Global Water Partnership Caribbean

Caribbean Community Climate Change Centre

Caribbean Water Security and Climate Resilience:
A Regional Framework for Investment

Thematic Programme of Action A

Climate resilient water infrastructure

Relevant regional partners[1]
Cap-Net, CAWASA, CCCCC, CDEMA, CIMH, CWWA, IFIs, UWI

Relevant national partners[1]
Water Utilities, Ministries of Finance, National Emergency Management Organisations, Meteorology Departments, Ministries of Works

Summary

Caribbean islands are amongst the most heavily exposed locations on earth to natural hazards. Within the ECCU countries a natural disaster inflicting damage equivalent to more than 2% of the affected country's GDP can be expected to hit the ECCU around once every two and a half years. Flooding, landslides and high sediment loads in water sources frequently damage water infrastructure leading to loss of service for businesses and communities. This places a heavy financial burden for repair costs. When Hurricane Tomas struck Saint Lucia in 2010, 80% of the population were left with limited water supplies due to a landslide which damaged the main reservoir and auxillary pumping and power systems. These natural hazards are combined with ageing water infrastructure and a low level of investment in replacement and rehabilitation in many cases. A more comprehensive approach to risk management for water infrastructure is needed, ensuring that new and replacement infrastructure is resilient to natural hazards. This should be coupled with increased investment in asset management.

The Programmes in this Thematic Programme of Action focus on the effective management of climate hazards and risks in the context of water supply and wastewater infrastructure resilience, leading to enhanced reliability and resilience of water services.

Programme A.1 – Strategic climate risk assessment and investment planning
Programme Objectives: Supporting water utilities to assess and manage climate risks to infrastructure assets, ensuring reliable and climate-proofed water services.

Programme A.2 – Operational climate risk management
Programme Objectives: Supporting water utilities to integrate climate risk management within operational practices, enhancing disaster risk management.

[1]Partners identified are indicative, not exhaustive, and are intended as a starting point

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Programme A.1 – Strategic climate risk assessment and investment planning

Programme Objectives: Supporting water utilities to assess and manage climate risks to infrastructure assets, ensuring reliable and climate-proofed water services.

Alignment with SDGs*	6.1 Water supply	6.2 Sanitation	6.3 Water quality	6.4 Water efficiency	6.5 IWRM	6.6 Water ecosystems	11.5 Water related disasters	13 Climate Change

Alignment with Regional CARICOM Climate Change Framework	Adaptation policy, strategy, capacity and awareness	Implementing adaptation measures	Low carbon development	Vulnerability reduction	Forest management

Indicative cost	Low cost for risk assessment, planning and guidance. High cost for implementation of investment plans.
Lead time	Short term for assessment and planning, medium term for implementing investment plans.

Water utilities require a complete understanding of the location, value, condition and exposure of their infrastructure assets to climate-related natural hazards in order to effectively manage risk and plan future investments. This encompasses both water supply assets such as reservoirs, pipes, pumps as well as wastewater management assets, together with auxiliary and third party services such as power and access.

This Programme may contain the following activities:

- Risk assessment of water utility assets (both water supply and wastewater management) to climate hazards, based on historical information and climate change projections;
- Development of adaptation plans setting out the priorities for infrastructure upgrades (both supply and wastewater) in high risk areas, and their integration within existing water utility investment plans;
- Development of guidance and protocols on the planning of new infrastructure to ensure designs are either located away from high hazard areas or can withstand climate hazards;
- Demonstration of the risk assessment process and preparation of guidelines, before upscaling; and
- Sharing knowledge on climate risk management between utilities, including a benchmarking of good practice in climate risk management.

Relevant regional experience: This Programme fills a gap as initiatives have not been identified that specifically address the issue of climate risk management for water utility infrastructure across the region. It should, however, link to other regional work including: the CAWASA / CWWA Cari-WOP initiative, which is working to build capacity amongst water utilities; the regional PPCR project to build data and evidence for climate change adaptation; and the CHARIM project developing guidance on risk assessment.

** Programme also aligns strongly with SDG 9 (Resilient Infrastructure)*

Climate resilient water infrastructure

Programme A.2 – Operational climate risk management

Programme Objectives: Supporting water utilities to integrate climate risk management with operational practices, enhancing disaster risk management.

Alignment with SDGs*	6.1 Water supply	6.2 Sanitation	6.3 Water quality	6.4 Water efficiency	6.5 IWRM	6.6 Water ecosystems	11.5 Water related disasters	13 Climate change

Alignment with Regional CARICOM Climate Change Framework	Adaptation policy, strategy, capacity and awareness	Implementing adaptation measures	Low carbon development	Vulnerability reduction	Forest management

Indicative cost	Low cost, most actions are operational rather than involving new infrastructure.
Lead time	Short, this builds on existing work.

