



White Paper

Barrier Analysis and Needs Assessment of the Policy Environment for Agriculture in Nine CARICOM Countries

The Bahamas, Belize, Dominica, Haiti, St. Kitts and Nevis, Saint Lucia,
Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago
2022





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Editors: Chaney St. Martin, Kelly Witkowski and Shanna Prevost

Project Management and Coordination: Shalini Maharaj

Proofreader: Catalina Ann Saraceno

Layout: Kathryn Duncan

Cover design: Kathryn Duncan

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Table of Contents

Acknowledgements	iii
List of Tables	v
List of Figures	v
Acronyms and Abbreviations	vi
Executive Summary	viii
1. Introduction	3
1.1 About This Study.....	4
2. Approach and Methodology	5
2.1 Approach	5
2.2 Methodology.....	6
2.3 Methodological Constraints.....	8
3. Findings	9
3.1 Efforts Toward CRA.....	9
3.1.1 Policy, Legislative and Regulatory Framework.....	9
3.1.2 Institutional Arrangements/Governance for CRA in AgREADY Countries.....	12
3.1.3 Financing for Climate-Resilient Agriculture in AgREADY Countries.....	13
3.1.4 Knowledge Management, Capacity Building and Awareness for CRA in AgREADY Countries.....	16
3.1.5 Social Norms and Behaviours.....	17
3.1.6 Considerations for Gender, Youth and Other Vulnerable Groups in CRA in AgREADY Countries	18
3.1.7 Advances Towards the CRA Transition in AgREADY Countries Through Technology.....	19
3.2 Critical Barriers to Developing Climate-Resilient Agriculture in AgREADY Countries	21
3.2.1 Policy, Legislative and Regulatory Framework.....	21
3.2.2 Institutional Arrangements/Governance	23
3.2.3 Financing Constraints for CRA.....	24
3.2.4 Knowledge Management, Capacity Building and Awareness	25
3.2.5 Social Norms and Behaviours	27
3.2.6 Gender, Youth, and Other Vulnerable Groups	28
3.2.7 Barriers to a CRA Transition Related to Technology Adoption	28
4. Recommendations: Entry Points for CRA in CARICOM AgREADY Countries	29
5. References.....	39
Annex 1: Stakeholders Consulted.....	46
Annex 2: Stakeholder / Consultation Mapping	48

List of Tables

Table 1: Examples of policy, legislation and regulations that create the enabling environment for agricultural development	12
Table 2: CRA in AgREADY countries NDCs.....	14
Table 3: Examples of support from financial and marketing institutions in AgREADY countries.....	16
Table 4: Examples of CRA training delivered to extension officers and producers in AgREADY countries. .	17
Table 5: Summary of CRA Applications or Facilitatory Strategies Across AgREADY Countries.....	19
Table 6: Priority CR Technologies identified through AgREADY countries' Technology Needs Assessment.	20
Table 7: Types of CRA technical assistance support provided to AgREADY countries	20
Table 8: Identified CRA training needs for value chain stakeholders	27

List of Figures

Figure 1: GCF CARICOM sub-regional AgREADY Project countries.....	5
Figure 2: Analytical framework for the AgREADY BANA.....	6
Figure 3: Primary (generalised) value chain actors for the AgREADY Project policy-based BANA.....	7
Figure 4: Dominica's Climate Resilience Targets (CRRP, 2020).	10
Figure 5: CRA focus of AgREADY country policy, strategies and plans.	11
Figure 6: Types of CRA financing in AgREADY countries.	14
Figure 7: Policy map of the entry points to strengthening the enabling environment for CRA.	29
Figure 8: Examples of types of financial sources for CRA.	30

Acronyms and Abbreviations

AAC	Agricultural Advisory Committee
ADB	Agriculture Development Bank
ADRM	Agriculture Disaster Risk Management
AE	Accredited Entity
AF	Adaptation Fund
ATGS	Agriculture Transformation and Growth Strategy
BAEF	Barrier Analysis Enabling Framework
BANA	Barrier Analysis and Needs Assessment
BDB	Bahamas Development Bank
CARDI	Caribbean Agriculture Research and Development Institute
CATIE	Tropical Agricultural Research and Higher Education Center
CAYF	Caribbean Agriculture Forum for Youth
CC	Climate Change
CCCCC	Caribbean Community Climate Change Center
CCORAL	Caribbean Climate Online Risk and Adaptation Tool
CDB	Caribbean Development Bank
CDSS	Climate Decision Support System
CIMH	Caribbean Institute for Meteorology and Hydrology
CR	Climate Resilient
CRA	Climate Resilient Agriculture
CRRP	Climate Resilience and Recovery Plan
CSA	Climate Smart Agriculture
CSGM	Climate Studies Group Mona
CVQ	Occupational Standards of Competence for Caribbean Vocational Qualifications
DEXIA	Dominica Export-Import Agency
DRR	Disaster Risk Reduction
DVRP	Disaster Vulnerability Reduction Project
EbA	Ecosystems-based Adaptation
ECLAC	Economic Commission for Latin America and the Caribbean
EU	European Union
EX-ACT	Ex-Ante Carbon-balance Tool (EX-ACT)
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FFS	Farmer Field School
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas

GSDS	Growth and Sustainable Development Strategy
ICT	Information and Communication Technology
IFI	International Financial Institutions
IICA	Inter-American Institute for Cooperation on Agriculture
MOA	Ministry of Agriculture
MSME	Micro, Small and Medium Enterprises
NAMDEVCO	National Agricultural Marketing and Development Corporation
NaGRiP	National Agricultural Policy
NAP	National Adaptation Plan
NASAP	National Adaptation Strategy and Action Plan
NCCSC	National Climate Change Sector Committee
NC	National Communications
NCCU	Nevis Cooperative Credit Union
NDA	Nationally Designated Authority
NDC	Nationally Determined Contribution
NDFD	National Development Foundation of Dominica
NFAP	National Food and Agricultural Policy
NFPAP	National Food Production Action Plan
NLC	National Liaison Consultant
PICSA	Participatory Integrated Climate Services for Agriculture
PPP	Public-Private Partnership
PwD	Persons with Disabilities
R&D	Research and Development
SASAP	Sectoral Adaptation Strategy and Action Plan
SBU	Small Business Unit
TNA	Technology Needs Assessment
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
UWI	University of the West Indies
VA	Vulnerability Assessment
YAP	Youth Action Plan

Executive Summary

The vulnerability of Caribbean countries to climate change is experienced across all sectors, and the agriculture sector has been identified as one of the most vulnerable sectors to climate change owing to the high dependency on natural resources and multifunctional role in socioeconomic development. The sector remains of vital socioeconomic importance in the Caribbean region despite being affected by a multiplicity of challenges, which have contributed to a steady decline in national and regional throughput over the past few decades. In fact, in the last 2 years, food insecurity in the region has increased dramatically. In light of projections of more frequent extreme climatic events and pandemic threats such as COVID-19, opportunities for climate-resilient agriculture to enhance food security and rural livelihoods while reducing Greenhouse Gas (GHG) emissions are increasing in importance.

The AgREADY Project Barrier Analysis and Needs Assessment of the Enabling Environment takes an in-depth look at the agriculture sector in the countries within the CARICOM AgREADY sub-region with an aim to contribute to a better understanding of the critical bottlenecks, barriers, and constraints to achieving climate resilience in the agro-food sector, while providing pathways and entry points to overcome these, ultimately to develop evidence-based climate-resilient, responsive agriculture that is more attractive for private sector investments. The assessment utilised an exploratory mixed methods approach inclusive of (i) document review and (ii) value chain stakeholder consultations to gather data relevant to the assessment framework. Constraints to the assessment included stakeholder and document availability, and time for the assessment that all impacted the extent of data and information available for analysis.

Key Findings

The enabling environment for CRA is the foundation for the presentation of key findings in the policy-based barrier analysis and needs assessment.

The agriculture and climate change policies of AgREADY countries have lagged behind the international agreements, and although some countries included climate change in their policy dialogue around 2015, the majority of countries responded in 2020 and beyond. Despite successive efforts at the regional level, the development and implementation of national policy, legal and regulatory frameworks, and plans associated with the CRA transition for enhanced food and nutrition security in CARICOM AgREADY countries remains challenging and incomplete, with inadequate capacities and coordination. Common challenges include a lack of coherence between sectors due to a siloed approach to the CRA transition, poor coordination in policy implementation, and a lack of political will, driven by five-year political cycles.

Agriculture sector policy and planning documents that are aligned with CRA principles almost always outline the governance arrangements for policy or plan implementation. The inherent interconnectedness and relevance of these arrangements for the vulnerability of the farmer/producer and agro-processor communities assumes a level of coordination that has not materialised and is considered weak. The impacts from future climate projections are also likely to put added stress on institutions in the future in different ways, according to their respective roles and responsibilities. The insufficiency of expertise for CRA suggests that there is a barrier occurring that constrains the development of human resources for advancing the development and implementation of associated policies. The *ad hoc* nature of public-private dialogue and partnerships is not in keeping with good governance and effective value chain development strategies.

Despite the diversity of financing mechanisms identified for CRA in AgREADY countries, the current levels of financing for climate change adaptation and mitigation in the agricultural sector are woefully inadequate. Existing financing mechanisms are often not wide-scale nor tailored to the specific circumstances of many small holder farmers, who make up the majority of producers. For example, the criteria and pre-requisites for various types of financing products are sometimes restrictive and discourage many smallholder farmers from seeking additional financing. There is also a general absence of risk-reducing financing mechanisms to address production losses, as a result of climate change, or otherwise.

Although the importance of knowledge management and communication along the agri-food value chain and its potential to effect sector improvements has been recognised, these tend to be lacking or not functioning effectively where they exist within the AgREADY countries. While capacity limitations and low levels of awareness of smallholder farmers also impede wider CRA adoption in the AgREADY countries, resolution of these issues does not immediately translate to CRA advancement, where there is a general absence of policy, financing, social inclusion mechanisms, and other key enabling factors.

Understanding traditional ecological knowledge and agricultural practices is important and has been recognised as crucial for the CRA transition in AgREADY countries. However, smallholder farmers, especially aged farmers, tend to adhere to traditional agricultural practices, which do not always align with the tenets of CRA. The low level of uptake of credit financing for farmers is often a result of farmer preference and perceptions. Adding to this, insecurity of tenure and availability of land for the youth present added challenges to smallholder farmers for access to credit financing. Although women account for 22-30% of the registered farmers in the Caribbean region, in AgREADY countries there is a wide variation in opportunities due to limited access to finance, land, networks, and information. AgREADY country-specific Technology Needs Assessments and Barrier Analysis Enabling Frameworks (BAEFs) that have been completed as part of the requirements of parties to the Paris Agreement identified key barriers to the adoption of CRA technologies that include high capital investment, limited technical capacity in the agriculture sector, especially among small farmers, limited localised information on available technology, affordable credit, financing not easily accessible to small producers, land insecurity, limited processing capacity, poorly developed markets, pricing of goods and limited processing and quality standards to support the CRA solutions.

Recommendations

The Barrier Analysis and Needs Assessment identified eight entry points to advancing the CRA transition, developed from the analysis of enabling factors across AgREADY countries. The entry points acknowledge the various inter-linkages among the enabling factors, with an aim to overcome the barriers identified to make the CRA transition. These are to:

A. Enhance financing for climate-resilient agriculture, through:

1. Identification of priority actions for CRA and assessment of the associated financial needs.
2. Integration of CRA into public financial management.
3. Selection and blending of financial instruments for CRA and managing climate risks in the food value chain.
4. Exploration and maximisation of the benefits of risk insurance solutions.
5. Enhancement of private sector engagement for CRA.
6. Facilitation of access to domestic and international climate finance.

B. Enhance the policy, legislative and regulatory environment to support CRA, through:

1. Engagement of public and private sector, civil society, and technical service providers in policy development and implementation activities.
2. Development and enhancement of agriculture and other policies relevant to the CRA transition.
3. Implementation of policy actions that drive CRA adoption.

C. Enhance capacity to facilitate farmer adoption of CRA technologies, through:

1. Establishment of partnerships with regional and international training institutions to build a cadre of persons to support the adoption of CRA technologies inclusive of youths.
2. Strengthening of extension services to support farmer adoption of CRA technologies.
3. Building flexible youth certification programmes to support the adoption and utilisation of CRA technologies.

D. Develop and expand on water-focused CRA technologies to address the impacts of drought on food production and productivity, through:

1. Prioritisation of key actors affected by or who impact water availability, distribution, and access for their incorporation into water investment and development plans.
2. Assessment of drought risks to the agriculture sector and reflect them in the development plans for the sector.
3. Integration of climate resilience considerations into sector investment plans.
4. Incorporation of grey infrastructure to manage excess flooding for future use.

E. Support access to land for wider CRA application, through:

1. Engagement of key government, private and civil society stakeholders, as well as customary landowners in land policy reform and implementation.
2. Development and implementation of integrated land reform policies, legislation, and institutional framework that supports the sustainable and equitable use of land for agriculture.
3. Building capacity and awareness of sustainable land management technologies and practices.

F. Market access to support trade in agri-food products, through:

1. Strengthening trade facilitation and food and nutrition security policies and enabling framework for key crops, livestock, and processed food simultaneously.
2. Increasing focus on food quality and safety requirements.

G. Build multi-level governance and enhance coordination across the food value chain, through:

1. Building inclusive governance arrangements for CRA.
2. Development of governance mechanisms for adaptive decision making.
3. Enhancement of governance for greater coherence across different development agendas.
4. Promoting PPPs for increased private sector investment in CRA.

H. Promote agriculture as a viable option for national economic development and livelihood enhancement, through:

1. Enhancement of productivity.
2. Strengthened entrepreneurial and business outlook for CRA.
3. Establishment of mechanisms to create equity in access to resources, goods and services, and decision making among women, youth and other vulnerable groups.

1. Introduction

The Caribbean region comprises small and low-lying developing states that are resource-rich, and highly diverse but which face significant socio-economic challenges. The economic development and way of life of Caribbean people have been premised on the use of abundant natural resources, rich biodiversity, and a warm, tropical climate. Over recent decades, socioeconomic development within Caribbean states has been hindered by challenges that include low and variable economic growth; unsustainable debt and weak fiscal management; high unemployment; high prevalence of non-communicable diseases; vulnerability to the effects of climate change and natural hazards; environmental degradation; crime and increasing threats to citizen security; as well as persistent and extreme poverty and food insecurity (FAO and CDB 2019).

Box 1: Factors Contributing to Low Productivity in the Agriculture Sector

“The productivity of agriculture is constrained by a broad set of factors, including inadequate access to improved varieties and other technologies, low access to credit, high labour costs, insufficient monitoring and response to pests and diseases, and inadequate skills and entrepreneurship among farmers.

The productivity of the livestock sector is constrained by several additional factors, including the low availability (and high prices) of quality feed – due to limitations in large-scale feed production and limited availability of grazing lands. Theft, low-quality feed concentrate, and low-quality breeding stock are other factors that specifically limit the productivity of the livestock sector.”
—FAO and CDB (2019)

Despite being affected by these challenges, the agriculture sector, which has contributed to a steady decline in national and regional throughput over the past few decades, remains of vital socioeconomic importance in the Caribbean region. The agriculture sector, which is highly dependent on natural resources, plays a multifunctional role in socioeconomic development as it remains a significant employer and contributor to the Gross Domestic Product (GDP) in several Caribbean states. For example, in Dominica, Haiti, Belize, Suriname, and St. Vincent and The Grenadines, GDP contributions averaged between 7% and 20% over the last five years, with employment ranging from 8% to 30% of total employment in 2019 (World Bank 2022). The sector, however, has been marked by several challenges, including low competitiveness, low productivity (box 1), slow growth, high trade costs, low capacity to comply with modern food safety and quality standards, as well as an inadequate response to the rapidly growing demands for high-standard, agri-food products from the tourism, processing, and retailing sectors, which has led to increased imports (FAO and CDB 2019). Across the region, there are significant interlinkages between these challenges and other national, regional and international issues that have contributed to the economic downturn within individual Caribbean states.

