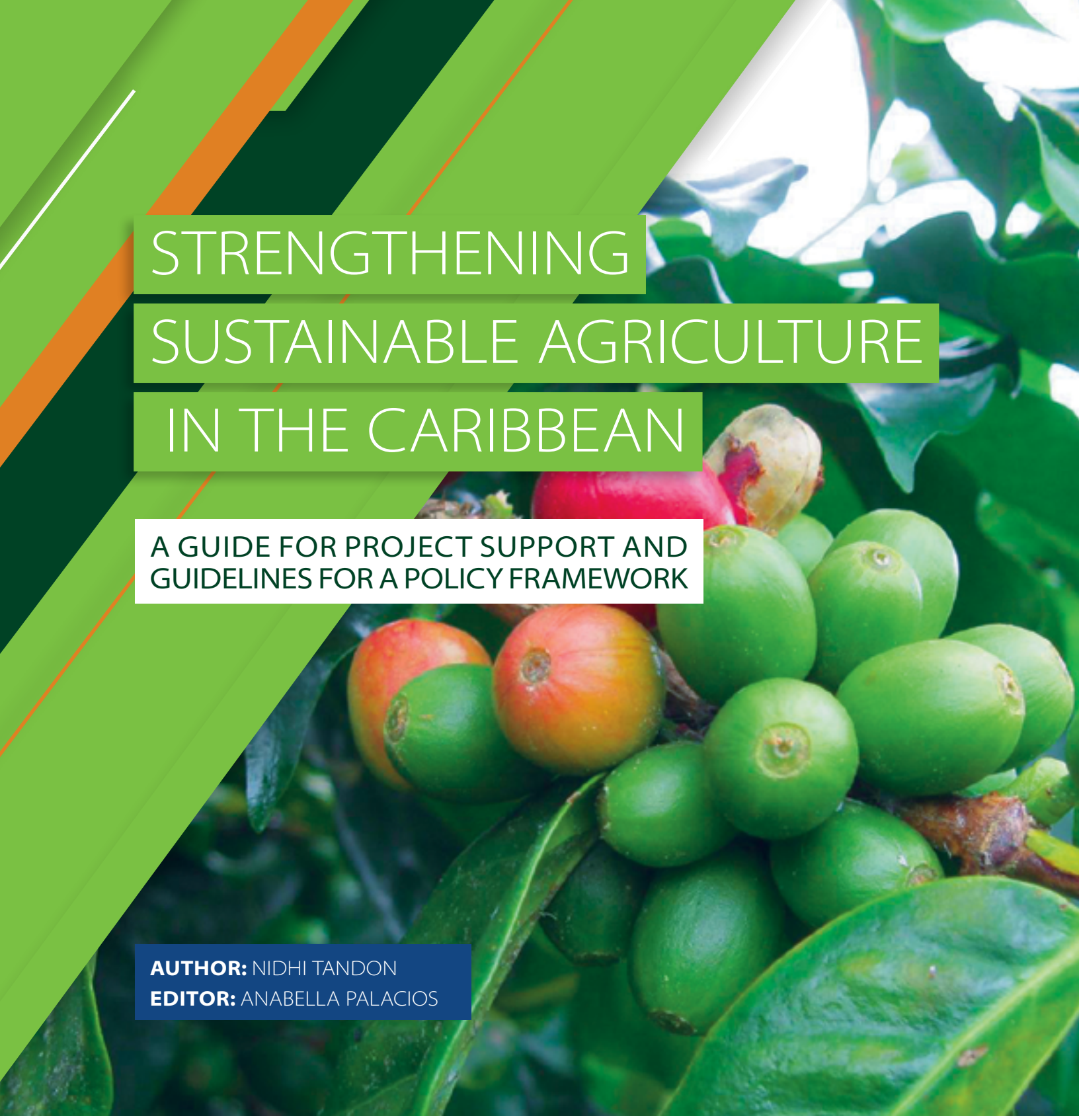
STRENGTHENING SUSTAINABLE AGRICULTURE IN THE CARIBBEAN

A GUIDE FOR PROJECT SUPPORT AND GUIDELINES FOR A POLICY FRAMEWORK



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COMPETE CARIBBEAN

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Strengthening Sustainable Agriculture in the Caribbean

A GUIDE FOR PROJECT SUPPORT AND GUIDELINES FOR A POLICY FRAMEWORK

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Alejandro Escobar and Anabella Palacios from the Access to Markets Unit at the MIF coordinated this work.

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The Multilateral Investment Fund (MIF), a member of the Inter-American Development Bank (IDB) Group, is funded by 39 donors and supports private sector-led development benefitting low-income populations and the poor - their businesses, their farms, and their households. A core MIF mission is to act as a development laboratory in order to build and support successful micro and SME business models.
More information at www.fomin.org.

Compete Caribbean is a private sector development program that provides technical assistance grants and investment funding to support productive development policies, business climate reforms, clustering initiatives and Small and Medium Size Enterprise (SME) development activities in the Caribbean region.

The program, jointly funded by the Inter-American Development Bank (IDB), the United Kingdom Department for International Development (DFID) and Foreign Affairs, Trade and Development Canada (DFATD), supports projects in 15 Caribbean countries. Projects in the OECS countries are implemented in partnership with the Caribbean Development Bank.
More information at http://www.competecaribbean.org/

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Preface

Over the past two decades, agriculture in the Caribbean has been in a state of decline, in terms of both productivity and competitiveness. Historically, Caribbean agriculture consisted of the production and export of traditional bulk commodities, notably bananas and sugar, as well as rice, coffee and cocoa. This activity was based on preferential trade arrangements with the European Union, under the Lomé Conventions and The Cotonou Agreement. With the removal of preferential access based on quotas for traditional crops and other reforms to the EU's trading policies, as well as the increased pressure of globalization, Caribbean agriculture has struggled to compete internationally, and has experienced considerable reductions in the production of crops for local consumption as well.

Agriculture is also a key source of employment in many Caribbean countries, accounting for approximately 16% of the overall employment in the region — 30% in Guyana, 25% in Dominica, 20% in St. Lucia, and 18% in Jamaica. Continued decline in agriculture will therefore have significant impacts on the economic and social viability of rural communities; and if left unchecked, will likely result in deterioration of real incomes and an increase in poverty rates in rural communities.

