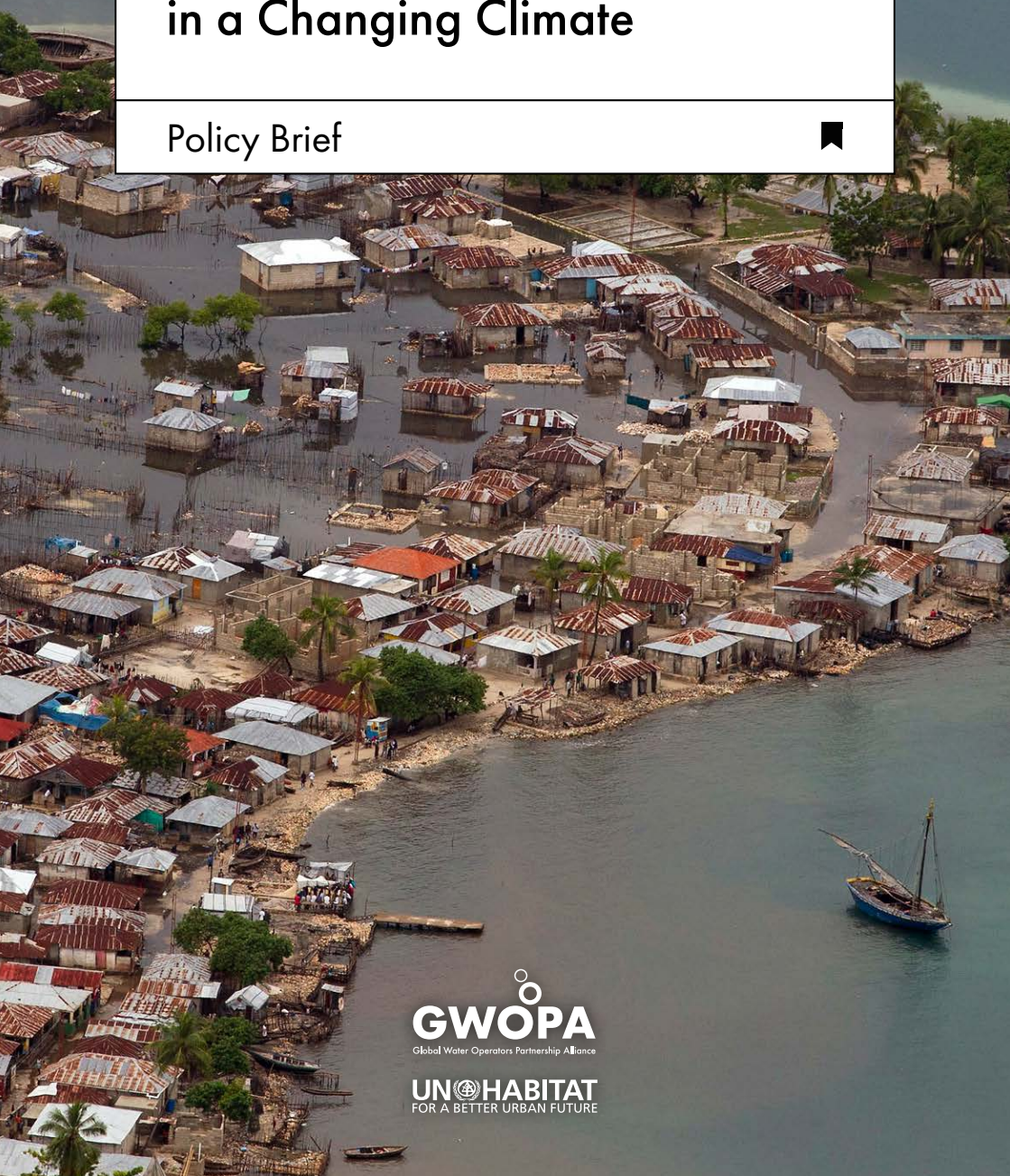


Water and Sanitation Operators Managing and Responding to Natural Disasters in a Changing Climate

Policy Brief



GWOPA
Global Water Operators Partnership Alliance

UN HABITAT
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Water and Sanitation Operators Managing and Responding to Natural Disasters in a Changing Climate

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About this Brief

This Policy Brief provides an overview of the current context and relevant initiatives implemented by water and sanitation operators in their response to natural disasters and climate-related hazards. It explores operators' tools and mechanisms aimed at securing water, sanitation and hygiene (WASH) for all during times of crises, including the governmental and regulatory measures that seek to secure long-term service sustainability through provision of technical and financial support to operators. This Policy Brief assesses the instruments as used by water and sanitation operators to respond to both climate and other natural hazard impacts.

