AGRICULTURE AS A CATALYST FOR STRENGTHENING FOOD SYSTEMS RESILIENCE IN THE CARIBBEAN

AN INPUT FOR DISCUSSIONS IN THE AMERICAS LEADING UP THE UN FOOD SYSTEMS SUMMIT 2021

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Introduction

The Caribbean region is comprised of an archipelago of small island states, bordered by a few larger mainland continental territories within central and South America. Food system resilience in the Caribbean can be strengthened by addressing agricultural challenges and repositioning the sector as a central pillar for socio-economic development in all countries. To achieve this, CARICOM Heads of Government have emphasized the need for regional integration, with food and nutrition security cited as a major praxis for informing a more holistic and sustainable model for development in the Caribbean. To this end, the revision of the Treaty of Chaguaramas in 2001 to include a Common Agricultural Policy entitled

"the Community Agriculture Policy", has been implemented as a strategic action for transforming the agriculture sector to play a meaningful role in the Single Market and Economy and to contribute to improving food and nutrition security in the Region. Specifically, CARICOM Heads of Government have identified the need to strengthen regional integration as one of its ultimate objectives, with food security as one of its major components, in order to facilitate a holistic sustainable development model for the region.

One of these hurdles is the reduction of the regional food import bill, which has been steadily increasing over the last few decades, and has skyrocketed during the current COVID-19 pandemic. CARICOM's food import bill increased from USD 2.08 billion in 2000 to USD 4.75 billion in 2018, and the food import bill for 2020 is projected to climb to USD8-10 billion[1]. Achieving any significant reversals in this trend calls for an urgent strategy towards optimization and increasing agricultural total factor productivity for the Region. This heavy dependence on imported foods carries with it an undesirable health dimension, where Caribbean diets include ultra-processed food products high in salt, saturated fats, trans fats, and sugars. According to the Caribbean Public Health Agency, NCDs are the leading cause of death and disability; 76.8% of total deaths (non-Latin Caribbean, excluding Haiti) were due to NCDs in 2016. Therefore, the strengthening of regional food systems platforms and reorienting Caribbean eating habits towards more indigenous products, has been deemed a key strategy for reducing the prevalence of non-communicable diseases (NCDs) and their accompanying negative social and economic impacts on regional economies.

Another critical challenge for the Caribbean in past decades has been the identification and implementation of efficacious models that can maximize the benefits to be derived via an effective linkage between agriculture and the enormous tourism industry; but to date, this unfortunately has remained elusive. Notwithstanding the declines caused by the COVID-19 pandemic for 2020, from a structural perspective, the tourism sector accounts for nearly 50% of total contribution to GDP for several Caribbean Member States, and in the case of at least four territories surpasses that 50% threshold. This points to a real opportunity of a ready market for regional agriculture if innovative approaches that capitalize on the strategic advantages of regional agriculture and promote indigenous foods and cuisine are central to the tourism experience.

The high vulnerability of the Caribbean member states to natural disasters and constant economic shocks is also another critical dimension for analysis of the viability of regional agriculture. The ability of the agrifood sector to make vital contributions to food security and livelihoods is threatened by its high level of vulnerability to climate change. This vulnerability is increasing, as well as the growing pressure climate change and other factors are placing on the natural resource base (especially water and soil) on which agriculture depends. Despite this, the agriculture sector has not been meaningfully prioritized in climate finance programming and processes, neither at the local nor regional level, and there is a heavy reliance on external international donor funding sources for

building resilience in regional agriculture systems. Therefore, specific challenges remain for regional authorities to mainstream more low-emission and climate resilient agricultural production systems, processes, and approaches into development planning.