Through their work in private sector development, the Multilateral Investment Fund (MIF), a member of the Inter-American Development Bank (IDB) Group, and Compete Caribbean (CC) are dedicated to fostering economic growth and revitalizing this key sector in the Caribbean. The MIF and CC commissioned this study on sustainable agriculture initiatives in order to identify its constraints for development at both the systemic sector level and at the farm level. Since agricultural production in the region is dominated by smallholder farmers who are undercapitalized, technologically conservative, unaware of best practices and certification standards, and extremely vulnerable to climate change effects, a policy framework should be established to support coordinated investment.

Innovative ways of promoting competitiveness and growth are needed if the Caribbean region is to revive its agricultural sector. Promoting sustainable agriculture is one option as shown in this report. Some countries in Latin America have pioneered the adoption of organic farming by small farmers through technical assistance projects supported by the MIF and other donor organizations that encourage the use of local resources and non-chemical inputs and advise farmers' organizations on marketing techniques. These types of projects have indeed increased farmers' income and boosted sector growth. However, a comprehensive understanding of their successes and challenges, as well as data analysis, are needed to drive policy and concrete practical actions.

Caribbean small island states could identify areas of competitive advantage in agriculture as their economies transition away from traditional commodity crops. The small size of the countries results in high production costs and limits the exploitation of economies of scale; therefore high-

value niche products are more likely to be competitive than traditional commodity crops under such conditions. This could help supply the dramatic growth in global demand for organic and/or sustainable production, especially in the European Union, United States and Japan. This report suggests potential means of further support and explains how the Caribbean could benefit greatly from introducing sustainable agriculture practices that generate better social and environmental benefits, much as countries in Latin America have. However while it seems logical for Caribbean small farmers to concentrate on organic and/or higher value niche products (such as organic vegetables, spices, coffee, specialty grains, seafood, oils, and cocoa), there are still challenges in promoting and attracting investment in this area. This publication aims to encourage public officials, international experts and local farmers to work together and provide insight into the design of incentives and adequate infrastructure support to make the most of these current conditions and opportunities.

This publication is divided into five sections. The first section is an introduction, followed by a brief discussion of the definition of sustainable agriculture in the second section. In the third section, key questions for balanced sustainability assessment are presented. In the fourth section, a few recommendations for policy design in order to strengthen the current weakness of the policy framework in the region are offered. And finally, a few practical actions that can be implemented using a public-private partnership approach at both the farm/producer level and at the industry/sector level are suggested.

This publication represents a shorter version of longer version of the report written by the author and aims to present a clear-cut and concise report for MIF and CC further project support and summarize some points for policy guidelines.

Special appreciation is extended by the MIF's project team leaders to the Compete Caribbean team and to MIF colleagues Wayne Beecher, Vashtie Dookiesingh, Hubert Forrester, Ruth Houliston, Winsome Leslie, Ishmael Quiroz, and Elizabeth Terry for their valuable support and comments. Thanks also go to the author of this study, Nidhi Tandon.

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1 Introduction

Today's model of industrial agriculture is very energy intensive. Inputs for agriculture have increased significantly, particularly for land preparation, fertilizer (primarily nitrogen), and irrigation. This is also reflected in the close correlation between crop and oil prices, making high-input agriculture even less profitable and exceedingly volatile for consumers. The full production and supply chain of industrial agriculture accounts for around 30% of total global energy demand. Caribbean governments and policy makers, agri-businesses and farmers, and ultimately consumers, will need to consider models of farming that are tenable in the long run, minimize dependence on expensive inputs, can supplement the fresh food and nutritional requirements of local consumers, and earn income from overseas markets once domestic needs have been fulfilled. Fundamentally, agriculture is about science and business – where the laboratory is often times the farm, and the business of farming walks a fine balance between risk and revenue from field to table.

This study provides an assessment of the sustainable agriculture sector in five countries of the Caribbean region: Barbados, Belize, Dominica, Guyana, and Jamaica. It analyzes the constraints to its further development and aims to share lessons learned from existing undertakings or experiences carried by international donor organizations, public agencies and non-governmental organizations (NGOs). It aims to identify gaps and opportunities to inform policy design, investments and practical steps that can promote sustainable agriculture in this part of the region. The report's recommendations are intended to advise decision making, programming and investments at the sector and farm/market level.

Citizens and consumers across the board are keen to see the sector fulfill its potential; long-time estate and plantation managers of sugar, cocoa, coconut, bananas and citrus in these countries are committed to seeing these sectors diversify into new lines of product development, new markets and new formulations—even if it might mean downscaling to adapt management capacities and investment. A growing number of farmers are securing organic and other certifications to differentiate and distinguish their products and their mode of production, and a younger generation of professionals who have inherited land or are graduating and seeking new opportunities is entering the agricultural scene with new visions, fresh ideas, seed capital, technical know-how, and determination.

According to a recent report released by the United Nations Conference on Trade and Development (UNCTAD) the fundamental transformation of agriculture may well turn out to be one of the biggest challenges of the 21st century. A slowdown in agricultural productivity, population increases in regions where the effects of climate change are hitting the hardest (such as the Caribbean, Africa and South Asia), and the environmental toll of current agricultural practices are important factors affecting food security for the entire planet. Although actual results from related investigations suggest that a change in paradigm is emerging, systemic support for this shift is still lacking. Meeting

food security challenges is also largely related to the disempowerment of the poor, and the inability of poor residents of rural areas to be self-sufficient.

For these reasons, this report seeks to inform policy makers and staff members of international organizations about important subjects and points raised by farmers, producers' organizations, public officials, and entrepreneurs regarding sustainable agriculture in this part of the globe. It will briefly state what is important to keep in mind when designing new projects affecting the agricultural industry and list a few recommendations for policy design and for investment standards, and finish up with practical actions for investment and support.

The findings of this report are drawn from field visits and observations of farmers and agents in the agricultural sector in the five Caribbean countries mentioned above during June 2013. Over seventy-five meetings were conducted to bring a diversity of insights and opinions to this report – many of these perspectives are highly contextualized and personal. A high proportion of meetings were with government and intermediary agencies. Meetings with farmers involved on-site visits where possible. Given the range and diversity of the farms, no comparative data was collected. In Belize, Romaldo Lewis, a local expert hired for this study, identified key actors in the public and private sectors, including service providers, credit unions, plantation managers and senior ministerial staff. Special thanks go to him and to the rest of the collaborators in the field for organizing meetings and contributing invaluable local sources and knowledge. The study relies heavily on the inputs and experiences of local and regional agriculture experts and incorporates information from research publications and third-party published sources to further substantiate the evidence.

