

APP Thematic Feature No. 9

Intra-ACP Agriculture Policy Programme (APP) Caribbean Action, with funding by the European Union under the 10th European Development Fund (EDF)



Intra-ACP APP Caribbean Action

Building Regional Institutional Capacity for managing Hazard Risks in the Agricultural Sector of the Caribbean.

Disaster risk now presents one of the most serious threats to sustainable agricultural development in the Caribbean and has implications for our food insecurity and national productivity. This creates significant setback potential for our efforts at poverty reduction.

The people of the Caribbean are determined and resilient. They have seen their fair share of tough times associated with low economic growth in struggling economies, high unemployment and socio-economic disruption and dislocation from the impact of natural hazards. Yet they always seem to bounce back. However, the increasing frequency and magnitude of hazard impacts, including those related to a changing and variable climate, demand more deliberate policy and action to manage risks in the agriculture sector.

According to the authors of a report on Disaster Risk Management and Climate Change Considerations in Agriculture sponsored by the Intra-ACP Agriculture Policy Programme (APP), Jeremy Collymore et al., "Caribbean experiences show that the negative and cumulative impacts of disasters erode livelihoods and coping capacities of the population over time, and in some cases erode or completely destroy productive land, destroy critical infrastructure and disrupt market access and trade."

Building environmental resilience is therefore a strategic priority of the Caribbean Community Operational Plan. It recognizes the vulnerability of CARICOM States to hazard impacts, including those of climate change, and effects of these phenomena on the agricultural sector, especially the need to strengthen consideration for those effects within planning in the sector.

One such regional intervention is the Caribbean Action under the Agriculture Policy Programme (APP). This programme is funded by the European Union (EU) under

Mainstreaming Climate Change and Disaster Risk Management in Agricultural Policy and Planning

the 10th European Development Fund (EDF) with the Inter-American Institute for Cooperation on Agriculture (IICA) as the executing agency and the Caribbean Agricultural Research and Development Institute (CARDI) and the CARICOM Secretariat (CCS) as implementing partners.

A resilient people deserve a resilient food system and the APP and its implementing partners are keen to see that happen.



Damages to the fishing industry in the Caribbean after Hurricane Ivan in Grenada, 2014 (Photo: Caribbean Community Climate Change Centre)

"Effects of climate change is an emerging issue for CARICOM Member States but little institutional experience is available to tackle such impacts", says the Regional Analysis Report on disaster risk management (DRM) and climate change adaptation (CCA) in the agriculture sector. "Strategic planning for DRM and CCA is essential in order to diminish future impacts of natural hazards and improve the sustainability of the development processes."

Understanding the problem, where we are at now and where we need to be, is the key to moving forward. This feature highlights the current vulnerability of the Caribbean agriculture sector to natural hazard impacts, the enhanced effect of climate change, the need to build DRM and CCA into agricultural planning, and the actions that need to be taken. An APP-supported study seeks to enhance understanding of the gaps in agricultural planning which can be filled in order to make the Caribbean more resilient to natural hazards and climate change.

A Vulnerable Region

“The specific characteristics of Caribbean island environments and histories condition the region’s sensitivity to climate risks”, say Pulwarty, Nurse and Trotz, the authors of an online article in Environment Magazine titled, “Caribbean Islands in a Changing Climate”. When categorized by the number of disaster events per unit area, small island states take up 19 of the 20 places most at risk. There have been an average of six significant hazard events in the Caribbean each year between 1970 and 2006.

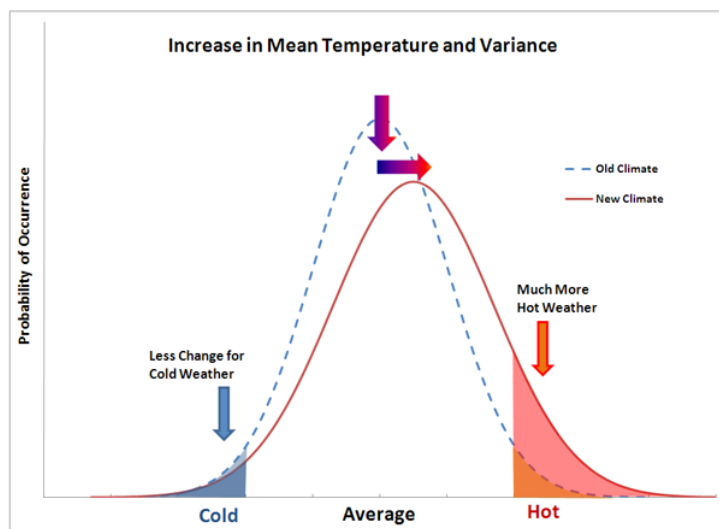
The specific characteristics of Caribbean island environments and histories condition the region’s sensitivity to climate risks

