ASSESSING THE CLIMATE RESILIENCE OF SAFE WATER ENTERPRISES

November 2020

Executive Summary

This report is a strategic assessment of the climate resilience of Safe Water Enterprises (SWEs). It finds that whilst the overall picture is of reasonable resilience to climate change, SWEs will need to engage with key sector stakeholders – i.e. governments, international and climate organizations, consumers, investors and funders - to develop appropriate mitigation strategies and identify sources of funding for their implementation, if continuity and affordability of water supply is to be assured.

SCOPE

In recent years, Safe Water Enterprises have emerged as a necessary and valuable contributor to serving the two billion people still lacking access to safe drinking water. SWEs are decentralized solutions that provide water to low income consumers, many of whom will likely face the greatest impacts of climate change. They offer a model to treat and distribute safe water so that it is reliably available, free from physical, chemical and biological contaminants, and affordable.

The study, carried out by Dalberg, uses data from more than twenty databases related to climate, water, social, demographic, economic, and legal-institutional factors, as well as data from seven leading SWEs.

The objective was to first understand the **impacts of climate change on water supply** in the forthcoming decade (2020 – 2030) – **droughts, flooding and high severity storms** being the major risks. It then assessed the effectiveness of SWEs in responding to this crisis. To achieve this, Dalberg developed a **climate resilience framework**, that analyses both the ways in which climate change disrupts SWE supply chains, and the financial, social, and institutional parameters that enable SWEs to build resilience in response to these negative effects. Finally, the report offers a **set of recommendations** on how key stakeholders can respond.

FINDINGS

The analysis demonstrates that **climate change over the next ten years will negatively impact water supply for approximately 5.1 billion people**, with water quality and affordability most at risk. **All water suppliers – from large scale utilities to SWEs – will face disruption to their supply chain.**

The study finds that in this context, **SWEs appear to be a fairly resilient model through which safe water can continue to be supplied in most regions in the world**. It shows that SWEs are already implementing a host of resilience strategies which are enabling them to continue to distribute water. Moreover, their key differentiating characteristics – namely decentralized operations, flexibility in response to stress events and less capital-intensive production – mean they are highly adaptable to the impacts of climate change and offer a cost-effective means of continuing to provide water supply when compared to other water systems.

However, the resilience strategies deployed by SWEs come at a cost and involve both capital and operational expenditure. Water treatment will become a significant cost driver due to deteriorating water quality over the next ten years, which will in turn increase the cost of service over time. While in many areas, SWEs will be able to implement resilience strategies on their own as a result of finance availability or customer willingness to pay, in the most vulnerable regions they will require external support.

It is therefore critical that key sector stakeholders – governments, international and climate organisations, investors and funders – get involved to provide targeted and coordinated support for SWEs, so they can keep serving those most in need at scale.

Finally, the report suggests how different stakeholders can explore ways to advance their strategic and social objectives, with an eye to both safe water access and climate resilience. SWEs will have to plan for their future requirements and expenditures, and better engage with consumers, governments and funders if they are to secure the necessary support. Policy makers should integrate SWEs as a valuable tool in their water supply system as they analyse their water needs and plan for the future, and make available subsidies, grants, or loans to support SWEs in regions where government intervention is needed to build resilience. Finally, knowing that climate change will affect SWEs in non-uniform ways, funders will need to factor in this additional variable across their investment lifecycle, from fundraising, to ecosystem building to investing to portfolio company support.

Photo : Sandro di Carlo Darsa

This document is a summary of a 4-month study conducted in 2020 by Dalberg, on behalf of Danone Communities, Aqua for All, Osprey Foundation, The Stone Family Foundation and Vox Impuls.

The full report can be accessed at http://safewater.enterprises

Methodology and analysis can be examined in the full report.

With thanks to the following SWEs for their contributions to this study:

Jibu: Kenya, Rwanda, Uganda, Tanzania, Zambia, Burundi and DRC

1001 Fontaines: Cambodia, Madagascar, Vietnam and Myanmar

Piramal Sarvajal: India

iPure: India

Spring Health: India

oshun: Senegal

Water4: Operations in 13 countries[1]

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Photo : Sandro di Carlo Darsa

KEY CONCEPTS

What are Safe Water Enterprises?

In recent years, decentralized water systems have emerged as a necessary and valuable contributor to the world's potable water needs.

Safe Water Enterprises are decentralized solutions that complement traditional utility approaches to expand access to safe drinking water. They offer a model to treat and distribute safe water so that it is reliably available, free from physical, chemical and biological contaminants, and affordable. SWEs differentiate themselves through their social mission: offering safe and affordable drinking water to the underserved and unserved whilst maintaining financial viability.

SWEs offer unique advantages that complement other efforts to meet safe water needs:

- **Reach** - Because they are significantly less capital intensive than comparable piped networks, decentralized water systems can provide service where traditional networks cannot serve.

- **Quality** - Even in many regions with piped connections, tap water does not meet safe quality standards; decentralized solutions can provide high quality safe drinking water that complements home access.

- **Continuity** - In regions where centralized water provision is intermittent, decentralized systems can provide continuity of service when alternatives fail.

The preceding 2017 report into SWEs by Dalberg, "The Untapped Potential of Decentralized Solutions to Provide Safe, Sustainable Drinking Water at Large Scale", found SWEs already had a global footprint across Asia, Africa, and Latin America. It demonstrated how SWEs have the potential to be a significant part of the safe water solution on a global scale, and highlighted how SWEs can address internal and external barriers to accelerate their growth.

What are the impacts of climate change likely to be (2020 – 2030)?

There are 3 main risks from climate change that will threaten water supply systems around the world in the next decade: droughts, flooding and more severe storms.

Climate change is the **change in global or regional climate patterns** resulting from human-driven processes. Awareness of the impacts of climate change is not new: the effects of the greenhouse effect have been well documented since the late 1980s. However, the lack of decisive progress to combat human-driven climate change means that negative impacts have become established phenomenon across many areas of the world.

Naandi, serving 750,000 customers in 7 states in India, including Maharashtra, is directly experiencing the impacts of climate change. As India's annual western monsoon has become increasingly unpredictable, 2019 saw Naandi's operations hit by severe regional monsoon floods. Many of the rural villages in Maharashtra, served both by Naandi's kiosks and other suppliers, flooded due to direct rainfall and from severe riverine flooding. Flood waters polluted raw water sources, damaged equipment and limited ability of staff and customers to reach distribution points.