Nidhi Tandon

2 Defining Sustainable Agriculture

Sustainable agriculture in this study should be understood as "agricultural investments, or agricultural projects, that include small and medium sized farmers as key players of the value chain, and which have adopted explicit strategies in its production and commercial cycles (processes) to sustain the business model in the long term and have a positive impact on the environment, on the families and farmers that are a part of the supply chain, and the overall community, and that are profitable. This could include businesses and projects in the food and agribusiness sector that specifically source their key products from local sustainable farmers or agricultural producers.

However, the term "*sustainability*" is a strongly value-laden term; it attempts to be a catch-all word for environmentalists and economists alike yet can be interpreted and applied very differently depending on the context and the drivers. It is not, however, a new concept, having been adopted early on by timber and mining industries with vested interests in ensuring that forests or water were conserved and maintained to supply infinite raw materials. Amongst its key conclusions, the United Nations Conference on Trade and Development (UNCTAD)'s Trade and Environment Review for 2013[1] emphasizes that the world needs a paradigm shift from conventional, monoculture-based, high-external input dependent agriculture towards regenerative production systems that also improve the productivity of small scale farmers. There is a need to interpret sustainability from a more holistic point of view, recognizing the farmer as a producer and a manager of an ecological system that provides a large number of public goods and services as well, such as water, soil, landscape, energy, biodiversity, and recreation.

In this sense, there are many factors when considering sustainability and there have been several attempts by industry and research alike to compile indicators and indexes with which to measure sustainability, including the Sustainable Agriculture Initiative (SAI) Platform[2], the Common Code for the Coffee Community (4C Association) and the Round Table on Responsible Soy (RTRS)[3]. An important effort to compare data has been done by the Committee on Sustainability Assessment (COSA) which for the first time released global data documenting the sustainability of certified farms around the world at the Rio+20 United Nations Conference on Sustainable Development in 2013. The dataset, collected over four years, includes surveys of more than 5,000 farms from eight countries representing the most extensive global effort to enable comparative analysis of the impacts of standards across multiple initiatives, countries and sectors.

A comprehensive survey in 2012 found that farmers in the Eastern Caribbean countries commonly defined sustainability in terms of soil and water conservation, and identified "sustainable practices"

as the ways in which land is cleared, erosion reduced and soil health improved. Furthermore, water conservation as opposed to rainwater harvesting and storage was an over-arching concern.[4]

However, in some ways the term "sustainable" does not sit comfortably with agriculture. Agriculture is inherently a risky undertaking and its level of sustainability is predicated by the minimizing of risks. The pre-and post-harvest periods are full of unknowns –unpredictable weather, potential loss from disease or pests and in some instances theft, combine with high transaction costs, market prices that cannot be relied upon, variables posed by the stringent expectations of a discerning market for food safety and all kinds of other standards to make the business a challenging undertaking at the best of times. Issues such as crime, vandalism and larceny are major concerns to contend with (and are ranked as the most problematic factor for business in Jamaica and in Guyana[5]).

Another urgent risk producer is climate change. The 2013 Global Climate Risk Index, which analyzes the climate-related vulnerability of the world's countries, ranks the five countries in this study as follows: Belize 26, Jamaica 51, Dominica 53, Guyana 97, Barbados 145 – indicating that Belize is the most vulnerable of the five[6]. An ECLAC study anticipates that "the negative effects of climate change are worse in countries like Belize where there are particularly vulnerable regions as well as groups that are relatively more exposed to climate changes, have few adaptation capacities and little potential for recovery".[7] The anticipated implications for small island states in particular are well documented. The Force 5 Hurricane Ivan in 2004 heralded an ominous change in weather patterns with more frequent and more severe storms devastating the region, increased rainfall causing severe flooding and with periods of drought.

These various attempts at conceptualizing an array of agricultural philosophies and practices gain an added sense of urgency in light of the compounding effects of population growth and natural biodiversity loss. This report does not apply an empirical measurement of sustainable agriculture; rather, it examines a range of examples, business models and social organizations around production, which, together, suggest that innovative ways of doing things have been emerging across the Caribbean region for some time. There is a need for the sector to explore methods that can address the long-term implications of producing from the land, the legacy of agriculture for generations to come and the wide range of hazards described above.

It is precisely these challenges that are driving innovation, the desire to diversify, and improvements in ways to forecast and prepare for the essentially unpredictable. This innovation will doubtless require more resources in the form of funds and technology, but equally has to be about how people are organizing themselves around production, through pooling and conserving resources and through cooperating to be more efficient producers with each other. This will be particularly important in the Caribbean context where hurricanes are expected to be increasing in strength over time and the symbiosis between communities and their immediate eco-systems needs to be immeasurably strengthened.

3 A balanced Sustainability Assessment

WHAT TO AIM FOR IN IDENTIFYING SUSTAINABLE AGRICULTURAL INITIATIVES

This publication recommends that a balanced sustainability assessment needs to ask the following questions:

- Is the production scale manageable?
- Is the business commercially and financially viable?
- Are there value-added features, including alternative production methods?
- Are there strong links with other growth or smart sectors?
- Is the production model ecologically sound?

Each of these questions is explored conceptually in this section to offer a composite portrait of the potential of sustainable agriculture in the region (illustrated with the letters "S.C.A.L.E." in the figure below).

↘
Political, financial, and regulatory framework underpinning sustainability goals

SIZE: OPTIMIZATION OF SCALE OF FARM
COMMERCIAL VIABILITY
ADDED VALUE AND NEW ALTERNATIVES
LINKS WITH SMART SECTORS
ECOLOGICAL FACTORS

1.
SIZE - OPTIMIZATION OF SCALE OF FARM

On a farm, there are differences in concepts, approaches and outcomes depending on the scale of the agricultural activity. In many ways, scale is really about management capacity in relation to the overall production size, and is managing production, what the grower or community can actually manage in order to stay in operation – this includes stability and consistency and a level of self-sufficiency.

Farming an acre of pineapple or cocoa requires a lot less attention than growing leafy greens and salads. In fact, one reason tree crops like cocoa do so well in the region is precisely because they are not labor intensive and require minimal management. Pineapples need more management – while they do self-propagate, they need to be replanted regularly.

What this boils down to in its essence is whether the production scale is manageable. In this sense, it is a human capacity variable, not just a day to day affordability concern. Many small farmers stay small because of the management requirements of the farm and the difficulty of attracting and paying good farm managers who will work on a small scale and who understand small farms and ecological issues. Assessment tools that weigh out the needs and capacity constraints of producers at the farm level need to be implemented, and issues such as time management and land clearing methods must be considered. Scale in this context can be measured by physical attributes of the farming business size, but also by the level of ownership and stake in the production decisions, processes, proceeds and reinvestment related to the farm.