Source: Caribbean Islands in a Changing Climate, Environment Magazine, Roger S. Pulwarty, Leonard A. Nurse and Ulric O. Trotz, December 2010.

In Dominica, banana farmers can tell you how Hurricane Dean in 2012 resulted in the loss of over 90% of their crops. Jamaican farmers can share how the same hurricane destroyed important food and cash crops such as cassava, corn, vegetables and cocoa. In 2005, floods in Guyana resulted in US \$55 million damage to agriculture and in 2015 farmers across the Caribbean watched their crops wither and die due to the lack of rain.

Changing climate is also being evidenced in the Caribbean. In April of 2016, for the first time in recorded history, snow fell on the small island of Guadeloupe. In 2013, a “freak”, out of season storm caused by a Low Level Trough System, resulted in extensive damage to crops, livestock, fisheries, forests, roads and farm infrastructure in Saint Vincent and the Grenadines, Dominica and Saint Lucia. In 2011, a prolonged dry season followed by intense rain events led to flooding and destruction of crops, livestock and infrastructure in Saint Vincent and the Grenadines.

The direct and specific costs and impact of climate change on the Region are hard to measure. There is no doubt that climate change exacerbates natural hazard impacts but it also has its own direct impacts. In the Caribbean today, nights are warming at a faster rate than days and the frequency of cool nights and days is decreasing. Warmer temperatures cause heat stress on exposed crops subjected to the intense heat of the Caribbean sun, as well as droughts and forest fires.



Conceptual representation of the shift in the probability distribution for average and extreme temperatures as a result of global warming. (Source: [Extreme Weather and Climate Change: Understanding the Link and Managing the Risk](#), Center for Climate and Energy Solutions, Daniel Huber, Jay Gulledge, December 2011.

Shifting precipitation patterns due to climate change leave farmers at a loss to determine when it is best to plant and harvest, and how to prepare for changing farming conditions. Caribbean farmers, supported by the results of ongoing research, suggest that rainy seasons are arriving later and not lasting as long, causing later peaks and flowering of crops and longer droughts.

These are just a few of the effects of natural hazards, including climate change, on the Region. To be fair, many of these same things are happening in different locations around the world. However, there are several characteristics that make the Caribbean more vulnerable. Firstly, most countries in the Caribbean are surrounded by water. Warming seas and oceans generate more powerful storms. The low-lying coastal zones that are essential to the socioeconomic and environmental well-being of the countries are vulnerable to erosion and environmental damage under the effects of stronger storms and higher storm surges.

In addition, the Region is heavily dependent on rainfall for water resources. More than 50 percent of regional

agriculture is rain-fed, so dealing with droughts is a significant challenge. Lastly, many countries in the Caribbean are generally lacking in adequate, well-developed infrastructure. This makes enduring impacts and recovering from them much longer and more challenging.

Summary of the Impacts of Climatic Change for the Caribbean

Projected increase of the global air temperature by 1.5 – 2 degrees Celsius leading to:

- **Decreased length of the rainy season and increased length of the dry season by 6-8 percent by 2050**
- **Increased Frequency of Intense Rains by 20 percent by 2050**
- **Rise in sea levels of 30 to 50 cm by 2080**
- **Increased intensity of the strongest hurricanes**

Source: "Caribbean Islands in a Changing Climate", Environment Magazine, Roger S. Pulwarty, Leonard A. Nurse and Ulric O. Trotz, 2010

The importance of agriculture to the Region makes the impacts of climate change and natural hazards even more significant. This sector is often the hardest hit by these two elements, leading to destroyed or damaged crops. The loss of crops then has a domino effect, leading to a reduced food supply, less income for farmers, higher rural poverty and wider economic impacts. With agriculture making up 7% of the regional gross domestic product and 25% of its labour force, loss to the agricultural sector means loss to the entire regional economy.