The initiatives are analysed at the occasion of the 4th Global WOPs Congress, particularly the session on "Managing and Responding to Natural Disasters in a Changing Climate." The session will support participants, panellists and moderators to achieve an understanding of the related issues and better communicate their inputs and practices. Finally, this Policy Brief is complemented and enhanced by several illustrative examples to showcase operators' practices, lessons learned and experiences shared during the GWOPA/GIZ #UtilityClimateAction webinars.

The Policy Brief builds upon the importance of not-for-profit partnerships and knowledge exchange. It provides essential guidance and recommendations to water and sanitation decision makers, regulators, operators, practitioners and other stakeholders, on how operators can be supported to improve their prevention, preparedness and response to climate and other natural hazards.



Context

Water-related hazards currently account for 90 per cent of all natural hazards and their frequency and intensity are generally rising¹. Almost 2 billion people were affected by natural disasters in the last decade of the twentieth century, 86 per cent of them by floods and droughts.² Droughts cause the most ill-health and death because they often trigger and exacerbate malnutrition and famine, as well as limit water supplies.³ According to the UN Global Assessment report, more than 11 million people have died because of drought and more than 2 billion have been affected by drought since 1900, more than any other physical hazard.⁴ Flooding increases the ever-present health threat of contamination in drinking water systems by industrial waste, refuse dumping or other inadequate sanitation.⁵ Globally, the number of inland flood catastrophes was twice as great per decade between 1996 and 2005 as between 1950 and 1980. Economic losses were five times as great. The dominant drivers of these upward trends are socioeconomic factors, such as population growth, land-use change and increased use of vulnerable areas.⁶ The recent example in the box below illustrates how water operators' partnerships (WOPs) can help disaster-affected operators better manage their response.

1 UNESCO World Water Assessment Programme (2012). "Facts and Figures from the United Nations world water development report 4: Managing water under uncertainty and risk". Available at www.unesdoc.unesco.org/ark:/48223/pf0000215644?posInSet=1&queryId=2038ba55-79b7-41d9-8347-7a5775f99823 , www.ipcc.ch/reports

2 World Health Organization (rev. 2004). "Water, Sanitation and Hygiene Links to Health: Facts and Figures". Available at www.apps.who.int/iris/bitstream/handle/10665/69489/factsfigures_2004_eng.pdf?sequence=1&isAllowed=y

3 Ibid.

4 UNESCO World Water Assessment Programme (2012).

5 Ibid.

6 3rd UN World Water Development Report, 2009

Climate-Resilient Infrastructure Built in Water Treatment Facility After Typhoon Molave

The San Jose-Bugay Water Treatment Facility was completed in 2018 through a water operators' partnership (WOP) between Dutch Water Operators (VEI), Bayawan Water District (BAWAD), Water For Life (WFL) project and three other water districts located on Cebu and Negros islands under the Performance Enhancement Water Utilities Philippines (PEWUP) project.

Typhoon Molave, known in the Philippines as Typhoon Quinta, caused widespread damage in the Philippines and Southeast Asia in late October 2020. Normally, rainfall in Bayawan City does not reach 200 mm in one month; Typhoon Quinta, however, brought more than 200 mm of rain in one day to Bayawan City, causing flash floods. Water from the Lower Uwakan River rose by 8 metres where the water source facility of BAWAD is located. BAWAD's San Jose-Bugay Water Treatment Facility also flooded. The San Jose-Bugay's pump station ceased to operate and was unable to provide water to the residents of San Jose and Bugay. The water tanker of BAWAD, which was used to promote WASH (water, sanitation and hygiene) to distant villages in response to the COVID-19 pandemic, could not be used because the road was impassable.

