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Caribbean Opportunities in Agri-business

Global Niche Sector Opportunities for Caribbean Agriculture

Ian Ivey



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1 INTRODUCTION

Being able to effectively identify the right type of potential opportunities available to the agricultural and agri-business sectors in the Caribbean depends on having a well-developed understanding of how the world and future markets are likely to evolve.

NEXT has completed a number of global foresight analyses of trends, discontinuities and uncertainties that are likely to impact upon the future of the agricultural sector internationally and from a Caribbean perspective. They have also undertaken comprehensive assessments of the current status of agriculture, the available resources, and the capabilities and enablers available in a number of Caribbean countries.

For the purposes of this Global Niche Sector Opportunities for Caribbean Agriculture Report we define agriculture as the business of growing of crops and animals, in both natural and artificial environments, to supply a wide range of end uses including human and animal food requirements, aesthetic and environmental needs, raw materials for the pharmaceutical sector, energy production, and industrial purposes and supplying highly customised solutions for other more specialised human needs.

This report provides:

- The foresight context used by NEXT to undertake agricultural sector foresight analyses.
- An overview of the key sub-sectors within agriculture which offer growth opportunities.
- A brief overview of the capabilities and enablers available in the region
- A matrix that identifies specific niche opportunity areas for Caribbean countries, within the capability constraints that have been identified for the region, associated explanatory comments, and specific examples pertaining to those niche opportunity areas.

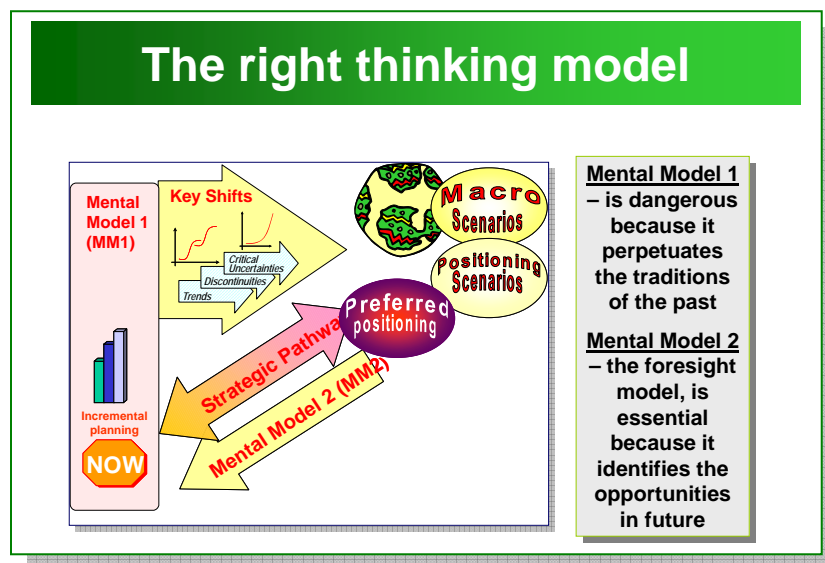
The most important aspect of undertaking such an analysis is to take a big picture view of such potential opportunities and avoid being constrained by traditional thinking limitations. This is particularly relevant to the banking and finance sector as the risks associated with past lending policies and approaches have become greater as the world enters a new era that is built around quite different business models and a rapid change in priorities, particularly with regard to food, energy and water.

This report and the accompanying reports titled 'Sector Success Stories' and 'Examples of Caribbean Best Bet Investment Opportunities in Agriculture' have all been developed within a foresight-based 'big picture' view.

2 THE FORESIGHT CONTEXT

The big challenge is to develop a consensus view of a long-term 'destination' that a country or sector can use as the basis for long-term planning and resource allocation. NEXT has developed a foresight-based 'thinking model' that facilitates the development of such a consensus. An overview of that model is shown in Figure 1.