Threats such as climate change and the COVID-19 pandemic have exacerbated existing issues and resulted in reduced agricultural production and productivity, which have contributed to food insecurity within the region. Owing to its high dependency on natural resources and its multifunctional role in socioeconomic development, the agriculture sector has been identified as one of the most at-risk sectors for climate change in Caribbean countries. Across the region, changes in climate such as increasing temperatures, droughts, flooding, storms and rising sea levels, have resulted in significant losses in the sector (CSGM 2020). Temperature increases have contributed to water loss, and more favourable conditions for certain pests and diseases, ultimately affecting crop production and yields. Droughts have also resulted in reduced crop yields, and extreme events such as flooding and hurricanes have caused significant crop losses. Sea level rise affects crop production and the availability of arable lands. Within the livestock subsector, higher temperatures result in heat stress, which can lead to death in extreme cases, and negatively impact livestock and animal protein production (CSGM 2020). These conditions are generally expected to worsen given the projections for increasing temperatures, more variable rainfall, rising sea levels, and more intense extreme

events. In addition to climate change, the sector has also demonstrated vulnerability to the COVID-19 pandemic and externalities such as the Russia-Ukraine war, which have resulted in reduced availability and elevated prices of inputs and imported foods. These factors have contributed to the regional food and nutrition security situation being unstable and unpredictable, with elevated food prices and many persons in the region being severely food insecure.

The complexity of the challenges facing the agriculture sector makes a strong and urgent case for a cohesive and collaborative transition to climate-resilient agriculture within the region. Climate-resilient agriculture is an approach that involves sustainably using existing natural resources through crop and livestock production systems to achieve long-term higher productivity and farm incomes under climate variabilities (Srinivasarao 2021)¹. While there have been several efforts geared towards implementing CRA technologies and practices, the region requires significant cohesiveness of policy, governance, and operational elements as well as adequate human and financial resources to facilitate the transition of the sector to one that is climate-resilient.

1.1 About This Study

This study summarises the key findings of a Barrier Analysis and Needs Assessment (BANA) of the policy environment for developing evidence-based climate-resilient responsive agriculture that is more attractive for private sector investments. The remaining sections of this chapter are organised as follows:

- *Section 2 (Approach and Methodology)*: Overview of the approach and methods used for the BANA, including record of key constraints and limitations.
- *Section 3 (Findings)*: Summary of the main BANA findings, including providing an overview of efforts towards CRA as well as critical barriers associated with the enabling environment, including the policy, legislative and regulatory framework, institutional arrangements/governance, financing, capacity building, and knowledge management, social norms and behaviours, gender, youth and other vulnerable groups and adoption of technology.
- *Section 4 (Recommendations)*: Entry points for CRA in CARICOM AgREADY countries) Recommendations for strengthening the enabling environment for CRA in the Caribbean.

¹ [https://www.downtoearth.org.in/blog/agriculture/climate-resilient-agriculture-systems-the-way-ahead-75385#:~:text=Climate%2Dresilient%20agriculture%20\(CRA\)%20is%20an%20approach%20that%20includes,farm%20incomes%20under%20climate%20variabilities](https://www.downtoearth.org.in/blog/agriculture/climate-resilient-agriculture-systems-the-way-ahead-75385#:~:text=Climate%2Dresilient%20agriculture%20(CRA)%20is%20an%20approach%20that%20includes,farm%20incomes%20under%20climate%20variabilities).

2. Approach and Methodology

2.1 Approach

Agriculture's high level of sensitivity to climate change, its characteristic as a significant global emitter of greenhouse gases (GHGs) as well as the mounting climate change-related production and productivity decline in the sector emphasise the need for an increasingly robust and climate-resilient agriculture policy framework. The AgREADY Project BANA of the enabling environment takes an in-depth look at the agriculture sector in the countries within the CARICOM sub-region (**figure 1**), with an aim to contribute to a better understanding of the critical bottlenecks, barriers and constraints to achieving climate resilience in the sector, while providing pathways and entry points to overcome these, ultimately to develop evidence-based climate-resilient, responsive agriculture that is more attractive for private sector investments.

Figure 1: GCF CARICOM sub-regional AgREADY Project countries²



The assessment was conducted using a value chain approach, which focused on the analysis of the enabling environment within the phases of the value chain (**figure 2**). The literature posits that CRA requires coordinated actions among the range of stakeholders along the value chain, in so doing creating climate-resilient pathways by sustainably using existing natural resources through crop and livestock production systems to achieve long-term higher productivity and farm incomes under climate variabilities (Tankha *et al.*, 2019; Alvar-Beltrán *et al.* 2021,). Improved access and utilisation of technology, transparent trade regimes, increased use of resources and conservation technologies, and increased adaptation of crops and livestock to climatic stress are the desired outcomes of implementing climate-resilient practices. The enabling environment for CRA encompasses factors that include: (1) innovation and transformational policies and corresponding governance structures to promote climate-resilient systems, (2)

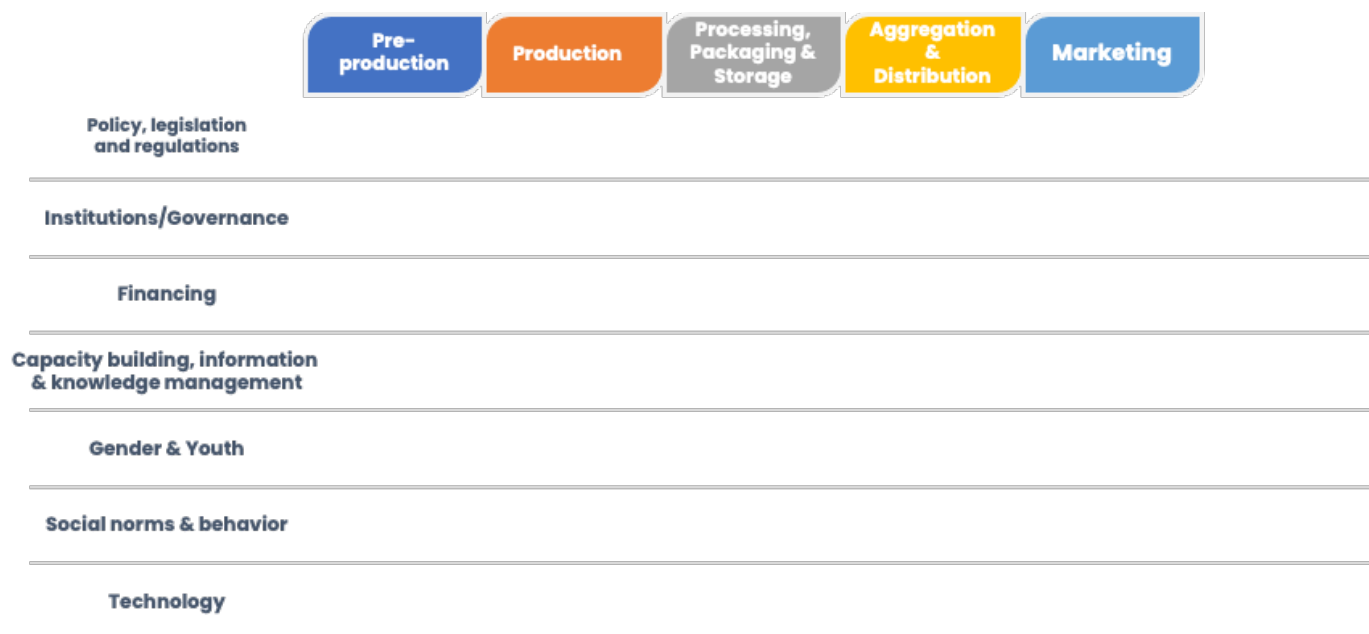
² AgREADY countries are represented with a black dot.

regulatory frameworks that stimulate innovation directly and indirectly, and (3) accompanying agricultural investments in rural credit, infrastructure, and markets. These policies, investments, and regulatory reforms will trigger significant changes, such as improving the access of agricultural products to foreign markets, increasing private investment in agricultural R&D, and fostering the use of more sustainable agricultural practices; with the proper policy measures, people will make the transition to more promising economic activities.

Box 2: Agri-food value chain

Agri-food value chains are designed to increase competitive advantage through collaboration in a venture that links primary producers, processors, marketers, food service companies, retailers and supporting groups such as shippers, research groups and suppliers. (www.omafra.gov.ca)

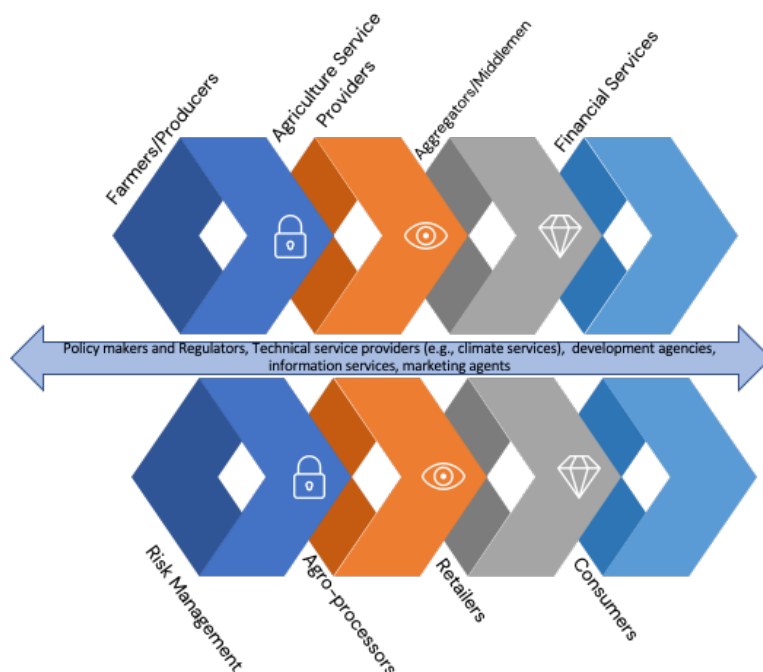
Figure 2: Analytical framework for the AgREADY BANA



2.2 Methodology

To meet the requirements of the CARICOM AgREADY Project, an exploratory mixed-methods approach was utilised for the effective delivery of the policy-based BANA in a process of triangulation for verification and validation. This involved (i) a comprehensive review of pertinent documents, including those relating to the AgREADY project, regional and national agriculture sector policies, plans and projects, national development and sectoral plans, climate change policies, plans and programmes, and (ii) in-depth individual and group consultations with 101 value chain actors including online/remote focus group discussions with producers and producer groups and networks, GCF NDAs, and other stakeholders over a two-month duration (figure 3 and annex 1).

Figure 3: Primary (generalised) value chain actors for the AgREADY Project policy-based BANA



The BANA followed four key steps:

1. **Document review.** A preliminary review of documents sought to establish the contributory factors within the enabling environment that were responsible for, or linked to, the adoption of CRA. These were used to develop the consultation instrument for the range of value chain actors. [Annex 2](#) provides mapping of the key stakeholders and the focus areas for the consultations. Further document review sought to establish country and regional context for the BANA (including COVID-19 recovery plans) and was also used to refine the consultation instrument, contextualised to each country.
2. **Administer BANA data collection instrument.** The AgREADY Project NLCs supported this phase of data collection by carrying out logistics and facilitating the remote consultation meetings. The NLCs were also responsible for follow-up with the key actors consulted for additional documents. Stakeholders (both public and private) within the agri-food value chain, identified in a stakeholder mapping process for each country, were consulted, with a snowball sampling method employed, allowing for the inclusion of others outside the initial sample. On average, consultations lasted 1 to 1.5 hours and included a set of open-ended questions, which offered flexibility and allowed for detailed discussion. The contents of the discussions were recorded in note form and digitally. These were finalised and key points matched with the different enabling factors.
3. **Collate and analyse the collected data and information.** All data and information collected, both via document review and direct stakeholder input, were collated and analysed. Gap-filling exercises continued for a short time due to project time constraints.
4. **Conduct final analyses and develop BANA report.** Analyses of the data and information led to the development of (i) key findings of progress, (ii) barriers to the enabling environment, and (iii) identification of entry points within the enabling environment for enhancing CRA ultimately to develop evidence-based climate-resilient, responsive agriculture that is more attractive for private sector investments.

The *Findings and Recommendations* sections of the report are built on the outputs of the above steps, supporting quantitative findings with qualitative narrative from the key informant interviews and documents reviewed. The report does not identify respondents in order to protect their anonymity but rather builds conclusions around the convergence of their opinions, triangulated with document review.

2.3 Methodological Constraints

The BANA primary data collection phase was conducted between May and June 30, 2022, but encountered country-level limitations and constraints that must be acknowledged. These included:

1. Unavailability of stakeholders and unresponsiveness to the invitation to the discussions.
2. Unavailability of key stakeholders at the time of consultation meetings.
3. Stakeholder fatigue, due, in large part, to multiple and similar activities ongoing simultaneously.
4. Slow pace with follow-up to collect and collate documents, especially those noted during meetings.
5. Difficulty in locating pertinent documents.
6. Inability to access documents, including those in draft form but discussed in consultation meetings.
7. Incomplete data and information.
8. National Liaison Consultants' (NLCs) fatigue due to multiple activities being implemented within a short timeframe, including administering multiple data collection instruments that proved to be time-consuming. This resulted in few consultations for some countries and little support for the PA-designed farmer focus groups.
9. Challenges relating to the completion of the planned consultations, with inadequate data at the local level.

Documents presented in French, and with few available for review made it difficult to grasp the situation in Haiti. Further to this, there was only one consultation for the country, and this did not adequately supplement the other sources. In other countries, changes in government made it difficult to conduct the assessment, especially where there was little to no buy-in for documents produced over five years ago. In some instances, relevant stakeholders were either absent from work or had recently resigned from their posts. The assessment was however supplemented by regional studies completed in recent years that provided additional information, where appropriate. Similar to the challenges with data collection for Haiti, for Suriname, documents were sometimes provided in Dutch, which was a constraint to efficient review and analysis. However, the AgREADY Project made efforts to translate these documents whenever possible.

3. Findings

3.1 Efforts Toward CRA

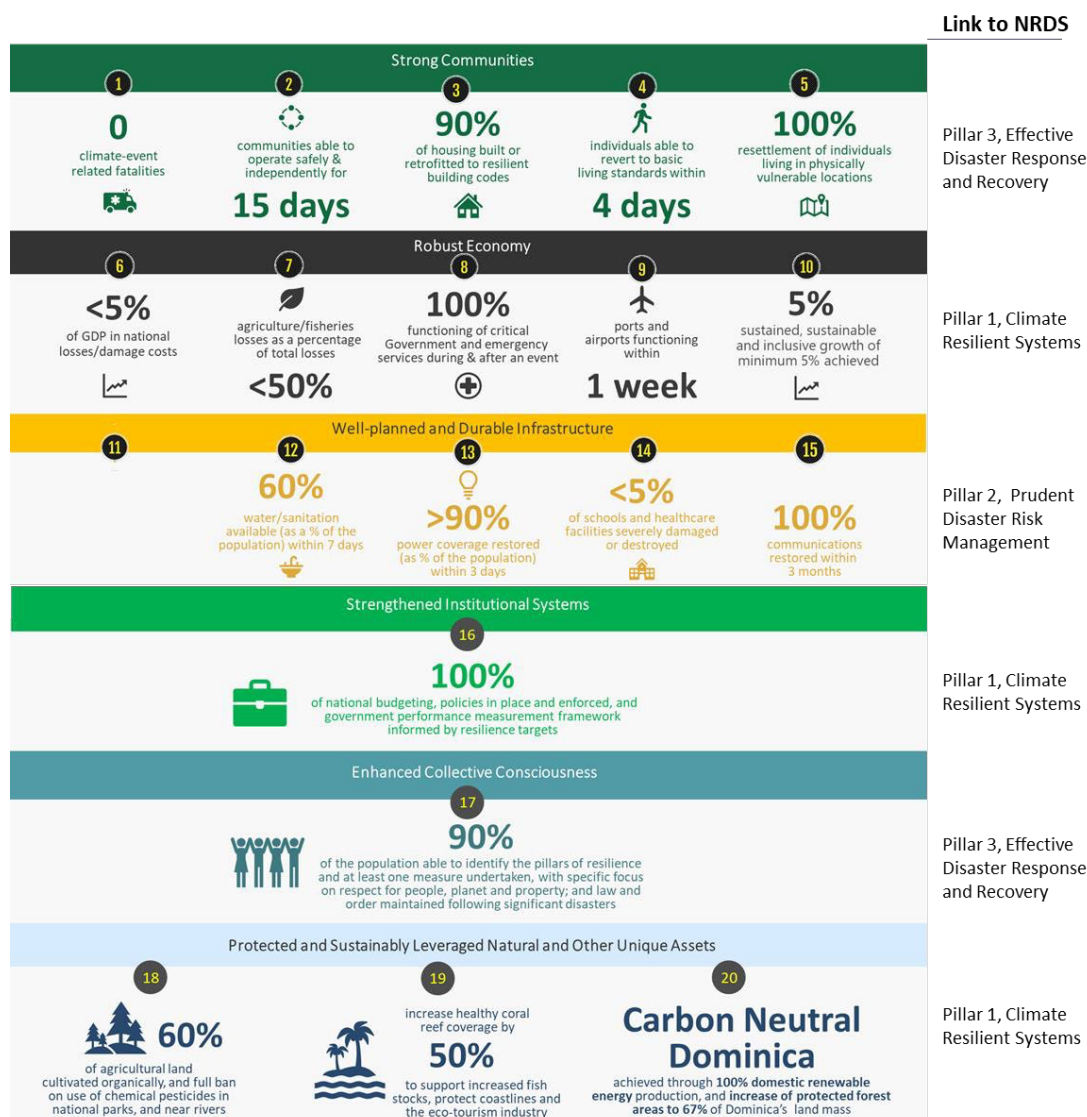
3.1.1 Policy, Legislative and Regulatory Framework

The climate change policies of AgREADY countries have lagged behind the international agreements and although some countries included climate change in their policy dialogue around 2015, the majority of countries responded in 2020 and beyond. Belize (2015), Saint Lucia (2016), and The Bahamas (2019) had early responses in their agriculture policies with disaster risk reduction (DRR) and climate change (CC) being priority areas. Broadly, the domestic CC agenda for the AgREADY countries is generally aligned with, and respond to, the requirements of international climate change agreements. This includes strategy documents and plans, even where an updated overarching agriculture policy does not exist. Analysis of country NDCs revealed that the agriculture sector featured largely under adaptation, but since 2020 updated NDCs had increased agriculture contribution to mitigation targets. National Communications (NCs) and National Adaptation Plans (NAPs) largely included agriculture as a key sector for building resilience.