This paper represents an attempt to highlight some key developmental challenges currently facing regional agriculture and to suggest a framework and actions for effectively transforming the sector, within the context of the on-going preparatory process for the United Nations Food Systems Summit later this year. This underscores the need for an integrated approach which emphasizes the orientation of regional agriculture towards increasing its contribution to GDP; the role of agriculture in promoting a healthy population in the Region; technology and innovation as compulsory components of agricultural strategies; effective linkage of regional agriculture to tourism; and ensuring that newer and more climate responsive approaches to regional agriculture are adopted. We believe that addressing these key challenges along the proposed lines will lead to regional agriculture becoming a pillar for food system transformation and the sustainable development of Caribbean territories.

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Transforming the Agricultural Transformation Process

In a post-2020 global context, where eco-system preservation, economic growth and development and human survival are more inextricably intertwined than ever, the thinking on what it will take to 'transform' agriculture in a region that has seemingly graduated from (and even abandoned) its agrarian roots, also needs a transformation of its own.

The quest for Caribbean agricultural transformation is neither recent nor new

The Caribbean region has been pursuing agricultural transformation for at least four decades, and through formal strategies since the mid-1990 CARICOM Regional Transformation Programme for Agriculture (RTP) endorsed by Heads of Government and Ministers of Agriculture. As was typical with agricultural development initiatives, transformation was externally driven, and reactive, in response to a loss of preferential market access, which impacted an extremely narrow, but dominant, segment of the sector - the traditional export crop industries. Efforts at transformation were also driven by the need to correct the economic growth strategy imbalances, which saw heavy public and private sector investment in the services (hotels and tourism) and industrial (petrochemical, manufacturing, etc.) sectors, with no explicit mandate for backward linkages to, and inclusion of, the outputs of primary agriculture – crops, fisheries, livestock and forest products. In more recent times, agricultural transformation is seemingly more urgent and inevitable. This also appears to be driven by the cumulative impacts of repeated damage and loss from recurring extreme natural hazards that are threatening to undermine the very foundation of agriculture itself – its capacity to produce and provide food, at least through contemporary and traditional farming system approaches.

Transforming agriculture's transformation

The decades of experience in pursuit of agricultural transformation offer some critical lessons. Firstly, that the concept itself, i.e., what exactly is to be understood by 'transformation', requires revisioning. This revisioning should start with clarification regarding 'what' is to be transformed and 'what' should drive such transformation. The 'agriculture' that is typically subject to a transformation dialogue is limited to the primary sector – crops, livestock, forestry and fisheries. This must be understood as just one, albeit critical and pivotal, part of the food system. Economic theory posits that as an economy becomes more diversified and industrialized, the share of the primary sector relative to secondary and tertiary activities will decline. This declining sectoral share should not be interpreted as a declining sector, but rather a more dynamic and integrated macroeconomic structure. As other sectors expand, the value of outputs generated exceed that of the agriculture sector.

The concern therefore has, and continues to be, that while primary production activities in agriculture have been increasing as more persons enter the sector, the productivity of these activities has generally been low and declining, leading to generally lower volumes of comparatively lower valued outputs (raw materials vs. manufactured goods). Further, the bulk of the sector's output is generally not mainstreamed into national, regional and international food systems through trade.

The evidence, presented through decades of deceleration of growth relative to other sectors, reduction of share in Gross Domestic Product (GDP), continued constrained trade, as well as employment and income performance, suggests that agricultural transformation has either not occurred, or if achieved at a given point in time, has not been sustained. At the core, assessments of why agricultural transformation has not achieved any significant or sustained level, point to limited public and private sector investments that did not create the elusive enabling environment. This is also linked to deficiencies in targeting explicit investments and creating explicit mechanisms for agriculture's economic integration, recognizing that its expansion must be demand and market driven.

It is therefore essential that agricultural development be built into such investments and mechanisms for food system and economic integration, particularly with other sectors prioritized for accelerated expansion and on the receiving end of significant public and private sector investments, such as tourism.

What should drive agricultural transformation? Internal imperatives. Have these been defined at the national level, and what are the implications for collective regional action? Is increasing the sector's contribution to GDP a sufficient or even practical goal to drive agricultural transformation?

