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Thematic Programme of Action C

Drought resilient water supplies

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Relevant regional partners¹

CARPHA, CAWASA, CCCCC, CDEMA, CIMH,
CWWA, GWP-C, IFIs, OECS, PAHO, UWI

Relevant national partners¹

Ministries responsible for Water
Resources and supply, Ministries of
Finance, Ministries of Environment,
Water Utilities, National Emergency
Management Organisations

Summary

A combination of seasonally variable rainfall coupled with insufficient storage infrastructure and limited data for strategic planning means that many Caribbean islands suffer from seasonal water shortages. This issue is exacerbated in drought years, manifested as saline intrusion into aquifers or the emptying of storage reservoirs. This necessitates rationing, often with expensive trucking of water. For example, the 2009-2010 drought in Jamaica resulted in reductions in water production of up to 90% at some plants. This led to widespread disruption and health impacts as consumers were obliged to use unsafe sources. In the future, rainfall is projected to reduce over much of the Caribbean region. Furthermore, population growth and changing patterns of water demand could also compound drought impacts. Action is needed to enhance the reliability of water supplies and secure their long-term sustainability through more effective management of drought and strategic planning.

The Programmes in this Thematic Programme of Action focus on enhancing the resilience of water services to drought through investment in infrastructure and operational drought management.

Programme C.1 – Strategic water supply planning for sustainable supplies

Programme Objectives: Support to water utilities in developing strategic investment plans to enhance resilience and secure water supplies in the medium to long term (decades)

Programme C.2 – Drought management planning
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Programme Objectives: Supporting water utilities to plan for and manage drought events, reducing disruption to essential services
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¹Partners identified are indicative, not exhaustive, and are intended as a starting point

Drought resilient water supplies								
Programme C.1 – Strategic water supply planning for sustainable supplies								
Programme Objectives: Support to water utilities in developing strategic investment plans to enhance resilience and secure water supplies in the medium to long term (decades)								
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 studies and strategic water supply planning, high cost for resulting infrastructure projects.							
Lead time	Short term for development of plans and long term for infrastructure investment.							
<p>Strategic water supply planning is a key prerequisite for water utilities to ensure sustainable water services in the face of developing populations and changing climate. The adoption of a broad range of supply side and demand side options, coupled with investment planning and supported by research and development will be important to maintain supplies in the face of a changing climate. This Programme will work closely with strategic planners within water utilities and Ministries with responsibilities for water supply and may include the following activities:</p> <ul style="list-style-type: none"> • Knowledge sharing and capacity development on current good practice for strategic supply planning across the region, and developing harmonised strategic planning approaches for the Caribbean Water Utilities; • Rolling out the Water Safety Planning (WSP) process across the region and ensuring risk assessments under the WSP process incorporate consideration of water availability, drought and climate change risks; • Further strengthening the tools and capacity to measure and model water sources and supply systems in order to increase the reliability of yield estimates for investment planning and to operationally manage supplies; • Developing scenarios of future water demand, and future water supply under a range of future climate change scenarios and including these in strategic planning approaches; • Identification of a range of supply and demand side investment options to address high priorities and assessing their performance to ensure they are robust to climate change. These should use innovative approaches where appropriate, building on pilot projects from across the region (for example, water efficiency measures, rainwater harvesting, water re-use and recycling, utilising a mix of groundwater and surface water and low carbon desalination, amongst others); • Initiating a dialogue on levels of service to consider the balance between future investment costs and the levels of service which can be feasibly achieved; • Developing costed long term investment strategies to close supply / demand deficits over a medium term investment horizon, and integration of these within existing planning frameworks; and • Investing in research and development to support the development of innovative solutions for sustainable water supplies. <p>Relevant regional experience: The CDB Water Sector Study has undertaken an assessment of water authority benchmarking and priority investments which can be used as a building block for strategic planning. The CAWASA / CWWA Cari-WOP initiative is also working on building capacity amongst water utilities and may be able to link in to the above activities.</p>								