A Volatile Pair

It is easy to understand the impact of both climate change and natural disasters on their own, but perhaps more difficult to understand why the APP has grouped them together in their initiative to create a resilient agriculture system.



Destructive Impacts of Hurricane Earl (August 2016) on an-APP Climate Smart Evaluation Trial for Water Stress in Corn (Maize), Belize (Photo: CARDI)

That is because potential natural hazard impacts can be worsened by climate change and variability. There are several reasons. First, as the climate warms, so do the oceans. Warm oceans add power to tropical storms and hurricanes that commonly hit the Region.

Next, the warmer atmosphere causes sea levels to rise through expansion of water droplets and accelerated rates of melting ice. Heightened sea levels create higher surges during storms, causing flooding, increased erosion and salinization of fresh water sources.

These two factors, climate change and natural hazards, are the Bonnie and Clyde of the environment - a dangerous pair.

A Vigilant Response

The increased frequency and intensity of natural hazards, the growing impacts of climate change and the increasing vulnerability of the Caribbean and its agriculture highlight the immediate need to enhance DRM and CCA in the Region.

The APP and its implementing partners, have recognized the need to be proactive rather than reactive in their approach to these challenges. Through the policy-linked study under Component 1 of the programme, coupled with the field work undertaken by CARDI under Component 2, initiatives are being taken to sensitise, build resilience and strengthen the integration of DRM and CCA into agricultural plans, policies and strategies across CARICOM.

It is the need to strengthen resilience in agriculture, which prompted the APP to support the initiative to design a Regional Standardized Audit Instrument (SAI) aimed at assessing the status of the integration of CCA and DRM within the agricultural sector and provide a framework for taking action. The purpose of the audit instrument was four-fold. It was designed to:

According to the United Nations Office for Disaster Risk Reduction, managing risk occurs through “systematic efforts to analyse and reduce the causal factors of disasters. Reducing exposure to hazards, lessening vulnerability of people and property, wise management of land and the environment, and improving preparedness and early warning for adverse events.”

1. Baseline the status of DRM and CCA integration into the agricultural sector
2. Promote an integrated DRM and CCA platform in the Ministries of Agriculture (MOA) that is strong, well-coordinated and systematic
3. Enhance the MOA’s DRM and CCA capabilities, knowledge and resources
4. Mobilize resources and strengthen partnerships that integrate Disaster Risk Reduction (DRR) and CCA

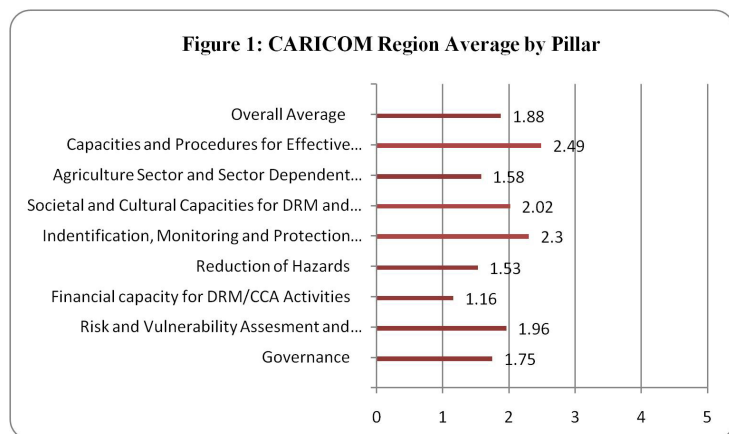
Creation of the tool involved the initial identification of four possible frameworks for evaluation. Once the tools were evaluated and the best possible tool was chosen, the resultant SAI was split into eight thematic areas, or pillars, which were used to evaluate how the agricultural sectors in 11 CARICOM countries are addressing considerations of DRM and CCA. Twenty-seven critical, agricultural DRM and CCA issues are identified and 71 items, or indicators, are evaluated to determine an overall score for each country, and an average score for the Region.