Core drivers of Agricultural Transformation

- ***Making the link between regional agriculture and regional health***

Past experience dictates that agricultural transformation must be driven by a recognition that, in the region, agriculture remains the only sector with inherent properties to provide food, which is a basic human right and increasingly, a national security imperative. As they develop economically, countries will increasingly source a portion of their food needs through imports. Most, if not all, Caribbean nations have arrived at an unsustainable food system imbalance, with imports of an extremely diverse basket of agricultural and food products accounting for a significant share of the national agrifood system. This outcome has created a distinctive vulnerability factor for the Caribbean linked to food insecurity and, by the nature of the food imports, a distinct association with public health vulnerability based on nutrition transitions, as evidenced in the rise in NCDs.

Ensuring the health of the regional population through food and nutrition must therefore drive agricultural transformation. If this is accepted, then the issue becomes, what is the most effective entry point, and the best strategy to deliver the results? In terms of strategic entry points, this must be defined in terms of a non-separation of nutrition from food, i.e. the 'food' promoted via a range of farming and production system investments, must be oriented toward simultaneously satisfying nutrition. Issues of genetic improvement of 'popular' plant and animal-based food products, as well as farming system approaches that can produce a constant stream of these products, unhindered by the disruptive 'seasonality' and 'natural disaster' elements, become essential components of any successful strategy.

There is an urgent short-term and long-term imperative to develop and strengthen healthy, resilient, and sustainable regional food systems through increased domestic production and trade. One objective from the Caribbean Community Agricultural Policy (CAP)[1] is *"To ensure that the regional food production, processing, distribution, marketing, trade, food safety, and agricultural public health systems can provide safe, adequate, nutritious, and affordable food for the region's inhabitants at all times, thereby achieving sustainable food and nutrition security".* However, achieving sustainable food production does not always translate to a more healthy and nutritious diet, but it puts food on the table. As a result, the region is grappling with non-communicable diseases that are linked to unhealthy diets, and this becomes a burden on the more vulnerable in society. WHO (2021) indicates that NCDs are the leading cause of death around the world.

One of the most common categories of food imported into the region, contributing significantly to the high import bill, is processed foods, which lead to excessive calorie intake and an increase in overweight and obesity, in turn leading

to NCDs. To prevent diet related NCDs, transformation in the food systems is needed so that nutritious, safe, affordable, and sustainable diets are available to all people. The link between agriculture, nutrition and health has been recognized in the Region for some time now, and there is the opportunity for both sectors to work together to solve the region's problems. In 1996, CARICOM Ministers of Agriculture in the Caribbean Declaration on Food Security stated that **"Food and nutritional security in the Caribbean is also related to chronic nutritional lifestyle diseases such as obesity, stroke and heart attacks…."** The linkage was subsequently reaffirmed in 2007 when CARICOM Heads of Government in the Port of Spain Declaration spoke of **"strong support for enhancement of food security; elimination of trans-fats from the diet; pursuit of fair-trade policies; and mandating of the labelling of foods"**. Now is a crucial time to invest in measures that will develop and strengthen our food sector to ensure sustainable access to safe and nutritious foods, both locally and regionally, barring hits on global trade. **The COVID-19 pandemic represents an opportunity for a paradigm shift in the Caribbean in the way we produce and consume healthy food. It presents an opportunity for a regional approach to achieving the goal of maximum food security, with support for sub-regional and national approaches to addressing the food self-security concerns.**

Such approaches also include action on the part of governments and the private sector to support smallholder farmers in livestock and crop production; to assist fisherfolk and fisheries to increase their productivity and market the food they produce; to **'eat what you grow'**; and to invest in healthy, resilient, sustainable regional food systems across the supply chain, including addressing intra-regional trade. The COVID-19 pandemic threatens to undermine the gains made in recent years in the prevention and control of diet-related non-communicable diseases (NCDs), as well as the maintenance of good health among people living with NCDs. As a significant net importer of food, with some countries importing 90-95% of what they consume, the Caribbean region is particularly vulnerable.

