the capacity of water sources (currently 80%) and analyzing the quality of the source in 20% of them.

Future Activity:

- Broader-reaching source quality analysis using an incentive system for water system operators that generates evidence to mobilize institutional support.

[12] Water For People Peru, Guide to implementing water planting and harvesting experiences in rural areas (Spanish), 2019.

Adaptation Aim: More dynamic and inclusive service management

Implemented Activities:

- Strengthening the capacities of the Municipal Technical Area for planning, budgeting, and monitoring processes and technical support for rural service providers.
- Strengthening water system operation and maintenance capacities for rural service providers.
- Annual monitoring of WASH services, and joint reflections between the municipality and partners
- Implementation of micrometering and family quotas for the financial sustainability of water systems.
- Climate Resilience Framework to measure the resilience of drinking water systems and improve response capacity.

Future Activities:

- Incorporating into the local policy on water sustainability for population use, within the water security axis, a municipal proposal for risk management in the face of climate change. This includes: 1) Intersectoral coordination between water uses, 2) education on climate change and management for adaptation to it (meeting of knowledge), and 3) representative participation (social and gender)
- Integrating the climate resilience framework into the municipality's service and sustainability monitoring processes and technical assistance.

Adaptation Aim: Stronger infrastructure

Implemented Activities:

- Analysis of the municipality's water system infrastructure assets, updated every 5 years.
- Diagnostics and technical assistance for recovery and innovations at the Asunción rural treatment plant (WWTP) and management of discharge and reuse certificates.

Future Activities:

- Contingency and preventive plans for systems whose intakes are located in vulnerable areas.
- Obtain discharge and reuse certificates at the Asunción WWTP and scale up the WWTP recovery experience in other municipalities.

Example of Planting and Harvesting Water Practices

In the steep Andean landscapes of Asunción, water is often abundant for only a few months of the year and scarce for the rest. Nearly 90% of the land in Cajamarca has slopes steeper than 15%, causing rainfall to rush downhill instead of replenishing soils and springs. During the rainy season (October – April), much of this water is lost as runoff. By the dry months (May – September), springs diminish, and families struggle to meet both household and agricultural needs. It is estimated that 80% of the region's water resources are underutilized because of this imbalance.[13]

To address this challenge, Asunción has revived an ancestral practice: planting and harvesting water. This technique, used for centuries in southern and central Peru, combines natural and built infrastructure to capture rainfall and regulate its availability throughout the year.

- **"Planting"** focuses on preparing the land to absorb and retain water. Communities reforest slopes with native trees, mulch degraded soils, and build infiltration ditches to channel rainfall into the ground. Grazing areas are managed to prevent erosion and protect fragile recharge zones. The choice of technique depends on local conditions – in areas with more than 500 millimeters (19.7 inches) of rainfall per year, forests can be planted to capture water through their root systems. In drier areas with less rainfall, lighter interventions such as infiltration ditches are preferred, as they retain water without increasing demand from thirsty trees.

[13] According to data from the National Water Authority.

- **“Harvesting”** complements this work with small-scale infrastructure that captures and stores water for later use. Communities construct intakes, reservoirs, and other systems to hold water during the rainy months, ensuring it remains available in the lean months when demand peaks. Together, these strategies increase base flows from springs, improve soil health, and create a buffer against seasonal shortages.[14]

Water For People worked with the municipality and JASS leaders to adapt this ancient practice for modern needs. Traditionally aimed at securing water for agriculture, in Asunción it has been repurposed to safeguard drinking water. Community leaders participated in an exchange visit to another district in Cajamarca where the technique was already in use, then returned to share their learning with residents through assemblies. Implementation relied on the work being carried out in *mingas* – an ancestral practice of collective work – bringing entire communities together from establishing nurseries to planting in fields.

The municipality’s role has been equally important. It manages a nursery that produces seedlings for commercial purposes, and through an agreement, a portion of revenue is reinvested into native reforestation for water harvesting. In 2024, more than 30,000 native plants were purchased for this purpose. This arrangement has created a sustainable financing mechanism that can be replicated in other municipalities with existing nurseries.