AgREADY countries whose agriculture policy and sub-policy documents are outdated, and where the policy documents make mention of climate change and building climate-resilience, often do not have defined follow-up strategies and actions for implementation. Dominica's Climate Resilient Act (2018) focused on building wider climate resilience, including its governance arrangements, while the country's Climate Resilience and Recovery Plan (CRRP) (2020) established a set of twenty national resilience targets, including Targets #7 and #18 related to the reduction of agriculture waste and promotion of organic agriculture (**figure 4**). The CRRP (2020) includes visions to transform Dominica into a 'Global Centre for Agriculture Resilience', through the implementation of an appropriate policy and legislative framework that reconfigures the production chain from farmers to end-users; this is meant to become a model for best practice regionally and internationally. More specifically, this action is centred on the development of a scientific and practical approach to reducing the vulnerability of farmers [and fisherfolks] through the adoption of climate-resilient practices, as well as the introduction of climate-resilient crops and infrastructure (CRRP 2020).

The recently completed Dominica Medium Term National Agriculture Policy (NAgriP) 2021–2030 was developed with a set of goals and objectives, specific pre-requisites and a defined institutional framework for implementation. Absent, however, is a clearly defined action plan to drive implementation and inter-sectoral coordination. The St. Kitts and Nevis' Agriculture Transformation and Growth Strategy (ATGS) (2022–2031) is also presented with a strategic framework, including institutional arrangements and a budget, but although there is an Action Plan appended to the document, it does not identify the key implementers for achieving outputs and outcomes. Saint Vincent and the Grenadine's Policy Framework & Strategic Plan for Agricultural Development (2010–2020) recognises the issue of CC but does not emphasise the adaptation measures required to address the impacts in the agricultural sector. For Trinidad and Tobago, the National Food Production Action Plan (NFPAP's) 2012–15 sought to boost domestic food production for food security and import substitution, but this plan is currently outdated and does not make provisions for addressing climate change.

Figure 4: Dominica's Climate Resilience Targets (CRRP, 2020).



CRA policy directives were often found in National Adaptation Strategies and Plans, whether in an agriculture sector plan or more broadly in the NAP or other national documents with a focus on adaptation and mitigation. Examples include St. Vincent and the Grenadines NAP (2018), St. Kitts and Nevis' Second National Communications to the UNFCCC (2015); Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Agriculture Sector (Agriculture SASAP) 2018–2028 under the national adaptation planning process, and Suriname's National Adaptation Plan (NAP) 2019–2029. Further to this, policy directives were also given in ministerial budget presentations, an example of which is provided in box 3.

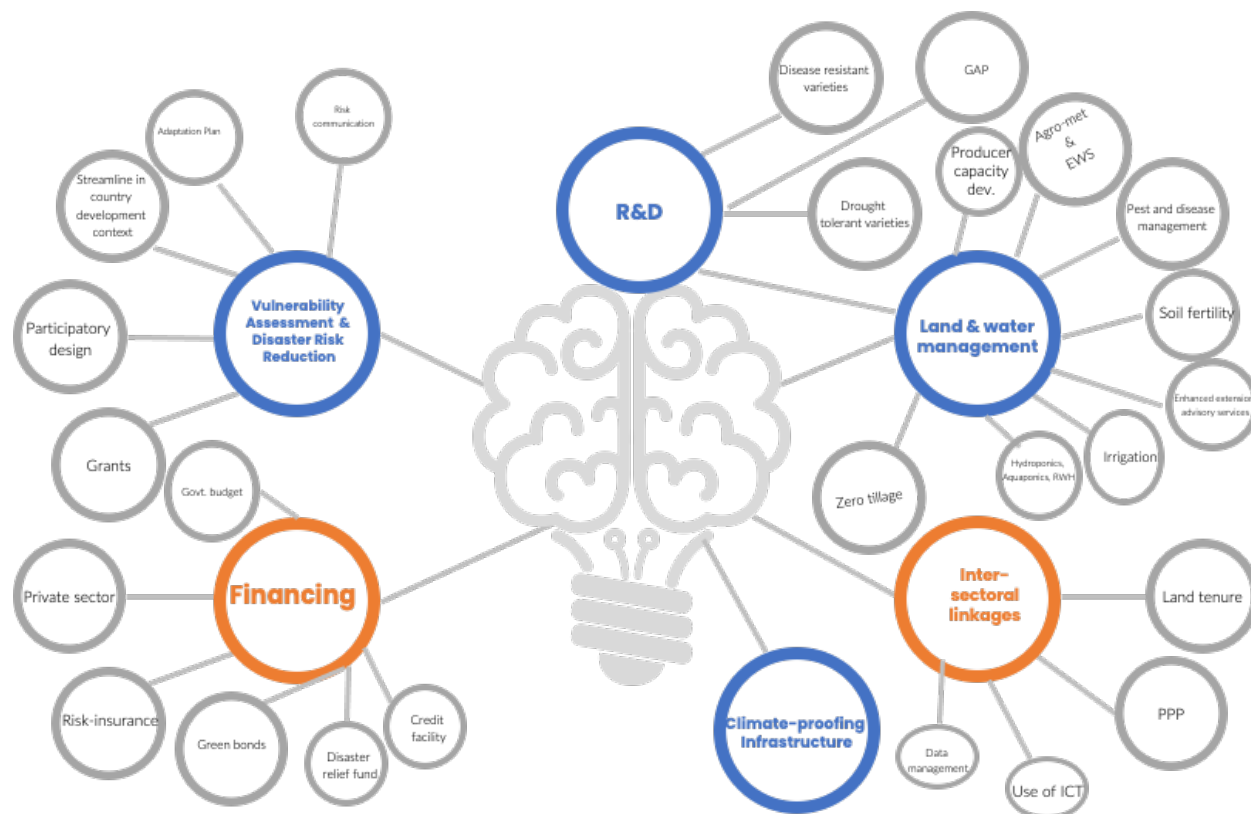
Box 3: Excerpts from Dominica's Prime Minister R. Skerrit's 2021-2022 Budget presentation

- USD 31.9 million were allocated to the Ministry of Blue and Green Economy, Agriculture and National Food Security in the 2021–2022 National Budget.
- Agriculture Resilience Programme will also continue with the distribution of seedlings, fertilizers and inputs to farmers.
- 250 livestock farmers will receive assistance in the form of materials valued at USD 3.1 million, to facilitate construction of climate-resilient animal housing.
- Renovation of regional offices to enhance service delivery and rehabilitation of 3 propagation centres.
- Construction of a tissue culture facility and training centre.
- Establishment of the Agricultural Development Authority, to include Marketing and Market Access for specified crops, Production, Technology introduction and adaptation, and Financing to support the commercialization of agricultural production and agribusiness; Plant propagation and Research and development.

<https://news.gov.dm/news/5315-31-9-million-for-agriculture> (undated, accessed July 17, 2022)

Where agriculture policies have been updated and plans developed, largely post-2015, their goals and objectives are often in keeping with the main elements of CRA. This mainstreaming of climate change into policy may have, however, outpaced the advances in climate change capacities, with implications for implementation. The emergence of new climate-resilient agriculture policies from resolutions to pillars and strategies and specific action plans is evident and often include a proposed budget. **Figure 5** highlights the CRA actions found in the range of country documents reviewed.

Figure 5: CRA focus of AgREADY country policy, strategies and plans.



A PLR framework for agri-food systems development exists and across the nine AgREADY countries, make provisions through a range of enabling factors associated with broader agricultural development. However, the specificity of the CRA and the CRA transition has largely not been accounted for in legislative and regulatory frameworks. Enabling factors covered by country-specific legislation and regulations as presented in table 1 include: governance and institutional arrangements, plant protection (against pests and diseases and phytosanitary measures), food safety and quality, animal health and disease prevention, marketing, packaging and storage, protection of agricultural land, soil conservation, use of quality seeds, among others.

Table 1: Examples of policy, legislation and regulations that create the enabling environment for agricultural development

Enabling factor for Agri-Food Systems	Examples of PLRs
Governance and institutional arrangements	The Bahamas Food and Nutrition Security Policy and Action Plan 2017–2022
Plant protection (against pests and diseases and phytosanitary measures against pests and diseases and phytosanitary measures)	The Bahamas Plant Protection Act, 2016 Saint Lucia Plant Protection Act, 1998 St. Vincent and the Grenadines Plant Protection Act, 2005 Suriname Plant Protection Act, 1965, 2020 Suriname Act on the Import and Export of Goods, 2003 Haiti Law on Plant Protection, 1936
Food safety and quality	The Bahamas Food Safety and Quality Act, 2016 St. Kitts and Nevis Agriculture Produce and Livestock Act, 2012
Animal health and disease prevention	The Bahamas Animal Health and Production Act, 2016 Belize Agriculture Health Authority Act 1999 (Poultry Health) Regulations 2022
Marketing	Belize Marketing and Development Corporation Act, 2003 Trinidad and Tobago NAMDEVCO Act, 2011
Packaging and storage	Belize Marketing and Development Corporation Act, 2003
Protection of agricultural land	Dominica National Land Use Policy, 2014 St. Vincent and the Grenadines Agriculture Amendment Ordinance, 1954
Soil conservation and erosion control	St. Vincent and the Grenadines Agricultural Act, 1954
Use of quality seeds	Suriname Seed Act, 2005
Research and development	Belize Institute of Agricultural Research and Development Act, 2003
Financing	Belize Marketing and Development Corporation Act, 2003 Trinidad and Tobago Agriculture Development Bank Act
Irrigation	Haiti Law on the creation of a special irrigation fund (1959) Haiti Law establishing the status of users of irrigation and drainage systems established or controlled by the State, 1952

3.1.2 Institutional Arrangements/Governance for CRA in AgREADY Countries

Agriculture sector policy and planning documents that are aligned with CRA principles almost always outline the governance arrangements for policy or plan implementation. The governance architecture for climate resilience in agriculture policy and planning implementation is generally led by ministries with responsibility for agriculture. In The Bahamas, the oversight committee for the Climate Change Policy for Agriculture and Marine Resources is a National Climate Change Sector Committee that comprises multiple government and non-government entities. A Steering Committee is expected to provide oversight for the implementation of St. Kitts and Nevis' ATGS (2022) and an Agricultural Advisory Committee will provide advice on the execution and implementation of recommended

activities and oversee the monitoring, evaluation and learning functions. The arrangements as outlined in policy documents assume significant inter-agency coordination and collaboration, but weak coordination was identified as a critical barrier during the stakeholder consultations. While these governance arrangements are outlined in the documents, it was difficult to determine the effectiveness of these structures given the limitations of this BANA. Notwithstanding, the BANA was able to identify specific initiatives and programmes being implemented by partner entities. For example, in Dominica, the Meteorological Office has been actively involved in the Disaster Vulnerability Reduction Project (DVRP) whereby a new Meteorological Office building is being constructed and a geospatial information system (DOMI NODE) will be used to store and share data.

The Dominica Meteorological Office is also collaborating with the Ministry of Agriculture and other external partners in the UNDP PICSA Project with new weather stations being installed in important agricultural areas and water level stations also being installed to provide alerts on water levels to farmers, especially in the event of flooding.

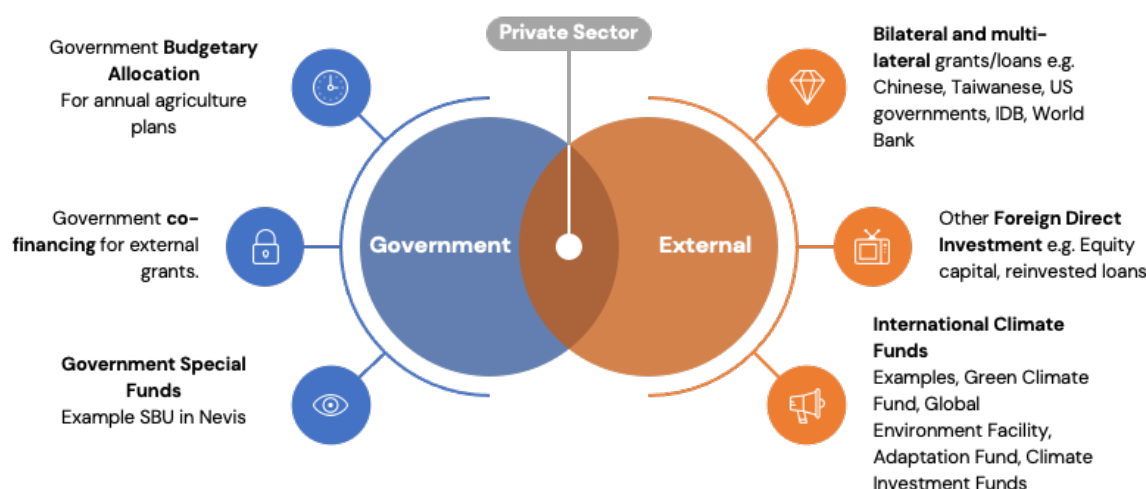
Similarly, in Trinidad and Tobago the Meteorological Office provides agriculture forecasts for 10 to 15 days and conducts drought monitoring and communicates these data and information to farmers and farming communities. These examples are indicative of ownership of these activities by CRA collaborators, having included them in their respective plans. Efforts to engage and involve Ministry of Agriculture stakeholders, including extension officers and working at the farm and farmer levels are also strengths of the arrangements. Initiatives were identified by other value chain actors, including marketing agencies (DEXIA in Dominica, NAMDEVCO in Trinidad, Small Business Unit in the Ministry of Finance in St. Kitts and Nevis), research and development organisations within and external to the countries (e.g., UWI, CIMH, CCCCC), and bilateral agencies providing financing and technical assistance support (e.g., the Taiwanese, Chinese governments, USAID, UKAID).

Regional technical support organizations play important roles in policy development in the countries. IICA supported the development of the NaGRiP in Dominica and CARDI generally does work in validating applicable techniques and technologies and the potential for adoption in countries. Similarly, the FAO, working in Trinidad and Tobago for example, is helping with strengthening data and data management for decision-making.