Within this context, strengthening local agriculture via the promotion of greater vertical integration within regional agriculture is an imperative for transforming the food system to ensure the supply of high-quality safe foods and a reduction in the incidence of NCDs. This calls for, but is not limited to, the modernization of food production and processing systems and creating greater awareness by consumers with respect to the quality of foods being consumed, through food labelling. *The modernization of food production and processing systems* would require food safety systems that reduce the chances of fresh produce and processed products becoming contaminated, given increasing consumer concerns about illness or death resulting from the consumption of contaminated food. In this regard, a key strategy must be the reduction of the occurrence of chemical, microbial and other types of contamination which have been reported in the Region. In the main, producers and processors play a pivotal role in this strategy by ensuring that their inputs and practices enable safe, high-quality food. Moreover, the public sector must offer services to underpin the implementation of food safety standards by the private sector and certify the safety of the foods consumed.

- ***Technology and innovation as the base for farming system resilience and agricultural productivity enhancement***

With climate variability and climate change, the inherent ability of agriculture to offset food and nutrition insecurity has been significantly undermined after repeated disasters from known natural hazards. Agricultural development initiatives have seemingly not established, over time, a firm and resilient base for sector growth from one period to the next. This fact should drive the internal urgency for transformation, as reflected in the current mantra of building back better, which implies that past rebuilding efforts were largely unsuccessful, thus placing the sector in a debilitating cycle of 'building back', i.e., recovery mode on loop, rather than a mode of productivity-driven growth. Productivity improvements through innovative technologies and practices that reduce farm system vulnerabilities and build resilience should drive agricultural transformation as a vehicle for enhancing viability, real and sustained growth and ultimately, strengthen its relative contribution to GDP. The goal of productivity-based agricultural transformation is not new. The point of departure, moving forward, is that productivity-based transformation must be underpinned by science, innovation and technology on a much broader scale and across all aspects of agile decision-making and actions, particularly now, in a highly variable and changing climate.

Some of the underlying causes of low productivity in Caribbean agriculture results from uncertified or low-level skill sets, inadequate management skill sets and entrepreneurship at the farm level, and low investment levels exacerbated by poor access to credit. However, these underlying causes are, for the most part, attributable to the extremely high climatic and crop insecurity risks associated with agriculture in the Caribbean, which severely compromise the narrow return on investment usually associated with small to medium scale agricultural production systems. The public sector response to low level private sector investment is inadequate research and development for Caribbean-adapted crop and livestock, as well as a frail extension and advisory services system, which are key drivers to promote transformation of agriculture in the Caribbean. As a result, the sector's growth and development has been apathetic and erratic at best, despite the abundance of poorly supported and underfunded development policies that have the potential to create employment opportunities and, more so, the potential for the required technological advancement in research and development.

Real growth in agricultural productivity is an outcome of multiple interacting factors tied to appropriate technologies and practices, policies and support institutions. Caribbean agriculture requires these factors in a well-coordinated, robustly supported system that is capable of quickly responding to the ever-changing demands of the agricultural systems in SIDS. Technology and innovation transformations are necessary to ensure the survival, and indeed the expansion, of agriculture to meet the goal of '25 in 5' championed by the Caribbean Community.

Technology (the practical application of scientific knowledge) and innovation (application of new knowledge to production or organizational processes) are twin concepts that provide a plethora of solutions to help in transforming the region's agriculture. Together, they form the core part of any strategy for agricultural transformation into the vibrant and competitive sector that the region seeks, to address its food and nutrition security and thereby reverse the trend of increasing food importation, now approaching five billion USD annually. This knowledge would have to be put into action in order to address the binding constraints identified above both at the supra national level and at the national level by the collective actions of stakeholders, including the producers, agricultural support services, academia and policy makers. There are several areas that could take precedence and feature in any such transformation. Some of the key fundamental innovation and technological developments that are required in Caribbean agriculture are outlined below.