BAWAD needed to rehabilitate the facility so it could resume water service to the two remote villages. Through the PEWUP Project, BAWAD was able to secure funding from WFL. The facility already used solar power as part of its resilience strategy. However, the flood situation called for the facility to be resilient to rising water levels and sustain good water quality with an improved treatment facility. BAWAD designed a resilient facility, elevating the solar panels from 2.5 metres to 6 metres above ground level and the control panel was elevated to 4 metres above ground. The damaged solar inverters were replaced and solar energy returned to the facility. A standby generator was also put in place. An improved treatment facility that included a concrete clarifier was also built to sustain the water quality of the system.

With rapid population growth, water withdrawals have tripled over the last 50 years. Water withdrawals are predicted to increase by 20 to 30 per cent by 2050, up to 6,000 km³ per year. Humans are over-consuming natural resources at an unsustainable rate. Around 3.5 planet Earths would be needed to sustain a global population pursuing the current lifestyle of the average European or North American.⁷



The San Jose-Bugay Water Treatment Facility ceased to operate after being submerged with floodwater © VEI.



A concrete clarifier was added to improve the treatment design of the facility © VEI.

⁷ UNESCO World Water Assessment Programme (2019). The United Nations World Water Development Report 2019: Leaving No One Behind. Paris, UNESCO. Available at www.unesdoc.unesco.org/ark:/48223/pf0000367306.

Urban Water Risks

According to the United Nations Department of Economic and Social Affairs (UN DESA), the world population is predicted to grow from 6.9 billion in 2010 to 8.3 billion in 2030 and to 9.1 billion in 2050. At the same time, urban populations are projected to increase by 2.9 billion, to 6.3 billion in total by 2050. An estimated 90 per cent of the people expected to be added to the population by 2050 will live in developing countries, in many cases in regions already under water stress. In 2030, 47 per cent of the world population will be living in areas of high-water stress.⁸ As the urban population increases rapidly, many major cities have had to draw fresh water from increasingly distant watersheds because local surface and groundwater sources no longer meet the demand for water or have become polluted. Currently over 70 per cent of wastewater worldwide is not collected or treated, and urban settlements are the main source of pollution.⁹

The United Nations Office for Disaster Risk Reduction (UNDRR) report on “The Human Cost of Weather-Related Disaster” highlighted that between 1995 and 2015, floods accounted for 43 per cent of documented natural disasters, causing 157,000 deaths, affecting nearly 2.3 billion people and causing an estimated \$662 billion in damages. In that same period, droughts accounted for 5 per cent of natural disasters, leading to 22,000 deaths and further affecting 1.1 billion people with damages worth more than \$100 billion.

By 2050, rising populations in flood-prone lands, climate change, deforestation, loss of wetlands and a rising sea level are expected to increase the number of people vulnerable to flood disaster to 2 billion.¹⁰ Current Intergovernmental Panel on Climate Change (IPCC) projections of rising temperatures and sea levels and increased intensity of droughts and storms suggest that substantial population displacements will take place within the next 30–50 years, particularly in coastal zones. A global temperature increase of 3–4°C could force an additional 1.8 billion people to live in a water-scarce environment by 2080 due to changed water run-off patterns and greater glacial melt. Land degradation is increasing. Nearly 2 billion hectares of land worldwide – an area twice the size of China – are already seriously degraded, some irreversibly. Globally, desertification, land degradation and drought (DLDD) affect 1.5 billion people who depend on degrading areas. These environmental stressors more often affect a nation’s poor, marginalized and politically weak citizens. As reflected in several reports it has been found in 141 countries that more women than men die from natural hazards and this disparity is linked most strongly to women’s unequal socioeconomic status.¹¹

8 Organisation for Economic Co-operation and Development (2008). “OECD Environmental Outlook to 2030”. Available at www.oecd.org/environment/indicators-modelling-outlooks/40200582.pdf.