Figure 1: The foresight model used to developing the right sort of thinking approach towards country and sector future opportunities (1)



In essence it can be summarised as follows:

- **Mental Model 1** thinking is based on the use of historical patterns and data and developing forecasts for the future derived from such patterns and data. The danger of such thinking is that it fails to identify key discontinuities that alter the shape of future markets. A good example is how electronic music downloads on the Internet led to a rapid decline in the sales of CDs and other hard copy delivery formats – and the established players in the global music industry failed to develop a strategy to cope with such rapid change.
- **Mental Model 2** thinking is based upon developing a view of how future markets may appear, say 10 years from now, and is based upon developing a well researched view of the potential impacts that a range of trends, discontinuities, and uncertainties could have. Such views are often called scenarios. By 'backcasting' from these scenarios, it becomes possible to develop strategies that focus on developing solutions for a range of niche growth opportunities associated with such scenarios e.g. solutions for aging populations.

By using such a model it becomes possible to avoid making decisions that have been developed in the wrong thinking context. One topical example is the imposition of high export taxes by the government in Argentina on food exports. This has resulted in an adverse reaction from farmers and serious food shortages within the country. A similar

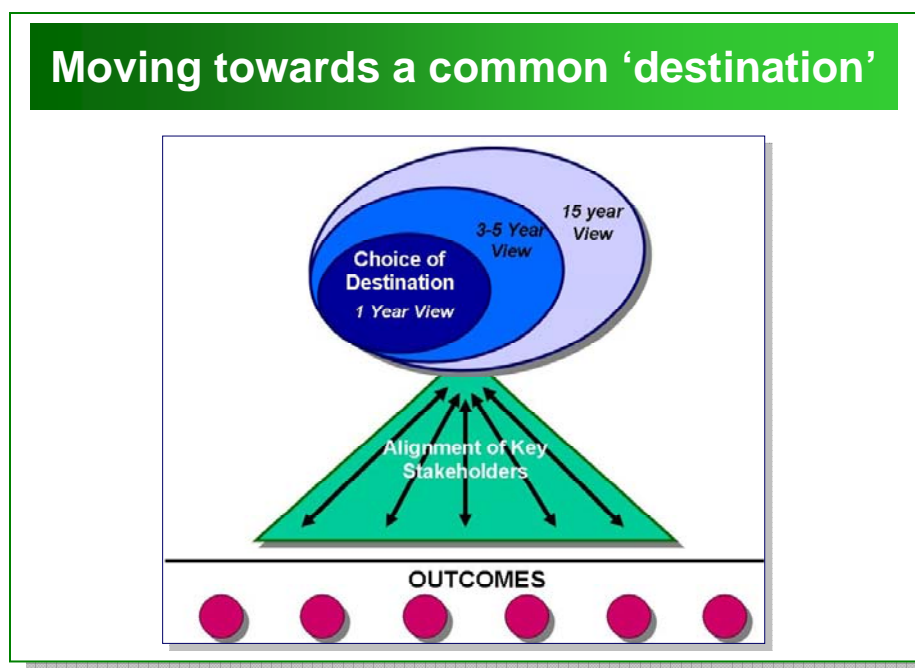
¹ NEXT Archives

situation arose in Malaysia when sugar prices were regulated within that country. This resulted in sugar being smuggled across the border into Thailand so that producers could benefit from higher global prices.

From a foresight perspective, the development of more sustainable solutions to deal with the longer term global supply and demand shifts would have been a wiser and more effective approach.

To develop such solutions it is important to have a 'destination' (a long-term view of up to 10 years), developed through a mutual consensus building approach, as the basis for better identifying key priority focus areas that shape the shorter term strategic decisions that need to be made today. Figure 2 illustrates the need to align all the key stakeholders (represented by the green triangle) so they are all working towards reaching the same agreed 'destination' and achieving the associated outcomes necessary to promote national economic and social progress.