Biotechnology provides an important point of departure to address low productivity in agricultural investments in appropriate crop and animal genetics to fully utilize genetic resources, along with improved practices that will provide the opportunity to increase yield, improve nutritional quality or make production more cost efficient and environmentally friendly across a swath of crop and livestock systems. These technologies, coupled with advances in the reduction of crop and livestock losses due to pests, diseases and poor nutrition, will significantly improve the productivity of Caribbean agricultural systems. Higher cost-effective production systems will drive investment in appropriate upstream industries utilizing these agricultural raw materials, given the economies of scale required for value addition. While such investments are already taking place, there is need for these activities to be more coordinated and further expanded to respond to the needs of a wider array of the productive sector in agriculture across the region.

The opportunities presented in the innovative revolution of the circular economy is currently a missed opportunity in Caribbean agriculture. Management of agricultural waste, which is currently a cost to agricultural and agro-processing operations across the Caribbean, can be converted into a source of income through appropriate recycling technologies.The ability to create wealth from agricultural waste will open up opportunities for those with less than optimum agricultural lands, in addition to lowering the initial inoculum of pests and diseases that find refuge in poorly discarded agricultural waste. This results in less use of pesticides, thereby reducing the harmful effects to biodiversity and human health as well as making Caribbean agricultural systems more cost effective.

Digital technology will be an important facet of the new agriculture, providing the means to integrate agricultural production from the farm to the consumer. Digital technologies have the potential to provide agriculture with the tools, information and e-commerce to make timely decisions and improve productivity. Such digital technologies, including a wide array of internet applications, mobile technologies and devices, artificial intelligence, digitally-delivered services and apps, are widely available. The ever-improving broadband services and investment in IT infrastructure in the Caribbean makes the use of this technology very feasible. Communication tools are an especially important asset in the digital age. Such tools can be used to enhance the exchange of information and communication between farmers, extension workers and other stakeholders in the agricultural innovation systems throughout the region.

Increasing climate variability and the existential threat posed by the more frequently occurring 100-year climatic events – droughts and storms – is a direct threat to the development of Caribbean agriculture. Innovative climate change adaptation and mitigation measures are pivotal on lists of priorities for a sustainable and developed agriculture sector in the Caribbean. This requires responses to build resilience in farming systems through education and training of the sector stakeholders. This must be conjoined with investments in on-farm adaptation strategies that incorporate new technologies for soil, water and crop management on farms. Examples of the types of adaptation required include water capture and storage, irrigation systems to mitigate agricultural droughts and its slow onset, development and/or utilization of new drought tolerant crop species and improved land management practices, soil amelioration strategies that emphasize the utilization of waste, and efficient and effective agrometeorological services. Climate change and urbanization are rapidly reducing the availability of arable land in the Caribbean. As such, an expansion of the innovative green cities conceptual framework by incorporating agricultural production systems that meet these criteria in the urban landscape of the Caribbean, may be a necessary adaptation strategy to climate change in achieving food and nutrition security.

These and other appropriate innovations and technologies can become a reality with correct institutional frameworks for robust planning and policy that prioritize and support research and development needs, extension services reformation and protection of private sector investments in the Caribbean agriculture sector. This will create the enabling environment to capture the opportunities for strengthening the production and productivity of agricultural supply chains in the Caribbean.