[1] The full report can be accessed at: http://safewater.enterprises

This study recognizes that climate change impacts have become a necessary variable to be taken into account when looking to meet the challenge of providing safe water for all. Accordingly, Dalberg used a ten year time frame, looking forwards from 2020 to 2030, to examine likely climate change impacts, incorporating data from more than twenty global databases, including resources related to climate, water, social, demographic, economic, and legal-institutional factors. Consideration was given to the two anticipated primary changes in the planet's climate: increases in average temperatures (expected to be around +0.2°C from current levels, to a worst case scenario of +0.5°C)[2] and changes in established weather patterns.

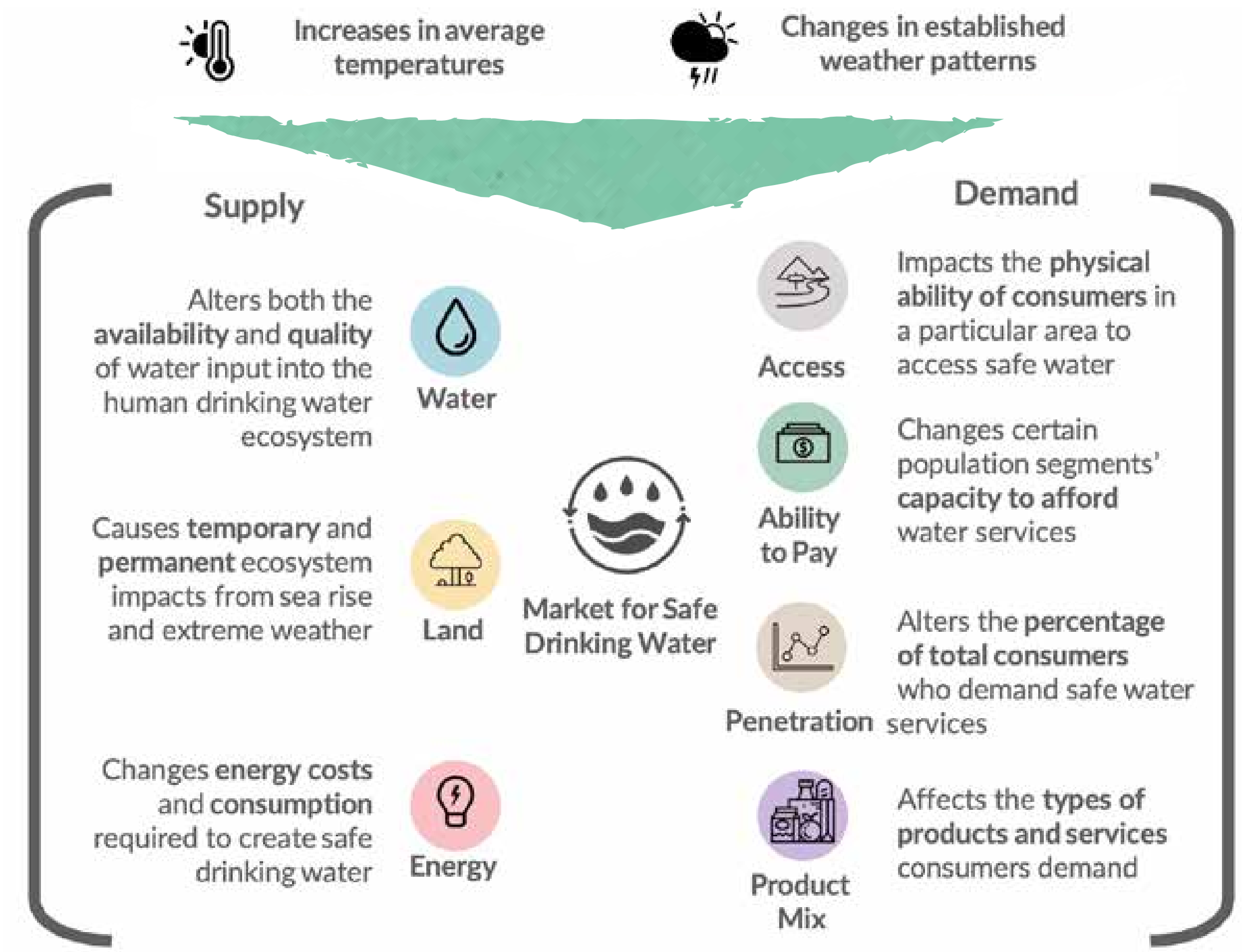
In the next ten years, these anticipated large-scale changes will lead to a range of outcomes directly and indirectly affecting water supply, including:

- Increased **frequency and severity of droughts** which can limit water availability and reduce water quality;

- Increased **likelihood of flooding**, which can contaminate raw water supplies and destroy treatment and distribution infrastructure; and,

- **More frequent severe storms** like hurricanes, which can pollute raw water supplies and damage infrastructure.

These expected outcomes will affect both supply and demand for safe drinking water, and **will impact all water supply providers' operations, whether large-scale utilities, SWEs or individual households.**



[2]https://www.ipcc.ch/sr15/chapter/spm/

METHODOLOGY

The approach used to build a climate change resilience framework

The research developed a framework to assess levels of resilience of SWEs by looking at the effects of climate change on their operations when set against the five safe water parameters defined by WHO.

To better understand climate resilience of water systems, key concepts from analysis related to climate resilience for businesses in general, and specific adjacent sectors such as energy infrastructure, were used as a starting point. Drawing on these concepts enabled us to build a water system resilience framework comprising:

Intrinsic resilience - actions that SWEs can implement without funding or technical support.

Assisted resilience - the set of responses based around external financing or technical assistance.

Combined, these form **mitigation tactics**, the set of resilience activities that an organization can implement to offset the full effects of climate change.

Left unmitigated, climate change may force water systems to reach a **point of failure** where they are no longer providing safe water defined by the WHO's parameters for quality, quantity, continuity, accessibility, and affordability.