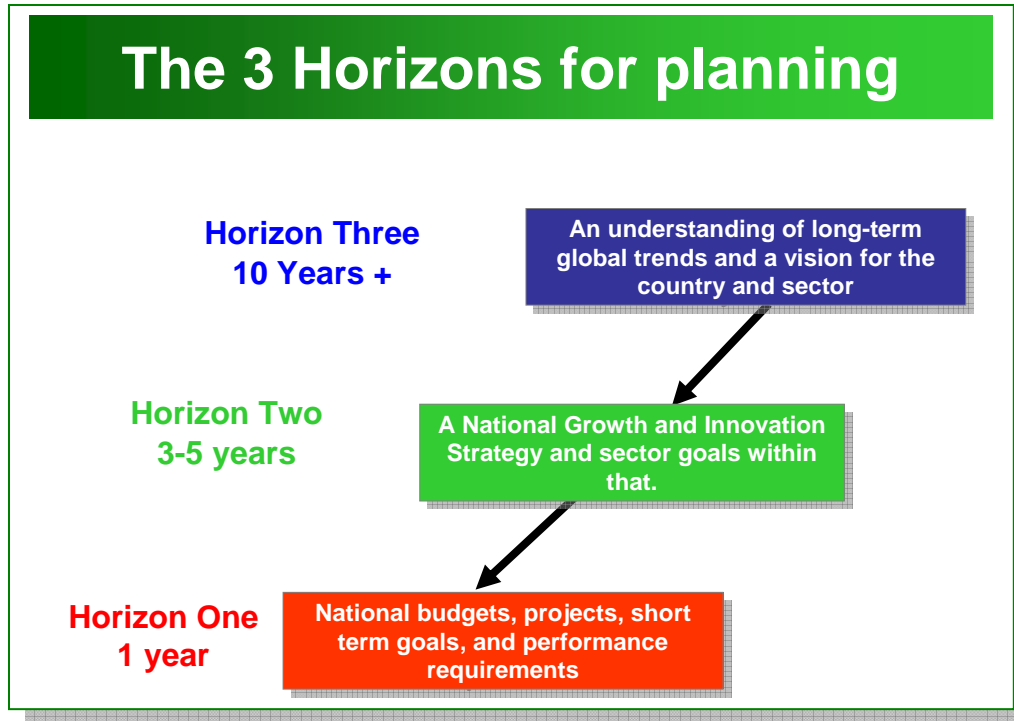
Figure 2: A context for relating a long-term 'destination' to stakeholder alignment and the achievement of outcomes ⁽²⁾



To facilitate such a long-term strategic planning process, built around a foresight 'thinking approach' that moves a business or organisation towards a mutually agreed long term 'destination', NEXT has developed the '3 Horizons' framework as shown in Figure 3.

² NEXT Archives

Figure 3: The '3 Horizons' strategic planning framework ⁽³⁾



This 3 Horizons model provides a simple framework for relating long-term preferred national or sector positioning to the medium-term strategic planning and short-term operational planning approaches. The 3 Horizons can be described as follows:

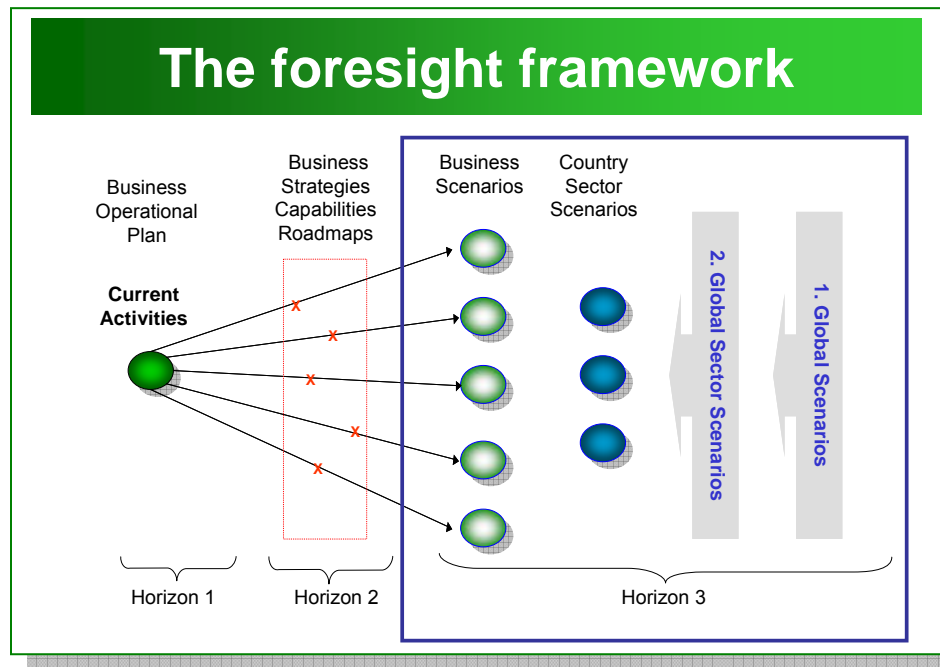
- **Horizon 3** – A long-term view of a preferred 'destination' for a business or organisation which is articulated in a Horizon 3 context of up to 10 years (maybe even longer in the case of infrastructure) into the future. It should be noted that developing the Horizon 3 context is not a one-off exercise. It requires an ongoing commitment towards its updating and revision as new information and knowledge comes to hand. It is a dynamic continuous long-term strategic planning process.
- **Horizon 2** – At this level the focus is on the development of 3 – 5 year strategic plans that have defined goals and specified timeframes for implementation.
- **Horizon 1** – At this level the focus is on annual operational and business plans that facilitate short-term implementation processes which are formulated within the medium and long-term strategic context.