9 Progress on Wastewater Treatment – 2021 Update. UN-Habitat and WHO, 2021. Available at www.unhabitat.org/progress-on-wastewater-treatment-%E2%80%93-2021-update

10 UNESCO World Water Assessment Programme (2012). Available at www.unesdoc.unesco.org/ark:/48223/pf0000215492.

11 www.ipcc.ch/reports

Therefore, current risks imposed on water and sanitation operators around the world are becoming more complex due to rapid urbanization, rising resource consumption and population growth. Cities need innovative, holistic and inclusive approaches to water management to enable operators to improve their water resilience capacity and provide essential services to residents, both in cities and surrounding communities.

Building Operators Capacities to Manage Disaster Recovery

From floods in Venice, Italy, to water shortages in Cape Town, South Africa, cities across the globe are facing severe challenges. At both city and municipal levels, capacity-building to create water and sanitation operators adapted to current and anticipated future climate change hazards is becoming a higher priority on urban agendas¹². However, converting these priorities into concrete and practical actions remains a challenging process. Cities are experiencing serious setbacks in building capacity amid financial and other resource constraints, a lack of political will or awareness and a lack of transformational policies. Consequently, there is a strong need, as well as a clear demand from operators, for cities to provide guidance and support throughout the process of building water and sanitation capacity. Building climate-resilient water and sanitation operators is crucial for resilient societies because water underpins all natural and human systems. Adopting an integrated and holistic approach with water at the heart of policies, planning and investments can provide the foundation for transformation towards sustainable and resilient societies. This type of holistic approach must form the basis of operators' response to the increasing challenges posed by a changing climate.

However, building water resilience will rely to a large extent on the operators' and communities' good and adaptive water management. To achieve resilience, these management strategies should be collaborative, coordinated, participatory, inclusive, adaptive, evidence-based, accountable and transparent. For example, improving accountability and transparency across different management functions can enhance the ability to plan, coordinate and communicate efficiently during emergencies and disasters. These same actions further build resilience by enhancing credibility and legitimacy, access to reliable information, increasing clarity of roles and responsibilities of key actors and building trust among stakeholders. Water and sanitation operators are already exchanging knowledge, learning, self-organizing, adapting and enhancing preparedness plans and responses to better deal with water-related shocks and stresses. Peer-to-peer water partnerships can further help operators' planning, coordination and communication mechanisms when under disaster threats, as illustrated in the box below.

12 Stockholm International Water Institute (2019). "Accelerating Climate Action: Building Resilient Cities through Improved Water Governance". Stockholm, Sweden. Available at www.siwj.org/wp-content/uploads/2019/12/AB_Accelerating-Climate-Action_WEBB.pdf

Peer-to-peer learning: Towards faster recovery from disasters

WOP: Syndicat Intercommunal du Centre et du Sud de la Martinique and the Water and Sewerage Company Inc. of Saint Lucia

The WOP between the Syndicat Intercommunal du Centre et du Sud de la Martinique (SICSM) and the Water and Sewerage Company Inc. (WASCO) of Saint Lucia, initiated in 2014, consisted of a comprehensive and coordinated programme of capacity development to support WASCO with specific objectives, such as acquiring the necessary methodology and tools to develop a master plan for water and sanitation; the improvement of the asset management through diagnostics, inventory and assessment; and the preparation of guidelines and orientations for a risk management plan including disaster preparedness, crisis management and resilience.

WOP: Provincial Waterworks Authority Thailand and Water Corporation Australia

The Provincial Waterworks Authority of Thailand (PWA) sought practical tools and approaches to better understand the impacts of climate change to their operations, to better achieve their goals of providing climate-resilient and safe water supply and addressing water quality constraints.

The overall objective of the WOP was improving PWA's operational efficiencies that contribute to its climate-resilient operations. This has been achieved by:

- reducing non-revenue water (NRW) in Udon Thani through a water meter replacement programme.
- water treatment and distribution processes in Chiang Rai.
- demonstrating innovative water treatment technologies for potential adoption in Rangsit
- PWA will also scale-up the technical interventions shared by Water Corporation throughout its network of waterworks.
- improving water quality management practices (i.e., reducing high turbidity and manganese levels).
- introducing energy efficiency management in water service provision.