Effect on water supply outcomes

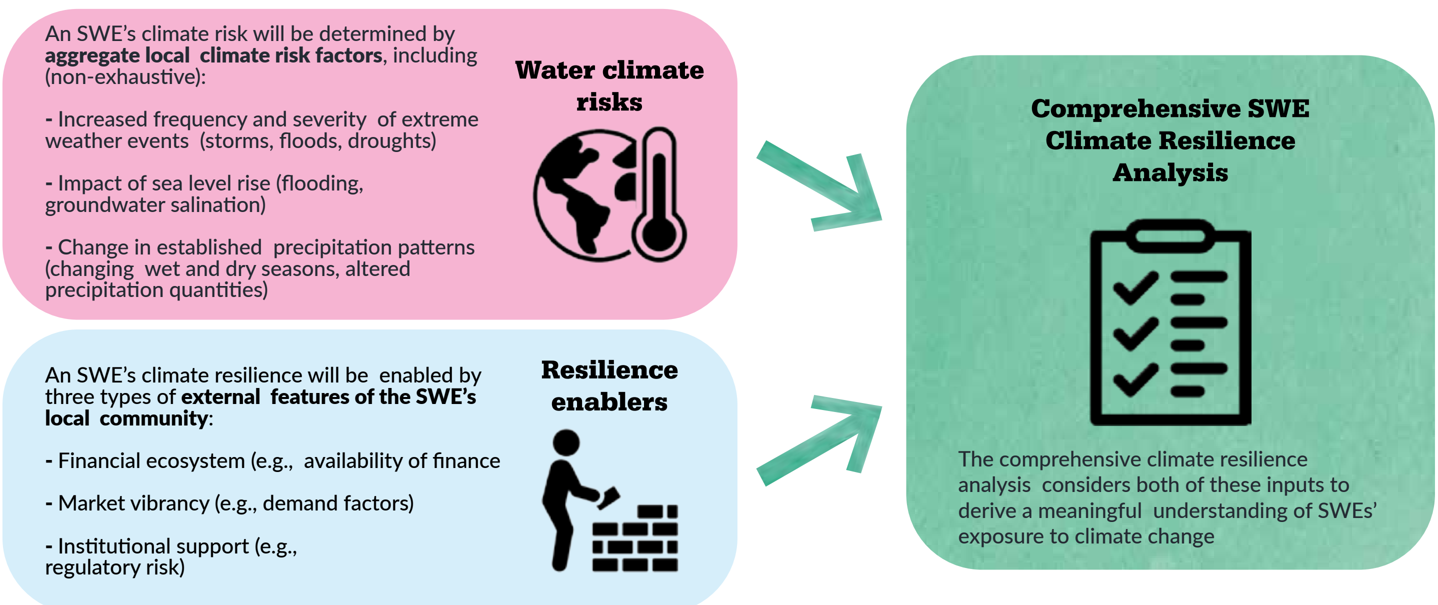
*Climate change is expected to have a significant impact on SWE operations, which is assessed across 5 **WHO water parameters contextualized for SWEs***

Definitions		
	Quantity	Quantity of water available for SWE production
	Quality	Quality of water produced by SWEs
	Accessibility	% population able to access SWEs for safe drinking water
	Continuity	# hours of continued operation for an SWE
	Affordability	% population with the ability to afford SWE product

WHO parameters for safe water, contextualised for SWEs

Understanding the factors which contribute to a water system reaching a point of failure enables the **cost of adaptation** to be determined, in order that the point of failure is avoided.

Overlaying the assessment of climate risks and their negative effects with mitigation options and their associated costs builds the comprehensive framework used in this research to assess climate resilience of SWEs.



KEY FINDINGS

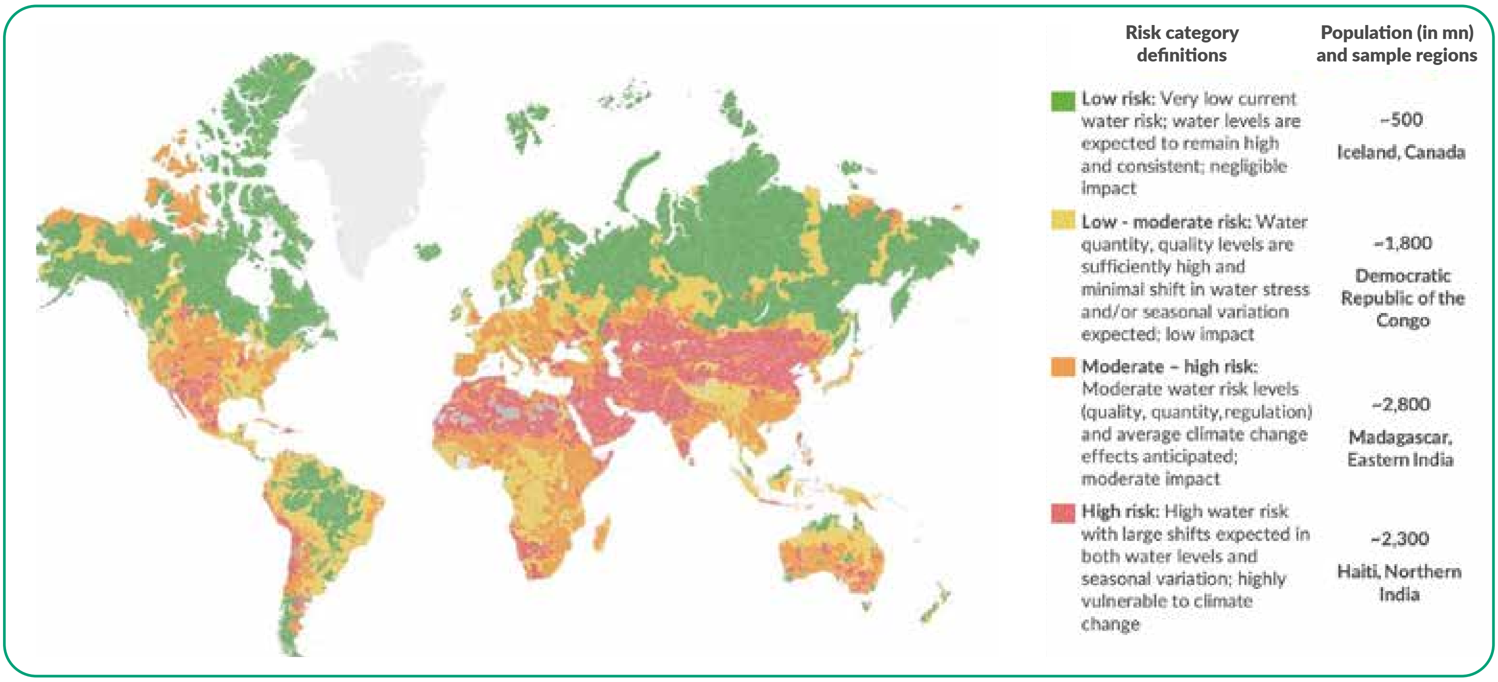
Key climate change risks and their impacts on water supply

Nearly 5.1 billion people live in regions of the world that are likely to face high or moderate-high climate risk over the next ten years. It will mostly impact water quality and affordability.

