Climate Change | WSS and Finance

In 2019, Water.org partnered with the Pacific Institute to examine the relationship between climate change and water supply and sanitation (WSS) systems. The research assessed the impact of WSS systems on climate, how climate change is likely to affect achievement of SDG 6, and opportunities for climate finance for WSS systems.

Overview

Water and climate change are intricately linked. Human-caused climate change is real and accelerating. This is creating challenges and opportunities for all aspects of freshwater management, including ensuring universal access to safely managed water and sanitation. The research confirmed:

- Climate change affects WSS, and WSS contributes to climate change through energy use;
- The key climate threats to WSS systems are rising temperatures and sea levels, changing precipitation patterns, and increasing frequency and intensity of floods and droughts.
- The impacts of climate change on WSS systems may undermine progress toward achievement of SDG 6 by pushing communities down the ladder.
- Poorer and marginalized populations are especially vulnerable to climate impacts because of reliance on more vulnerable WSS systems, weaker institutional protections, and limited access to funding.
- Efforts to identify and mobilize new funding is critical to developing climate resilient WSS programs, and innovative new financing approaches are available, especially new forms of bonds (such as green and catastrophe bonds), microfinance and microinsurance, and favorable taxing strategies.

Our research reinforces the unavoidable conclusion that water action must be part of climate action, or else it will be part of the problem. Universal water and sanitation access, as a promise, is inextricably tied to the climate future that our investments are building.

Adopting water and energy efficiency improvements that are affordable and resilient to climate change can benefit both the environment and those living in poverty. Climate finance will be required to invest in those smart choices on both the mitigation and adaption fronts.

Financing engineering will be just as important – maybe more so – than plumbing engineering in solving water without fueling the climate crisis.

Mitigation through climate smart choices

WSS systems contribute to climate change through direct and indirect emissions of GHGs. Direct emissions are from the breakdown of human excreta and food waste during wastewater management and depend on the technologies and management practices employed. Indirect emissions are related to the use of energy across the water-use cycle and are the largest source of GHG emissions from WSS systems

Current energy use for WSS systems is estimated to be 120 million tons of oil equivalent (Mtoe), or 1.2 percent of total global energy production. Recent estimates suggest that providing for the water and sanitation needs of a growing population would double the water sector's energy use between 2014 and 2030, largely due to assumptions about greater use of energy-intensive seawater desalination, implementation of large-scale water transfers, and increased collection and treatment of wastewater.

The goal of universal access need not come at the expense of our climate. We can meet both water and climate needs with smart investments. Improvements in water and energy efficiency, coupled with renewables, can simultaneously conserve water and decrease energy use and greenhouse gas emissions.

Key areas for smart investment include the following:

Non-revenue water – In the countries where Water.org works, non-revenue water represents about 35 percent of the water put into the distribution system. Of this amount, an estimated 60 percent represent physical losses that could potentially be recovered, reducing water use, and by extension, energy use and GHG emissions. Further, reductions in water loss can improve the financial viability of the utility, protect public health, and help defer or eliminate expenditures for new supply and treatment infrastructure.

Reduce groundwater depletion – Unsustainable groundwater use worldwide is leading to declining groundwater levels. This increases the energy required to pump water and GHG emissions. In India, for example, the demand for water is expected to exceed supply by 2050. For every additional 10-meter drop in groundwater levels, the energy needed to pump India's groundwater would require more than four new 500-megawatt electric powerplants, which could lead to substantial additional GHG emissions. Strategies to address this problem include improving urban and agricultural water-use efficiency to reduce groundwater depletion, improving the efficiency of groundwater pumps, using non-carbon energy for pumping, and adopting tariff policies that reflect the scarcity of water. It is important to note that water to meet basic human needs is such a small part of total water demand that is plays no significant role in the groundwater depletion occurring around the world.

Go carbon neutral and beyond – While global estimates suggest that providing access to water and sanitation will increase energy usage and GHG emissions, there are some circumstances under which the reverse would be true. For example, constructing a protected well with a hand pump that reduces reliance on water trucked from a distant source could save water and reduce GHG emissions. Likewise, energy efficiency and recovery at new urban wastewater treatment plants could generate more energy than is needed to operate those plants, providing an opportunity to sell the excess energy and reduce GHG emissions.

