

# Increasing resiliency in the face of climate change

## How WSS systems and financing can adapt to meet the challenge



As human-caused climate change accelerates, it is destabilizing all aspects of water supply and sanitation (WSS), including the goal of universal access. Climate change raises grave considerations for WSS systems, and most urgently for the needs of people living in poverty. We know that WSS solutions must be part of climate action or they become part of the problem. In a comprehensive white paper, Water.org and the Pacific Institute identified innovative financing and approaches that can make WSS systems more resilient to climate change, lower in emissions, and more accessible to everyone.<sup>1</sup>

### Global risks at the tap

Climate change and water and sanitation have an interwoven connection, with each affecting the other. Water resources are affected by shifting precipitation patterns that generate both floods and droughts, and by rising seas that threaten to spill into freshwater sources. Reversely, WSS systems are impacting the climate by generating needless greenhouse gas emissions through inefficiencies and the use of fossil fuel sources. These effects impact how we must think about the design of WSS systems. It is no longer appropriate to design systems for historical conditions without considering future impacts of climate change.

Innovative financing is well positioned to meet these risks by:

- Upgrading WSS systems to withstand local changes and extreme events
- Raising energy efficiencies and reducing emissions in the water sector
- Bringing affordable financing to people living in poverty so they can invest in their own climate-smart solutions

### Inequitable impacts

Many people living in poverty are most vulnerable to climate change. Today, 785 million people - 1 in 9 - live without access to basic water services and the 2 billion - 1 in 3 - live without basic sanitation. The women and children who perform the labor of obtaining water and managing traditional WSS systems will experience some of the worst consequences. Communities with limited access will suffer disproportionate health burdens, as they already do, from unsafe water and sanitation. Those with improperly managed sanitation will be 11 times more likely than others to have contaminated groundwater.

For all of these reasons, climate change could slow the progress of achieving the Sustainable Development Goals. There will be no chance of reaching Goal 6 – water and sanitation for all – if the current situation of poverty and inequity gets worse. Too many communities lack the financial resources to build or upgrade WSS systems, or to rebound from extreme events. While Goal 6 aims for all communities to climb the ladder towards safely managed water and sanitation, climate impacts can push them back down.

### Transforming WSS systems to mitigate climate change

Investments in water and sanitation at the household, community, or utility level can transform lives and improve the environment. Smart project choices enhance the management and efficiency of utilities, reduce water losses, and spur the transition to renewable energy options. In fact, water systems even have the potential to go beyond carbon neutrality: if the energy flushed away in domestic wastewater can be harnessed through biogas recovery rather than released into the atmosphere, treatment facilities can become a power source.

#### Actions to reduce the climate vulnerabilities and carbon emissions of WSS investments

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|---------------------------|--|
| Protected wells           | <ul style="list-style-type: none"><li>● Protect groundwater and reduce contamination sources</li><li>● Shift to deeper, more protected aquifers</li><li>● Use energy-resilient pumps to continue operating during extreme events</li></ul> |
| Protected springs         | <ul style="list-style-type: none"><li>● Expand short-term storage</li><li>● Enhance land-use protection for water quality</li></ul>  |
| Rain harvesting           | <ul style="list-style-type: none"><li>● Expand local storage</li><li>● Diversify source availability</li></ul>   |
| Toilets                   | <ul style="list-style-type: none"><li>● Build ventilated improved pit latrines or septic tanks to be flood resilient</li><li>● Design composting toilets for effectiveness in a greater temperature range</li></ul>                        |
| Water supply utilities    | <ul style="list-style-type: none"><li>● Repair leaks</li><li>● Expand options for filtering and treating different contaminants</li><li>● Protect storage from contamination and extreme flooding</li></ul>                                |
| Sanitation utilities      | <ul style="list-style-type: none"><li>● Safely manage wastewater to avoid contamination</li><li>● Capture biogas to meet energy needs</li><li>● Reuse water</li></ul>  |
| Environmental investments | <ul style="list-style-type: none"><li>● Protect watersheds for water recharge</li><li>● Emphasize water conservation and reduce water loss</li></ul>   |

<sup>1</sup> Heather Cooley, Peter Gleick, Mai-Lan Ha, Jiehong Lou, Irving Mintzer, and Sonali Abraham, *Climate Change: Water Supply and Sanitation Financing*, Pacific Institute, September 2019.