3.1.3 Financing for Climate-Resilient Agriculture in AgREADY Countries

There is a mix of financing mechanisms already being utilised for CRA practices in AgREADY countries. Data analysis identified that financing for CRA included a mix of government budgetary allocation, bilateral and multilateral grant and loan financing, and other Foreign Direct Investment (**figure 6**). Although only a small percentage of national budgets are for agriculture (for example Haiti—5%, Dominica—3.2%, and Trinidad and Tobago—2%), key objectives for applying financing for CRA in the countries have been to reduce the high food import bill and for food and nutrition security.

Figure 6: Types of CRA financing in AgREADY countries.



Government financing support for CRA is evident in the inclusion of climate-smart agriculture (CSA) and ecosystems-based adaptation (EbA) in its reporting under the Paris Agreement and collaborations with external financing entities. AgREADY countries' NDCs have increasingly included CSA and other resilience-building approaches (table 2) along with NCs and NAPs, with a mix of both unconditional³ and conditional⁴ financing.

Table 2: CRA in AgREADY countries NDCs.

CARICOM AgREADY Country	NDC	Agriculture-related adaptation goals
The Bahamas	Initial NDC (2015)	<ul style="list-style-type: none"> Formulate and implement strategies and measures that will help to enhance food security and sustainable food production.
Belize	Updated NDC (2021)	<ul style="list-style-type: none"> Reduce post-harvest losses. Develop and implement an enhanced early warning system for drought and extreme weather events.
Dominica	Initial NDC (2015)	<ul style="list-style-type: none"> Promote food security through climate-resilient agricultural/fisheries development to build climate-resilient communities by strengthening capacity to address climate change risks to food security associated with changing precipitation patterns. Establish early warning systems, multi-use disaster shelters (powered by renewable energy and back up bio-diesel generators), and emergency preparedness training programmes in vulnerable communities. Design and implement climate change adaptation and disaster risk management education and awareness programme at all levels to be coordinated by the Department of Climate Change, Environment, and Development.
Haiti	Updated NDC (2021)	<ul style="list-style-type: none"> Strengthen the population's adaptive capacities and resilience by developing watersheds and soil conservation; enhancing and conserving natural resources; preserving and strengthening food security; and establishing an information, education and awareness programme.
St. Kitts and Nevis	Updated NDC (2021)	<ul style="list-style-type: none"> Expand SMART aquaponics and aquaculture systems. Develop alternative livelihoods and training and diversify away from at-risk crops. Introduce drought resistance technologies and species in animal husbandry.

³ From government budgetary allocation.

⁴ Hinged on external sources of funding.

CARICOM AgREADY Country	NDC	Agriculture-related adaptation goals
St. Lucia	Updated NDC (2021)	<ul style="list-style-type: none"> Developing and implementing better practices in agricultural production.
St. Vincent and the Grenadines	Initial NDC (2015)	<ul style="list-style-type: none"> Improve agricultural practices and pest and disease management. Improve agriculture policies/strategies.
Suriname	New / Updated NDC (2020)	<ul style="list-style-type: none"> Rehabilitation and enhancement of infrastructure such as dykes and river defences (precondition). Improvements in water resources management. Promotion of sustainable land management. Applying innovative technologies in the use of land. Introduction of a national land use planning system, to make the embedding of climate change in (agricultural) development plans possible. Strengthen capacity to implement a national research, development and innovation programme, and strengthen agricultural research.
Trinidad and Tobago	Initial NDC (2015)	Third National Communication includes CSA as an adaptation goal.

Source: Country NDCs; GHGMI (2022)

Although CRA is not always the primary objective of government support for financing in AgREADY countries, there is evidence of a range of products and initiatives being utilised. In St. Vincent and the Grenadines, duty concessions are provided for CSA inputs, while in Trinidad and Tobago, the removal of taxes and duties on all inputs and resources registered for agricultural purposes described during the 2021–2022 budget presentations would make agriculture an entirely tax-free industry. In St. Kitts and Nevis, there continue to be government subsidies on water although irrigation is not well developed, and the agriculture sector continues to utilise potable sources of water to supplement rainfed agriculture. In Nevis, once a farmer passes a product through the Department of Agriculture, 3% to 10% of proceeds are deducted for an insurance/savings scheme at the Marketing Division. In addition, the Department of Agriculture also provides seedlings to farmers. Development Banks in AgREADY countries have also been supporting climate-resilience building in agriculture (**table 3**).

Table 3: Examples of support from financial and marketing institutions in AgREADY countries.

AgREADY Country	Organisation	Support
The Bahamas	The Bahamas Development Bank	Provides access to financing for agricultural development in crop production and animal husbandry as well as value-added processing. The bank is willing to work with farmers to tailor loans payments to harvest cycles and offer grace periods.
Belize	Development Finance Corporation	Provides agriculture loans for purposes such as land clearance and field preparation; seeds/plants; machinery, equipment, and vehicles; operational expenses; non-traditional crops; livestock; water harvesting and renewable fuel production.
Dominica	National Development Foundation of Dominica	Provides micro-financing for hydroponics, waste reduction, renewable energy (use on poultry farms for example), and agro-processing. The NDFD intends to launch a pilot for fertigation, hydroponics, and aquaponics. Also provides business training and support the clients with simple record-keeping books to allow for the development of manufacturing statement to determine the cost of production and pricing of their product.
Haiti		The agriculture sector has access to 2–3% of the bank's credit.
St. Kitts and Nevis	Nevis Small Business Unit/ Taiwanese Government	Supports women in agriculture (currently 5 women in agriculture have applied and received the loan assistance with fencing and irrigation. Prerequisites for the loan are a business plan, licence, invoices, proof of address, IDs, completed application form. Following in-house analysis, and board review, the Nevis Cooperative Credit Union facilitates the banking element. Funding is dispersed in stages and monitoring is done.
Saint Lucia	St. Lucia Development Bank (SLDB)	Business Recovery Programme (BRP) is a facility under the SLDB's Climate Adaptation Financing Facility (CAFF) that will support Saint Lucia's COVID-19 Economic Recovery and Resilience Plan (ERRP) by providing financing and technical support to Micro, Small, and Medium Enterprises (MSMEs) affected by the COVID-19 pandemic. It provides a mixed loan/grant facility to potential borrowers with the grant being used to incentivise the adoption of climate smart technology and provide liquidity support to assist them to recover and become more resilient. The BRP is one of the policy interventions under ERRP Pillar 1—Stimulating the Economy. It is designed to provide liquidity and affordable credit to MSMEs in sectors critical to Saint Lucia's economy such as agriculture, fisheries, tourism, manufacturing, and other services. Provides agriculture loans for land for crop and livestock enterprises, rainwater harvesting, agricultural equipment, irrigation equipment, farm infrastructure, marketing of agricultural produce, refrigeration equipment, among others.
Suriname	VCB Bank	Provides business loans to entrepreneurs in the agricultural sector who depend on seasonal income for the repayment of their credit. These loans target entrepreneurs such as rice farmers, pig farmers, flower growers, etc. The seasonal credit can be used for the reclamation and sowing of agricultural areas.
Trinidad and Tobago	NAMDEVCO Agriculture Development Bank	Grants accessible to young entrepreneurial agriculture graduates Has 10 loan products on offer. Including for equipment, primary production, and agro-processing. ADB loans support technology-driven production systems: hydroponics and controlled agriculture systems.

3.1.4 Knowledge Management, Capacity Building and Awareness for CRA in AgREADY Countries

The AgREADY countries have recognised the importance of knowledge management systems that facilitate access to agriculture data and streamlining of agricultural activities to meet sector targets, and have taken several steps towards establishing such systems. Efficient agriculture sector operations are heavily dependent on the flow of data and information along the agri-food value chain. According to a CTA Report (McNaughton and Soutar 2015), studies have shown that Information and Communications Technology (ICT) infrastructure improvements (such as increased mobile coverage, information services, real-time pricing and weather data) directly result in improved income for farmers and lower market prices. Belize is one of the few AgREADY countries with an agriculture information management system that serves as a repository of data (such as number of farmers, location of farms, farm size, commodity being produced, and amount of production, among other things) that guides sector operations.

Both St. Lucia and Suriname also have agriculture information and management systems/applications, while the development of a similar system is underway in Dominica. It should be noted that even where such systems exist, improvements are necessary to ensure they can be effectively used to improve decision-making within the sector that is geared towards improved climate-resilience, reduced food waste, improved market access and supply, livelihood generation and overall sector performance.

Across the nine AgREADY countries, CRA-related training has been evident at various levels, with the capacity of extension services and other relevant agriculture ministry stakeholders being built in order to facilitate knowledge transfer to farmers. Enhancement of extension officer capacity is crucial to driving CRA implementation, and as can be inferred from **table 4**, the capacity of extension officers in CRA is built to support the delivery of CRA-related training to producers. In general, water management/irrigation, covered structures, crop nutrition, soil conservation, artificial insemination, improved plant varieties and animal species have been some of the key training areas of focus within the nine AgREADY countries. While capacity building and training efforts are often project-driven, the agriculture ministries have largely prioritised capacity building as outlined in applicable policies, strategies, and plans. As a result of these efforts, farmers are more aware of common CRA technologies promoted by the agriculture ministry within each country. For example, in SVG, farmers now have a better understanding of CSA and are more receptive to implementing certain techniques and technologies (e.g., greenhouses), with improvements in the lives of farmers noted. Notwithstanding, across the AgREADY countries, there remain factors that constrain knowledge and awareness being translated to implementation as discussed in section 3.2.

Table 4: Examples of CRA training delivered to extension officers and producers in AgREADY countries.

Training Delivered	Extension Services	Farmers and Agro-processors
General CRA	x	
CSA	x	x
Crop Management	x	x
Protected Agriculture (e.g., greenhouses, shade houses, climate-resilient livestock housing)	x	x
Animal and Plant Health	x	x
Water Management/Soil Conservation	x	x
Participatory training and education (e.g., FFS)	x	x
Post-harvest technologies/ Reduction of food waste	x	x
Food Safety and Quality	x	x
Sustainable Agricultural Enterprises	x	x
Recordkeeping/ Business Planning		x
Organizational Development		
Proposal Writing/ Project Development		
Climate Change Awareness		x
Climate services/ Agromet/ climate decision support	x	x

3.1.5 Social Norms and Behaviours

Understanding of traditional ecological knowledge and agricultural practices is important and has been recognised as crucial for the CRA transition in AgREADY countries. Traditional agricultural practices place a premium on localisation, biodiversity, and a cultural appreciation for a diverse range of crops. CRA requires cultural and biological diversity, especially for compensation where one method or crop fails especially as a result of weather patterns, and by extension, longer-term climate projections.

Family, farm, and community structures are important for CRA, and relationships among smallholder farmers have proved to be advantageous, with multiple benefits. CRA approaches such as FFS have been used in AgREADY countries and strong farmer relationships have been especially important for information sharing and knowledge management. In Dominica for example, through a local practice called *koudmain'*, and similarly in Trinidad and Tobago through *Gayap*, farmers support each other through rotating farmer field days where they share new and innovative practices they have learnt and help with on-farm activities. There was also evidence of sharing of tools and equipment among farmers in The Bahamas and St. Kitts and Nevis.

3.1.6 Considerations for Gender, Youth and Other Vulnerable Groups in CRA in AgREADY Countries

AgREADY countries have made strides in providing financing for CRA practices to women, youth, and other vulnerable groups. In Nevis, the NIA/SEDU Relending Fund is a special loan product for women, and male youth 35 years and under, of which 2% is for the agriculture sector, including crops, livestock, and agro-processing and to date, there have been five agriculture women beneficiaries. Similar loan facilities were also noted for Belize and Dominica. Additionally, the UNDP/Government of Japan has a women-focused livelihood resilience project in Dominica [and Guyana] that focuses on value chain development, microfinancing, and CSA and supports rural women and vulnerable groups. In Dominica, examples of grants were noted that were geared towards increasing the capacities of women in climate-smart activities and due to its success, was expanded into different regions. The NDFD in Dominica launched a study in the Kalinago territory to determine interest in loan products for green financing and through the IDB, funded an activity with case studies of women-owned agri-businesses.

Women's involvement in agriculture in AgREADY countries has been reflected in their leadership roles, the number of women's farmer organisations that exist in some countries, and their general active participation across the value chain. Dominican stakeholders reported that due to their receptiveness and organisation capacity, women are having increasing prominence as leaders of farmer organisations. Additionally, there are a number of women farmer groups that have been active and have participated in CRA activities. It was noted that across AgREADY countries, women are actively involved in vegetable production, agro-processing, beekeeping, aquaponics, micro-skills, table skills, and handicrafts.

In AgREADY countries, there has been significant focus on building the capacity of women in CRA. Agriculture policy in St. Kitts and Nevis is driving increased participation of women in agriculture and there have been efforts including training, provision of tools and equipment, inputs, and special financing. In St. Lucia and St. Vincent and the Grenadines, involvement of women at the policy level was given special mention. In the Extension Division of the Nevis Department of Agriculture, most of the officers trained in CRA were women. In Haiti, the Ministry of Agriculture is training all farmers to become better decision-makers with regard to climate change and agroforestry. The training sessions reflect a gender ratio of six males to four females. In Dominica, the UNDP and FAO are working with women farmers to build their resilience, and in St. Kitts, women are increasingly participating in the backyard garden program. Also in Dominica, IICA used its internal funds post Hurricane Maria to support beekeepers women's groups, among other farmer groups, for capacity building to identify adaptation options to reduce vulnerabilities, through land and water management, soil conservation, and infrastructure development. In St. Vincent and The Grenadines, it was noted that workshops and seminars on climate change had more women than men participating. **Educational institutions in AgREADY countries have incorporated gender and youth considerations in agriculture course offerings that promote their involvement in CRA.** The curricula of agricultural colleges and research institutions have incorporated CRA theory and practice. There is generally a good understanding of sensitive groups and provisions are generally made for women and youth. COTED mandated that UWI partner with IICA and FAO to develop training in agriculture climate-smart technologies. Dominica was selected as the first country to deliver the programme in a formalised way. UWI St Augustine partnered with the Dominica Open Campus to deliver courses

for extension services in climate-smart technologies and these have included a gender and youth focus. In St. Vincent and the Grenadines, the St. Vincent and the Grenadines Community College's representative noted that there was no bias to who can apply and that the college has always had more females registered than males, excepting for the current cohort. In alignment with the CARICOM's Youth Action Plan (CYAP), St. Vincent and the Grenadines has developed a youth in agriculture policy, while St. Kitts and Nevis has developed targeted programmes and projects, and more broadly, regional civil society groups (e.g., Caribbean Agriculture Forum for Youth) have been established. These have been developed to address the chronic shortage of youth interest and participation in agriculture and the aging population of farmers. The IICA/CARICOM/GCF AgREADY Project includes an activity to design a strategy to strengthen the capacity of AgREADY Caribbean youths in climate-responsive agricultural techniques, technologies, and approaches. The strategy will be complemented with a template for Occupational Standards of Competence for Caribbean Vocational Qualifications (CVQ) and an associated Level 1 course outline.

3.1.7 Advances Towards the CRA Transition in AgREADY Countries Through Technology

Several CRA technologies have been piloted and, in some cases, perfected across the AgREADY sub-region and the wider Caribbean region. BANA data collection identified a slate of CRA applications and facilitatory strategies that have been applied across the nine AgREADY countries that are summarised under nine thematic areas in **table 5**. The identified applications provide significant opportunities for upscaling.

Table 5: Summary of CRA Applications or Facilitatory Strategies Across AgREADY Countries.