WOP: National Water Supply and Drainage Board (NWSDB) Sri Lanka and Yarra Valley Water Australia

The two operators involved in this WOP worked to strengthen NWSDB's capacity to continue delivering effective services in a changing and increasingly uncertain environment while addressing climate change impacts. Capacity-building activities included developing a toolkit on climate change adaptation for water operators. An additional objective focused on ensuring adequate water supply, especially during the dry season and flood events. This WOP:

- provided NWSDB the opportunity to observe best practices in climate change adaptation to achieve improved operational efficiencies in water service delivery.

- exposed NWSDB to state-of-the-art technologies being adapted by Yarra Valley Water Australia that can be applied to NWSDB's operations.
- introduced NWSDB to Yarra Valley Water Australia's different programs with emphasis on the focus areas of the partnership such as: disaster management, climate change, NRW, high performing business culture and management of meters and other assets.
- provided a greater understanding of two cultures and ongoing in-kind support.

Scope of the 4th Global WOPs Congress session on “Managing and Responding to Natural Disasters in a Changing Climate”

Water and sanitation operators and the communities they serve are already suffering the effects of a changing climate. Utilities are particularly under stress due to significant losses and damages to infrastructure, water sources, supply and quality, while urban populations grow rapidly and water demand increases. Climate change often puts utility workers at risk of heat-related illness and other physical and mental conditions. In facing these challenges, water and sanitation utilities are developing adaptation and emergency strategies to address current and future climate and weather threats.

To tackle the climate crisis, operators must understand how it is linked to changes in the water cycle and prepare themselves for a future with more severe droughts and floods, more unpredictable rainfall patterns and dramatically rising sea levels. Ideally, water and sanitation operators should focus on smart, water-related solutions that build resilient societies and ecosystems. When preparing for a climate future where water-related disasters will become both more frequent and more severe, operators and other WASH actors must include more nature-based solutions and consultations with other experts at the planning stage.¹³

This Congress session will capture relevant operator responses to climate and other natural caused hazards, their lessons learned, and good practices. This Congress will also provide a stage to share how operators are responding to weather and climate change challenges. The session will focus on present and future challenges and inspire the wider water and sanitation professional community to rethink its approaches and to reassess existing remedies. This session aims to help operators better understand how to move from current risks to resilience in the future and eventually become less vulnerable to natural and climate-related disasters.

¹³ www.siwi.org/latest/nature-based-solutions

Conclusions and Recommendations Towards Climate Resilient Operators

The global water community has embraced the resilience concept as the most appropriate planning paradigm to address the current situation of urban water stress, as evidenced by the launch of new initiatives and coalitions working together to advance resilient, smart and sustainable cities. The Global Commission on Adaptation's Water Action Track,¹⁴ a global platform launched in September 2019 to accelerate climate change adaptation actions in water and water-related sectors, calls for a resilience approach to tackle the climate disaster, prioritizing three water action areas: water resilience planning, the Resilient Basins Initiative and city water resilience.

Climate change impacts the water cycle by disrupting weather patterns, leading to extreme weather events and unpredictable water availability, as well as exacerbating water scarcity and contaminating water supplies in the short, medium and long term. Such impacts can drastically affect water quantity and quality, affecting human health, livelihoods and resulting in tremendous economic losses. Changing temperatures and rainfall patterns alter ecosystems, changing the distribution of some waterborne illnesses and disease vectors. Rising sea levels affect water and sanitation service security and safety.

Building and maintaining water supply and sanitation systems that can recover from climate shocks is critical for a sustainable future and should rely upon the commitments of different levels of government. Integration with other sectors to share perspectives on water, sanitation, climate and health will be necessary to achieve the desired goals. Integration is particularly important when applying risk-based approaches and tools, such as water and sanitation safety plans.

Water and sanitation operators play an important role in city-level recovery from climate change-related disasters. A strong climate sensitive regulatory framework is a key enabler in the process. Water operators' partnerships can be an important mechanism in addressing management gaps when confronting a changing climate and other natural hazards.

¹⁴ Global Commission on Adaptation and the World Resources Institute (2019). Adapt Now: A Global Call for Leadership on Climate Resilience. Available at files.wri.org/s3fs-public/uploads/GlobalCommission_Report_FINAL.pdf.



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