## Financing climate-smart investments

WSS systems need much more investment than has been committed, and the gap may grow as climate change accelerates. Both the public and private sectors are starting to address climate change in earnest: average annual climate change investment has reached \$463 billion, most of it private. A set of promising climate finance approaches are emerging at every scale.

### Small providers and individuals

**Microfinance** can build community resilience to climate risks and improve the environment. Low-income households and small providers use microloans for infrastructure like piped water, rainwater collection, and toilets. The loans and solutions are demand driven, but sector experts advise on technologies suited to the local climate. With revolving funds, the capital investment can be recycled many times and create significant leverage across large areas. Examples of microfinance are beginning to make impacts across the globe. For instance, Water.org has helped catalyze more than \$2 billion in small loans to empower more than 27 million people with water and sanitation solutions.

**Microinsurance** has the potential to cushion millions of vulnerable households from the financial shock of property loss, crop failure, accidents, illness, and death. It is not yet well tested for managing climate risks in WSS, but it looks promising for regions facing severe floods or droughts.

**Pooled bonds** function as a special purpose vehicle to facilitate the efforts of small providers to access capital markets and relieve the budget pressures of financing WSS improvements.

### Larger water systems

**Green bonds** are recognized by the UN as low-carbon, climate-resilient investment opportunities. For example, a bond to upgrade a sewage treatment plant with biogas energy capture could not only improve urban sanitation but also provide a “leapfrog” opportunity for an emissions-heavy process to become carbon neutral or even carbon negative. WSS projects have dominated US municipal green bonds; globally, however, water still accounts for just 4% of the green bond market.

**Results-based financing** can be applied to bonds for improved management of water resources. The most relevant examples are projects designed to fix leaky pipes. Leaky pipes and inadequate infrastructure waste 8 trillion gallons of water per year, equal to 25% of the total amount of drinking water globally. This translates into billions of kilowatt-hours of electricity pumping water that produces unnecessary carbon emissions. Globally, patching just one-fifth of the leakage by 2050 would avoid wasted carbon emissions equal to 2 billion barrels of oil.

### Upstream financing mechanisms

**Climate finance facilities dedicated to WSS** are poised to attract finance that promotes climate-smart infrastructure and services. The proposed blended finance tool initiated by Water.org and IFC, the Global Credit Enhancement Facility (GCEF), will provide credit enhancement support structured as partial credit guarantees to local financial institutions in multiple countries to roll out new lending products for household water and sanitation.

**Catastrophe (Cat) bonds** are a potential instrument that can help developing countries finance disaster risk management. With a Cat bond, the holder of the policy receives a payout when a disaster reaches a predetermined threshold. Future Cat bonds may be engineered to cover multiple risks, including disruption of water infrastructure by hurricane or flooding.

**Resilience bonds** are a type of Cat bond that can help public-sector entities access the global capital market while promoting investments in resilient infrastructure. These bonds’ insurance structure yields a resilience dividend when losses are avoided. This dividend is then transferred to a revenue stream, further motivating communities to invest in resilience.

**The Green Climate Fund** is also venturing into WSS financing in vulnerable regions. It has accredited the Infrastructure Development Company Limited of Bangladesh, which is exploring an innovative approach to rehabilitate a water-distribution network using a mix of grants, equity, and debt. This makes sense for the Green Climate Fund, as smart project choices can reduce energy needs and associated greenhouse gas emissions from such networks.