2.
COMMERCIAL AND FINANCIAL VIABILITY

a. Regular record keeping: A surprising number of small-scale farms do not keep regular financial and production records and so do not actually have up-to-the-minute information, making any kind of dollars-and-cents planning more difficult to manage. These records would include economic returns over time, market size, exposure to financial risk, costs of production, and competitive advantages. Small-scale farms are less likely to consider taking out loans if they cannot track basic elements of financial performance, including repayment ability, solvency and backup liquidity.

b. Maximizing resource efficiency: Commercial viability is increasingly about maximizing resource efficiency while reducing negative environmental impacts in the face of business competition, environmental degradation, and resource depletion. Commercial viability is essentially a series of calculated trade-offs. It involves, in economic terms, optimizing the efficiency of the production system and securing the farming production system's income sources in the face of market volatility and uncertainties.

c. Diversity of production and income sources: Markets are fickle; farmers can quickly saturate small markets with their products (as seen in the poultry industry in Belize), be undercut by cheaper imports (as seen in the dairy industry in Belize) or, in high season face low prices because of market gluts. This suggests that, in order to maximize sustainability, farm businesses do better by diversifying their markets, supplying a range of customer types and spreading risks across different products.

3.
ADDED VALUE AND ALTERNATIVES

Value chains need to be consistent and continuous over time to be sustainable. The concept of "adding value" could involve at least three aspects:

a. Adding levels of sophistication to the processes and outcomes of production. This does not necessarily involve a physical transformation of the end product; sophistication can be added through product description, identity preservation, and other "knowledge" based inputs.

b. Innovating social collaboration among producers and models of sharing costs (inputs), practices (knowledge) and revenue from co-production.

c. Reducing operating costs and using fewer resources per unit of economic output and thus increasing profitability by taking eco-efficiency measures that also reduce or recycle waste (e.g. sugar plantation that treats waste water).

Conventionally, "adding value" in agriculture is usually equated with adding a processing step to raw material. In fact, selling a fresh, high-end natural product can in some cases be of higher value than a processed, bottled product. Offering the market high-end natural produce can include other important aspects that cater to the customer or that bring the producer closer to the consumer.

On the international market, it is unlikely that Caribbean products will compete on competitive rates alone, due to economies of scale. It is more likely that their export market will continue to be targeted through such "interested consumer constituencies" as the tourist industry and "fair trade" outlets, the diaspora community, and, increasingly, through a discerning and well-informed consumer market looking for a high-end and healthy product that speaks to a deeper interpretation of "sustainability."

4.
LINKS WITH SMART SECTORS

The growing literature around "climate-smart agriculture," while important, tends to be specific to modes of farming and the use of seeds engineered to handle specific climates. Linking to smart sectors is more about the multi-disciplinary nature of agriculture and the fact that it needs to be developed alongside other sectors relevant to the overall economy. Promoting science-based, collective knowledge around farming can be leveraged through other growth sectors. In practice this could mean:

a. Establishing innovative links with culinary and agro-tourism, or with naturalists and ecologists interested in engaging with farming activities with their research.

b. Collaborating more closely with private sector development and the application of appropriate technologies that simplify processing, provide power, and minimize fossil fuel consumption.

c. Applying alternate water and waste management systems.

d. Linking research to policy that places an emphasis on communicating and further developing results in the field with the engagement of communities.

e. Integrating information and communication technologies (ICT) in all aspects of farming, marketing, data and record-keeping, integration of data systems, and the use of GIS systems to overlay farm structure and natural resources surveys.

f. Collaborating with education systems and applied learning, –particular targeting curriculum development and applied farming for youth and adults.

5.
ECOLOGICAL FACTORS

The environmental reproducibility of ecosystems linked with farms can be analyzed using agri-environmental indicators that assess the impacts of farming practices on the environment. In most cases, these indicators provide information primarily on risks for the environment linked with farming activities. The ecological profile of sustainable agriculture systems is, by its very nature, contextualized, depending on the soil structure, water access, what is being planted and how. "The challenge of sustainability assessment in agro-ecosystems is to detect hidden stress before it becomes apparent in yield decline or before the system is irreversibly damaged"[8]. Economic and ecological resilience must therefore be measured by the degree of bio-diversity, the capacity of natural systems to hold each other in check, the methods of production, waste and water management, and the whole-use of product. Some key measures include:

a. Bio-productivity per hectare. Productivity can be enhanced to achieve more bio-capacity, however this often comes at the cost of a larger ecological footprint. For example, energy-intensive agriculture and heavy reliance on fertilizer may increase yields, but requires increased inputs and generates higher CO2 emissions.[9] Shifting away from conventional plowing practices to "zero till" or "zero kill," which involves planting a crop directly into pasture grasses, is one example of an emerging agricultural paradigm based upon co-evolution, biological productivity and ecosystem stability.

b. Water count. The two sectors in the world that use the most water are chemical-intensive agriculture and fossil fuel-based energy production. Irrigated agriculture accounts for almost 70% of world water withdrawals and close to 90% of the total consumptive water use (the portion that is lost to the immediate environment for use).[10] More efficient and effective water management for agriculture as a way to cope with climate-related water stress, particularly in rain-fed agriculture, is a top priority agenda item for all stakeholders.[11] In Belize, for instance, new natural water filtering systems using Effective Micro-Organism Technology™ (EM) have been established in the waste water treatment ponds of Belize Sugar Industries Ltd.

c. Use of toxic chemicals. A considerable portion of a farmer's budget goes to covering the cost of fertilizers, which are "prohibitive and cause a lot of injury to the sector."[12] The cost goes beyond dollars and cents, however. As long as poisonous herbicides like Gramoxone, banned in many countries, but still regularly used in banana cultivation in Belize and Dominica, makes its way into the groundwater, conserving crayfish—a food protein source for local communities—is a futile activity. Toxic side effects in humans have been noted in areas where Paraquat[13] (the active ingredient in Gramoxone) has been used over time. Farmers in Dominica noticed that after rinsing containers that had been used to mix Gramoxone in streams, dead fish would bob up on the water surface. As with most countries in the world, Caribbean countries have had chemical regulations that are limited in their reach because chemical management regimes are largely controlled by industry. Chemical regulations are primarily designed to address "gross" environmental pollution at a grand scale, and not the chronic health effect on an individual level from constant exposure. The "externalities" of using toxic chemicals and in some cases, banned substances, are regarded only as that – externalities. The growing public availability of scientific evidence linking toxic chemicals to serious human diseases means that more consumers can, and will, take steps to avoid toxins in their food if accessible and affordable choices are available to them. To avoid this, farmers and technical staff must be trained in dosage application, frequencies, and sequences to minimize pest resistance and environmental impacts.