Compared to traditional strategic planning exercises, the key difference in this approach is that this model is not driven from historical patterns and perspectives but from a Horizon 3 perspective – 'backcasting'. This means that the outcomes achieved are more focussed on advancing a country, sector, or organisation towards a preferred future 'destination' rather than being held back by linkages that only have relevance in a historical context and which can actually work against achieving economic and social progress.

³ NEXT Archives

To use the 3 Horizons framework effectively, there is a need to develop scenarios that reflect various alternative futures for the sector within a global context and then to identify a set of scenarios for a business within a sector and country that best matches the emerging global niche opportunities associated with those global sector scenarios. An overview of the framework under which such an approach can be pursued is shown in Figure 4.

Figure 4: The foresight framework for matching global sector scenarios with individual business opportunity scenarios (4)



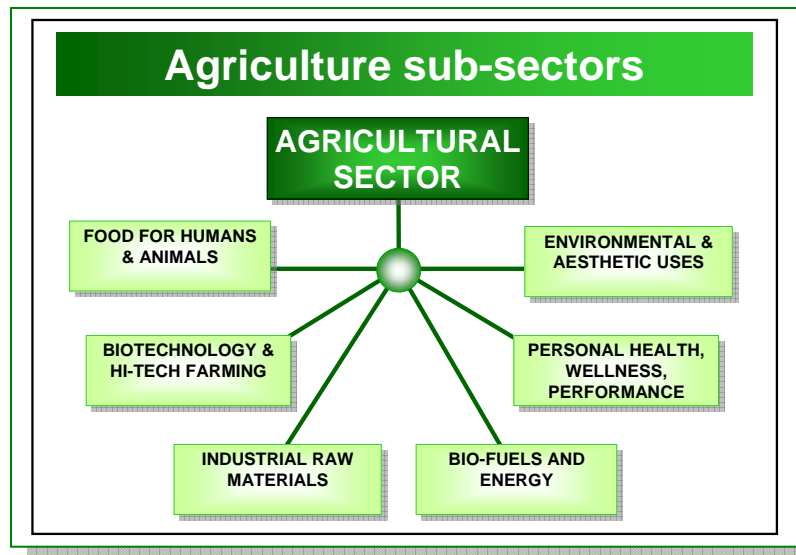
It is within this overall foresight context that future global niche opportunity areas for the Caribbean agricultural and agribusiness sectors have been identified.

⁴ NEXT Archives

3 GLOBAL NICHE SUB-SECTORS IN AGRICULTURE

Based upon various global foresight studies undertaken by NEXT, there are a number of global sub-sectors that offer considerable growth potential to the agricultural sector in a big picture sense. An overview of those sub-sectors is shown in Figure 5.

Figure 5: Overview of global agricultural sub-sectors that offer considerable growth potential internationally ⁽⁵⁾



A more detailed view of particular opportunity areas in each of these sub-sectors is provided in the following sections.