Themes	CRA Applications or Facilitatory Strategies Across AgREADY Countries
Water Management	<ul style="list-style-type: none"> ▪ Rainwater harvesting, ▪ Solar or renewable energy technologies ▪ Soil moisture conservation / mulching ▪ Water use efficiency – drip and micro irrigation ▪ Catchments
Plant breeding / germplasm improvement	<ul style="list-style-type: none"> ▪ Drought tolerant varieties of key food crops ▪ High-yielding varieties of cassava
Animal breeding / productivity improvements to reduce carbon footprints	<p>Artificial insemination - upscale to breed for:</p> <ul style="list-style-type: none"> ▪ Heat tolerant expressions ▪ Productivity improvements in animals <p>Productivity improvements through feed and nutrition management</p> <ul style="list-style-type: none"> ▪ Alternative feeds through forage and pasture management ▪ Manure management ▪ Manage enteric emissions
Modified environmental production systems	<ul style="list-style-type: none"> ▪ Exploring container gardening ▪ Greenhouse or shade house production systems ▪ Aquaponics and hydroponics
Climate information decision support	<ul style="list-style-type: none"> ▪ Climate services or agromet services
Ecosystem-based Adaptation	<ul style="list-style-type: none"> ▪ Agroforestry ▪ Land management techniques to address landslide and erosion ▪ Silvopastoral systems
Trade facilitation / value chain strengthening	<ul style="list-style-type: none"> ▪ Food safety standards ▪ Traceability ▪ Agro-processing and post-harvesting technologies (food loss and waste reductions)
Financing Strategies	<ul style="list-style-type: none"> ▪ Line of credit to micro-organisations for green or energy efficiency technology retrofitting (lighting fixtures, equipment, etc) ▪ Risk insurance products ▪ Loan Guarantees

AgREADY country-specific Technology Needs Assessments and Barrier Analysis Enabling Frameworks (BAEFs) that have been completed as part of the requirements of parties to the Paris Agreement prioritised key technologies for adoption in the agriculture sector. Six of the nine AgREADY countries completed TNAs that identified and prioritised technologies applicable to and considered important for increasing productivity in the agriculture sector. In keeping with the projections for climate change, technologies common across the countries included crop diversification, soil conservation, and irrigation. **Table 6** outlines the priority technologies defined for the six AgREADY countries.

Table 6: Priority CR Technologies identified through AgREADY countries' Technology Needs Assessment.

AgREADY Country	Priority Technologies
Belize	Agroforestry; crop diversification and new varieties; drip irrigation; rainwater harvesting; soil conservation, sprinkler irrigation
Dominica	Nutrient management; soil conservation, drip irrigation, protected agriculture, aquaponics; hydroponics
Haiti	Agroforestry
St. Kitts and Nevis	Early warning systems for forecasting wet and dry periods; adoption of drought-resistant cultivars; Geographical Information Systems (GIS); change of sowing and harvesting periods; pesticide application technologies and practices; Integrated Pest Management (IPM) systems and practices; soil management technologies and practices; aquaculture and mariculture technologies
Suriname	Integrated farming systems; improved irrigation efficiency; climate-resilient crop varieties and livestock breeds
Trinidad and Tobago	Pressurised irrigation technologies; protective structure cooling systems—caterpillar tunnel; establishment of early warning systems; crop breeding; e-livestock management; virtual soils doctor

Technical assistance is provided by five key regional and international institutions that support AgREADY countries to build the enabling environment for CRA. The premier technical CRA support organisations in the region are CARICOM, CCCCC, CARDI, IICA, and the FAO. The support institutions provide technical assistance, general coordination, climate-smart tools and services, financing, and research and development to member states. **Table 7** provides examples of the support provided by the range of technical institutions within the region to AgREADY countries.

Table 7: Types of CRA technical assistance support provided to AgREADY countries

Institution	Examples of Technical Assistance Support Provided
CARDI	<ul style="list-style-type: none"> Genetic improvements relating to the West Indian Red Habanero Improvement of sweet potato cultivars Development of protected agriculture production systems Climate information decision support for the agriculture and fisheries sectors Improvement of small ruminant production
FAO	<ul style="list-style-type: none"> Used GCF-accreditation status to support country projects GHG emissions technologies, EX-ACT⁵ and GLEAM⁶ for agri-food systems monitoring Baseline data collection
IICA	<ul style="list-style-type: none"> Partnership with CATIE to support the region
ECLAC	<ul style="list-style-type: none"> Research, sector assessments
UWI	<ul style="list-style-type: none"> Research

⁵ The Ex-Ante Carbon-balance Tool (EX-ACT), an appraisal system developed by FAO, provides ex-ante estimates of the impact of agriculture and forestry development projects, programmes, and policies on the carbon-balance.

⁶ GLEAM differentiates key stages along livestock supply chains such as feed production, processing, and transport; herd dynamics, animal feeding and manure management; and animal products processing and transport. The model captures the specific impacts of each stage, offering a comprehensive and disaggregated picture of livestock production and its use of natural resources.

Institution	Examples of Technical Assistance Support Provided
CARICOM	<ul style="list-style-type: none"> Facilitate advances in education and training related to CRA Promote youth engagement through the CARICOM Youth Development Action Plan⁷
CCCCC	<ul style="list-style-type: none"> Climate-related policy advice Archive and clearinghouse for regional climate change data and documentation Dissemination of CCORAL to support climate risk planning and development GCF-accreditation
CDB, USAID, World Bank, IDB, EU	<ul style="list-style-type: none"> Financial support Sector assessments
GCF NDA and AE	<ul style="list-style-type: none"> In-country support for access to GCF financing

3.2 Critical Barriers to Developing Climate-Resilient Agriculture in AgREADY Countries

3.2.1 Policy, Legislative and Regulatory Framework

Despite successive efforts at the regional level, the development and implementation of national PLR frameworks and plans associated with the CRA transition for enhanced food and nutrition security in CARICOM AgREADY countries remains challenging and incomplete. The COVID-19 pandemic highlighted the fragility of food security in the region and specifically in households and the dependency of the region on other territories, with over 38% of the population of the Caribbean affected.

“If the Caribbean is to remain wedded to the SDGs, it would require greater attention be paid to its food systems, especially in terms of ensuring food security, combating the threats posed by climate change and being able to mobilize financing for climate resilient agriculture.”
—President Dr. Mohamed Irfaan Ali, President of the Cooperative Republic of Guyana (Food Systems Summit 2021)

Although efforts at the national level have been launched to improve agricultural productivity, these have been stymied by limited physical capital, human capital, and technology needed to drive CRA. In Dominica and St. Kitts and Nevis, a focus on building CRA is not well supported by irrigation policy, and with the increased droughts, the largely rainfed agriculture has had to be supplemented by potable water supply, which is both inefficient and costly. Other infrastructural policy deficiencies include transportation, roads, and electricity. Although there is evidence of value chain development largely for export most of the AgREADY countries have been slow in developing priority value chains for food and nutrition security. Land tenure and land policy reforms have also been lagging and many small farmers are unable to respond to the requirements for financing due to the insecurity of tenure. In Haiti, for example, land tenure is characterised by fragmented and shared farming approaches. The land tenure insecurity generates a reticence or even the fear to invest and favours the emergence of violent conflicts disturbing social peace, which has resulted in the loss of life, material damage and destruction.

Other common policy, legislative and regulatory challenges include a lack of coherence between sectors due to a siloed approach to the CRA transition, poor coordination in policy implementation, and a lack of political will, driven by five-year political cycles in the Caribbean. Where policies have been developed by respective sectors and organisations, efforts to integrate them have been largely unsuccessful. Water policies have not kept up with the changing climate, specifically in relation to the need for irrigation as a result of the reduction in rainfall and water availability for crop production in particular. Value chain development is often opportunistic and although the focus is on export potential and/or food and nutrition security, it does not give adequate consideration to important climate hazards and their impacts. Gaps in land policy reform to protect agricultural lands from being converted to other land uses and for boosting domestic food production continue to exist. In the northern leeward islands, there are significant connectivity and transport challenges and road networks in agricultural areas are often difficult to traverse during and after heavy rainfall events. Although gender policies are increasingly being developed as a result

⁷ The CARICOM Youth Development Action Plan emphasises commitment to promoting and facilitating sustainable livelihoods and ensuring optimal food security within the region by creating meaningful opportunities for youth in agriculture through investment in modernised approaches that encourage youth to explore diverse career options and entrepreneurship in agriculture as a viable alternative for their development.

of the needs for international climate reporting and implementation, the considerable opportunity to mainstream gender into CRA policies and programmes has not been sufficiently explored. In addition, there are data-sharing problems and siloed planning. Similarly, efforts to strengthen associated legislative instruments and regulations such as those that govern rights to productive resources, including access to land titles and capital have been slow. There have also been inadequacies with regulatory agencies to support food safety and plant and animal health. In St. Kitts and Nevis, for example, the prevalence of a mango seed weevil prevents the country from exporting to US ports. Also, in St. Kitts and Nevis, the required labelling and testing systems and associated facilities do not exist.

At the sectoral level, there is an inherent inadequacy in capacity and coordination for the implementation of agriculture policies. Even where cross-sectoral and multi-stakeholder governance arrangements have been defined in policy documents, these have not been effectively operationalised. Further to this, the development of supporting strategies and plans often does not involve the key partner organisations and the lack of ownership and buy-in is reflected in little to no effort to mainstream the actions in their own organisational plans. Notwithstanding the existence of policy, legislative and regulatory instruments described in section 3.1, the efforts to update outdated instruments that can facilitate the CRA transition have been weak. Beyond the implementation of projects that promote CRA and support the enabling environment, there has been a slow transition and mainstreaming into country PLR frameworks. Dominica's Sale of Produce Act (1941) requires producers to keep a record of production and sales, but enforcement has been weak. The issue of poor record-keeping practices was corroborated during consultations with financial institutions across multiple countries. CSA as an approach to CRA has been a feature of many projects, and NCs, NAPs, and country NDCs also include actions as part of adaptation plans. However, in Belize's NDC for example, the document falls short on including more specific CSA practices and relating to specific value chains in support of practical financing and implementation of the NDC. Currently, in Belize, no major policies are being formulated relating to individual CSA pillars, but several policies have been formulated, whose objectives cut across the different CSA pillars, such as the Growth and Sustainable Development Strategy (2016), National Adaptation Strategy (2015), and the National Agriculture and Food Policy (2015–2030). The major barrier that seems to be affecting the implementation of those legally formalised policies is inadequate financing for the implementation of the laid-out policy actions, and coordination among relevant ministries. Still, attractive opportunities exist for coordination among all relevant stakeholders to assist in addressing and financing the implementation of those policies (CIAT 2018).

The dependency on externally funded projects to drive CRA in AgREADY countries has its own set of impacts on CRA policy implementation. Projects are often opportunistic and efforts towards multi-stakeholder coordination and cooperation are weak. Furthermore, these do not generally support policy coherence. Even with lessons learned and good practices emanating from projects, these generally do not drive policy reform, reflected in weak sustainability. The siloed approach to project implementation also impacts the ability to achieve policy coherence and a more coordinated approach to policy development.

A primary hindrance to CRA policy development and coherence with other policies is competing development agendas. Competing development priorities such as the recent COVID-19 pandemic and the specific country responses, improving road networks and others directly affect climate-resilience building in the agriculture sector. This is often intricately linked to inadequate financial capacity and the prioritisation of short-term development goals. Another barrier is poor planning and management, which affects policy effectiveness and associated outcomes. Even in countries like Saint Lucia, Dominica, and St. Kitts and Nevis where policy documents have been recently revised or developed to integrate climate-resilience building, the CRA planning and responses typically remain project driven. As a result, a more coordinated response is stymied by the application of a donor funding model.

3.2.2 Institutional Arrangements/Governance

The key institutions defined within the governance framework for CRA relate not only to the value chain but also to critical hazards such as floods and droughts. Their inherent interconnectedness and relevance for the vulnerability of the farmer/producer and agro-processor communities entails a level of coordination that has not materialised. Coordination is a key function of CRA to ensure alignment between climate change adaptation and mitigation, agriculture sector, other sectoral and development priorities. The inter-relatedness of the value chain phases, climate hazards and their impacts, and the response mechanisms associated with these were not well developed and synergistic development among the key value chain actors remain weak, at best. As a result, actions are siloed and piecemeal. Further to this, there are perceived conflicts between the climate change and development agendas. At the same time, for small holder farmers who have limited land space, there is often a trade-off between maximising planting area and investing in CR technologies. In addition, access to financing is a major impediment to the CRA transition.

Coordination along the food value chain is often weak. Although the assessment found that most AgREADY countries defined the governance arrangements and requirements for inter-agency coordination, the participatory mechanisms to establish linkages among the stakeholders, establish ownership and achieve engagement of all stakeholders were not well developed. More often than not, in defining the institutional arrangements for implementation of agriculture policies, the roles and responsibilities of the stakeholders were not defined. This was generally evident in supporting implementation plans, whereby implementing partners, required resources and timelines, as well as provisions for monitoring and evaluation were often absent. This resulted in a siloed approach at the sectoral level with limited networking and inadequate information sharing, that resulted in slow policy reform, especially to support CRA. Similarly, although the climate change policies analysed have established various ministries to achieve the objectives, in practice, there is still no real coordination and in most instances the policies are largely implemented by the agriculture ministry. Countries have suffered from this reality, especially as climate change interventions (including those in the agriculture sector) are often projectized where different institutional mechanisms are involved depending on the donor agencies' requirements, which at times can overlap or contradict each other. Furthermore, there is limited communication and dialogue across government, exacerbating policy incoherence.

Institutional barriers that are constraining, or have the potential to constrain, the ability for organisations and farmers to better facilitate adaptation to climate change were evident across AgREADY countries. In general, the institutions function relatively well; however, there is a need to link the additional stresses on the social-ecological system that will be introduced by future climate change impacts, including: increase in temperature, droughts, and extreme rainfall during the wet periods, and decrease in annual rainfall and more severe storms and hurricanes. The unevenness in availability of technical skills and knowledge is also acknowledged. Often, meteorological offices, academic institutions, and regional technical support agencies are the main repository of climate change data and information and the availability of climate services and decision support systems, although growing, is inadequate. Evidence shows that awareness and skills for CRA planning are not well disseminated across the value chain.

The impacts of future climate projections are also likely to put extra stress on institutions in the future in different ways, according to the roles and responsibilities of the institution. The discussion brings into focus the roles and responsibilities of institutions according to the CRA components of increased productivity and higher incomes, adaptation, and resilience building, and mitigation by reducing GHG emissions. Associated institutional barriers that are impacting and will likely continue to impact institutions include: capacity to identify and adopt appropriate and cost-effective CRA technologies; human resource capacity to drive CRA policy, legislation, and regulations, and planning for provision of CRA extension services to farmers and other stakeholders; ability to work with farmers

to improve the security of land tenure, which will also be important for accessing well-needed financing for CRA; ability to provide adequate water especially in times of drought; efforts at advancing R&D; ability to develop credit financing products to support CRA adoption; enhancing the capacity to maintain existing markets and access new ones, especially where it concerns food safety standards and specific market requirements.

The insufficiency of expertise related to climate change and adaptation and mitigation measures reported by some AgREADY countries suggests that there is a barrier occurring that constrains the development of human resources for implementing adaptation and mitigation policies. This can have a direct effect on farmer communities who rely on the capacity of agriculture ministry personnel related to seed variety selection and shifting seasonal calendars. Low human resource capacity for CRA may also limit the scale of these initiatives, which, in light of the adverse effects of climate change, are likely to become more frequent, widespread, and advanced.

Actual effectiveness of risk governance structures (policy frameworks and institutional arrangements) in the implementation of aligned climate change adaptation-DRR objectives, is also weak. Some countries refer to ineffective policy frameworks and plans as a baseline to develop more supportive and effective structures. While projects and even NDCs tend to highlight progress in the implementation of specific climate change adaptation-DRR projects or programmes, there is little evidence of comprehensive evaluations of progress, implementation, and effectiveness of risk governance arrangements.

Public-private dialogue was found to be *ad hoc*, and this was not in keeping with good governance and effective value chain development strategies. Input from private sector actors is important to identify the key binding constraints on the further development of value chains, and to prioritise public investments. Public-private dialogue was also not well developed as part of the policy development process. As a form of collaboration, there was no real policy direction towards facilitation and promotion of public-private partnerships (PPPs) for CRA.

For most AgREADY countries, adaptation was seen as a more pressing concern over mitigation for the agriculture sector. NDC analysis was a good measure of the climate focus of the agriculture sector and the AgREADY project's review of country documents found more effort towards adaptation and less focus on mitigation and reduction of GHG emissions in the respective NDCs, although even these were spottily addressed and often were reliant on conditional financing. As a result, donors, even when they have the funds to contribute to agriculture adaptation measures, lack the political will or the administrative capacity to support massive and sustained action in this arena, and when they do, it is often with attached conditions, which seek to impinge on basic governance processes in the receiving country. This blunts their focus and effectiveness. For these reasons, even though it is becoming increasingly clear that avoiding climate action has serious cost implications, knowledge about climate change is not translating into sufficient action.