Climate change impacts on water ecosystems

The research focused on analysis of data from **15,000 hydrological sub-basins over the period 2020 - 2030**, as well as interviews with leading climate experts, to estimate the expected magnitude of key climate change impacts on water ecosystems.

The results segment the world into four climate-risk regions that vary in the degree of risk that water supply faces due to climate change.



Source: WRI Aqueduct Global Maps 2.1 Data; Dalberg analysis

While northern areas are largely low risk, **nearly 5.1 billion people live in regions of the world that are likely to face high or moderate-high climate risk over the next ten years.**
A large proportion of this population is concentrated in Asia and Africa with countries such as India accounting for a sizable share of this at-risk population.

Impacts on water supply operations

Most of the SWEs surveyed as part of this report are serving populations in regions with moderate to high climate risk. Their role in providing safe water to at-risk populations underscores the need to understand how climate change will impact on their operational and financial aspects and ultimately whether they can continue to provide water which meets safe water parameters.

To achieve this, the research assessed the predicted impacts of climate change risks on the business – the impact being a direct cost or effect on operational efficiency – through analysis of ten of the most relevant SWE business metrics relating to water supply and water demand.

SWE business metrics impacted by climate change

Business metric	Value chain	Type
Factor downtime [# of op. hours]	E T D	Operational
Energy for extraction (units/L)	E	Operational
Cost of chemical ($/L) (groundwater)	T	Financial
Cost of chemical ($/L) (surface water)	T	Financial
Energy for treatment (units/L) (groundwater)	T	Operational
Energy for treatment (units/L) (surface water)	T	Operational
Labour hours for distribution (hrs/L.)	D	Operational
Labour cost for distribution ($/L)	D	Financial
Population density (people/sq. mi)	S	Operational
Willingness to pay ($/L)	S	Financial

E Extraction D Distribution T Treatment S Sales Financial metric Operational metric

Impacts of climate change on safe water parameters

These ten metrics capture the tangible impacts of climate change on SWEs and their consumers by relating impacts to the safe water parameters, as it is illustrated by the example of 1001 Fontaines.


Photo: Sandro di Carlo Darsa

1001FONTAINES

Country of operation: Cambodia

Climate Segment 1: Moderate-High Risk

Key climate change risks: in recent years, traditional rainfall patterns have become more unreliable. In 2019, the rainy season failed to arrive for 3 months, causing many of 1001fontaines primary water sources to become severely depleted.

Impacts on safe water parameters:
- **declining quantity of water available for extraction**
- **disruption to continuity until alternative sources could be found**
- **increased treatment costs to ensure quality, as higher chemical and biological contamination levels were experienced**
- **increased production costs, impacting on affordability**
- **accessibility decreased with consumers travelling further to access safe water as sources ran dry.**

The table below shows the overall risk score assigned to each WHO safe water parameter in the four water climate-risk regions, indicating the general risk to water supply in each region in the absence of mitigation efforts.

		Category 1: Low risk	Category 2: Low - moderate risk	Category 3: Moderate - high risk	Category 4: High risk
	Total population (millions)	~500	~1800	~2800	~2300
Climate risk scores (for esach water supply outcome)	Quantity	1	1	3	4
	Quality	2	3	4	4
	Accessibility	1	1	2	3
	Continuity	1	2	3	4
	Affordability	1	3	4	4

1 **Steady state**
Low impact of climate change on SWE operations; nominal change in parameters

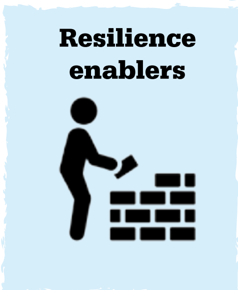
2 3 **Moderate to high risk**
Some impact of climate change expected; adaptation necessary for shift back to steady state

4 **Point of failure**
Severe impact; left unmitigated, effects could render the SWE operations unviable

Analysing climate change impacts in terms of the outcomes for safe water parameters in each risk segment identifies quality and affordability as the water parameters most likely to be affected, followed by continuity. During the time frame considered for the analysis, shock events like floods and cyclones are more likely to disrupt water than stress factors like salination due to rising sea levels. These shock events have a significant impact on quality as water sources become contaminated. This will lead to an increase in costs, including treatment costs, and as a result the cost to serve will rise and affordability will fall.

Impacts are likely to be particularly acute in **the high risk segment**, in which almost all water supply outcomes – quantity, quality, continuity, affordability and accessibility – are likely to reach point of failure. SWEs will need proactive measures to ensure water supply in the face of such climate risk.