3.1 Food for Humans and Animals

Examples of growth indicators:

- An additional 1.9 billion tonnes of cereals and 160 millions tonnes of meat will be needed annually to feed the world by 2030 ⁽⁶⁾.
- The global market for organic products grew from US\$ 35 billion in 2005 to an estimated US\$ 42 billion in 2006 – a 20% jump ⁽⁷⁾.
- By 2017 20% of Canada's population will be immigrants from a range of ethnic groups, 111% more than in 2001 ⁽⁸⁾.
- China has signed a contract with the Philippines to secure long-term growing rights for food and biofuels on 1.2 million hectares of land ⁽⁹⁾.

⁵ NEXT Archives

⁶ Agriculture and the Farmers Situation in 2030, Andrzej Babuchowski, 2007

⁷ http://ec.europa.eu/research/conferences/2007/food2030/docs/food-2030-andrzej-babuchowski-manuscript_en.pdf

⁸ http://www.ifoam.org/press/press/Statistics_2007.html

⁹ http://www.ats.agr.gc.ca/events/4391_e.pdf

⁹ <http://www.iht.cm/articles/2007/01/15/bloomberg/sxchiag.php>

- Prices for food staples are rising at a rapid rate and are expected to stay high through to 2015 according to the World Bank (¹⁰).

Examples of emerging opportunity niches for agriculture within this sub-sector include:

- **National food security** – as nations grapple with growing concerns about the global food supply. Key drivers include the growing wealth of consumers in China and India, environmental extremes (e.g. droughts in Australia and the USA), land degradation, urban encroachment, competition for water, and low productivity in many less developed parts of the world.
- **Organic food** – as more people in wealthy nations or elite consumer groups want to eat healthy chemical-free foods. Key drivers include aging populations, the more individualistic consumer, more environmentally concerned consumers, and rapid growth in ‘Age Defiance’ – anything that might slow down the aging process.
- **Alternative sources of animal feeds** - as world feed and grain prices rise, so do the costs of meat production. There are real concerns in the meat production sector that there may not be a viable future for feeding grain and another food crops to animals as staple food prices rise globally, because of the poor efficiency of conversion factor. The big driver is the growing wealth of consumers in China and India, many of whom want to eat more meat, and the strain this is placing on global feed and food supplies.
- **High value gourmet food products** – aimed at the high-end food connoisseur market, especially in wealthy countries. One key driver relates to the fact that 70% of the world’s wealth is in the hands of the over 50’s, their children have grown up, and they want to go out and enjoy life. Another is the trend for people to eat out more often. Another is the growing focus towards healthier foods rather than ‘junk food’. A fourth is a growing interest in nostalgia products.
- **Ethnic food products** - as cultural and ethnic influences grow. Large Diasporas in key locations can help drive new food fashions – traditional and fusion based. There are also greater numbers of successful ethnic entrepreneurs emerging around the world. A key driver is the nostalgia factor associated with ethnic products in offshore markets.
- **Heritage fruits and vegetables** – a small high value niche growth area built around retaining the ‘best of yesterday’. The main driver behind this growth area is nostalgia. But protection of bio-diversity is also another driving factor.
- **Exotic meats** – the trend is for wild meat to become harder to find globally as many species become hunted almost to extinction. There is an opportunity to farm ‘wild meat’ using a natural approach and supply high value niche markets – not only in the Caribbean but also in rapid growth areas such as Asia. in Trinidad ‘wild meat’ commands TT\$ 75 – 120 /lb compared to TT\$ 8.00 – 10.00 /lb for pork.

3.2 Biotechnology and Hi-tech Farming

Examples of growth indicators:

- One estimate for biotech revenues in the US is a total of US\$125 billion for 2006 with annual growth rates of 15-20% likely in future years (¹¹).

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http://www.khaleejtimes.com/DisplayArticle.asp?xfile=/data/business/2008/April/business_April420.xml§ion=business

11

<http://synthesis.typepad.com>

- Biotech is currently the fastest growing sector in the drug industry and is forecast to record sales of \$250bn by 2015 - 20.3% of the global market ⁽¹²⁾.
- An average of 322 plant variety protection (PVP) patents per annum was granted in the USA in recent years ⁽¹³⁾.
- A high-tech 18-storey urban farming concept has been developed that would be able to feed 50,000 city residents off an area the size of one city block ⁽¹⁴⁾.