According to one study, the capacity to monitor persistent toxic substances (PTS), including persistent organic pollutants (POPs) in the Caribbean is mainly ad hoc and relies on analysis from accidents.[14] A regional report covering over 23 countries in Central America and the Caribbean reported that there is a lack of data and monitoring capacity for PTSs in the Caribbean and in Central America.[15] This is further confirmed by Fernandez et al (2007). In Jamaica, an increase in fish mortality in coastal areas coincides with the period of the year when pesticides are applied on coffee plantations.[16]

d. Identifying eco-system vulnerabilities: According to one report, the Caribbean is one of the most disaster-prone regions in the world, as suggested by the probability of a hurricane striking in any given year. Over the last 60 years, the Caribbean countries have suffered from 187 natural disasters, most of them tropical cyclones (usually hurricanes), and floods. The frequency of disasters varies significantly within the Caribbean, with Jamaica and the Bahamas having the highest probability of a hurricane striking in any given year. However, for most countries the probability of a hurricane is high, above 10 percent per year.[17] "Stress symptoms in the most vulnerable and sensitive ecosystem element present an early warning for the entire ecosystem."[18] As the impacts of climate change are becoming increasingly visible, it will be imperative to engage directly with farmers and communities to determine how best to manage ecological risks and to share research findings with practitioners.

4 Policy Recommendations

A NEED FOR POLITICAL LEADERSHIP

The overall agricultural policy framework in the Caribbean region is weak and fragmented. This manifests itself in the following ways:

- The "vision" for the sector exists primarily on paper, lacks strategy or direction, and attempts to address all things at once without the required budgetary commitments. To date, a policy framework on agricultural sector development lacks direction, is at best confused, or is missing altogether—planning units and extension services having been decimated some time ago.
- There is a lack of prioritization in agriculture relative to other sectors generally, meaning that ministries of agriculture are consistently massively overworked, understaffed, and under-budgeted. For example, the allocation of funds to the agricultural sector in Jamaica as a percentage of the government's total budget over the last five years has averaged 1.1 %, as opposed to an average of 11.0% for education, 4.7 % for health, and 6.6 % for national security.[19] In the last five years, agriculture has remained under 2% of total budget allocation in Belize.
- There are weak to non-existent science and technology and research and development arms to complement and support agriculture, effectively meaning that well-meaning policy statements do not translate into a structured approach to the different scales of farming in these countries.
- There is an over-reliance (if not dependency) on donor aid and technical inputs, which continue to play a powerful role in determining what is grown, how and for whom. This could lead to crops for ethanol placing even further pressure on existing land tensions in the very near future, since there is high interest in producing alternative energy in the Americas.
- The marketing and trading system favors interna2tional export markets or tourist markets over domestic or regional markets, requiring production at scale in order to minimize costs.

Recommendations for the region's policy makers therefore include:

1.

DEFINE AGRICULTURAL POLICY IN CONSULTATION WITH PRIVATE AND PUBLIC SECTOR STAKEHOLDERS

Governments determine a country's agricultural strategy while considering the views of technicians, investors and financing agencies in committing the finances required to deliver said strategy, and in regulating financial flows and trade agreements that affect the sector.

- Ministries of Agriculture need to work closely with other related sectors to define and determine their policy strategy, including Ministries for Natural Resources and Forestry, Urban Planning, Tourism and Human Resources (Education and Information), Energy, and ICT. These policies need also to be defined in the context of climate change.
- Most existing policies benefit large-scale farmers and not smallholders. To ensure that policies are "grounded" with the widest range of farmers as possible, a bottom-up approach that includes consultations, discussions, and surveys conducted directly with small and medium farmers, men and women, and farming communities is needed.

2.

ORGANIC POLICIES AND STANDARDS NEED TO BE LEGISLATED AND APPLIED

Organic agriculture in the region needs substantive legislative and institutional strengthening. Organic agriculture, the world's fastest-growing of all sectors in agriculture,[20] has its roots in traditional agricultural practices in small communities. Shifting to organic farming is an attractive option for small farmers in the Caribbean as the demand for organic produce and products continues to grow.

- Organic farmers are able to apply local resources and knowledge as well as non-chemical inputs to their farming systems, conserve their soil and land quality, and revive indigenous agricultural practices. This, in turn, can have a positive long-term impact on local food security and promote a return to holistic environmental management systems. There could be a positive outcome if more farmers adopt organic methods successfully, which would require developing storing, processing and marketing facilities to ensure that products reach their markets and meet the quality standard requirements.
- Organic standards have long been used to represent a consensus about what an "organic" claim on a product means, and to convey that information to consumers. Certification not only leads to consumer trust in the organic system and products, but also gives organic farming a distinct identity and makes market access easier. Thus, in contrast with food labeled as "environment ally friendly" or "green," the organic label denotes compliance with very specific production and preparation methods. For farmers to use the organic label, they must receive certification that the product complies with applicable standards following third-party inspections of their operations.[21]

3.

IMPLEMENT SUPPORTING POLICIES AND FARM-LEVEL TRAINING TOWARDS COMPREHENSIVE MANAGEMENT PRACTICES AND SPECIFIC MEASURES TO CONTROL THE USE AND APPLICATION OF PESTICIDES IN THE AGRICULTURAL SECTOR

- Strengthening the organic sector will require strengthening measures to control agro-chemical use.[22] Organic agriculture eschews the use of artificial synthetic pesticides, supporting the use of local species and traditional techniques of pest management. Such practices are known as organic pest management (OPM). OPM requires informed decision-making and careful planning.
- There is however, a lack of legislation and regulations on the import, export, transport, use, production, emission, storage and disposal of persistent toxic substances (PTS) in the region,[23] and very little on education and awareness.[24]
- Further training programs need to be developed that provide farming communities with the complete information that will enable them to weigh the risks of chemical use.[25] This could be done by agricultural colleges in liaison with public and private sector interests.

4.

REALLOCATE BUDGET COMMITMENTS TOWARDS AGRICULTURE, WITH EXPLICIT COMPONENTS FOR SMALL-SCALE FOOD PRODUCTION

Appropriate resources need to be dedicated towards the recommendations outlined above.