1. **Governance:** This thematic area measured the institutional and technical capacity of a country for CCA and DRM in their planning and policy frameworks and coordination mechanisms at all levels of the agriculture sector, measuring items from integrated frameworks, aligned plans, information exchange, collaboration and management.

2. **Risk Assessment and Monitoring:** Assessing and monitoring risks and vulnerabilities was the focus of this area, along with a review of early warning systems.
3. **Financial Capacity:** In this area, the SAI measured a countries financial capacity for the development and implementation of DRM and CCA activities in the agricultural sector. It examined financial plans and budgets for resilience, contingency funds and credit, incentives and financing for key players in the agriculture industry and financing of agriculture DRM and CCA expenditures.
4. **Risk Reduction:** This pillar, or thematic area, looked at the initiatives and ability of countries to reduce hazards including climate related risks, and underlying vulnerabilities in crop, livestock, fishery, and forestry subsectors. It looked at the effective land use, building codes, standards and designs for farm buildings and the development and transfer of technologies that integrate CCA and DRM.
5. **Monitoring and Protection:** Identifying, monitoring and protecting critical ecosystem services that confer a disaster resilience benefit to the agriculture sector was the focus of this pillar.
6. **Societal and Cultural Capacities:** Sector employers, systems of engagement and grassroots organizations, such as farmers groups, NGOs and CBOs, were looked at under this thematic area in order to better understand the societal and cultural capacities for DRM and CCA activities in the agriculture sector.
7. **Infrastructure Capacity:** A focus on this pillar led to the assessment of the agriculture sector and sector dependent infrastructure capacity to cope with disasters that the sector might experience. It entailed a review of protective infrastructures, the food supply chain and administrative operations.
8. **DRM and CCA Measures:** The last thematic area dealt with the capacities and procedures for effective disaster preparedness, response and rehabilitation which included early warning systems, event management, equipment and supply needs, food, staple goods and fuel supply, inter-agency compatibility and post-event recovery planning.

Figure 1 below shows the average score assigned to the Region as a whole for each pillar.

The highest score that could be awarded in any thematic area was 5. Analysis and interpretation of the data was made easier by a definition of the four levels of attainment that could be awarded by the SAI.



Source: CARICOM Regional Analysis Report: Assessment of DRM and CCA considerations in Agriculture Sector, August 2016, Collymore, Little and Spence.

Level 0.00 to 1.49 represented 'Little to No Progress'.
 Level 1.50 to 2.99 represented an 'Awareness of Needs'.
 Level 3.00 to 4.49 represented the 'Development of Solutions',
 Greater than level 4.50 represented 'Full Integration.'"

A Vital Need

The APP supported audit exercise is just the beginning of a long road to promoting agricultural resiliency in light of climate change and natural hazards. Through this contribution, MoAs now have a benchmark as to where they are and how sufficient is their response in integrating DRM and CCA in their agricultural planning. Also, as noted in the consultant's report, "it has raised many other issues related to programming focus, strategic capacity investments (prior and future), as well as to supporting processes of data capture, harnessing and evaluation for use in policy design and practice."

The results obtained from the assessment of the integration of DRM and CCA considerations within the Agriculture Sector in CARICOM (Overall Regional Score of 1.88, Level 2) suggest that CARICOM is in the early stages of mainstreaming DRM and CCA in the agriculture sector. There is a growing level of awareness and understanding of the value and requirements of integration. There has been a recognition of the need for action and decisions for movement on these issues.

There exists a platform for advancing DRM and CCA integration in planning in the agriculture sector. To capitalize on this opportunity will require a retooling of the knowledge assessment and development processes, better harvesting and use of existing hazard and other data, better interfacing with the generators of risk profiling data and more application of their outputs.

The strongest areas of integration relate to capacity and systems for preparedness, response and recovery, ecosystems services management and enhancing of societal and cultural capacities. This is an interesting mix that appears to respond to hazard experience, small state issues and the increasing sensitivity to environmental threats to our development.

However, there is a noted dichotomy in the evidence of integration within CARICOM Member Countries with over 30 percent of the countries reporting indicating little or no progress at the integration of DRM and CCA in planning the agriculture sector. The study was not in a position to explain the extent to which this is related to the level of investment or outcomes of investment, although a number of contributing elements that categorize the status are noted the report.

