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Thematic Programme of Action D
**Climate resilient
agricultural water
management**

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Relevant regional partners¹

CARDI, CARPHA, CCCCC, CIMH, FAO,
GWP-C, IFIs, UWI

Relevant national partners¹

Ministries of Agriculture, Ministries
of Finance, Agricultural Trade
Associations, Farmers Associations,
Meteorology Departments

Summary

Agriculture makes a significant contribution to the GDP of several Caribbean countries. Despite its declining contribution to most national economies in the region, the agricultural sector plays a critical role in food and livelihood provision and the servicing of other economic sectors such as tourism and manufacturing. Agricultural employment accounts for at least 20% of total employment in some countries and is close to 30% in Belize, Dominica and Guyana. This profile suggests that many households across the region are at significant risk if agriculture systems are stressed by events such as prolonged drought. The majority of the region's agriculture is rain-fed and production and profitability is strongly influenced by variations in rainfall and, in particular, rainfall extremes. In 2009 and 2010, a severe drought caused millions of dollars in lost income in the Caribbean agricultural sector which was worsened by increased bush fires on farms resulting from the hot, dry conditions.

In the absence of available water from formal irrigation schemes, many small scale farmers have developed innovative ways of intercepting and storing rainwater runoff but the quantities are insufficient to meet shortfalls in agricultural water demand during dry periods. In general, water for irrigation when necessary is a major constraint for most small scale farmers.

In order to safeguard this key sector from drought, increased investment in securing water supplies for agriculture is needed alongside improving the efficiency of agricultural water management to improve 'crop per drop' yields. This will be especially important given climate change projections of a reduction in rainfall across much of the region. As an operational practice, seasonal forecasting would be a low regrets climate resilience measure to further assist in the efficient management of water resources for agriculture.

The Programmes in this Thematic Programme of Action focus on investment in securing agricultural water supplies, efficient water management and effective management of agricultural drought risk.

Programme D.1 – Securing agricultural water supply and improving efficiencies for drought resilience

Programme Objectives: Supporting small scale farmers to invest in appropriate water supply systems to support agricultural livelihoods and improve drought resilience

Programme D.2 – Drought risk reduction through seasonal forecasting

Programme Objectives: Supporting small scale farmers to manage the risks of agricultural drought through the provision of forecasting and decision support services

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

Climate resilient agricultural water management								
Programme D.1 – Securing agricultural water supply and improving efficiencies for drought resilience								
Programme Objectives: Supporting small scale farmers to invest in appropriate water supply systems to support agricultural livelihoods and improve drought resilience								
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 technical studies and capacity development, medium for pilot projects and high costs for rolling out / financing infrastructure and technology across the region.							
Lead time	Short term for technical studies and capacity development and pilot projects, building on existing work, medium to long term for rolling out / financing infrastructure and technology across the region.							
<p>The region has a strong track record in piloting projects on the provision of reliable water supplies through rainwater harvesting and other approaches to water storage at a farm level. In addition, efficient irrigation techniques such as drip irrigation, protected agriculture and the use of solar water pumps have been trialled across the region. However, opportunities exist to develop approaches for scaling up and financing these types of technology to provide smallholder farmers with a more resilient source of livelihood in a changing climate. This Programme could contain the following activities:</p> <ul style="list-style-type: none"> • Strengthen capacity to identify and appraise options for on-farm water management, building on best practice across the region and existing outreach programmes; • Investigation of the economic case for a range of on-farm water management options to build a strong business case for investment, and gain an understanding of the existing institutional, financial and cultural barriers to investment in on-farm water management; • Technical investigations of the current and future water availability and demands under a range of socio-economic and development scenarios to assess the strategic requirements for agricultural water management across the region; • Producing plans for the upscaling of water management interventions such as efficient irrigation infrastructure, re-use and recycling of grey water, nutrients from waste, rainwater harvesting technology, pumping and storage equipment. This should include appropriate financing and implementation mechanisms and provision to support capacity development; and • Continuation of the testing and piloting of emerging technology for on-farm water management such as bio-char to manage degraded soils. <p>Relevant regional experience: This Programme would build on the strong track record of organisations including CARDI and FAO, but would focus primarily on the water management aspects of agricultural resilience.</p>								