Photo : Sandro di Carlo Darsa



Resilience enablers in water ecosystems to mitigate risks

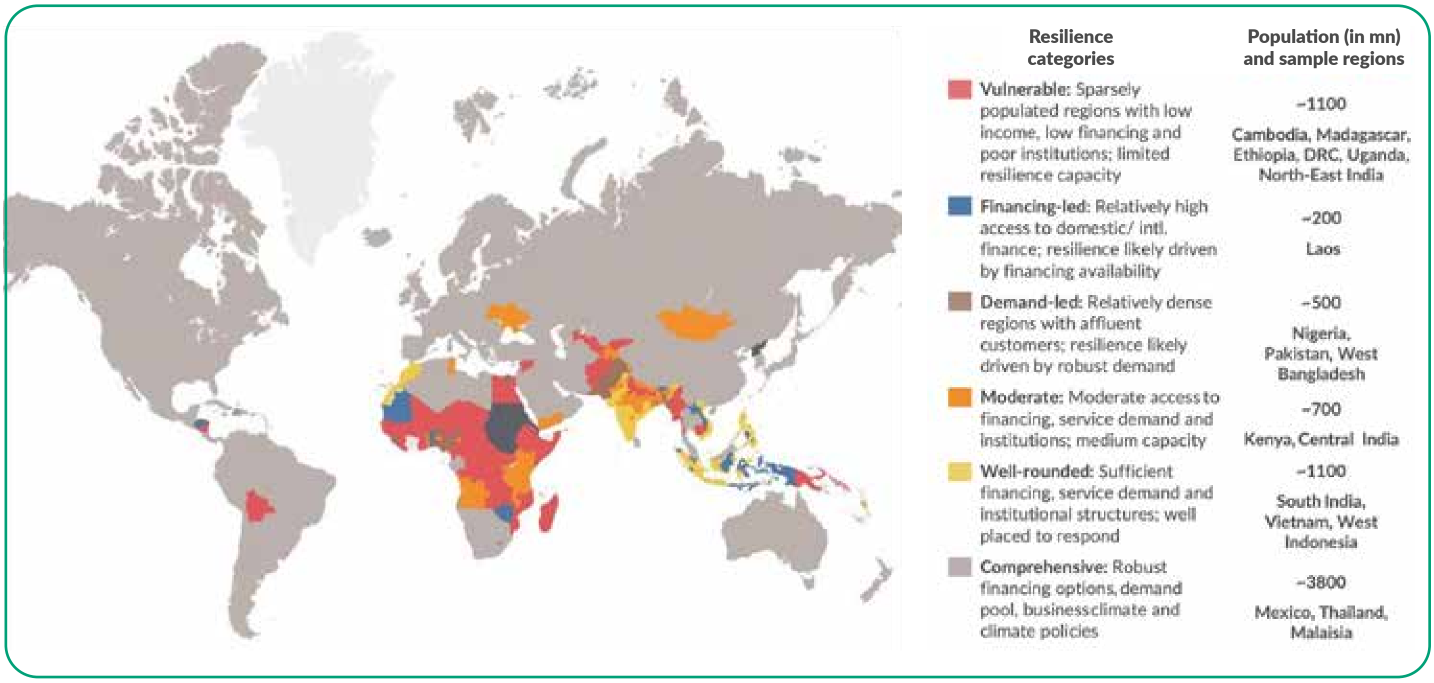
SWE resilience is shaped by the socio-economic conditions of the environment in which they operate. SWEs in about 65% of target markets will be able to form a resilience response as a result of public financing availability or robust customer demand. SWEs' resilience, both intrinsic and assisted, is a function of the financial, social, and institutional support available, which varies by location.

Consequently, in addition to different levels of water climate risk, regions also have varying levels of ability to respond to these risks.

- The **availability of finance** in a region enables SWEs to fund investment in climate preparations and to more effectively respond to or repair after climate-induced shocks to business operations.
- **Demand-side elements** influence SWEs' capacity to generate funds for climate investments through sales and to continue operations in the event of a crisis.

- **Legal-institutional elements** of SWEs' operating environment contribute to their resilience by determining the efficiency of the local business environment and the regulatory attitude towards climate adaptation.

The analysis divided the world into 'resilience categories' based on the availability of these 3 resilience resources.



Note: ~84M worth of population not included in the analysis due to low data availability
Source: 1. Dalberg analysis

Vulnerable regions (with neither public or private sector financing nor consumer-led ability to support water systems) and **demand-led** regions (with poorly developed support from financial and institutional ecosystems) are the most at risk.

At the other end of the spectrum, **well-rounded** and **comprehensive** regions have access to financing, consumer demand density, and high-quality institutions to deliver water services in the face of climate shocks and stresses.

Comprehensive SWE Climate Resilience Analysis

Identifying high risk groups

Overlaying climate change risks and resilience enablers, the research identified seven unique water-climate segments that are relevant to the SWE ecosystem. Of these, SWEs operating in the four segments most at risk will require specific support to combat climate change.

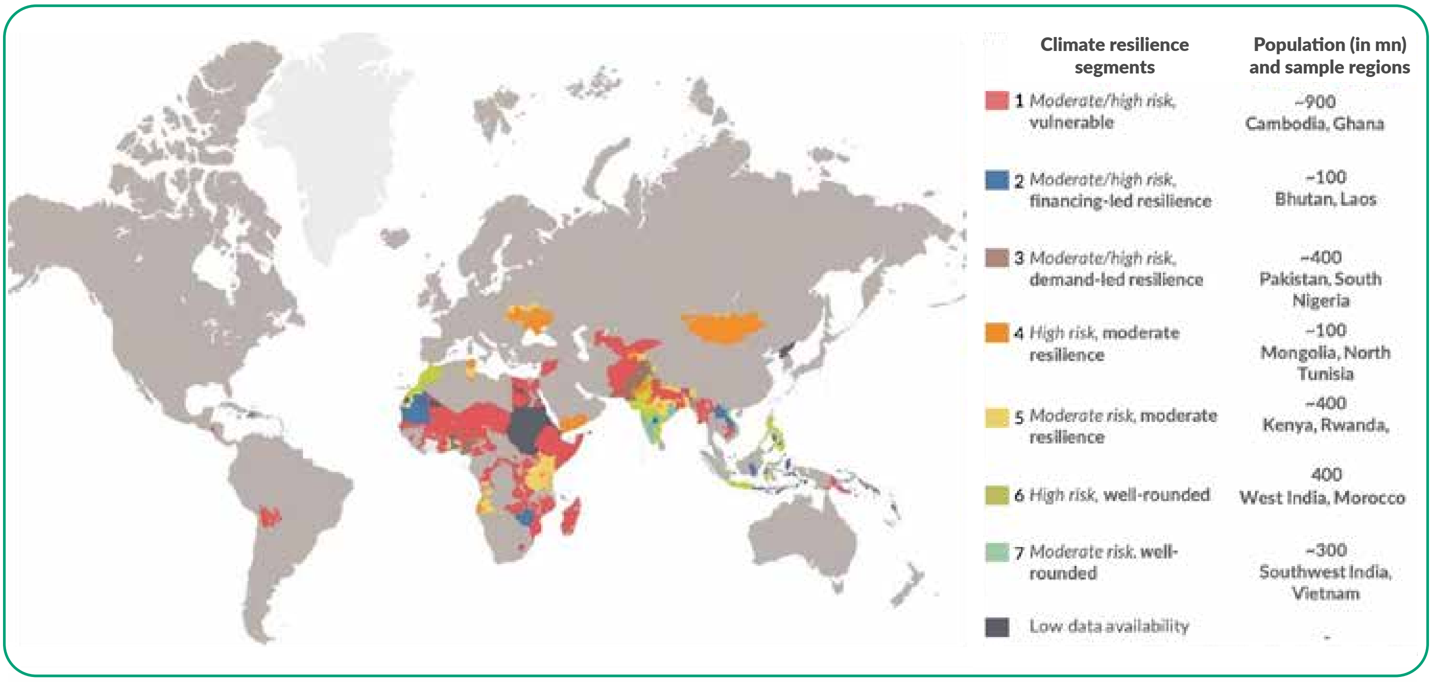
By combining climate risks and resilience analysis, it can be seen that large SWEs and funders are engaging across a range of 'climate resilience segments,' which have varying levels of water climate risk and resilience.