Climate impacts and WSS system resilience

Climate change affects both natural water resources and human-built WSS systems, threatening achievement of SDG 6 and putting those living in poverty at the greatest risk. These impacts will grow over time.

The key climate threats affecting WSS systems are rising temperatures and sea levels, changing precipitation, and increasing frequency and intensity of extreme events, especially floods and droughts. These climate changes will affect water availability, water quality, infrastructure operations, and the quality of WSS services. This, in turn, can result in increased water insecurity, greater rates of water-related infectious diseases, and higher costs.

For water supply, changes in management strategies, such as protecting and diversifying sources, could be more important than technology in improving climate resilience. For sanitation, by contrast, key vulnerabilities can be reduced by understanding local climate risks and choosing appropriate technologies less sensitive to these risks.

No one is immune from climate change, but the poor will feel it first and worst. Impacts on women and children will be more pronounced, as the burden for collecting water disproportionally falls on these groups. Poor and economically disadvantaged communities lack the financial resources to build or upgrade WSS systems and rebound from extreme events and climate impacts. And communities with limited access to safe WSS systems will suffer disproportionate health consequences from worsening climate impacts that adversely affect water quality and access to safe sanitation. In particular, the risk of water-related diseases such as cholera and dysentery rise as temperatures rise.

Furthermore, as water supplies no longer meet demand or as communities are destroyed by climate-related catastrophic events, people will be displaced. Estimates vary, and are speculative, but some have suggested that hundreds of millions of people will be displaced by extreme storms, sea-level rise, and water scarcity by 2050. Those living in poverty will have very few choices and be forced to take refuge in displacement camps or overcrowded urban slums with inadequate, often non-existent, water and sanitation services.

The financing gap to meet SDG 6 is likely to widen According to the World Bank, meeting SDGs 6.1 and 6.2 requires an annual investment of $114 billion, excluding operation and maintenance costs. This is approximately three times the historic spending on extending services to the underserved. Accurate estimates of the additional cost from climate changes are not available because climate impacts and the timing of these impacts are uncertain, the types of resilience strategies needed when and where are not known, and data are limited. While the study was unable to estimate an accurate estimation, we know the investment gap is large and getting larger.

WSS Climate Finance

Massive investments – far above what has currently been committed – are needed for WSS infrastructure and institutions, and the gap between need and commitment will worsen as climate impacts intensify. New financing strategies, including a range of innovative forms of green financing, can help fill this gap, improve environmental services, and support WSS needs in developing countries and communities.

Minimizing the dangerous impacts of climate change and producing stable, balanced, and sustainable economic development requires an all-out effort to shift the global economy onto a high-efficiency, low-carbon, and sustainable path.

Both the public and private sectors are helping address climate change through new forms of investment. World leaders are working to make new funds available for climate finance, and under the Paris Agreement have committed $100 billion annually between 2020 and 2025 from public and private sources. The Climate Policy Initiative estimates that average annual climate change investment is $463 billion, with more than half of this amount from private investments.

Political, legal, and regulatory reforms can improve both the enabling environment for greater private investment and ensure that those investments yield sustained benefits to people in poverty and the environment.

Financing strategies that tackle mitigation and adaptation & resiliency are particularly applicable to WSS.

- Mitigation efforts would primarily focus on working with service providers, such as utilities and community-based organization, to advance water efficiency improvements and water loss reductions; energy efficiency improvements, and adoption of biogas recover and other renewable or lower GHG energy options.
- Resilience efforts would include work with stakeholders on climate-smart technologies and practices within markets to catalyze finance for households and service providers to build or upgrade WSS systems and rebound from climate-fueled extreme weather events

The following are examples of types of financial approaches that can be applied to WSS:

Green bonds are recognized as low-carbon, climate-resilient investment opportunities by the United Nations. Since first entering the market in 2007, green bonds have seen strong growth, with issuances reaching US$ 185.5 billion in 2018. Water supply and treatment projects account for just 4% of the global green bond market but dominate the US market, suggesting potential to expand into other countries, including those where Water.org works.