Climate resilient agricultural water management								
Programme D.2 – Drought risk reduction through seasonal forecasting								
Programme Objectives: Supporting small scale farmers to manage the risks of agricultural drought through the provision of forecasting and decision support 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 planning and technical development, medium cost for installing and maintaining monitoring systems.							
Lead time	Short term, building on previous projects such as CAMI.							
<p>In addition to investing in water management infrastructure, usage of seasonal forecasting can provide a low cost, low regrets option to manage drought risk. The region has experience in seasonal forecasting but opportunities exist to further enhance technical capacity and to strengthen capacity of farmers to access and utilise seasonal forecasting in their operational practices such as planting and water management. This Programme could contain the following activities:</p> <ul style="list-style-type: none"> • Develop regional and national level implementation and financing plans for basic data collection to improve technical capacity to analyse and forecast drought events; • Expand the technical services in drought modelling, mapping and information service provision; • Review the institutional and technical barriers and opportunities for successful uptake and use of drought forecasts within agricultural decision making at a variety of levels, from small scale farmers to large scale agribusiness; and • Strengthen capacity amongst agricultural extension workers and farmer associations on the use of forecast information, and the opportunities for reducing negative impacts of droughts. <p>Relevant regional experience: This Programme would build on the considerable experience in drought forecasting for agriculture at CIMH and CARDI.</p> <p><i>* Programme also aligns strongly with SDG 2 (Food Security)</i></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 Project Partner	Scope / Possible Project Countries	Possible / Proposed National Partners	Project Title	Project Description
CARDI	UWI	GWP-C	National Ministries of Agriculture / Water	National Ministries of Agriculture / Water	On farm water management and water use efficiency training	Regional training of stakeholders in on-farm water management and water use efficiency. Provide training on Water Use Efficiency for the Agriculture Sector utilising the Water Use Efficiency Manual developed by the GWP-C and Aquacrop modelling developed by FAO.
CARDI	CCCCC	FAO, GWP-C	National Ministries of Agriculture / Water	National Ministries of Agriculture / Water	Biochar for soil water and nutrient capacity enhancement	Use of biochar for soil water and nutrient capacity enhancement. The soil is a limited resource, a great portion of which has been degraded by poor use and management.
CARDI	FAO	GWP-C	National Ministries of Agriculture / Water	National Ministries of Agriculture / Water	On farm water management economics and financing	Rolling out improved on farm water management across the region – cost-benefit analysis / value for money analysis of on farm water management interventions and financing modalities.
CARDI	GWP-C, UWI, FAO		National Ministries of Agriculture / Water	National Ministries of Agriculture / Water	Crop consumptive use study	With increased droughts, the volume of water available to the farming community is decreasing therefore more efficient agricultural practices are needed to ensure that the maximum “crop per drop” is achieved. This project would determine the consumptive use of water for crops of economic importance in the Caribbean to ensure the most efficient use of soil water to obtain maximum economic returns.
CARDI	UWI	GWP-C	National Ministries of Agriculture / Water, private industry	National Ministries of Agriculture / Water, private industry	Water re-use for agriculture	Due to ongoing droughts and the forecast for more droughts in the future there is an ever increasing need to explore all sources of irrigation water. Recycling of water is one such source for agricultural production. This project would identify and assess the potential for re-use in agriculture of water utilised by major consumers such as industrial facilities, tourism businesses, agro processors etc. (note this also aligns with theme B).

Regional Agency	Possible Regional / International Partner	Confirmed Regional / International Agency / Project Partner	Scope / Possible Project Countries	Possible / Proposed National Partners	Project Title	Project Description
CARDI	GWP-C		St Kitts	Water Utility, Ministry of Agriculture	Desalinated water for agriculture	With the shortage of water being experienced across some Caribbean States, there is an emergent need to seek alternate water sources to augment the water supply. Equipment set up cost for desalination plants are decreasing and with the use of renewable energy it is possible that desalinated water can compete with other sources for use in agriculture. This pilot project would evaluate the economics of the use of desalinated water in agricultural production in the Caribbean (St. Kitts).
CERMES at UWI	FAO			Water Utility, Ministry of Agriculture	Vertical farming for improved water resources management	Pilot Project to investigate the potential for small-medium vertical farming in Carriacou.

CAMI	Caribbean Agrometeorological Initiative
CARDI	Caribbean Agricultural Research and Development Agency
CARPHA	Caribbean Public Health Agency
CCCCC	Caribbean Community Climate Change Centre
CIMH	Caribbean Institute of Meteorology and Hydrology
FAO	Food and Agriculture Organisation of the United Nations
GDP	Gross Domestic Product
GWP-C	Global Water Partnership Caribbean
IFIs	International Financial Institutions
SDG	Sustainable Development Goal
UWI	University of the West Indies



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