- ***Capitalizing on the Agriculture-Tourism Concurrence***

The Caribbean is the most tourism-dependent region in the world. The tourism sector accounts for approximately 50% of GDP in Member States, and is the biggest contributor to the creation of jobs and the earning of foreign exchange for the Caribbean economy, accounting in 2019 for 35% of employment, with the accommodation and foodservice sectors representing 13.0% of women's employment and 7.4% of men's employment. Furthermore, women represent 62% of employment in accommodation and food service activities in the Caribbean, while Micro, Small and Medium-Sized enterprises (MSMEs) represent the bulk of tourism firms. In 2019, the Caribbean rebounded strongly from a decline in 2018 (-0.7%). An estimated 31.5 million tourist visits were recorded among Caribbean destinations in 2019, which was a new record for the region. For the seventh consecutive year, cruise business in the Caribbean region also grew. The total estimated number of cruise visitors descending upon the region during 2019 increased by 3.4% to approximately 30.2 million, a new record. **All of these gains up to 2019 have now been severely derailed by the COVID-19 pandemic, presenting** both the agriculture and tourism sectors with a major and evolving challenge. The closure of hotels and restaurants and the domino effect this has had on employment, combined with the need to maintain adequate food supplies, have underscored the critical need for strengthening linkages between agriculture and tourism, and for diversification and re-imagining of the existing tourism product. Moreover, the restrictions on food exports from major suppliers in the USA is drawing attention to the need for greater food security and strengthening of intra-regional production and trade to satisfy both domestic and tourism markets across the Region. It is imperative in this period of downturn to continue to strengthen the policy and institutional framework for promotion of agrotourism linkages, and build the reliability of national and regional food supply systems (both in terms of production and processing), thus mainstreaming the utilization of technology for online trading (procurement and payments).

A sustainable, functional, interconnected system of identified commodity exchanges within CARICOM needs to be established in order to provide a reliable food supply system to service trade with the tourism and hospitality sector in the Region. These logistic reorientations of commodity movements within CARICOM should promote green supply chains or logistics pillars that will enable member countries to address climate-related and local environmental impacts caused by the transport of goods, and enhance the competitiveness of their exports through less carbon-intensive value chains. Blockchain design can offer opportunities to be built into these trading systems, on the agreed need to bring transparency to agricultural financial transactions, data transmission, credit history, and financial agreements for smallholders and others with a vested interest in regional agricultural commodities trading.

Significant potential exists to position the Caribbean as a world class Food Tourism destination, offering authentic and unique cuisine based on the use of local ingredients and championed by a cadre of chefs and culinary professionals committed to promoting the food culture, traditions and biodiversity of the Region, and to ensuring

food and nutrition security for locals and tourists alike. With regard to the rural sector, and in light of the increasing demand by visitors to pay more for community-based farm to table experiences, the promotion of food tourism can contribute to the reactivation and dynamization of the rural economy and sustainable development, through the identification and strengthening of agrotourism initiatives and commercialization of the selected value chains. It is therefore critical to build capacity in rural communities and with farm families, and particularly among women and youth involved in the culinary arts, so as to develop new and unique tourism offerings that can satisfy these emerging trends, within the reality of creating safe "bubbles" and "corridors" in compliance with COVID-19 protocols, and providing the assurance of safe and healthy food and traceability at all locations.

The multi-dimensional nature of both agriculture and tourism demands coordination of policy imperatives and a multi-sectoral and multi-layered approach for addressing cross-cutting issues, at both the public and private sector levels, among ministries of agriculture, rural/community development, tourism, transportation, health, energy, environment, education, public works, trade and economic development, and with development partners and donor agencies. There is also very little dedicated finance and investment support for agrotourism in the Caribbean Region. Development banks have indicated very low uptake by clients of resources for agriculture-tourism ventures, and the potential needs to be exploited.