Water utilities exploit a range of contingency plans and procedures to deal with the impacts of climate hazards which disrupt services and damage infrastructure. However, opportunities exist to further improve contingency planning, operational practices and to reduce the level of disruption when climate hazards occur. This Programme may contain the following activities:

- Strengthening regional cooperation between national water utilities to share resources and expertise for rapid recovery following climate hazards;
- Further development of data collection and hazard modelling capabilities across the region, taking into account data scarcity and long term sustainability of data collection and management;
- Linking water utility operational practices with real time weather forecasting and early warning systems;
- Linking seasonal water resources operational activities with medium term weather forecasting in order to improve early action and contingency planning for drought events;
- Strengthening the provision of cost effective approaches to provide potable water during disruptions due to floods, storms or droughts to provide communities with continued access to safe water supplies during adverse emergency situations; and
- Improving contingency planning for hazard events based on a detailed understanding of risks associated with hazards occurring, such as health impacts and outages of service, focussing on priority services such as the emergency services, hospitals and schools, for example.

Relevant regional experience: This work builds on ongoing initiatives of CAWASA in regional utility cooperation and CIMH in climate hazard forecasting, and would further strengthen the linkages between water utilities and the climate services providers. In addition, this Programme may build on existing disaster risk management activities led by NEMOs.

** Also aligns strongly with SDG 9 (Resilient Infrastructure)*

Immediate projects identified by regional partners

Regional organisations have identified project concepts within programme areas articulated above which can be implemented in the short term. Relevant regional project concepts for this thematic area and programmes are presented below.

Regional Agency	Possible Regional / International Partner	Confirmed Regional / International Agency Project Partner	Possible / Proposed National Partners	Project Title	Project Description
CAWASA	**CDEMA** **CDEMA** **CIMH**	CWWA, GWP-C, GWOPA Cap-Net / Caribbean Water Net	Water Utilities Water Resource Management Agencies National Disaster Agencies	Centre for Excellence for Training with a focus on Climate Resilience Training for Water Operators	Training programmes for regional water operators have proved to be very expensive, logistically challenging and have had limited geographic scope. There is need for harmonising training, tutorial programmes, and industry best practice for trainers of water operators through real and virtual training platforms. Specialised training for this particular cohort within the sector is an ongoing necessity and in demand by the utilities. This project will give particular focus to climate resilience integrated in the training programme. It will be integrated in the Cari-WOP initiative. CAWASA and CWWA will focus on general training while the GWP-C & Cap-Net / Caribbean Water Net focus will be on the climate resilience aspect.
CAWASA			Water Utilities	Benchmarking Water Utilities in the Caribbean	Fundamental to improving water sector performance is the management of information: its collection, analysis, interpretation and dissemination. There is a dire need in the region to measure water utility operations (inputs and outputs) to perform company comparisons in the context of infrastructure reform and to identify performance gaps. Regulators and government ministries need to evaluate trends and establish reasonable targets.
CAWASA			Water Utilities	CAWASA Disaster Relief Programme	The Caribbean is one of the most vulnerable regions to weather related catastrophes. Most water utilities have suffered extensive damage to their water catchments /intakes, treatment, storage and distribution infrastructure year after year and are faced with finding the high cost of restoration. The member utilities have resolved to cooperate with each other to better manage the damages caused by the annual passage of hurricanes. The main objective of the Disaster Relief Programme is for the CAWASA membership to provide joint manpower assistance to a water utility that has suffered damage as a result of a disaster.
CIMH					Flooding and resultant massive economic losses are common throughout the Caribbean. To address this CIMH has established a real time flood forecasting system. The proposed project builds on the existing system to include forecasting for related disaster phenomenon, which are also triggered by high rainfall events.
CDEMA			National Disaster Agencies	Project title: Development of guidelines for early warning systems for floods	While there has been work on early warning flood systems in the region, for maximum efficiency, certain minimum standards must be met and Programmes of an ideal system should be identified. This project seeks to establish these regional guidelines for adaptation and modification as needed at the national level.
GWP-C		CCCCC; CAWASA	Central Water and Sewerage Authority (CWSA)	Climate proofing the Sandy Bay water service improvement project, St. Vincent	Delivers a Project Appraisal Document to access funding for a climate proofed water service improvement project. Provides capacity development for climate risk assessment and economic appraisal approaches. Project outputs will be translated into capacity development materials for regional dissemination.

> **A more comprehensive approach to risk management for water infrastructure is needed, ensuring that new and replacement infrastructure is resilient to natural hazards.**

Cap-Net	Capacity Development in Sustainable Water Management
Cari-WOP	Caribbean Water Operators' Partnerships Platform
CAWASA	Caribbean Water and Sewerage Association Inc.
CCCCC	Caribbean Community Climate Change Centre
CDEMA	Caribbean Disaster and Emergency Management Agency
CHARIM	Caribbean Handbook on Risk Management
CIMH	Caribbean Institute of Meteorology and Hydrology
CWWA	Caribbean Water and Wastewater Association
ECCU	Eastern Caribbean Currency Union
GWOPA	The Global Water Operators' Partnerships Alliance
GWP-C	Global Water Partnership Caribbean
IFIs	International Financial Institutions
NEMOs	National Emergency Management Organisations
SDG	Sustainable Development Goal
UWI	University of the West Indies

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