At one end, the **High-Risk/Vulnerable** segment is characterised by medium to high risk of climate change and very little capacity for resilience. In total, this segment has 900 million people encompassing many parts of Sub Saharan Africa and South East Asia. Ethiopia exemplifies the challenges faced in this segment, already classified as one of the most drought-prone countries, but likely to face greater challenges as variability of rainfall increases. Ethiopia has limited resilience to draw on, with scant availability of financing, very low-income levels and weak institutional support.

In contrast, and despite moderate climate risk, the **Moderate Risk-Well Rounded** segment has sufficient access to financing, robust service demand, favourable policies and/or business climate to adapt. In India, for example, the Government's initiative for Coalition for Disaster Resilient Infrastructure highlights the national commitment to building resilience and minimising losses from climate-related disasters in the water sector amongst others.

A number of regions have **well-rounded** resilience and can respond to climate risk without relying on external support. The segment includes much of southern India, the Philippines, Morocco, and wealthier islands of western Indonesia.

An array of regions exists between these segments, with **moderate to high climate change risk and a mix of resilience sources** (some derive resilience from the demand side as they are located in dense, middle-income areas, while others are in regions where financing is relatively easy to come by). For example, in Kenya and Rwanda, relatively dense populations and robust presence of funders will allow for some resilience. In southern Nigeria and Pakistan, most customers will be able to absorb a price increase.



Note: Only included the 7 segments in focus for the analysis above; ~115M worth of population not included in the analysis due to low data availability
Source: WRI Aqueduct Global Maps 2.1 Data; Dalberg analysis

Photo : Sandro di Carlo Darsa

RESPONSE

Building resilience

SWEs are working to meet the challenges of climate change using a variety of tactics. As climate change effects become more pronounced, the cost to serve will increase on average by around 3% in low risk segments and by around 18% in high risk segments, with mitigation strategies subject to refinement by SWEs. In the most at risk segments, SWEs will need external support to achieve sufficient resilience.

The research indicates that climate change may force water systems to reach a point of failure if left unmitigated. But as the impacts of climate change have begun to be felt, many SWEs are already deploying measures to lessen climate change impacts. Even during times of severe climate shocks, SWEs have already demonstrated they are able to continue to offer essential water supply services to their customers.

When faced with floods in 2019, Naandi was well placed to respond to the event. Careful planning when setting up operations had ensured Naandi selected and operates rural sites in partnership with Gram Panchayats (local governments), enabling trust and integration into local villages, values which carry particular weight for people in times of vulnerability.

Naandi had also selected locations for kiosks at flood-resistant locations, to counteract the potential flooding as it became more prevalent. As a result, Naandi continued to operate while other kiosks were forced to close, enabling Naandi to continue to provide existing customers with access to safe water whilst also gaining new customers as a trusted supplier. Sales not only temporarily increased, but many customers went on to become regular customers with Naandi after the flooding had subsided.

Photo : Sandro di Carlo Darsa

The report consolidated tactics already deployed by SWEs and supplemented these with additional potential solutions – in total, the report covers 23 tactics spread across 9 categories. This list provides a starting point and is open to refinement by SWEs as they will apply field knowledge and expertise to their specific operating environments.

In order of increasing complexity (with the easiest to implement coming first), these response tactics are:

	Categories of SWE Climate Adaptation Techniques	Exemples
Quick wins	**1. Inventories:** Building excess inventory of both raw & treated water, and other essential supplies **2. Resource pooling:** Pooling critical resources across SWE locations and with other players in the supply chain	Purchasing water tanks to store excess capacity and arranging for transport across
Incremental gains	**3. Conservation:** Maintaining intended water production and service levels using lower amounts of production inputs **4. Resource removal:** Modifying a portion of SWE operations to run without specific process inputs **5. Resource adaptation:** Modifying existing SWE resources to enable new purposes	Adapting existing mobile messaging systems to reach customers during a shock event, reducing wastage through runoff tanks, and expanding product mix
Long term plays	**6. Redundant capacity:** Building redundant capacity of key inputs such as energy to keep the SWE running in the face of shocks **7. Technology change:** Shifting critical technology/ filtration processes for SWEs **8. Input substitution:** Replacing a key production input in short supply with another (e.g., replacing electricity by natural gas) **9. Mitigation-oriented design:** Designing infrastructure and processes to mitigate impact of disruption on primary production processes, especially at the beginning of a new SWE venture	Investments like solar panels to generate and batteries to store energy, changing treatment technologies, and site selection studies to build resilience

The SWEs which participated in this research provide examples of mitigation in practice, ranging from low cost tactics to ensure continuity and quantity of service in the face of increased droughts, to higher cost investment in technology to assure quality and quantity of water as groundwater becomes increasingly contaminated.