- ***Towards a More Climate Responsive Regional Agriculture***

The situational analysis of the impact of climate change on food system resilience in the Caribbean, which requires regional actions to develop a more climate responsive agriculture can be summarised in three (3) key messages (Taylor 2021; IPCC 2018): i) ***Take note*** that global temperatures resulting from human-induced climate change has already increased by 1^{0}C, and that the associated negative impacts on agriculture are proving difficult to manage and are threatening the reliability of the sector as a developmental pillar in the Caribbean, ii) ***Take into account*** that we are on track to surpass a 2^{0} C increase in temperature which will result in "unprecedented" impacts on the sector and render developmental goals (international, regional, and local) "unattainable" and iii) ***Take regional-climate action*** to build an evidence-based agriculture sector that can be sustainably financed to build food, nutrition, and livelihood se curity along a low-carbon/resilient developmental paradigm. Collectively, these key messages speak to the profile logic of an unprecedented climate-related impact on agriculture (*hazard and impact setting*), which can render the sector as an "unreliable" developmental pillar, therefore emphasizing the urgency for strategic regional action to systematically build climate resilience in the agriculture sector as a foundation for securing food, nutrition, and livelihood security. In this light, agriculture is positioned as part of the solution for addressing climate-related risks and building the resilience of food systems and livelihoods.

With respect to the message of ***taking note***, the agriculture sector is one of the most vulnerable sectors to climate-risks (climate change and variable) due to its high dependency on natural system resources such as water, soil and air. Owing to its largely rain-fed nature, agriculture in the Caribbean depends on the "familiarity" of climate patterns to sustain or enhance its development, production and productivity indices, and overall contribution in achieving socio-economic goals. However, changes in climate patterns, which are punctuated by more variable rainfall, hotter and drier days, sea level rise and an increase in the frequency of extreme tropical cyclones, (Climate Studies Group Mona, 2020), have created a level of "unfamiliarity" that exacerbates existing challenges in agriculture and presents new mitigation and adaptation challenges. These challenges and impacts are current, affect all aspects (infrastructure, production, food quality, market prices and accessibility) of agricultural food systems and result mainly from the vulnerability of the Caribbean to multiple hydrometeorological hazards. In the region, hydrometeorological hazards (floods, droughts, and tropical cyclones) have been associated with 85% of all natural disasters that have adversely impacted food and livelihood security in the Caribbean from 1970 to 2014 (FAO, 2018). Moreover, the vulnerability and impacts of hydrometeorological hazards on agriculture are often exacerbated by predisposing factors such as poor land use, environmental management, socio-economic coping strategies and practices (IPCC 2012). To this extent, the cumulative agricultural production losses from the impacts of disasters in the Caribbean, expressed as a percentage of potential production, is more than twice the global mean value, and is the third highest among developing regions. Subsectors of agriculture are impacted differentially by specific hydrometeorological hazards. For example, crops, fisheries and aquaculture are more adversely impacted (damage and loss) by floods (45-65%), livestock by drought (86%), and forestry by storms (64%) (FAO 2018). This suggests that adaptation planning for agriculture, whether regional or national, must be tailored to reflect and address subsector differences, even if a regional action plan is developed.

Take into account that with the 1°C increase in global temperatures, the Caribbean countries are already incurring considerable costs to cope with and adapt to climate impacts, which often exceed their financial capacity. Estimates of the economic impact of climate change for Caribbean SIDS are generally higher than world average (>5% of GDP/year), with costs projected to surpass USD 22 billion per year by 2050 (Aveceo 2014; 2016). This will account for approximately 10% of the current size of the Caribbean economy if adaptation measures are not successfully implemented (Atteridge et al. 2017). For these reasons, many Caribbean SIDS depend on external financial support to supplement the expenditures of national and local governments, which often have weak or volatile finances (i.e., high levels of public debt and low economic growth rates). This international support is likely to remain critical in efforts to build resilience to climate change and invest in low-carbon development in the Caribbean. However, the current track to surpass a 2 0C increase in global temperature, which is associated with projections of "unprecedented" (Taylor, 2021), impacts on the sector, further increases the financial resources needed to cope with and adapt to climate-related risks and achieve sustainable development goals. The strain of financial resources further

increases with the growing importance and impact of other hazards such as, earthquakes and volcanic eruption, and biological risks (COVID-19 pandemic).