An analysis of data from the SAI and other national documentation revealed that the status of CDM national architecture is generally a good indicator of the level of integration at the agricultural level. Additionally, it was noted that hazard experiences appear to have an indifferent relationship to what countries do to address institutional capacity building, invest in identified gaps or improve some of the immediate basic elements of the architecture related to response, relief and recovery for which there have been multiple experiences.

In addressing the specific thematic areas, the report points out that Governance is the 3rd lowest ranking of

Over 30% of CARICOM Member States reported little or no progress with integrating DRM and CCA planning in the agriculture sector

the eight pillars. This" suggests the need for prioritized investments in overall coordination infrastructure, skills and knowledge development. Given the central role of governance in the mainstreaming process it must be a priority area for attention and may call for a re-assessment of how resources are mobilized and

prioritized.” The report also pointed out the lack of capacity for data capture, analysis and storing, which is vital in building successful resilience programmes.

In the area of **Risk and Vulnerability Assessment and Monitoring**, the biggest challenge will be applying a common tool for monitoring across the Region. This is because of the diversity in numbers and types of plans and risk management programmes across CARICOM Member states. Additionally, consultants found that many of the national plans were out of date in their consideration of risk ratings and structural vulnerability assessments were limited, and often irrelevant.



Vulnerable and important mangrove forests in Saint Lucia.
(Photo: Lyndon John)

All nine countries analyzed also had weak **Financial Capacity for DRM and CCA activities**. During the analysis, the consultants found that financial plans had substantial gaps and insurance and risk transfer mechanisms for producers were limited. Contingency funds were available, and often found to be adequate, however the rules which applied to most would allow those resources to be diverted for other purposes. Clearly, a priority needs to be placed on financial support and proper resource use in this area.

When it comes to **Reduction of Hazard**, it appears that land zoning to prevent exposure and losses in crops, livestock, fisheries and forests is limited and building codes and design solutions for farm buildings are inadequate to properly address the physical challenges facing the Region. As noted in the report, “sector stakeholders will need to assertively add their voices to the call for more risk sensitive land use policies in their specific countries and the region in general.”

Additionally, the use of new technologies to address disasters and climate change is limited and inconsistent and the use of guidelines on settlements in hazard prone areas seems ineffective.

Identifying, Monitoring and Protecting Critical Ecosystems services seems to be an ad hoc activity in most countries, with little attempt to track the health of eco-systems over time. The importance of these types of activities will require a mindset change on the part of stakeholders across the board, which is a priority in the thematic area of **Enhancing Societal and Cultural capacities for DRM and CCA Activities**. However, with less than 50% of the farming and fishing communities covered by one-government body that addresses DRM and CCA, it is not an issue that is at the forefront of everyone’s mind.

There is a general lack of resilience planning carried out with, or for, many farming communities, as well as limited business continuity plans for recovery following a disaster. Before quality, effective resilience plans can be created, key stakeholders need to become informed and motivated as to the importance and value of such plans.

In the area of **Assessing Agriculture Sector and Sector Dependent Infrastructure Capacity to Cope**, consultants found that there are inadequate protective infrastructures, such as dams, levees and flood barriers, as well as inadequate maintenance of existing infrastructures. The food chain supply and administrative infrastructures are also vulnerable, but to varying degrees around the Region.



Managing water levels in Guyana. (Photo: Canbean Associates Inc.)

The **Capacities and Procedures for Effective Disaster Preparedness, Response and Rehabilitation** was the highest scoring pillar in the study but there is still a lot of work to be done in this area. Currently, early warning systems in place can reach 70-80% of the farming and fishing population, however that still leaves a 20% rate of vulnerability. There are emergency procedures and emergency operation centres however there is limited testing of plans and few annual drills. Emergency food supplies are planned however, they will only address a short window of time.

As noted in the consultant's report, "given the frequency of impact of the sector by hazards and prior investment by FAO and others to support contingency planning, the results raise questions about sustainability of capacity and the mode and the adequacy of the support. More so, the agriculture sector of many of these countries has been repeatedly impacted. It begs the question as to whether this is a matter of not learning from lessons identified, a commitment issue or a combination of these."

Though the SAI could not identify why countries were not sufficiently responding to these issues, a few interesting observations were made when analyzing the data and examining national Comprehensive Disaster Management (CDM) plans outside of agriculture.