Examples of the emerging opportunity niches for agriculture within this sub-sector include:

- **Genetic Modification** – this opens up a whole new set of opportunities, some of which are more acceptable to consumers than others. The use of GM in the food sector is proving to be less acceptable than in the medical and biofuel sectors. The big driver behind GM is being able to develop new, highly customised, and innovative solutions to mankind's challenges. But there are risks associated with this technology that, so far, have limited the acceptance of such solutions.
- **Medical applications** – these include 'pharming', producing pharmaceuticals using genetically modified organisms (GMOs), the extraction of high value medical bioassay materials from animal processing waste streams, and the identification of components in traditional crops and natural flora and fauna for deriving pharmaceutical applications. The main trend driving this sector is the shift towards naturally-derived solutions.
- **Industrial applications** – some already exist, such as the production of enzymes using GMOs for the food processing sector. Others include bio-fermentation to produce raw materials for industrial value-adding purposes. The main driver is to shift from relying on non-sustainable resources for industrial processes to long-term sustainable sources of raw materials.
- **Environmental applications** – deriving sustainable solutions for environmental issues such as pollution and land degradation. The main driver is a growing concern to redress global deterioration of the environment and the impacts of climate change.
- **Plant and animal improvement and IP protected material** – This includes traditional breeding and selection processes, but with the addition of innovative technologies that can speed up the process. It also includes the securing of patent and plant variety protection rights for the developers of unique new biotypes and cultivars. The main trends driving this opportunity area include the needs for more productive and unique biotypes and the increasing value associated with knowledge (i.e. IP).
- **Urban agriculture** – a growing global trend towards sustainable cities (e.g. 'Sustainable Sydney 2030' in Australia ¹⁵) includes ways of improving city food security through local sourcing. Some highly innovative high-tech farming concepts are being developed as a means of delivering such solutions.

¹² <http://www.markt-studie.de/studien/pharmaceutical-market-outlook-2015-implementing-innovative-longterm-strategies-sustainable-future-growth-p-3456.html>

¹³ <http://www.ams.usda.gov/SCIENCE/PVPO/CurrentNews/2007%20PVP%20Board%20Minutes.pdf>

¹⁴ Could vertical farming be the future? <http://www.msnbc.msn.com/id/21154137>

¹⁵ <http://www.cityofsydney.nsw.gov.au/2030/>

3.3 Industrial Raw Materials

Examples of growth indicators:

- The rising cost of oil is driving a shift towards plastics derived from renewable biological sources by major groups such as Toyota, Walmart, and Del Monte ⁽¹⁶⁾.
- The demand for environmentally friendly building materials is expected to grow from nearly US\$2.2 billion in 2006 to US\$4.7 billion in 2011. Residential green building is expected to boom, with a dramatic increase in the use of green flooring in particular ⁽¹⁷⁾.
- A US survey found consumers will likely double what they spend on green products and services in 2008 over 2007 - rising from US\$250 billion to US\$500 billion.

Examples of the emerging opportunity niches for agriculture within this sub-sector include:

- **Natural fibres** – there is increasing interest in using high strength natural fibres, some which are reported to be as strong as steel, to reinforce materials such as carbon fibre components used, for example, in the vehicle manufacturing sector ⁽¹⁸⁾. The trends behind this area are a move towards the use of sustainable resources and a transition towards closed cycle manufacturing processes.
- **Bio-plastics** – produced from renewable plant materials e.g. lignin extracted from certain types of willows. These can be produced from crop residues which currently go to waste. The big trend driving this area is the shift away from finite fossil fuel derived raw materials to renewable and sustainable resources (provided they are non-food!).
- **Pharmaceuticals** – there has been an increase in activity by pharmaceutical companies in the search for solutions to human health problems derived from natural sources. The trend driving this shift is that for every problem mankind suffers from nature is likely to offer a potential solution - somewhere.
- **Eco-housing** – this is a small niche high growth sector, especially in wealthier economies. Natural materials, including modern versions of mud and straw 'bricks' natural insulation, and chemical-free materials are increasingly being used to build environmentally friendly houses. Many of these components can be derived from crop residues. The big trend driving this area is the move towards more sustainable solutions.