SWE	Situation	Response	Cost	Benefit
1001fontaines Cambodia	In 2019, a severe drought left water levels at many kiosks so low that the kiosks were not able to sustain continuous operations	1001fontaines developed a drought mitigation plan that prioritized obtaining treated or raw water from nearby kiosks that were operational	Low. Included: (1) cost of compensating donor site entrepreneur, and (2) cost of transport of raw/treated water	• Continuity: Sites remained capable of delivering service • Quantity: Maintained pre-drought quantities
Sarvajal India	When Cyclone Fani struck Orissa in 2019, many Sarvajal kiosks sustained damage from the cyclone's high winds and from flooding.	Sarvajal activated existing IoT-based monitoring on essential infrastructure to understand which kiosks were online and what repairs were necessary.	None. Sarvajal had already installed these systems for regular ops; they could be adapted in an emergency.	• Continuity: Sarvajal identified 30 sites could continue ops, and prioritized repairs at remaining 6.
Spring Health India	Ground water quality has declined over time, due partially to decreased recharge as monsoon rains have become more unreliable	Spring Health has begun to switch from chlorination-based treatment to chlorine dioxide treatment systems	Initial capex 4-5x greater for chlorine dioxide systems than for chlorination systems	• Quality: Output water is higher quality (reduced TDS) • Quantity: Increased quantity of output

While SWE resources are likely to be sufficient for implementation of low-cost tactics to address minor climate impacts, **building long term resilience and ensuring continuous water supply will have impacts on both capital and operational expenditures. The cost to serve is estimated to increase by on average 3% in the low risk segments**, and by around 18% in the high risk segments, where investing in comprehensive mitigation will require leveraging significant resources (internal or external). The exact nature of adaptation tactics employed, and therefore the cost, will vary across segments depending on the magnitude of the regional climate challenge and local resources, but these figures nonetheless provide indicative costs of implementing mitigation measures.

Not all water climate segments will be able to implement sufficient tactics by themselves and ensure 100% resilience. **SWEs in about 65% of their target markets (segments 5, 6 and 7) will be able to shape a resilience response due to public finance availability or customer willingness to pay extra. The other 35% in segments 1 to 4, representing 1.5 billion people, (many of whom are unserved) are likely to require significant assistance to respond to climate change.**

Segment	*Water risk score*	*Resilience score*	*Segment summary*[1]
1. Moderate/ high risk, vulnerable	3.2 – 3.8	0.57	15 – 18
2. Moderate/ high risk, financing-led	3.2 – 3.8	2.00	53-63
3. Moderate/ high risk, demand-led	3.2 – 3.8	0.79	21 – 25
4. High risk, moderate	3.8	2.00	53
5. Moderate risk, moderate	2.0 – 3.2	2.79	87 – 140
6. High risk, well-rounded	3.8	4.00	105
7. Moderate risk, well-rounded	3.2	4.00	125

Segment summary	*Interpretation*
0 to 50	Will struggle to build resilience against climate change
50 to 100	Largely assisted resilience with some gaps
100+	Strong resilience with minimal need for assistance

1. The Segment Summary score is calculated by dividing the resilience score by the water risk score

Figure: Summary of ease of response to climate change impacts by climate resilience segment

Recommendations for SWEs, policy makers and funders / investors

This report provides a means for different stakeholders to explore ways to advance their strategic and social objectives, taking into account both safe water access and climate resilience.

SWEs

SWEs provide a safe, reliable and flexible means to reach last mile consumers. However, SWEs will need support from funders to reinforce their operations if they are to successfully face the challenges presented by climate change.

The results of this study provide direction for SWE's engagements with governments, funders and consumers, as well as planning for their own infrastructure requirements and expenditures.

The framework enables SWEs to:

- Assess the key water climate risks to their operations to better understand cost implications and impacts on affordability. SWEs can use a simple self-assessment tool created by Dalberg to serve as a starting point.

- Adopt climate-resilient business practices to respond to their risk scenarios and in relation to local contexts.

- Focus on mitigation planning for regions prone to more long-term events (e.g., recurring droughts, declining water tables), whereas for short-term shocks, simple low-cost adaptations to existing practices can be utilised.

- Leverage climate knowledge to activate new sources of investment.

Engagement with Governments and international organizations

In highly vulnerable regions like Cambodia and most Sub-Saharan African countries, SWEs should proactively seek to build relationships with **governments or foundations for subsidies or grants** to fund essential climate resilience preparations. Specifically, support that **reduces treatment costs** could be especially impactful. SWEs could also join wider coalitions of players, acting together to mitigate climate risks in a territory.

Engagement with Funders

In regions with financing-led resilience, such as Laos and Tanzania, SWEs will need to seek external sources of financing **willing to take sub-market returns** in order to generate impact.

Engagement with consumers

In regions with demand-led resilience, like Pakistan and southern Nigeria, SWEs can **rely on robust demand to pass on price increases** to customers.
As water quality declines, **demand for SWE supplied water may increase** as customers look to SWEs to meet needs beyond safe drinking water (e.g. water for cooking).

Policy makers

Policy makers should integrate SWEs as a valuable tool in their water supply system approach and make available subsidies, grants, or loans to support SWEs in regions where government intervention is needed to build resilience to climate change.

SWEs have the potential to be a significant part of the safe water solution on a global scale, not only as a cost-effective mechanism to supply safe and affordable water to the poor but as a resilient means to fill the gaps in times of climate shocks where other water systems may be more impacted.

The water climate risk and resilience framework presented here provides the means for policy makers to more effectively diagnose how well-prepared their water systems are to meet future needs in the context of a changing climate, and where necessary to scale up deployment of SWEs in locations in which they are best-suited to meet the needs of consumers. The framework also gives direction to policy makers in targeting support so that the most promising SWEs remain functional during shock events and in the longer term, ensuring people continue to have access to a reliable safe source of water.


Photo : Himelin Otounga


Photo : Sandro di Carlo Darsa

Funders / investors

The framework developed is a valuable tool to enable funders to assess and refine their future investments in the sector. It illustrates the need for funders to become both targeted and collaborative in their investments, and to provide more operational support to their investees to tackle climate change.

Climate change will affect all water supply systems in the coming decade in non-uniform ways and should become an additional variable that funders will need to factor in across their investments. This research has highlighted that SWEs remain a compelling option to investors in terms of both impact and returns whilst giving shape to the operational support necessary for SWEs to continue to serve. The findings in this report suggest a set of **key implications spanning the investment lifecycle for** SWE funders:

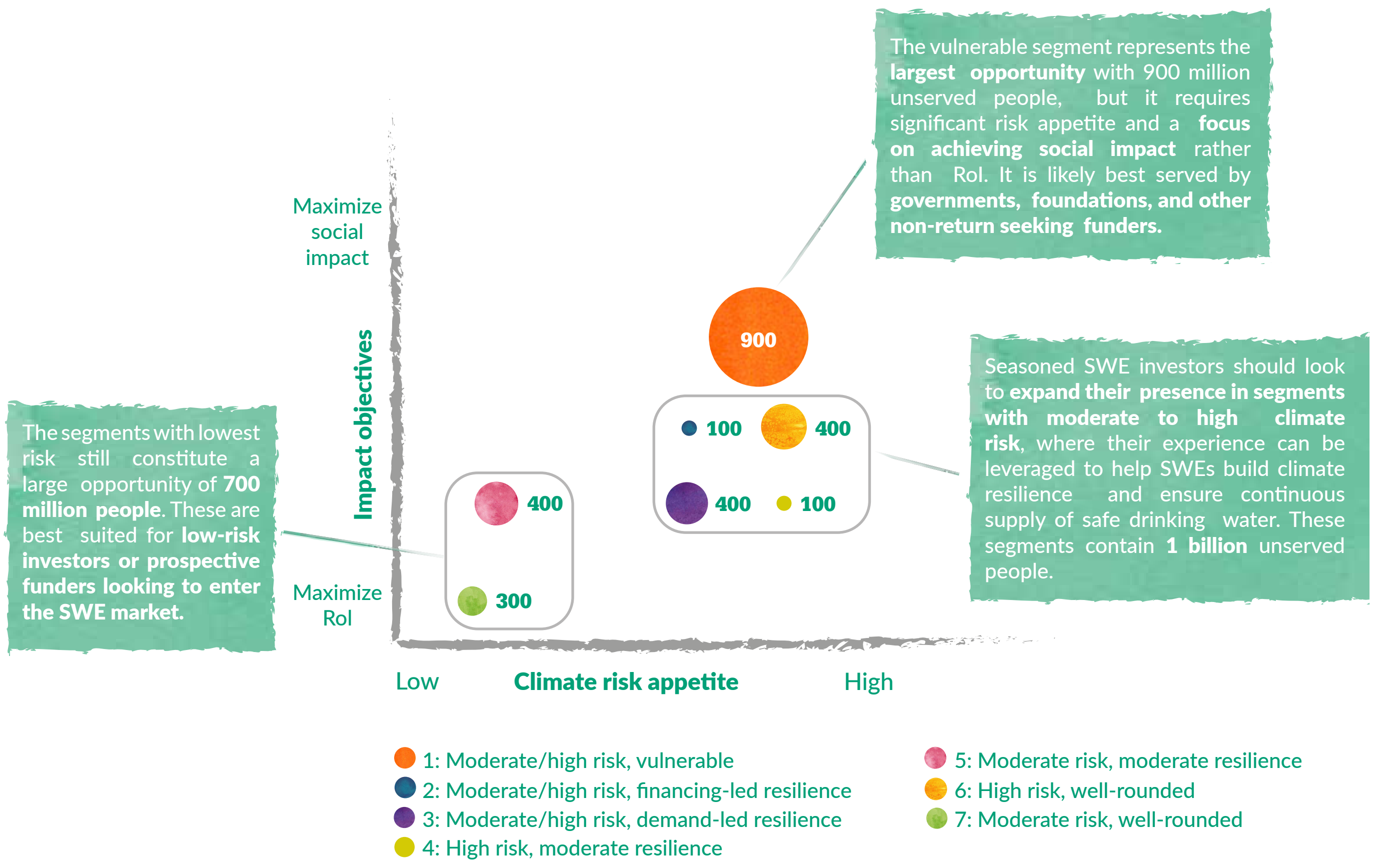
Fundraising: To account for the additional variance that climate change brings across segments, funders should look to raise diversified funds that bring together capital with different risk-return goals. Fundraising partnerships with a wide range of investors who are open to the use of de-risking tools would become critical. Specific climate-risk regions offer different risk-return profiles, with almost all the segments covered in the report having enough of a critical mass to be viable for variable forms of investment.

Ecosystem building: To make SWEs (and any other water model) successful in responding to climate change will require coordination across a range of actors in the ecosystem. Existing funders should proactively advocate the comparative advantage of SWEs in the face of climate change to crowd in additional support from investors, international organizations, and local governments, and advocate for the creation of ecosystem-level entities that can ensure resilient operations, on-going financing, and also the license to operate for SWEs.

Investing: Climate change risk and business dynamics will vary across segments; as a result, targeted, climate-conscious investment will be necessary to ensure investment outcomes align with funder objectives. Investors and other funders should consider portfolio approaches as part of their investment planning process in order to identify funding mixes that meet their needs for creating impact and returns while balancing risk.

Supporting portfolio companies to manage climate change: Investors should ensure that existing projects upgrade their operations to incorporate climate resilience best practices, and that new projects comply with these standards from project inception.

Investors can target their investments in the SWE ecosystem based on their objectives and risk appetite. The seven segments represent a range of investment options in terms of risk as well as potential social impact, with varying implications for different types of investors.



Conclusion

SWEs are a resilient channel through which safe drinking water can be delivered to some of the most vulnerable populations facing climate change impacts, but they will require targeted and coordinated support to succeed at scale.

Photo : Himelin Otounga

Currently, two billion people still cannot access safe drinking water, with the situation set to worsen over the coming decade as the effects of climate change become more pronounced. If the UN target of SDG 6, **to provide universal and equitable access to safe, sustainable and affordable drinking water for all by 2030**, is to be met, better understanding is needed of the issues presented by climate change on water supply, as is the case for other climate-related topics.
This report goes some way towards investigating, evaluating and considering the role of SWEs as a sustainable means of water supply in the face of climate change. While the research indicates that climate change impacts will mostly affect water quality and affordability – putting even more at risk the most vulnerable populations – it also illustrates the means for climate experts, organizations and funders to join forces to address the water challenge.

SWEs are only one of the solutions available to serve the many people currently lacking access to safe drinking water, but this report shows that they are also a model that seems fairly resilient to climate change, while guaranteeing potability of the water served. If they are to continue not only to ensure their social mission, but also to grow their impact, they will need additional resources from funders, governments and international organizations to help offset rising operation and capital expenditures. In turn, SWEs offer a diverse range of investment opportunities to funders and alternative routes through which policy makers can tackle water supply challenges within regions affected by climate change.

For their part, SWEs will need to take time to better understand the precise risks in their geographies if they are to overcome the challenges faced. Of equal importance, SWEs will need to work together to gain efficiencies when refining mitigation strategies and costings. Unifying efforts amongst SWEs will further serve to facilitate collaboration among and advocacy by SWEs for greater voice and to reach and onboard potential allies.

Photo : Sandro di Carlo Darsa