3.2.3 Financing Constraints for CRA

The current levels of financing for climate change adaptation and mitigation in the agricultural sector are woefully inadequate. Climate-resilient interventions in agriculture require substantial investments and innovative types of financing to support the transformational changes that are needed to maintain or increase agricultural productivity while using less resources, and build the resilience of vulnerable farming communities to the impacts of climate change while also reducing or removing greenhouse gas emissions, and this is often a challenge for AgREADY countries. Although there is evidence of a range of types of financing, these are often not wide-scale and not tailored to the specific circumstances of many small holder farmers, who make up the majority of producers. Several of the nine AgREADY countries have developed climate financing strategies, which identify the agriculture sector among the sectors prioritised for climate financing. These strategies indicate that multiple financing sources

are required to support agriculture sector climate change adaptation and mitigation programmes and actions. In Belize, for example, the Climate Financing Strategy (2021–2026) outlines that to fulfil agriculture-related targets and actions linked to Belize’s NDC will require USD 41 million for mitigation actions (with approximately USD 31 million already identified / mobilised) and USD 113 million for adaptation actions (with an estimated USD 41 million already identified / mobilised).

Another key financing gap in the AgREADY countries is the general absence of risk-reducing financing mechanisms to address production losses, linked to climate change or otherwise. Across the countries, there are several examples of sub-sector wide losses linked to factors such as climate change, loss of preferential agreements and other externalities that ultimately result in reduced sector earnings. These factors have contributed to a reluctance to develop and implement de-risking measures. In Belize, for example, “agricultural insurance, be it multi-peril or index-based insurance, does not exist. Farmers can insure their life, health, houses, barns, tractors, and transport vehicles, but they cannot insure against risks affecting their production outcome” (World Bank 2018). While AgREADY country governments have implemented response measures, e.g., cash pay-outs, or provisions of inputs post a climate-related disaster or in response to severe downturn linked to disasters such as the COVID-19 pandemic, these are often not sufficient to build the levels of resilience required by farmers and can contribute to farmers’ misgivings as it relates to employing new technologies that are perceived to increase their risk profile. “Knowing they are exposed to risks, many farmers are very conservative, and they tend to have reservations regarding innovations that could bring additional risk exposure. On the other hand, when they are convinced that an innovation will reduce risk and generate reasonable returns, they are generally willing to invest, as indicated by the cases of fertiliser, pesticides, and tractors” (World Bank 2018).

The criteria and pre-requisites of various types of financing are sometimes restrictive and discourage many smallholder farmers from seeking additional financing. Criteria for access to credit often include stringent requirements for collateral, one of which is production records that can prove onerous for farmers. Additionally, unattractive repayment terms (high interest rates and short duration for loan repayment) and, in some instances, high requirement of working capital, also prove to be significant deterrents. While some countries have recognised these issues and have tried to develop and make available financing instruments geared towards the agricultural sector or to MSMEs, generally, the requirements are sometimes still too restrictive, especially for smallholder farmers. **Land tenure/ownership is a major issue for many small farmers who seek access to loan financing.** This corroborates with the insecurity of tenure issues faced by many smallholder farmers and the policy reform gaps identified. Almost all of the nine AgREADY countries are faced with this issue. Furthermore, where prime agriculture lands are owned by government, there is inconsistency in efforts to make these available to farmers. Trinidad and Tobago was one of the few countries with such a programme, which targets the youth in particular.

3.2.4 Knowledge Management, Capacity Building and Awareness

Although the importance of knowledge management and communication along the agricultural value chain and its potential to effect sector improvements has been recognised, these tend to be lacking or not functioning effectively where they exist within the AgREADY countries. The BANA consultations and literature review revealed that effective knowledge exchange and communication is often impeded by infrastructural (lack of, or inadequate ICT), financial, institutional barriers (inadequate collaboration and corporation), which negatively impact timely and efficient collection, storage, retrieval, dissemination of, and access to, data and information among agriculture stakeholders.

Deficiencies in institutional capacity are another key barrier that hampers widescale adoption of CRA. While key agriculture sector stakeholders have been trained in CRA thematic areas, as previously highlighted in section 3.1, there are still knowledge, capacity, human resource, and financial constraint gaps. According to the FAO (2019), “many Caribbean countries and regional institutions still require further assistance and support to (a) increase their knowledge and capacity to assess climate change risk and (b) to design and implement appropriate climate-resilient policies and programmes”. This was largely confirmed for the AgREADY countries during the BANA consultations. In Belize, for example, it was highlighted that capacity building and training are needed to understand the kinds of data needed and how to use that data to support sustainable operations in the sector. Capacity building is also needed to adopt, or adapt, where necessary, the technologies that have been identified as promising for the local agriculture sector.

Box 4: Factors that affect access to information, knowledge and decision-making for women, youth and vulnerable groups

“With limited access to and control of resources, women have more difficulties accessing training, improved technology, market information, and agricultural inputs, such as fertiliser and irrigation to improve production. For example, access to irrigation water often depends on tenure of property, which female farmers are less likely to have. Rural women, youth, and vulnerable groups are also more likely to lack access to the knowledge and resources required to meet rapidly evolving phytosanitary and food safety standards enforced by local, regional, and international markets for processed products. Agriculture extension services in most BMCs are not sufficiently sensitised to the importance of gender-equitable service provision, which can lead to the exclusion of women from accessing benefits and participating in decisions.

—FAO and CDB, 2019

While capacity limitations and low levels of awareness of smallholder farmers also impede wider CRA adoption in the AgREADY countries, resolution of these issues does not immediately translate to CRA advancement, where there is a general absence of policy, financing, social inclusion mechanisms, and other key enabling factors. Section 3.1.4 outlined some of the advances linked to capacity building, training, and awareness within the AgREADY countries, however, there still remain significant capacity building needs as shown in **table 8**. The need for field/practical demonstrations was also highlighted. In Dominica, for example, extension officers are sometimes only able to do short trainings (one day) with farmers, which is often indoors with no field demonstration.

Table 8: Identified CRA training needs for value chain stakeholders

Training Needs	Extension Services	Farmers and Agro-processors	Policymakers and Planners
General CRA	X	x	x
CSA	X	x	
Crop Management	X	x	x
Protected Agriculture (e.g., greenhouses, shade houses, climate-resilient livestock housing)	X	x	
Animal and Plant Health	X	x	
Water Management/Soil Conservation	X	x	
Participatory training and education (e.g., FFS)	X	x	
Post-harvest technologies / Reduction of food waste	X	x	x
Renewable technologies	x	x	x
Food Safety and Quality	x	x	x
Sustainable Agricultural Enterprises	x	x	
Recordkeeping / Business Planning		x	
Organizational Development		x	
Proposal Writing / Project Development		x	x
Climate Change Awareness		x	
Climate services / Agromet / climate decision support	x	x	x
R &D / Product Development		x	x
Marketing			x
Climate Financing, including risk transfer			x
Digital technologies / ICT	x	x	x
Monitoring, evaluation, and learning			x

3.2.5 Social Norms and Behaviours

Land tenure and the fragmented and insecure nature of land ownership across the CARICOM AgREADY subregion are grounded in socially accepted norms. For family inherited lands, there is a tendency to pass on land predominantly to males, resulting in chronic gender-biased land ownership in the region. In addition to this, the practice where family inherited lands have been passed down to multiple beneficiaries has resulted in fragmentation and inefficient-sized agriculture holdings, that often do not observe legal land transfer methods. A result of this is the inability to access credit from formal financial institutions.

Smallholder farmers in AgREADY countries, especially aged farmers, tend to adhere to traditional agricultural practices, which do not always align with the tenets of CRA. These traditional agricultural practices involve the use of labour-intensive approaches, traditional knowledge, tools, natural resources, organic fertiliser, and old customs and cultural beliefs of the farmers. Some of these practices rely on outdated information and tools and prove to be inefficient and exacerbate environmental degradation, including loss of biodiversity and the farmers are not readily accepting of change. For example, in the Hinterlands in Suriname, some farmers continue to maintain their

longstanding practices, which often do not result in increased productivity and do not build resilience. There are some who wait to see that the new practices/ technologies work/ make a profit before they embrace them. Another example is in the Bahamas with an aging farmer population, the adoption of new technology was considered to be low.

The low level of uptake of credit financing for farmers is often a result of farmer preference and perceptions. In Dominica, for example, farmer perception of loans was negative and resulted in a preference for grants. This affected the uptake of available loan products and was found to be a constraint to the adoption of CRA technologies.

3.2.6 Gender, Youth, and Other Vulnerable Groups

Although women account for 22–30% of the registered farmers in the Caribbean region, in AgREADY countries there is a wide variation in opportunities due to limited access to finance, land, networks and information. While several AgREADY countries would have made significant strides in narrowing the gender divide, systemic discriminatory practices around land tenure, accessing credit and decision-making continue to constrain women's participation in CRA. In Dominica and St. Kitts and Nevis, stakeholders emphasised that women faced significant constraints to meet the criteria for loans, including the required collateral, and this affected their ability to adopt CRA technologies and realise the gains from increased productivity and increased income. Other constraints for women farmers articulated by stakeholders included dual responsibilities as homemaker and farmer, labour-intensive farming practices that often require hiring of additional labour, and high transportation costs.

Poor land access has been recognised as a critical barrier to the inclusion of youth in CRA. Although there was evidence of initiatives for youth access to agriculture lands such as in Trinidad and Tobago and St. Vincent and the Grenadines, where the youth faced immense challenges to access land, this effectively excluded them from participating in CRA practices and applying technologies even when they have had opportunities to participate in training and other capacity building exercises. The BANA did not identify any youth-responsive land policies to change the status quo.

3.2.7 Barriers to a CRA Transition Related to Technology Adoption

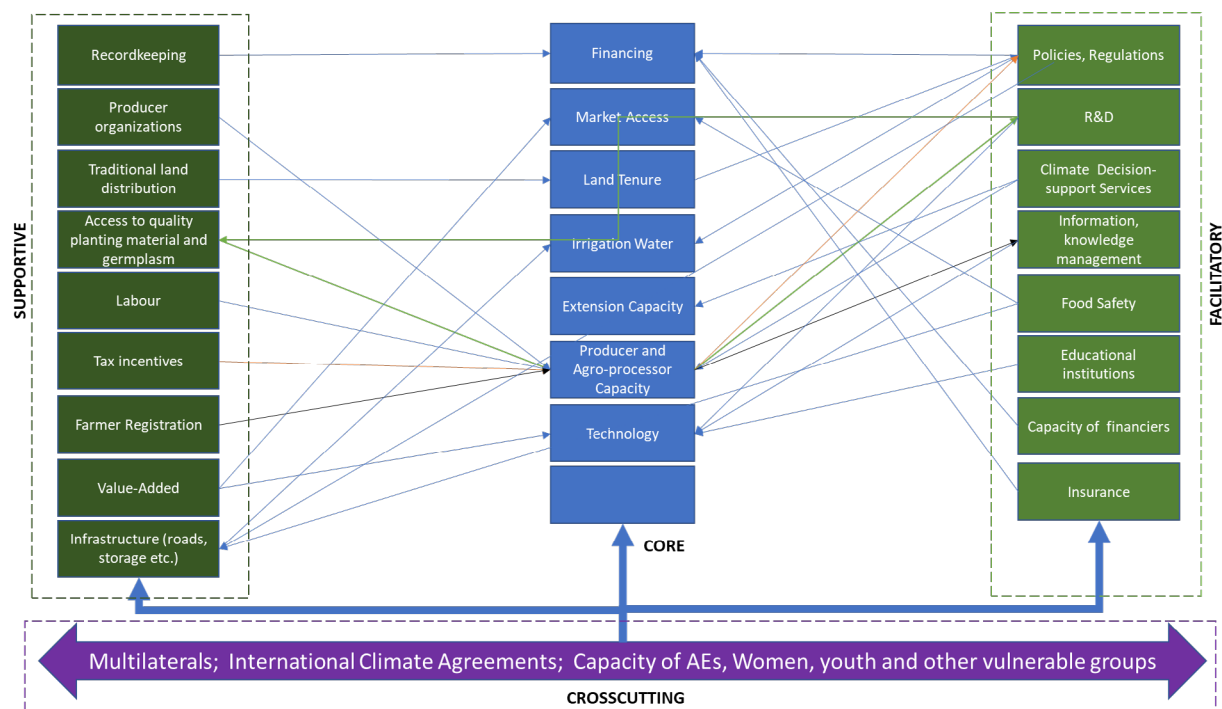
AgREADY country-specific Technology Needs Assessments and Barrier Analysis Enabling Frameworks (BAEFs) that have been completed as part of the requirements of parties to the Paris Agreement identified key barriers to adoption of CRA technologies. The BAEFs identified the main barriers and constraints to include high capital investment for CRA technologies, limited technical capacity in the agriculture sector, especially among small farmers, affordable credit, financing not easily accessible to small producers, land insecurity, and limited processing and quality standards to support the CRA solutions. Further to this, in consultations, Haiti identified key constraints to adoption of agroforestry technology, to include lack of technicians with specific knowledge of agroforestry technology, inadequate compensation to balance the price of products of agroforestry systems compared to products of short-cycle systems, poorly developed market for the sale of agroforestry products, and limited processing capacity for agroforestry by-products. For Dominica's priority technologies that included integrated soil nutrition management and soil conservation, the major barriers identified were the high capital cost for the establishment of organic fertiliser producing facilities, limited localised information on available technology, absence of production standards/ quality assurance systems for production, and insecure land tenure status, which impacts access to finance.

4.

4. Recommendations: Entry Points for CRA in CARICOM AgREADY Countries

The impacts of climate change, especially on subsistence agriculture in AgREADY countries, are likely to exacerbate food insecurity and generate cascading impacts on multiple fronts, including health and nutrition, well-being, and livelihoods. The BANA identifies the following key gaps to CRA in AgREADY countries: slow policy reform, especially in areas of land tenure, irrigation, food safety and financing; limited access to climate information and extension services; and poor governance mechanisms. Further to these, relevant predictors of barriers (e.g., credit access, market access, land tenure, and inputs availability) are not well accounted for in more current agriculture policies. Sectoral policies, strategies, and plans also aim to improve farmers' climate resilience through initiatives including the promotion of drought-tolerant crop varieties, climate-resilient livestock housing, increasing farmers' access to climate information and extension services, and the availability of financing. Scrutiny of these barriers will be important for refining the NAP sector policies, agriculture policies, and programmes to eliminate such barriers. **Figure 7** presents a policy map of identified barriers to the enabling environment for CRA transition and the response entry points for realising the transition (combinations of core, facilitatory, supporting and cross-cutting factors).

Figure 7: Policy map of the entry points to strengthening the enabling environment for CRA.



A. Enhance financing for climate-resilient agriculture

Financing is a core barrier and constraint to achieving CRA in AgREADY countries. Governments, development organizations, and the private sector make up the primary sources of finance for both infrastructural and non-structural CRA technologies and for disaster response and recovery. Even where insurance is available, there may still be a requirement for governments to fund the response, especially given the extent of a disaster and its impact on the food value chain.

Financial resources can be delivered from various sources through different mechanisms and instruments (**figure 8**). Decisions on how, when, to whom and by whom finance will be allocated, provided or mobilised to build climate-resilience involves various factors. They include the acceptable level of residual risks for individual stakeholders despite efforts to adapt to climate change. They also involve the relative allocation of identified risks by reducing, transferring, or retaining them. Other factors not directly related to finance may also influence decisions. These could include capacities of stakeholders, political power dynamics, and the cultural acceptability of the proposed measures. The psychological and emotional distress expected to be triggered by the impacts of climate change is another consideration.

Figure 8: Examples of types of financial sources for CRA.

	Public	Private
Domestic	<ul style="list-style-type: none"> • National budgets • Sub-national budgets • National development financial institutions and funds 	<ul style="list-style-type: none"> • Businesses and households • Commercial banks • Non-bank financial institutions (microfinance, credit unions) • Philanthropy • Insurance companies
International	<ul style="list-style-type: none"> • Governments of providers of ODA and other official flows • Multilateral and bilateral development financial institutions • International climate funds and facilities 	<ul style="list-style-type: none"> • Remittances • Multinational enterprises • Commercial banks and institutional investors (insurance companies, funds, etc.) • Philanthropy

1. Identification of priority actions for CRA and assessment of the associated financial needs.

- Engage with value chain stakeholders to better understand the climate risks to agriculture and the food value chain and explore suitable measures to address these risks and determine their associated costs.
- Agree on and utilise methodological approaches to assess the costs of the actions to strengthen climate resilience.
- Engage with development, commercial, and micro-financial institutions to harness their financial expertise and private sector perspectives, as relevant, for articulating assessments of financial needs.