The justification for ***taking regional climate action*** is embedded in common climate risks, socioeconomic profiles and challenges, as well as a robust and regional policy framework and strategies that can build the comparative advantage of individual Member States to improve availability, accessibility, and affordability of food, especially for the most vulnerable. Perhaps the most important policy in this regard is the CARICOM Regional Food and Nutrition Security Policy (RFNSP), which provides a coherent, convergent and comprehensive framework within which national governments, civil society and private sector actors can join forces with regional organizations and development partners in cross-national, multi-sector and synergistic partnerships to identify, finance, implement and monitor an integrated set of concrete actions to achieve the four objectives of a) food availability; b) food access; c) proper food utilization for good health, nutrition and wellbeing; and d) stable and sustainable food supplies at all times. Annexed to the argument of policies and other commonalities as justification for a regional approach, is a suggested summarized paradigm shift statement that **"IF"** Caribbean countries recognize the key role of agriculture in the climate solutions, and invest in compiling the necessary data and information to make informed decisions to guide the sectoral response to climate change, **THEN** those countries will be able to design and execute effective agricultural programmes that are aligned with national and global climate and development priorities **BECAUSE** they will have the institutionalized priorities, needs, systems and processes in place to support coordinated investment in adaptation and mitigation." This statement has been articulated in the First Green Climate Fund Readiness Project focused on *"Strengthening the foundation for a climate responsive agricultural sector in the Caribbean"* at a regional level, which will be implemented by IICA from 2021-2023. Beyond the project scope, this is viewed as a foundational part of an evidence-based and inter-sectoral strategy for developing and rebranding Caribbean agriculture as "low-emissions", to enhance market opportunities and attract private sector investments.

Collectively, foundational activities for i) improving processes and guidelines for effectively engaging agricultural stakeholders and building their capacity to provide evidence-based input to climate action programming; ii) developing consolidated and validated frameworks and workflows (i.e. methodologies and tools) for evidence-based analyses to guide investments towards a more climate responsive agriculture sector (Cerano et al, 2020); iii) preparing climate change-agriculture case studies (Roop and St. Martin, 2020), a knowledge management portal, and occupational competency standards to support the dissemination of best practices and building skills of youth to support climate action; and iv) increasing the number of quality agriculture-focused project concept notes developed and submitted, will better inform the development of actions to reduce the vulnerability of the agriculture sector to climate change-related hydrometeorological hazards, which will support a more stable food system. To this end, deliverables from these actions should focus on creating a strong and comprehensive mitigation and adaptation agenda for agriculture (which accounts for future challenges and recognizes synergies and trade-offs, as well as sustainable financing and investment.

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Closing remarks

Notwithstanding the trends observed in the last decades with massive shifts to tourism and other sectors, agriculture remains intrinsically important and a critical component of the economies of all countries in the Caribbean Region. Agriculture, if properly managed can, arguably, be the safest option to usher in new prospects for long-term sustainable socioeconomic growth and development to the Region. Understanding and managing the agricultural transformation as a complex process with drivers that are multidimensional, interrelated and highly dynamic, is central to creating a development framework that is relevant, enabling and self-sustaining.

Agricultural transformation has and will continue to need significant reversals in decades of institutional deficiencies, low and declining public sector budgets, limited private sector investment, diminished operational capacity within ministries of agriculture and constrained incentive and capacity of farmers/fisherfolk to integrate, apply and sustain productivity-enhancing good practices, innovation and technologies.

Institutional transformation, at all levels, has lagged, but needs to be urgently addressed for agricultural transformation. This must facilitate and enable dynamism and growth in the sector which, in turn, will attract investment to fuel expansion, not only in the production of primary output, but more importantly, to drive agrifood manufacturing, domestic market distribution and international trade. This, in turn, will lead to the ultimate goal which is marked improved performance, relative to other sectors, that increases its export earning capacity and contribution to GDP. In short, the ultimate aim will be to enhance the multifunctional nature of regional agriculture for the benefit of all.

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