- Agriculture's share of government spending around the world is far lower today than it was in the 1980s and early 1990s. Shares tend to be smaller in developing countries (less than 10%) and higher in developed countries (greater than 20%).[26] The structural adjustment programs imposed on Caribbean economies mean that budgetary resources to agriculture have been cut back to less than 5% of the total budgets.[27]
- Spending on agriculture per agricultural population has increased in all regions except for Latin America and the Caribbean.[28] The Comprehensive Africa Agriculture Development Program (CAADP), for instance, has set and agreed to a target of at least 10% of the national budget for the agricultural sector.
- Current spending patterns show that small-scale food production (which represents 8 out of every 10 agricultural producers) is not explicitly recognized in budgetary planning and programming in most countries.[29] Budget allocations to the sector need to prioritize the differentiated needs and capacities of the productive sector and should really target, both in quantity and quality, the small-scale producers sector.

5.

GOVERNMENT NEEDS TO CONSULT WITH STAKEHOLDERS TO DEFINE POLICIES THAT SUPPORT LOCAL INNOVATION AND HUMAN CAPITAL INVESTMENTS

Innovations in the sustainable agriculture sector are few and far between. They are hampered by policies impact them directly and indirectly– both policies that stand in their way and policies that do not yet exist to support them.

- Public policy needs to determine in the first instance how to secure sustainability by mitigating risk, and in the second instance how to promote resilience and vibrancy through market-based fiscal and monetary incentives for new industry links with agriculture. This will also mean more affordable financial and banking services, access to low-interest loans linked to farming seasons, and a review of the VAT levies on agricultural inputs combined with capacity development of all stakeholders.

6.

IMPLEMENT BUSINESS MODELS TO ATTRACT PRIVATE SECTOR INVESTMENT AND PARTICIPATION

The Latin America Outlook - ECLAC 2013 report recommends that "in addition to long-term state policies, there is a need to encourage better agricultural practices and greater participation by the private sector, with special emphasis on public-private alliances in the areas of research and agricultural extension." [30] Government is ultimately the architect of the terms under which private investors can support the sector. Public and private sector interests need to consider a dual-track approach to strengthening the sector. One track is systemic and infrastructural: the physical hardware and systems that support sustainable production. The second track is targeted at human capital investment at all scales of farming.

5 Priority areas for further investment and support

Building on an analysis of what works and what does not, as well as an assessment of risks and sustainability factors, this section focuses down on four key areas emerging as priority domains for support and investment:

A. HUMAN CAPITAL INVESTMENT
B. SYSTEMIC AND INFRASTRUCTURAL INVESTMENTS
C. APPROPRIATE TECHNOLOGIES AND APPLICATIONS
D. INSTITUTIONAL CAPACITY BUILDING

The following recommendations include practical actions that can be taken at both the farm/producer level and at the industry/sector level, and are suggested to be implemented through a public-private partnership approach.

A. INVESTMENT IN HUMAN CAPITAL FOR AGRIBUSINESS DEVELOPMENT

The human side of production needs to be strengthened through new ways of working, learning and practicing sustainable agriculture. The combination of three factors: poor work ethic in national labor force, an inadequately educated workforce, and insufficient capacity to innovate (Barbados, Jamaica, Guyana GCI 2011), suggests that public sector investment in human capital remains absolutely indispensable to the future of the sector.

Farm owners interviewed for this study invest their own time and resources to train farm labor; for example, in aspects of record keeping for organic farming, natural composting methods, and harvesting. The demand for peer-to-peer training provided by models such as the USAID Farmer-to-Farmer program, and the range of training manuals produced in Guyana, are indications of a gap that needs to be filled. Significant resources need to be made available through organized clusters of producers; whether in cooperatives, clusters of individual farmers, producer associations, women's/youth groups, or any combination thereof. The following three examples taken from the research suggest there is a change in tempo and interest in working and learning in innovative ways.

1.
FARMER ASSOCIATIONS FOR COMBINING HARVESTS AND NEGOTIATING POWER

Belizean chocolate has been quite successful in circumventing commodities board bottlenecks because external firms have effectively 'sponsored' their entry into the marketplace by committing to purchase a fixed amount prior to harvest, creating a market and attracting farmers. A similar approach might work for cocoa farmers with Hershey's in Jamaica, or Starbucks[31] in the case of coffee.

Another response is to present an alternative to commodity boards. The **Jamaica Cocoa Farmers Association** estimates that it could process almost 3,000 tons of organic cocoa annually between a few large farms and associated smaller farms. The model rests on farmers paying a standard membership fee and benefiting from the sale of processed organic cocoa through vertical integration. Besides enrolling farmers, the association has also been trying to identify alternative financing mechanisms or financial tools because it finds that conventional banking services are extremely onerous, not responsive to their needs (by not, for example, offering crop risk insurance) and costly for the typical small farmer.

2.
FARMER CLUSTERS FOR POOLING RESOURCES AND BUILDING RESILIENCE

Jamaica Organic Agriculture Movement (JOAM) has a potential coffee farm cluster with ten farmers, two of whom are certified organic farmers and another handful who are preparing for certification. All have small farms, save one with over 200 acres. One isolated 20 acre farm has five very small satellite farmers who have both the potential and expectation to participate in deepening the organic impetus in their emerging farming community. The advantage of this cluster of small coffee estates is that it can create a coherent and innovative model of a "coffee collaborative" with its own unique branding, specialties, and stories. Potential benefits could include:

- Pooling resources, sharing experiences, and joint marketing efforts
- Solidarity among producers with potential for deepening organic impetus
- Coordinated messaging to influence and impact agricultural policy and the coffee industry board
- Sharing solutions and best practices for challenges such as treating coffee rust disease

3.
PEER GROUP LEARNING

Educational incubators, land-based farmer training incubators, land-based agriculture business incubators, organizations supporting new farmers and community learning gardens all have key roles to play. Peer-based training models like the USAID-supported Farmer-to-Farmer-Program in Guyana are invaluable.

B. SYSTEMIC AND INFRASTRUCTURAL INVESTMENTS

If agriculture is to be part of the solution to climate change, and at the same time continue to contribute to food security and poverty alleviation, there will need to be a significant increase in investment in the sector, and in infrastructural systems that support the sector. Policy and investment need to consider how best to develop support infrastructure for a local market complex. Gaps remain, such as inadequate basic road access to farms; in Jamaica and Guyana, the inadequate supply of infrastructure is listed as one of the most problematic factors for doing business.[32] Much of the infrastructural development that needs financing and human capital investment is in newer "smart" sectors, such as ICT, renewable energy sources, and agro-tourism. As these systems are established through private investment and public-private partnerships, their interface with the broader agri-business sector needs to be central.