2. Integration of CRA into public financial management.

- Strengthen the planning and budgeting process for mainstreaming CRA actions in sector planning, prioritization, and budgeting, and incorporate a gender budgeting approach where possible. Ensure that actions that involve women, youth, and other vulnerable groups are included and appropriately budgeted.
- Enhance collaboration between agriculture, planning and finance ministries, and other government entities responsible for climate policy through the budgeting process.
- Tag budgets and public expenditure to better understand and monitor where, how, and how much public finance is allocated for CRA and potential gaps.
- Develop and enhance social safety nets that are responsive to shocks, while encouraging public investments in DRR where possible.

3. Selection and blending of financial instruments for CRA and managing climate risks in the food value chain.

- Conduct stock takes of available and accessible financial instruments (grants, debt instruments, risk transfer/sharing instruments) and develop a comprehensive blending strategy to manage risks to CRA

- b. Identify and apply tools to support selection of financial instruments based on the uncertainty and unpredictable nature of climate change, coupled with efficacy and broader socio-economic considerations such as gender and social inclusion
 - c. Explore and pilot emerging financial instruments and solutions such as parametric insurance, bonds, equity, low credit facilities, which are especially suitable for small holder farmers and agro-processors.
- 4. Exploration and maximisation of the benefits of risk insurance solutions.**
- a. Expand and develop the insurance sector through capacity building and awareness raising for policy makers, domestic insurers and potential beneficiaries, building on public-private partnerships and pilot activities. Create the appropriate linkages with other sectors to ensure the risk transfer products can meet the needs of smallholder farmers and MSME agro-processors in particular.
 - b. Build the capacity of insurers and potential beneficiaries to harness data for a long-term view of climate risks.
 - c. Involve target beneficiaries, including women, youth, and other marginalised groups, in early stages of development of products and solidify functioning partnerships to achieve scale. Manage the expectations of beneficiaries/policy holders regarding the benefits of insurance products through financial literacy programmes.
- 5. Enhancement of private sector engagement for CRA.**
- a. Establish clear and bold policy targets on CRA to build private sector confidence and boost the attractiveness through well-defined co-benefits and risk-return profiles of potential CR investments in agriculture. Establish linkages with and engage private sector in the conduct of Technology Needs Assessment (TNA) for international climate change reporting to increase their understanding of sector needs.
 - b. Develop and enforce legal and regulatory frameworks that lower investment barriers and enhance economic incentives for private sector investment in CRA.
 - c. Utilise blended financial instruments for projects with the potential to deliver impacts on CRA but cannot reach scale due to the significant risks or costs to the private investor.
 - d. Harmonise domestic legal frameworks and standards for PPP, with policies on climate-resilience and in particular CRA.
- 6. Facilitation of access to domestic and international climate finance.**
- a. Support and facilitate preparation of project proposals by domestic actors, linked with the production, collection, and analysis of the data needed for climate risk assessment for proposals especially geared towards the international financial community (e.g., GCF, AF, GEF, multi-lateral institutions and other IFIs).
 - b. Engage target stakeholders, especially the most vulnerable to climate change and its impacts, including women, youth, and indigenous groups, early in project conceptualization and development. Build their collateral capacity (e.g., land title) and business acumen (record keeping and business planning) to access financing for CRA.
 - c. Identify the most relevant international financing sources based on the eligibility criteria, access modalities, programming priorities, and logical frameworks of the financial sources in light of country and sector priorities and capacities.
 - d. Support capacity development at the organizational and operational levels in accessing climate finance, especially focal points, national implementing entities, and direct access entities, where relevant.

B. Enhance the policy, legislative and regulatory environment to support CRA

While AgREADY countries have made several strides towards mainstreaming climate change in agriculture sector policies and plans, there are deficiencies and gaps within the policy, legal, and regulatory framework, which pose a significant barrier to the CRA transition. In order to establish a more cohesive and integrated policy, legal, and regulatory framework that will translate to effective implementation on the ground, it will become necessary to identify and address gaps that contravene the sustainable management and use of natural resources within the sector and to overcome barriers and constraints to PLR framework implementation. Key actions in this regard include:

1. Engagement of public, private sector and civil society and technical service providers in policy development and implementation activities.

- a. Work collaboratively with other sectoral and national level stakeholders towards increasing the use of green and renewable technologies.
 - i. Supporting actions could include the reduction of import duties on green technologies such as greenhouses and solar-powered pumps.
- b. Hold dialogue with producers, agro-processors, and other local level stakeholders early in the policy development stages. Prioritise involvement of women, youth, and other vulnerable groups in policy dialogue.
- c. Engage private sector in the policy development and implementation process, especially in relation to financing of policy actions.

2. Development and enhancement of agriculture and other policies relevant to the CRA transition.

- a. Assess agriculture and other relevant policies for gaps in the CRA transition.
- b. Utilise climate data and information to inform new policy actions.
 - i. Identify sources of climate data and information and establish a plan for collection, analysis and utilisation in policy development.
 - ii. Conduct vulnerability analyses, crop suitability assessments, and other relevant climate-based analyses to inform policy, legislative, and regulatory reform.
 - iii. Incorporate climate data and information into agriculture policy monitoring.
- c. Develop and update policies and their associated implementation plans that fill identified gaps and reflect critical elements necessary to drive CRA, including, but not limited to policies that:
 - i. Are geared towards (i) preserving agricultural lands for productive use within the sector and (ii) regularizing tenure and land access for farmers as this will positively impact investment in sustainable and climate-resilient land management technologies and practices.
 - ii. Prioritise the promotion of best-practice CRA technologies and practices.
 - iii. Improve R&D outputs as responses to the impacts of climate change.
 - iv. Drive adoption of green technologies (infrastructural and inputs) in the production systems.
 - v. Support the trade of fresh produce and processed goods that undergo climate-resilient processes, including meeting food safety and quality standards.
 - vi. Ensure alignment of agriculture policies with climate policies and national development policies and plans and other relevant sector policies.
 - vii. Promote livestock diversification and “climate-ready” species and breeds.
 - viii. Encourage high-quality diets for livestock that increase conversion efficiency and reduce emissions.
 - ix. Provide incentives for small holder farmers for (i) increased access to quality planting material and germplasm while (ii) enhancing the infrastructure to support reduced GHG emissions, reduction of waste and increased productivity.
 - x. Drive use of digital technology systems for commodity pricing and marketing.

3. Implementation of policy actions that drive CRA adoption.

- a. Explore sources of financing for implementation of policy actions that include government budgetary allocation, local, and international private institutions, bilateral and multilateral organizations, among others.
- b. Encourage ownership of policy actions by relevant stakeholders by tracking efforts to mainstream the actions in their organizational plans, including budgeting.
- c. Establish and utilise a policy monitoring committee that monitors implementation of policy actions against relevant production and climate-resilience targets and facilitates adaptive management.

C. Enhance capacity to facilitate farmer adoption of CRA technologies

Capacity building has reverberated throughout the BANA as a limiting factor to the enabling framework to support accessibility, affordability, and application of CRA technologies across AgREADY countries. Through regional and international collaborations, there are several structures that AgREADY countries may leverage to enhance capacity for CRA technologies. In addition, options to strengthen inter-regional pathways for capacity building in CRA technologies for youths and other vulnerable groups present opportunities to increase the pipeline of regional skillsets.

1. Establishment of partnerships with regional and international training institutions to build a cadre of persons to support adoption of CRA technologies inclusive of youths.

- a. Build a pipeline of technically competent talent in CRA solutions through the use of scholarships and fellowships. Provide scholarships to students interested in areas where skillsets are short to meet industry needs through private partners.
- b. Leverage development partnerships to provide fellowships to private and public sector professionals to strengthen their capacity in key CRA talent areas.

2. Strengthening of extension services to support farmer adoption of CRA technologies.

- a. Utilise tried and proven farmer training techniques to build extension officer capacity, for example, through the widely accepted⁸ farmer field school (FFS).⁹ The FFS extension delivery methodology is flexible and has been applied in addressing a growing range of technical topics such as: soil, crop, and water management, seeds multiplication and varietal testing, IPM, agropastoralism, aquaculture, agroforestry, nutrition, value chain, link to markets, etc.

3. Building flexible youth certification programmes to support adoption and utilisation of CRA technologies.

- a. Provide training options, in addition to the existing TVET and CVQ training, that are more flexible and adaptable to the qualifications, or lack thereof, of several at-risk youth who are currently in agriculture or may benefit from going into agriculture. These options may include enhancing and improving accredited agriculture courses through the inclusion of CRA, strengthening access to accreditation for farmers (possibly a hybrid FFS approach) and expanding 4H movement to serve as a feeder approach for youth in agriculture.

D. Developing and expanding on water-focused CRA technologies to address the impacts of drought on food production and productivity.

Agriculture is an important sector in AgREADY countries, and while the sector is not a large contributor to GDP, it provides employment opportunities to rural populations, and supports achievement of national food and nutritional security goals. In AgREADY countries, water management in rain-fed agriculture is becoming more and more complex to overcome the expected water scarcity stress. In addition to this, climate change projections suggest that

⁸ Farmer Field School (FFS) is an approach based on people-centered learning. Participatory methods to create an environment conducive to learning: the participants can exchange knowledge and experience in a risk-free setting. Practical field exercises using direct observation, discussion, and decision-making encourage learning-by-doing. The field is the space where local knowledge and outside scientific insights are tested, validated, and integrated in the context of local ecosystem and socio-economic settings.

⁹ www.fao.org/farmer-field-schools/overview/en/

water requirements for agriculture will have to be met through the judicious application of climate-smart water technologies. An entry point to maintaining and improving food production and productivity levels and by extension increasing incomes and supporting livelihoods is through safeguarding critical water resources for sustainable use through adaptive measures for effective water management, particularly in drought-prone areas. An integrated approach needs to be implemented in agricultural water management through adoption of innovations such as water harvesting, micro-irrigation and resource conservation farming to increase water-use efficiency in agriculture and other critical services to human and animals.

1. Prioritisation of key actors affected by or who impact water availability, distribution, and access for their incorporation into water-investment and development plans.

- a. Engage sectoral government entities, primary producers and agro-processors, and special groups including women, youth and other vulnerable groups in determining policy objectives and priority actions for water-related CRA.
- b. Assign the responsibilities for overseeing and implementing the actions.
- c. Devise and utilise mechanisms to ensure equity in availability and access to the water resource.
- d. Build capacity of key government and local actors for monitoring and maintenance of new and upgraded irrigation systems.

2. Assessment of drought risks to the agriculture sector and reflect them in the development plans for the sector.

- a. Use vulnerability assessments (VAs) and climate information such as the Standard Precipitation Index to determine the main impacts of drought and reduced rainfall and future projections on the agriculture sector.
- b. Identify and prioritise climate-resilient measures and integrate them into, or link them to, sectoral development plans.
- c. Communicate the level of climate risk that needs to be borne by the private sector actors and the level at which the government is required to provide public support or investment.
- d. Develop and strengthen irrigation policies, as relevant, to support water availability in response to the impacts of drought.
- e. Utilise PPPs to support new and expanded irrigation infrastructural development within defined geographic areas.
- f. Use Climate Decision Support Systems (CDSS) for ongoing monitoring of water-use efficiency of irrigation systems and balance with use of rain-fed agriculture.
- g. Establish agriculture drought management governance structure, with participation of public, private, producers and agro-processors, R&D institutions and other key stakeholders and utilise this structure for policy development and implementation, decision making and monitoring, evaluation and learning (MEL) relating in particular to harnessing water, storage, distribution and cost, as well as other measures such as water conservation (e.g., drip-irrigation technology, water harvesting and storage).

3. Integration of climate-resilience considerations into sector investment plans.

- a. Develop inventories of key infrastructure and assets within the agriculture sector and consider short, medium, and long-term climate risks in sector and investment plans. Consider use of renewable energy sources for operations of irrigation systems.
- b. Assess the costs associated with capital investments, operational expenditure and other expenses for implementing water-related CRA technologies in agriculture sector (and in some cases water sector) development plans.
 - i. Utilise existing technology needs assessment (TNAs) and other sector assessments to determine the water-related needs, suitability of the technology and cost-effectiveness to the priority actors.

4. Incorporation of grey infrastructure to manage excess flooding for future use.

- a. Establish appropriate grey infrastructure to facilitate the capture and storage of floodwater for future irrigation purposes. This could include excavated catchments or micro dams.
- b. Manage groundwater sources for agriculture purposes (including monitoring of salinity).

E. Support access to land for wider CRA application

Land, and secure access to it, is fundamental to agriculture sector growth and development, particularly within the context of competing demands on the finite resource and the challenges posed by climate change. Within the Caribbean, there are several land-related issues that negatively impact agriculture sector performance. These include:

- Insecure tenure—"Many farmers are land tenants not landowners. Insecurity of tenure is recognised as the main factor limiting the ability of land tenants to invest in improvements to their farms." (FAO 2013). Additionally, the matter of "family lands" can affect investment in agriculture, as while persons enjoy the right to live upon and cultivate the land, it cannot be used as collateral for a loan (FAO 2013).
- Poor land management—Poor land management has been recognised as a major constraint to sustainable agricultural production (FAO 2013).
- Absence of effective land zoning/land use policies—In some instances, this had led to agricultural lands being converted to other uses.

These factors speak to the need for land-use policies, supported by implementation mechanisms, as well as capacity building and training that is geared towards fostering sustainable, efficient, and climate-resilient agricultural productions systems. Resolving land issues for agricultural development requires an integrated approach that considers other key related sector needs such as water availability. In instances where the responsibility for land matters does not reside with the same ministry responsible for agriculture, the agriculture ministry and other stakeholders may be required to play a strong advocacy role in ensuring land issues relevant to the agriculture sector are appropriately addressed.

1. Engagement of key government, private and civil society stakeholders as well as customary landowners in land policy reform and implementation.

- a. Involve key stakeholders early in the dialogue on land policy reforms. Consider exploring the influence of social norms and behaviours, conflicting legislative instruments and land use practices on land tenure.

2. Development and implementation of integrated land reform policies, legislation and institutional framework that supports the sustainable and equitable use of land for agriculture.

- a. Establish an intersectoral land policy advisory body to provide guidance and support monitoring of implementation of the integrated land reform programme.
- b. Develop and implement a land regularisation programme, ensuring that women, youth, and other vulnerable groups are not disenfranchised. This may include:
 - i. Land survey and registration of titles
 - ii. Security of tenure for CRA adoption (e.g., through formal long-term land lease arrangements)
- c. Establish land zoning policies and structures that are evidence-based (i.e., built on climate projection data, water availability considerations, crop suitability studies) to ensure effective pairing of agricultural lands and activities for enhanced production.
- d. Develop and implement associated plans and financing strategies for rollout of the land reform programme.
- e. Utilise incentives to promote restoration of marginal and degraded lands.
- f. Discourage the conversion of prime agriculture lands to other uses.

- g. Secure farmer access to irrigable and arable agricultural lands that has supporting infrastructure such as developed road networks and adequate drainage systems.

3. Building capacity and awareness of sustainable land management technologies and practices.

- a. Encourage the development of farm plans that support:
 - i. Soil conservation to improve agricultural productivity
 - ii. Sustainable cropping systems (e.g., crop rotation, multi cropping)
 - iii. The use of CRA technologies for greater land-use efficiency and productivity, especially for smallholder farmers, while minimizing the impact on biodiversity through land expansion
- b. Support farmers to restore marginal and degraded lands and watershed areas.
- c. Promote diversity of land uses for agriculture.
- d. Encourage increased cover of trees and perennials.
- e. Protect against large-scale erosion.

F. Market access to support trade in agri-food products

Market access and, more so, trade facilitation can be valuable tools to support multiple objectives. Market access is facilitated by both domestic and international trade policy dynamics and food safety rules, coupled with economic theories such as demand and supply and marketing tools such as consumer preferences, branding, and others. All these dynamics, have to be balanced with national priorities such as the economic development agenda and food and nutrition security. Entry points to facilitate market access include:

1. Strengthening trade facilitation and food and nutrition security policies and enabling framework for key crops, livestock, and processed food simultaneously.