Drought resilient water supplies								
Programme C.2 – Drought management planning								
Programme Objectives: Supporting Water Utilities to plan for and manage drought events, reducing disruption to essential 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, most activities are operational. Medium cost for investment to support implementation of Drought Management Plans.							
Lead time	Short term, this can build on existing work ongoing in the region.							
<p>Although investment in water supply can help improve the resilience of supplies to drought in the long term, drought management planning is a crucial component to increase preparedness and minimise the impacts of severe drought events when they occur. Drought management planning is present within the region, and many countries have been required to act during recent droughts. However, further opportunities exist to harmonise and strengthen drought management planning and implementation across the region. This Programme may include the following activities:</p> <ul style="list-style-type: none"> • Review of Drought Management Plans for water related stakeholders across the region, focusing mainly on water utilities, but also considering water related business continuity plans for critical and major water users e.g. large scale farms and key government facilities such as emergency services, schools and hospitals as well as private businesses, including the tourism industry; • Development of water resources modelling including hydrological models to represent supplies as well as demand side models and projections. Linking supply and demand models to project water balances over medium term (~1 year) based on seasonal forecasting and scenario testing; • Development of Drought Management Plans building on regional and national good practice and lessons from recent droughts in order to minimise disruption and maintain water quality; and • Capacity development to support development of Drought Management Plans, and to support the implementation of these plans within water utility operational practices. <p>Relevant regional experience: This Programme would link into a proposed CDEMA programme Capacity Building for National Drought Risk Management Planning, and would aim to build capacity to implement drought management plans across key sectors.</p>								

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	Scope / Possible Project Countries	Possible / Proposed National Partners	Project Title	Project Description
CARPHA		GWP-C, UNEP-CAR / RCU, GIZ	Regional	Water Utilities, Water Resources Agencies, Ministries responsible for Water	Caribbean Rainwater Harvesting (RWH) Programme	Updating and continuation of the RWH Programme developed by CEHI / CARPHA. The Programme speaks to RWH awareness raising, capacity building, legislative and policy development and infrastructural development.
CARPHA	PAHO		Regional	Water Utilities, Water Resources Agencies, Ministries responsible for Water	Regional Programme for Water Safety Planning	Continuation of Water Safety Planning activities carried out by CARPHA and PAHO in countries such as St. Lucia, Guyana and Jamaica. Roll out to other countries / entire region. Water Safety Planning involves the protection of water supplies from watershed source to household storage and distribution.

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GWP-C/ OECS	CERMES at UWI		Antigua and Barbuda	Water Utilities, Water Resources Agencies, Ministries responsible for Water	Hydro-geological Mapping of Caribbean countries	<p>This project seeks to improve the governance and management of the groundwater resources of Caribbean countries identifying hotspot areas, and utilising available and other data to develop models for the quantitative and qualitative analysis of this resource. Information to be gathered includes exploitable volumes of water available from the country's groundwater resources, the location and boundaries of these aquifers, the hydro-geological information and the identification of the critical recharge zones of aquifers.</p> <p>In addition to providing the tools (scientific analysis, GIS data presentation and modelling), this project also aims at building technical capacity so that the work completed can be continued and managed when the project is completed. There has been a specific request for assistance from Antigua and Barbuda in this regard, it has been suggested that initial work be conducted there and lessons learnt, techniques and methodologies be applied to other countries.</p> <p>The OECS is keen on the conduct of groundwater assessments for its member countries and it is anticipated that this initiative can be modified to address the OECS need with possible roll out first in the OECS countries.</p>
						<p>For those countries at the just completed policy stage, this project attempts to move these countries to the next stage, namely the development of master plans taking into account climate change aspects. Funding is required for the next stage of master plan development. There is an opportunity for information sharing and exchanges among countries, e.g. those that have completed their master plans and those that are starting.</p>
GWP-C			Regional	Water Utilities, Water Resources Agencies, Ministries responsible for Water	Development of Water Resources Master Plans for Caribbean Islands	

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UWI Mona, Dept. of Geography and Geology and Environmental Management Unit		UWI Mona, UWI St. Augustine, CDEMA	Initially Jamaica, then replication to other countries	Water Resources Authority, Jamaica, Met Service of Jamaica, ODPEM Jamaica	Water Security and resilience towards climate change for the water sector for Jamaica	Jamaica has been severely affected by the drought of 2010, 2014 and now 2015. The agriculture and domestic sectors have been worst affected with major impact in the parishes of Kingston and St Andrew, Clarendon, St Elizabeth, St Thomas, and St Catherine. Severe water shortages occurred in communities of the urban areas of Kingston with significantly low levels in the major water supplies. Climate projections show an increase in dry days and probability of drought for the island, hence this will affect the water sector directly in the future. There exists no significant drought management plan and adaptation strategy for water security for the island. New sources of water need to be identified, which entails detailed mapping of the existing sources, geological studies, the analysis of aquifer parameters and the analysis of the water budget for each basin with climate projections at a high resolution scale of 10km. This has not been done and needs to be conducted since drought appears to be a more frequent event in recent years. Separate water budgets need to be conducted for water for urban areas and agricultural areas. Demand and consumption analyses are needed for agriculture, and the domestic sector with projections of climate scenarios and population growth.