The benefits of this practice extend beyond water availability. Planting and harvesting water strengthens ecosystems, restores soil health, and reinforces community traditions of shared responsibility. Because the practice is rooted in ancestral knowledge and validated by modern experience, it carries cultural legitimacy while also meeting today’s climate adaptation needs. Since water harvesting and planting are validated ancestral techniques, base flow from the springs is expected to increase in the medium term. Looking ahead, the development of a national Guide to Implementing Water Planting and Harvesting Experiences in Rural Areas will support wider replication across Peru.

[14] Water For People Peru, Guide to implementing water planting and harvesting experiences in rural areas (Spanish), 2019.

Integrating Climate Into Planning

Integrating Climate Risks and Adaptation into Local Policy in Asunción

The Municipality of Asunción has been involved in implementing these experiences since the beginning and has co-financed some activities. This has allowed for integrating climate risk issues into its local policies and master plan.

From the outset, the municipality co-financed activities such as planting and harvesting water, which allowed these efforts to be integrated into its **Local Policy for the Sustainability of the Water Service for Public Use**. Within this policy, one of the priority areas is water security, which includes water harvesting and planting projects. A municipal climate change risk management proposal will be integrated into this policy based on recent results of the University of Bristol's Resilience Framework tool. This includes three key priorities: improving cross-sector coordination across water uses, strengthening education and awareness on climate change, and ensuring decision-making processes are representative of women, older adults, and vulnerable groups. Discussions are underway around integrating the University of Bristol's Climate Resilience Framework tool into the annual monitoring framework for services and sustainability. This integration is expected to take place on a two- to three-year cycle, tied to census data for all water systems.

Lessons Learned

Lessons learned and key challenges for integrating resilience

The experience in Asunción highlights several lessons for building climate-resilient WASH:

- **Experience can serve as an alternative in the face of climate change.** When approaches bring together converging perspectives – such as integrated water resources management (IWRM), climate science, and traditional knowledge – they can be validated in practice and scaled for broader impact.
- **Climate resilience in WASH services is not linear or straightforward**. It requires a systems approach that addresses freshwater ecosystems, service management, and infrastructure together rather than as isolated elements.
- **Better technical decisions are needed at the source.** The location and management of catchments must account for climate risks, including preventative measures to reduce future vulnerability.
- **Local capacity must be strengthened.** Building the ability of municipalities and providers to generate local information for decision making – whether for contingency planning, water source monitoring, or service management – is critical for resilience.
- **IWRM is a fundamental tool**. Linking water resources management with WASH services ensures that both are more sustainable.

- **A gender perspective must be incorporated.** Adaptation processes are stronger when women and marginalized groups are actively represented in governance and decision-making.
- **Financing remains a key challenge**. Sustainable resources are needed for ecosystem monitoring, water quality analysis, and emergency preparedness. Without financial sustainability, districts and service providers remain highly vulnerable.
- **Institutional fragmentation weakens resilience.** The large number of small, rural providers across Peru complicates coordination, capacity building, and institutional support—issues that extend beyond district boundaries and must be resolved nationally.

Conclusion

Asunción is taking deliberate steps to ensure that climate resilience becomes part of how services are planned, financed, and managed over the long term. These steps include:

- Raising awareness among the population by sharing the resilience results of the drinking water systems found in the district
- Involving different actors in the process for coordinated work
- Developing and implementing the Municipal Climate Change Risk Management Plan for water and sanitation services
- Preparing informational materials to promote the participation of the population and various municipal stakeholders in actions for the transition toward climate resilience,
- Institutionalizing the process so stakeholders can sustain it over time.

The district's work is already influencing efforts beyond its boundaries. Planting and harvesting water is being scaled up through national guidance for municipalities and supported by the financial models created through local nurseries.

The University of Bristol's Climate Resilience Framework is being applied in two additional districts in Peru and has been replicated in Guatemala, demonstrating its relevance across very different contexts. Collaboration with the Jequetepeque-Zaña Interregional Basin Water Resources Council is connecting district-level action to watershed-level strategies, offering a model for how climate resilience can be embedded in larger governance structures.

Systematizing the district's experience ensures that it is not only preserved but also transferable. By documenting what has worked – and what challenges remain – Asunción provides lessons that can inform adaptation in other parts of Peru and beyond. **Its progress demonstrates that even small rural districts can become leaders in climate resilience, drawing on ancestral practices, local leadership, and systems strengthening to safeguard WASH services for generations to come.**

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