- a. Secure alignment between market access and import substitution objectives in conjunction with trade reciprocity and the safeguarding of national food and nutrition security.
- b. Enhance capacity for food safety and traceability issues to allow for ease of manoeuvring food safety and quality standards of international markets.
- c. Strengthen capacity of marketing organizations to work with farmers, agro-processors, and other stakeholders across the supply chain. Areas for strengthening include market potential assessments and supply chain management to further improve market access.
- d. Develop a food safety and traceability framework in order to safeguard local food and nutrition security.

2. Increasing focus on food quality and safety requirements.

- a. Support farmer/agro-processor behavioural change towards recordkeeping through awareness-raising on food quality, safety, and traceability requirements.
- b. Build capacity of primary producers and agro-processors to record all stages of production, processing, distribution, and sales and make these available for inspection and certification.
- c. Develop and implement a “traceability/good agriculture product” system to support market access for agri-food products from AgREADY countries.
- d. Enhance packaging and labelling that build consumer confidence in the quality of products.

G. Build multi-level governance and enhance coordination across the food value chain

Weak coordination is a critical barrier to achieving CRA. An effective CRA governance arrangement provides an important basis for agriculture ministries to coordinate CRA actions by different ministries and agencies, local governments, producers, agro-processors, the range of other value chain stakeholders, and development co-operation providers.

A governance arrangement for action on climate resilience must therefore be inclusive to ensure its approaches are informed by the needs of the most vulnerable people. Women and people in marginalised and Indigenous groups often face barriers to participating in decision making, from farm level to national agriculture and other relevant policy-making processes. Developing inclusive governance must therefore pay attention to equitable engagement of vulnerable stakeholders in decision making for CRA. This includes, for instance, improving their access to information and considering the domestic responsibilities of women, the involvement of youth and other vulnerable groups.

Inclusive governance arrangements also facilitate the generation of context-specific information about climate risks and possible solutions to address them. Governance arrangements that foster coherence between development policies and priorities, agriculture policies and strategies, climate policies, and other policy agendas can help governments achieve CRA and broader sustainable development goals. Such policy coherence may contribute to improving efficiency in the use of financial and human resources, and minimising misalignment between different policy objectives (e.g., climate mitigation, health and well-being, agriculture sector development, disaster risk reduction, water resource management, and conservation of biodiversity).

The following are key entry points for enhancing coordination and strengthening CRA governance arrangements:

1. Building inclusive governance arrangements for CRA

- a. Map the agri-food value chain, including women, youth, and other vulnerable groups (e.g., persons with disabilities and indigenous peoples).
- b. Build mechanisms for stakeholder participation in CRA policy, planning, implementation, and monitoring and evaluation, including in formally developed policy consultation processes, multi-stakeholder decision making bodies, farmer organizations. Utilise other arrangements including climate change engagement mechanisms such as those for the GCF.
- c. Facilitate understanding of stakeholders' respective roles and responsibilities and mainstream relevant CRA actions in their organisational plans.
- d. Engage with civil society organisations and the private sector, for assessing climate risks to the agri-food value chain and discussing associated policy options to address them.

2. Development of governance mechanisms for adaptive decision making

- a. Establish and enhance governance arrangements that support adaptive decision making for CRA, especially as it relates to the uncertainty presented by the identified climate hazards and their impacts.
- b. Explore and apply tools and approaches to support adaptive decision making with both vertical and horizontal exchange of information, robust decision making, and dynamic adaptive policy development pathways.
- c. Support continuous learning about climate risks and regularly adjust CRA actions and measures as needed.

3. Enhancement of governance for greater coherence across different development agendas

- a. Equip agriculture ministries and agencies with information and incentives to integrate CRA measures and that they are aligned and consistent with the national development agenda, and other policies and plans for building climate-resilience (e.g., NDCs, NAPs, ADRM and other DRR policies and plans).
- b. Strengthen inter-sectoral and inter-agency linkages for key facilitatory and support enabling factors including policy coherence (e.g., developing irrigation policy to address drought and water scarcity issues; land policy reforms to address land insecurity issues).
- c. Integrate CRA into a policy cycle with policy implementation at strategic, operational, and technical levels.
 - i. Strategic—alignment with international climate and agriculture agreements.

- ii. Operational—strengthened agriculture policy frameworks and institutional arrangements that support farm level and MSME implementation. Also ensuring alignment with national climate and DRR policies and plans.
- iii. Technical—strengthened technical capacity to assess climate and disaster risks and opportunities and prioritise CRA and DRR measures. Capacity and readiness of producers and agro-processors through harnessing skills and availability and access to financing are key.

4. Promoting PPPs for increased private sector investment in CRA

- a. Establish interlinkages and ensure alignment between CRA policies and broader country PPP policies.
- b. Utilise relevant PPP models that support the CRA transition, operating at different levels of the agri-food value chain.
 - i. Incorporate accurate, sustainable, and efficient distribution of risks and benefits between public and private counterparts of the transaction risk distribution.
- c. Build awareness on mechanisms for development of innovative partnerships, which can accelerate the scaling of CSA and climate information services.

H. Promote agriculture as a viable option for national economic development and livelihood enhancement

Despite declines in GDP contribution over recent decades, agriculture remains a significant contributor to socioeconomic development. Challenges such as climate change, aging farming population, inability to access credit, market access limitations, high cost of inputs, low productivity, praedial larceny, among others, have impacted the perception of agriculture as a viable livelihood generation option. Another critical issue facing the sector is the disparity in access to resources, goods, and services experienced by women, youth, and other vulnerable groups. As such, these groups require special focus to ensure they are not marginalised as the sector seeks to transition to CRA. While governments across the region have tried, through policies, plans, programmes and projects, to address some of these issues (e.g., in St. Lucia, the government has implemented programmes to encourage youth participation in the sector), a more streamlined and integrated approach is required. Equitable and sustainable agriculture sector development that results in livelihood enhancement for farmers will require:

1. Enhancement of productivity.

- a. Enable access to CRA productivity improvement technologies.
- b. Facilitate availability of technical services for CRA technology adoption.

2. Strengthened entrepreneurial and business outlook for CRA.

- a. Facilitate investment in agriculture through access to capital, land, labour, inputs.
- b. Engender market access through value chain diversification and expansion.
- c. Enhance capacity for adoption of best practices in agribusiness management at the producer level.

3. Establishment of mechanisms to create equity in access to resources, goods and services and decision making among women, youth, and other vulnerable groups.

- a. Develop financial products and services to support CRA adoption by women, youth, and other vulnerable groups that are:
 - i. Gender-sensitive
 - ii. Age-appropriate
 - iii. Geared towards incentivising PWDs, indigenous and other vulnerable groups.
- b. Engage women, youth and other vulnerable groups in agriculture advisory and decision-making bodies.

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Annex 1: Stakeholders Consulted

AgREADY Country	Stakeholder
The Bahamas (8 stakeholders)	Ministry of Agriculture Policy Planning & Research Unit
	CARDI—Bahamas Rep.
	Bahamas Agricultural Industrial Cooperation—General Manager
	Leader of the Free National Movement and former Minister of Agriculture
	BRON Intl.—Leading Climate voices in the country
	Bahamas Department of Meteorology—Head of the Climate Section
	University of The Bahamas—Climate Change Adaptation and Research Resilience Center—Current lead but the not the Executive Director
	BRON Intl.- Senior Environmental Scientist
Belize (8 stakeholders)	Ministry of Agriculture, Food Security and Enterprise (3)
	American Sugar Refining, Inc.
	Belize Agricultural Health Authority (2)
	Development Finance Corporation
	National Climate Change Office, Ministry of Sustainable Development, Climate Change and Disaster Risk Management
Dominica (16 stakeholders)	Ministry of Agriculture—Policy Formulation and Administration Unit
	The MET Office
	CARDI
	Division of Agriculture
	UWI, St. Augustine
	Benjo Seamoss (Private Sector)
	Dominica Export Import Agency (DEXIA)
	Central Universal Farmers Group
	Lands and Surveys Division
	FAO Correspondent
	IICA Specialist—Dominica
	Extension Unit
	GCF NDA (2)
	Ministry of Planning
	National Development Foundation of Dominica-Finance related
Haiti (1 stakeholder)	Ministry of Agriculture, Natural Resources and Rural Development—Forestry Unit

Saint Kitts and Nevis (23 stakeholders)	Department of Agriculture, Saint Kitts
	Department of Agriculture, Nevis
	Extension, Dept. of Agriculture, Nevis
	Water Resources Nevis Island Administration
	Small Business Development UNIT Nevis Island Administration
	Economic Affairs and Public Sector Investment Programme and GCF NDA Ministry of Sustainable Development St. Kitts
	Economic Affairs and Public Sector Investment Programme Ministry of Sustainable Development St. Kitts
	Project Analyst / (NDC Partnerships Co-Focal Point) Department of Economic Affairs and Public Sector Investment Planning Ministry of Sustainable Development St. Kitts
	Nevis Disaster Management Department
	Department of Planning and Environment Nevis Island Administration
	Farmers (9)
	Input Suppliers (2)
	Agro-processors (2)
Saint Lucia (14 stakeholders)	Water Resources Management Agency (3)
	Meteorological Service (2)
	Ministry of Agriculture, Fisheries, Food Security and Rural Development (2)
	Farmer Groups (3)
	Independent Farmers (4)
Saint Vincent and the Grenadines (13 stakeholders)	Ministry of Agriculture, Forestry, Fisheries, Rural Transformation, Industry and Labour
	Ministry of Agriculture, Forestry, Fisheries, Rural Transformation, Industry and Labour
	IICA
	CWSA
	Department of Forestry
	MET office
	SVG Technical College
	Farmers (6)
Suriname (12 stakeholders)	Ministry of Regional Development (2)
	FAO
	University of Suriname
	Retired Met Office Personnel
	Retired Agriculture Researcher
	Farmer Groups/Collectives (6)
Trinidad and Tobago (6 stakeholders)	NAMDEVCO
	Meteorological Office of Trinidad and Tobago
	Agricultural Development Bank of Trinidad and Tobago
	Network of Rural Women Producers in Trinidad and Tobago (NRWPTT) (2)
	IICA Trinidad and Tobago

Annex 2: Stakeholder/Consultation Mapping

GCF- AgREADY Project “Strengthening the foundation for a climate responsive agricultural sector in the Caribbean”

Policy Analysis: Stakeholders for Barrier Analysis

This document is a guide for National Liaison Consultants and IICA Country Teams on how to prepare for and conduct stakeholder consultations as part of the PA Barrier Analysis.

STAKEHOLDER/ENTITY	FOCUS FOR CONSULTATIONS
UNFCCC Focal Point or their designate (<i>written questions to be sent as follow-up to previous NDC discussions</i>)	<ul style="list-style-type: none"> Understanding of: <ul style="list-style-type: none"> how the government intends to roll out the work programme or the CC response programme the position of agriculture in the CC response programme the adequacy of agriculture in climate response plans and strategies
Ministry of Agriculture: <ul style="list-style-type: none"> Policy and Planning Unit Finance 	<ul style="list-style-type: none"> Mapping of the policy-making process or governance framework Framework involved in agricultural planning to determine gaps and opportunities for strengthening. Climate resilience in the ag sector <ul style="list-style-type: none"> Key climate and non-climate factors that threaten the food system Policy direction that considers climate change and especially climate projections Mainstreaming (climate resilience roadmap) climate change in agricultural policies, strategies, planning processes and budgeting Current and planned climate smart investments Assessment of GHG emissions from the agriculture sector with supporting mitigation actions (and any adaptation co-benefits) Roles of key institutions involved in policy, programming, coordination and resource allocation in the ag sector Impact of COVID-19 and any economic stimuli Impact of imports on food systems and food security Policies that support access to inputs Legislation for seeds and genetic material Regulations for timely access to inputs Availability of skilled workers along the value chain and strategies for youth engagement Barriers to, and challenges with, participation of women, youth, poor and PWDs Diversification and value addition, provision of climate-resilient production technologies, dissemination of climate information services, and availability of financial and insurance services Food safety concerns and efforts to minimise loss and waste Facilitation of PPPs Impact of trade policies on food systems Impact of policies on price and market conditions Project portfolio, particularly climate-changed based projects
Ministry of Agriculture – <ul style="list-style-type: none"> Marketing and distribution Data Management and Information R&D 	<ul style="list-style-type: none"> Climate resilience in the ag sector <ul style="list-style-type: none"> Key climate and non-climate factors that threaten the food system Current and planned climate smart investments Mainstreaming (climate resilience roadmap) climate change in agricultural policies and strategies Assessment of GHG emissions from the agriculture sector with supporting mitigation actions (and any adaptation co-benefits) Quality of technical information and communication with extension service and farmers Types of agricultural data usually captured and utilised Main challenges to information dissemination Impact of policies on price and market conditions Linkages and coordination across value chain phases

STAKEHOLDER/ENTITY	FOCUS FOR CONSULTATIONS
Ministry of Agriculture • Extension Services	<ul style="list-style-type: none"> Climate resilience in the ag sector <ul style="list-style-type: none"> Key climate and non-climate factors that threaten the food system Current and planned climate smart investments e.g., water adaptation measures Quality of technical information and communication with extension service and farmers Barriers to, and challenges with, participation of women, youth, poor and PWDs Linkages and coordination across value chain phases Role of traditional practices and impact on application of CSA Current agriculture climate resilience projects
Ministry of Agriculture (or other Ministry(ies)) • Land management • Water management	<ul style="list-style-type: none"> Policies that support access to inputs How is land categorised and what priority is given to agriculture land and its distribution? Programmes that support land tenure and agriculture land management Land distribution, including programmes that make provision for farmer groups and their associated costs and benefits Distribution of irrigation water Availability of irrigation versus rainfed water for farmers, including cost of water Impact of drought and extreme rain conditions on water availability Planning for irrigation water in light of future climate projections Current and planned water adaptation measures Current programmes that support water demand
Farmers' Groups (including youth)	<ul style="list-style-type: none"> <i>Focus group questions to be provided separately</i>
Academia and Non-Government Technical Service Providers	<ul style="list-style-type: none"> Role of R&D in food systems Main institutions driving research and summary of work being undertaken, including gaps, challenges and successes Main challenges disseminating information Key supporting organizations that facilitate access to key agricultural inputs. <ul style="list-style-type: none"> Roles of these organizations. Perceived barriers to participation Availability of skilled workers to support utilization of climate responsive technologies Ongoing programmes targeting youth to build capacities in climate resilient best management practices along the ag value chain Capacity in support organizations to manage the transitions to green technologies and sustainable development practices <ul style="list-style-type: none"> Adequacy of these institutions to manage the transition and associated standards Capacity in support organizations to provide market facilitation
Disaster Risk Planning and Management	<p><i>To be led by Dr. Vincent Little</i></p> <ul style="list-style-type: none"> How agriculture and food security are featured in emergency scenarios
Ministry of Finance / National Development Planning Entity	<ul style="list-style-type: none"> Importance of agriculture to national development (food security, exports, economic development) Impact of imports on food security and economic development Agriculture intersectoral linkages (e.g., agriculture-tourism, agriculture-health) Understanding of how the government prioritise industries including agriculture Financing framework, strategy for financing climate actions or low emission development.
Private Sector Stakeholders	<ul style="list-style-type: none"> Access to finance, risks transfer products or insurance, R&D, market access, access to inputs
Meteorological Office	<ul style="list-style-type: none"> Information sharing with the agriculture sector, climate services such as drought monitoring Access to weather data and data collection infrastructure such as automatic weather stations Capacity to transform information into decision support for the agriculture sector Current and future climate services for the agriculture sector
Development entities (FAO, IICA, CARDI, etc.)	<ul style="list-style-type: none"> Roles and responsibilities Climate resilience building support provided Current projects underway Capacity building support for climate resilience in agriculture Key value chains supported (if any)
Government marketing agency	<ul style="list-style-type: none"> Certification programmes to meet international standards Selection of international markets Priority markets for crops (what are the key exports) Promoting value addition



Inter-American Institute for Cooperation on Agriculture

Headquarters. P.O. Box 55-2200
San Jose, Vazquez de Coronado, San Isidro
11101 - Costa Rica
Phone: (+506) 2216 0222 / Fax: (+506) 2216 0233
e-mail: iicahq@iica.int