Regional Agency	Possible Regional / International Partner	Confirmed Regional / International Agency Project Partner	Scope / Possible Project Countries	Possible / Proposed National Partners	Project Title	Project Description
UWI Mona, Dept. of Geography And Geology and Environmental Management Unit		UWI Mona, UWI Cave Hill -CERMES, Climate Studies Group, UWI Mona, GWP-C		Water Resources Agencies, Ministries responsible for Water	Development of Rainwater Harvesting (RWH) model for the parishes of Kingston and St Andrew and St Catherine	The parishes of Kingston and St Andrew and St Catherine are the most urbanised parishes in Jamaica. Population density is highest for Kingston, capital city of Jamaica, followed by Portmore and Spanish Town of St Catherine. The prevailing drought of 2015 and the past droughts of 2010 and 2014 have severely affected these parishes with major areas of the main cities experiencing water shortages. There is no existing model or plan or policy for rainwater harvesting in these parishes as well as for Jamaica. The project would involve mapping of all houses of the urban areas, shape and size of the roof, roof material. Analysis of rainfall for these parishes would be conducted with estimation of frequency of maximum rainfall, flooding or storm water discharge per roof and will be calculated using standard formulae. The total amount of water that can be captured from extreme rainfall would be analysed. Finally, a model for RWH would be developed in consultations with local stakeholders and license agencies for implementation of the model. Impacts of climate variability will also be conditioned over the present rainfall-runoff model for estimation of flow under different emission scenarios. This initial project in Jamaica will be replicated in other islands. This project is in synergy with the Caribbean RWH programme, which speaks to RWH for communities and urban areas.
CERMES at UWI	GWP-C, CCCCC			Water Utilities, Water Resources Agencies, Ministries responsible for Water		Development of water resources modelling including hydrological models to represent supplies as well as demand side models and projections. Linking supply and demand models to project water availability balances over medium term (~1 year) based on seasonal forecasting and scenario testing.
CDEMA	CIMH, CCCCC			National Disaster Organisations	Project Title: Capacity Building for National Drought Risk Management Planning	This programme would develop a training programme for National Disaster Coordinators on adaptation and implementation of a National Drought Management Plan. The existing regional Model Drought Plan would be updated in collaboration with CDEMA NDCs, the CU and other key technical partners, in particular to better reflect how regional climate change data and climate change adaptation strategies should be incorporated into national planning for drought emergencies. A set of standardised training materials and tools would be developed as part of a capacity building programme for National Disaster Organisations (a grouping which includes the water, health and agriculture sectors). Sustainability will be built into the project design.

CARPHA	Caribbean Public Health Agency
CAWASA	Caribbean Water and Sewerage Association Inc.
CCCCC	Caribbean Community Climate Change Centre
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster and Emergency Management Agency
CERMES	Centre for Resource Management and Environmental Studies
CIMH	Caribbean Institute of Meteorology and Hydrology
CWWA	Caribbean Water and Wastewater Association
GIZ	Gesellschaft für Internationale Zusammenarbeit
GWP-C	Global Water Partnership Caribbean
IFIs	International Financial Institutions
OECS	Organisation of Eastern Caribbean States
PAHO	Pan American Health Organisation
RWH	Rainwater Harvesting
UNEP CAR/ RCU	United Nations Environmental Program Regional Coordinating Unit for the Caribbean Environment Programme
UWI	University of the West Indies



This document is an output from a project commissioned through the Climate and Development Knowledge Network (CDKN). CDKN is a programme funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) for the benefit of developing countries. The views expressed and information contained in it are not necessarily those of or endorsed by DFID, DGIS or the entities managing the delivery of the Climate and Development Knowledge Network, which can accept no responsibility or liability for such views, completeness or accuracy of the information or for any reliance placed on them.

The Climate and Development Knowledge Network (CDKN) is a project funded by the UK Department for International Development and the Netherlands Directorate-General for International Cooperation (DGIS) and is led and administered by PricewaterhouseCoopers LLP. Management of the delivery of CDKN is undertaken by PricewaterhouseCoopers LLP, and an alliance of organisations including Fundación Futuro Latinoamericano, LEAD Pakistan, the Overseas Development Institute, and SouthSouthNorth.