Catastrophe and resilience bonds are a potential financial instrument for developing countries to finance disaster risk management. With catastrophe bonds, investors receive an above-market rate of return when a pre-determined catastrophe doesn't occur during a specified period time. If a catastrophe occurs, however, investors sacrifice some or all the principal, which is then used by the insurance companies to pay claimholders. The innovation of resilience bonds is that they monetize the value of resilience achieved by an infrastructure project. Communities especially vulnerable to extreme weather events can be appropriate locations for issuing resilience bonds. Resilience bonds are designed to work in alignment with – and as a complement to – catastrophe bonds, although no standard resilience bond framework has been accepted into the market.

Microfinance offers low-income households and small-scale providers of WSS services access to small loans for investment in WSS infrastructure, including the rehabilitation or expansion of small piped-water systems and toilet solutions. WSS microfinance is well positioned and has huge potential to empower households to adapt to climate shock and prepare future climate shocks.

Microinsurance can cushions millions of vulnerable low-income households from the financial shock of property loss, accidents, illness, and death. The use of microinsurance to manage climate risk is not well-tested in the water sector but looks promising for regions facing imminent impacts from severe floods or droughts. One attractive strategy involves bundling of microinsurance products with services of high priority to the poor, such as health insurance or climate change insurance.

Pooled bonds can help small water-service providers finance WSS infrastructure. Through pooled bonds, a single bond issuance can mobilize large volumes of capital and lower transaction costs. This would allow small or medium-sized service providers, who individually lack the

capacity to issue a municipal bond or meet the funding requirements for gaining access to capital markets, to access the capital market and relieve budget pressures.

Green Climate Funds and Climate Finance Facilities - There are emerging examples of specific climate funds being applied to WSS. For example, the Infrastructure Development Company Limited of Bangladesh (IDCOL), a financial institution wholly owned by the Government of Bangladesh and an accredited entity of the Green Climate Fund, is exploring an innovative approach that would fund a project to replace and rehabilitate 320 km of a water-distribution network, upgrade pumps, and rehabilitate related infrastructure. Likewise, the Development Bank of Southern Africa's Climate Finance Facility is deploying capital to fill market gaps and crowd in private investment, targeting commercially-viable projects that cannot attract market-rate capital. It represents the first time the "green bank" model has been applied to an emerging market.

Recommendations

Billions of dollars from public and private sources are going into climate finance for both adaptation and mitigation, but only a small portion is being used for WSS systems, as water hasn't commanded much of the climate conversation. Water.org is in a unique position to bring green and climate finance to WSS systems, by leveraging our evidence base and vast network of partnerships and relationships with finance institutions, governments, multi- and bi-lateral organizations, development financial institutions, and industry leaders in new efforts to mitigate climate change and help advance climate resilience. Our success in mobilizing nearly US$2 billion and helping 22 million people get access to safe water and sanitation is proof that affordable finance is an effective means to reach people living in poverty.

Promising climate finance approaches which Water.org should consider expanding and tapping into with a climate lens include microfinance, microinsurance, green bonds, performance-based contracts, catastrophe and resilience bonds, and green climate funds and facilities.

Efforts to identify and mobilize new funding for WSS are critical to developing climate mitigation and resilient WSS programs. Innovative financing approaches are available, especially new forms of bonds, microfinance and microinsurance, and favorable taxing strategies.

Assessments and legal and regulatory reforms should be initiated at the national and local level to improve the enabling environment for domestic and international private capital investment. There are several examples of successful efforts to create a positive enabling environment for investment. In Jamaica and in Bangladesh, for example, the Ministry of Finance created a unit dedicated to working across government on bringing to market projects that address mitigation, adaption and resilience. Likewise, in India, the 2 Percent Bill under the Companies Act 2013 makes India the first country in the world to have mandatory Corporate Social Responsibility (CSR) spending that targets the water sector.

In short, finance engineering will be as important—or more so—than plumbing engineering in diminishing the climate crisis and solving the water crisis.