First, the national CDM plan was usually a fair predictor of the integration of DRM into national agricultural plans. Second, hazard experiences, no matter how significant, didn't seem to increase a country's commitment to capacity building or investment to fill identified gaps in relation to response, relief and recovery. As expected, the scores of the countries with a higher level of per capita income reflect a greater readiness to respond to disasters and climate change. Unfortunately though, it is those countries that have the lowest agricultural contribution to GDP. Conversely, those countries with the lowest income per capita and the highest agricultural contribution to GDP, have the lowest scores.



Hurricane Omar hits the Caribbean in 2008. (Photo: APP)

In their recommendations following the DRM and CCA Agricultural Consultancy, consultants noted their belief that "programmatic elements alone will not generate the systematic change necessary to alter a sector trajectory of repeated loss and disruption to farming systems, livelihoods, communities and national economies." They felt strongly that actions needed to focus on regional collaboration and broad goals for resilient agriculture, supported by agreed frameworks, standards and knowledge products. They also highlighted the importance of educational and research institutions, as well as the private sector in creating and delivering the products and services that will be required for success.

"Finally", the report states, "Agriculture DRM and CCA should be elevated to the highest level of development priority in the CARICOM Region. Given the vulnerability of countries in the region to natural hazards and the fact that natural hazards are likely to increase in intensity and frequency, this should be an urgent priority for governments, civil society and regional organizations in the Caribbean."

In light of this reality, consultants recommended some priority actions at the conclusion of their report.

The Four Areas and Priorities for Action to Address CC and DRM in the Caribbean are as follows:

- 1. Institutional and Technical Capacity for DRM and CCA in Agriculture:** The priority actions in this area should include strengthening of the framework for institutional collaboration between the various stakeholder involved in agriculture DRM and CCA measures in the Caribbean; consolidated efforts to harmonize the work of the sector partners in DRM and the interface with the CDM monitoring framework to accommodate the generation of data from this exercise; and, a review of how and where the agriculture sector is reflected in Regional Strategic Frameworks for Comprehensive Risk Management, Resilient Development and Sustainable Development in order to move toward a stronger infrastructure for risk management.
- 2. Financial capacity to support identified DRM and CCA priorities:** The priority actions in the area should include, support for regional capacity building in incorporating risk financing in the budget planning cycle of the ministry of agriculture and other key sector stakeholders; promotion of a model suite of incentives for encouraging DRM and CCA integration in the agriculture sector; and, a review of risk transfer programmes in the Caribbean and the sharing of a good practices guide.

3. **Enhanced Capacity for Comprehensive Risk Management:** The priority actions in this area should focus on improving climate risk and vulnerability assessment tools and methods; the creation of climate information products and early warning systems that are customized to the needs of farmers; and, develop a 'good practices' database and provide training on the same at MOAs, colleges and vocational schools.
4. **Establishment of a Platform for Sustaining the Initiative:** The priority actions in this area should focus on tools standardization, evidence and needs driven programme development, resource mobilization and articulation of criteria for centers of excellence.



Dealing with the after effects of Hurricane Matthew in Haiti, 2016.
(Photo: IICA Haiti)

See also:

C1 Tech Feature #10: 'Building Regional Commodity-based Industries – Considerations for Agricultural Policy and Planning'

C1 Tech Feature #11: 'Moving 'Local' Food within the Region – Part 1: Connecting the Region through Better Logistics'

C1 Tech Feature #12: 'Moving 'Local' Food within the Region – Part 2: Breaking Down Non-tariff Barriers'

This is the first in a 4-part series of Thematic Features with a focus on key areas for a regional policy response, produced under the Agricultural Policy Programme (APP) Caribbean Action, highlighting work under Component 1 – Strengthening Regional Policy and Strategy. The APP is funded by the European Union (EU) under the 10th European Development Fund (EDF) with the Inter-American Institute for Cooperation on Agriculture (IICA) as Executing Agency and the CARICOM Secretariat (CCS) and the Caribbean Agricultural Research and Development Institute (CARDI) as Implementing Partners.

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Document prepared by:
Canbean Associates Inc. Toronto, CANADA



Intra-ACP Caribbean Action Implementing Partners