Investment in infrastructure and systems for sustainable agricultural development
- Links to Tourism Sector
- Information and communication technology (ICT)
- Alternative and renewable energy
- Financial support and institutional capacity building

1.
INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR AGRICULTURAL DEVELOPMENT

The huge potential of smart use of ICT in agriculture is still largely underexploited, even as ICT continues to be an industry that provides a relatively healthy return on investment. There are inefficiencies at the regional level due to fragmentation in regulatory and technological standards; this is particularly the case when ICT is unable to facilitate trade in goods and services across borders. In addition, the proliferation of different business models and standards results in disruptions in information flows between different software platforms and technological solutions. There is a need for appropriate, affordable and interoperable ICT solutions for agricultural application.[33] Three key aspects of ICT platforms (both Internet-based and on mobile phone platforms) include:

- ICTs as access tools for:
  - mobile finance
  - current market price information
  - communications and networking
- ICTs as a business tool to streamline processes and improve business transactions:
  - Training and capacity building
  - Administrative and logistic services through software management
- ICTs as marketing and media tools:

  - To facilitate market entry of new players
  - For market analysis, placement, and penetration
  - For branding
  - For legal compliance
- ICT as a cost reducing tool

In Belize, multi-media training materials are being developed to help Mayan cocoa farmers better understand, for example, how to control the spread of Monilia disease. A geographic information system (GIS) will be implemented to track the progress of small farmers and the spread (or decline) of crop disease. In Jamaica, the Rural Agricultural Development Authority (RADA) and the Mona School of Business and Management have agreed to explore how the application of information and communication technology can further enhance the delivery of agricultural extension services to farmers across the country. The agreement aspires to forge value-adding partnerships across the agricultural, academic and local technology communities, and is designed to help farmers take better advantage of both institutions' research resources, technical expertise, and wealth of relevant data.

2.

ALTERNATIVE/RENEWABLE ENERGY

Another sector that may attract private financing and public-private investment is in the energy sector. The International Monetary Fund (IMF) suggests that Caribbean "electricity costs are among the highest in the world, reflecting sector inefficiencies, lack of investments, and/or monopoly powers of generators and distributors."[34] The demand for readily available and affordable energy in the Caribbean is high. The Caribbean can draw on a generous as well as developmentally and environmentally friendly supply of renewable energy. There is a natural fit between renewable energy and farming in the Caribbean, where wind, solar, geo-thermal and biomass energy are rich in supply. They can be easily harvested and potentially provide farmers with a predictable income, if the region puts in place the kind of policies (e.g. feed-in tariffs for renewable energy) that have made farmers and private households in Canada, Denmark and Germany, for example, both major energy suppliers and energy income generating entities.

Thus far, however, the Caribbean region as a whole is missing out on the growth in renewable energy – this urgently needs to be addressed, given the region's dependence on imported oil. In 2007 the CARICOM nations spent US$12 billion on imported fossil fuel, almost double the 2004 bill of US$ 6.5 billion. The costs for traditional energy, consisting mainly of oil, gas and coal, are among the most expensive in the world; they range from US$ 0.24 to US$0.37 per kWh compared to US$ 0.08 in the United States. Even though the costs are extraordinary, access to energy is not reliable. Jamaica and Guyana regularly suffer blackouts because the transmission lines are unable to transport the generated power to end users. The region's abundant natural energy resources – including sun, wind, tidal, geothermal and biomass (from bananas and sugarcane for instance) – have not yet been fully tapped; a fact that, if not corrected, can potentially cripple major economies in the Caribbean. One of the region's largest energy consumers is the tourism industry. The global economic slowdown has affected that sector in recent years, but that as more Asians discover the Caribbean as a vacation destination and as the North American economic recovery continues, energy needs should increase again[35].

Developing renewable energy in the Caribbean will be challenging unless incentives are put in place to generate clean energy and impose sanctions on polluters (for example, a "polluter pays principle"). The region lacks a coherent and regionally binding regulatory framework, and in fact some governments have turned over the responsibility for energy planning to private sector utility companies. Many islands privatized utilities in the 1970s and 1980s - including their telecommunications industries – and these privately owned monopolies have a vested interest in maintaining the status quo and preventing independent power producers (IPPs) like farmers and private households from selling to the grid.

In the short term, the main driver behind renewable energy growth in the Caribbean will be self- or micro-generation, which is already taking place, with the hotel industry likely to be the next area of growth. Conditions will become more favorable once the policy environment changes and public awareness increases.

3.

LINKS TO THE TOURISM SECTOR

Opportunities abound for farmers to economic links with tourism. The most direct link is in supplying fresh foods directly to hotels and cruise ships. However, with more and more tourists requesting "authentic" learning experiences and carbon-neutral vacations, this opens doors for small farms that might never produce enough to sell to large hotels, but can offer farm tours, farm-to-table events- or bed-and-breakfast stays.

A challenge for most such farmers is getting insurance coverage to protect themselves should visitors become party to an accident. The tourism industry and the farming community will have to find a mutually acceptable way to deal with these issues. In the meantime, the SEEDCAP Caribbean Action Plan 2013 expects to place agro-tourism in the forefront of opportunities, strengthen the overall image of farmers and farming, and build regional branding around tourism and farming. Examples the Durga Farm in Jamaica speak to this new business opportunity (see text box next to). Other such projects include Jungle Bay in Dominica, and a former sugar plantation in Barbados that is raising capital to preserve its historic architecture and open the venue to tourism.

4.

FINANCIAL SUPPORT AND INSTITUTIONAL CAPACITY BUILDING

A resilient food and rural economy requires a decentralized support and marketing infrastructure that divests power directly to community-based structures. One key persistent challenge is accessing affordable finance tailored to the needs of different scales of farmers. The IMF reports that "credit unions are very large in selected countries, including Montserrat (66% of GDP), Dominica (39% of GDP), while their assets in Belize, Barbados, Grenada, St. Vincent and St. Lucia range from 13–19 % of GDP."[36]

However, experiences from the field point out the difficulty that commercial farms have in meeting their operating costs, which are high relative to income. When the costs of electricity, fuel, and labor are added in, along with often punitive conventional bank fees (which may prevent small holders from opening a bank account in the first place) even the most entrepreneurial and resilient farmers find it difficult to manage. To ensure such impediments don't stranglehold farmers and their businesses, financing modalities need to ensure the following, at a minimum:

- **Making loans affordable.** The Small Business Development Finance Trust Inc. in Guyana estimates that about 70% of its loans to rural areas cover basic inputs for production like seeds, seedlings, fertilizers, chemicals, and fuel (rarely for land itself). By far the largest portion of the loans goes directly into the productive part of the enterprises. A 2012 survey of credit unions in Belize showed that intermediate value chain steps, from post-production to the wholesale or retail market, have either been neglected or have not successfully addressed grant and loan interventions.[37]
- **Tailoring financing to specific needs.** Public and multilateral institutions have an important role to play in closing the gap in financing, but local intermediaries need to be strengthened within a regulatory framework that caters to the particular seasonal and scaled needs of small producers. The terms of loan servicing need to be better aligned with the scale of loans.
- **Diversifying income sources. Eco-service payments.** Farmers' roles in stewardship, of water and land for instance, suggest that there is scope for agri-environmental and conservation payments to be made to farmers who are farming sustainably or organically. Two types of payments may encourage organic farming: transitional per-hectare payment, and continuing payments based on area (such payments are in practice in the European Union, Norway and Switzerland). In some countries, payments are made through community-based schemes involving local community groups and local governments.
- **Diversifying income sources. Energy production on farm.** Complementing farming activities and income with generating additional income from selling power back to the national grid from renewable energy installations set up on farmland and roof tops is a proven and successful scheme employed by farmers in other regions of the world.
- **Securing grants.** The Global Environment Facility's Small Grants Program (SGP) is outstanding as a decentralized channel for supporting innovation, both at the community level and across the region. After almost two decades of experience in the field and continued donor confidence in the program, there is plenty to learn from this grant mechanism. A few of its characteristics are:

    - It is not time constrained. Time constraints cause projects to be "pushed" onto communities because the "deliverables" of the project must be achieved by a deadline. With time-constrained projects, the planning and implementation process is often shortened, which then leads to unsustainable projects because they were not fully thought through.
    - It encourages innovation. With innovation come great risks, and many donors are hesitant of funding "risky" projects. Addressing environmental problems requires testing new ideas.
    - It recognizes grassroots groups and puts resources in their hands to execute their ideas. This also empowers these groups to initiate changes within their communities, rather than making them wait for local authorities and governments
    - It is flexible and dynamic. SGP recognizes on-the-ground challenges and accepts submissions in alternative formats, such as photo story or participatory video.

- **Building resilience through customized insurance products.** Smallholder producers and self-capitalized farmers of all sizes generally do not have access to the kinds of safety nets that are available to farmer groups or large scale production interests. Farmers are routinely exposed to crop failures, economic shocks, weather related events, and etc.[38]. The International Labour Organization (ILO) has piloted a crop insurance scheme that bundles together life insurance, property insurance and insurance against loss of food crops.[39]

EXAMPLE OF GOOD PRACTICE:

THE DURGA FARM VISITOR

The Durga Farm in Jamaica could serve as the face agro-tourism and volunteerism for vacationers. Bananas, papayas, assorted vegetables, beans, lettuce, tomatoes, honeybees, pigs, and goats are all being raised on its five acres farm. The farm uses a range of alternative technology systems, including solar heating, simple drying technology, and compost toilets. The owners have used waste from local farms and hotels – coffee husks for composting, sheets and old carpeting for walkways — and are experimenting with natural building materials like locally available bamboo and grasses for thatched roofs. The farm is part of a bigger project called Durga's Den - a sustainable living center for learning about and teaching permaculture, organic farming methods, and green architecture. "The experimenting and teaching aspects are very important to us. Every summer we host groups of students who have a chance to experience sustainable living, by sharing in all the day-to-day work and learning through workshops and hands-on experience. Our students come from all over: Europe, South America, Mexico, and the USA. We are hosting a group from Penn State University next week¨ the owner of the farm said. Durga Den's goal is to develop a network of farm stays with Jamaican farmers from different parishes. Membership benefits would include training in organic farming, natural building and appropriate technologies, so farmers could participate in workshops offered at farms within the network and learn how to develop their accommodations affordably with local materials and lots of character.

C. APPROPRIATE TECHNOLOGIES AND APPLICATIONS

There is a common consensus that there is a "technology gap" across the sector, as the need and desire increase for know-how, management and disbursement of local seeds and lesser dependence on imported, foreign-sourced seeds. Therefore, more research and development is needed to establish the market potential for an indigenous seed industry in the region.

1.

APPROPRIATE AND AFFORDABLE TECHNOLOGY AND KNOW-HOW TRANSMISSION

One way to protect crops from direct exposure to climate change is to grow them under cover, whether under a canopy of trees or under man-made covers, including nets and plastic sheets. This increase in protected agriculture structures provides new opportunities for recycling water use even in non-

hydroponic systems. In Belize, a report on the Toledo Cocoa Growers proposed that smaller fermentation boxes be designed to improve drying and storage facilities, which would in turn improve women's performance and increase production. Several countries in the LAC region have taken steps to promote the use of cleaner technologies that rationalize the use of water and minimize carbon footprints.[40]

D. INSTITUTIONAL CAPACITY BUILDING

1.
GOVERNMENT BODIES

Ministries of Natural Resources, Forestry and Agriculture, Energy and Land use, along with Environmental Planning Units, need to be strengthened organizationally, operationally and in their overall policy coordination and collaboration capacities with each other. In Barbados, the National Agriculture Strategic Plan currently being drafted recognizes the need for support for MAFFW (the Ministry of Agriculture, Food, Fisheries and Water Resource Management) to establish operational procedures, plans and systems in order for it to deliver and implement the plan. While national budgets will need to reallocate funds towards these ministries, there will be a need for more systemic capacity building of these ministries in the immediate future.

2.
DEVELOPMENT OF A SYSTEM OF NATIONAL ACCOUNTS

It must compiles the full economic costs of agricultural activities on the environment, and their direct links to health and nutrition, would enable the kind of comparison and evaluation needed to properly assess the real value that agriculture brings to the economy. In other words, strengthening the tracking of indicators that are more holistic in calculating agricultural production is integral to strengthening the sector as a whole. This would also go a long way toward weighing the pros and cons of the various types of agriculture practiced in the region and, in time, lead to a total reassessment of the support system for the agricultural sector in general.

3.
INTERMEDIARY AGENCIES AND RESEARCH INSTITUTIONS

In the five countries studied, support services for the farming community come primarily from government extension services, other donor technical assistance, and from allied institutions such as the Caribbean Agricultural Research and Development Institute (CARDI) and Inter-American Institute for Cooperation on Agriculture (IICA). At present, CARDI[41] has the potential to do much more to support research and development in the sector, but it can do so only if individual countries deliver on their promised funds. IICA also continues to be a significant partner organization, but they too are stretched thin and are unable to respond to the many and varied requests that they receive.

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