3.4 Biofuels & Energy

Examples of growth indicators:

- In Europe, biodiesel currently represents 2% of total on-road fuel consumption and is expected to reach 6% by 2010 ⁽¹⁹⁾.
- Increasing numbers of communities are becoming 100% sustainable in terms of energy. Two excellent examples of communities using biomass as a major source of energy are Jühnde in Germany ⁽²⁰⁾ and Güssing in Austria ⁽²¹⁾.

¹⁶ <http://www.ecoistabode.com/2008/02/new-bioplastics-trend.html>

¹⁷ <http://www.ideal-living.com/?p=19>

¹⁸ <http://www.risoe.dk/afm/coronet-regional-seminar/Abstracts/CORONET%20Abstract%20David%20Plackett%20Risoe.pdf>

¹⁹ <http://www.allbusiness.com/management/3987847-1.html>

²⁰ http://www.finfacts.com/irelandbusinessnews/publish/article_10008702.shtml

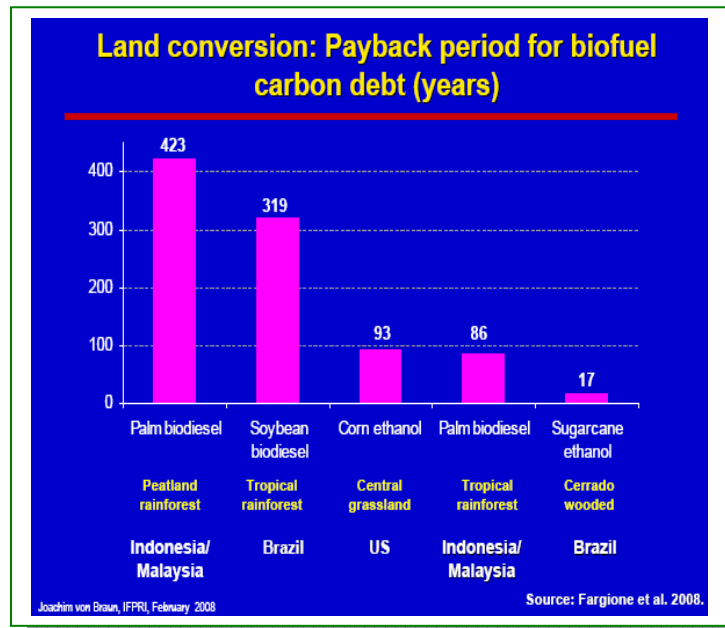
²¹ <http://www.iht.com/articles/2007/08/28/business/carbon.php>

- China is signing long-term deals to produce crops for bio-fuels with a number of countries e.g. Indonesia (²²).

Examples of emerging opportunity niches for agriculture within this sub-sector include:

- **Biofuels** – for the purposes of this report biofuels are liquid fuels derived from biological sources. It may be that biofuels are only a transitional opportunity because new technological developments may render the combustion engine obsolete within a decade or two. Fuel cell technology is one potential threat. There is no potential for producing biofuels from food crops, only crop waste and residues or non-food crops. Care needs to be taken with carbon equations as some relating to biofuels are not acceptable within global sustainability guidelines. For example, cutting down natural forest cover to grow biofuel crops can have a 300 – 400 year payback period, in terms of restoring the carbon balance, as shown in Figure 6.

Figure 6: The payback period for the production of biofuel derived from land clearing and conversion (²³)



- One key driver behind the biofuels opportunity is the existing pool of combustion engines that drives the world's transportation fleets, and the time taken to phase out such engines if and when a viable alternative becomes available.
- **Bioenergy** – this is somewhat different to biofuels and is designed to provide a long-term carbon balanced energy solution built around using biomass. Such biomass can be derived from renewable crop and animal farming waste streams or from managed plantations which have a positive carbon balance. Examples of the technologies associated with this area include biogas generators, bio-gasification of wood, high efficiency wood burning devices, and the highly efficient Organic Rankine Cycle technology with a 70% energy conversion efficiency rating (²⁴). The key drivers behind this trend include sustainability, climate change, and 'peak oil'.

²² <http://www.uofaweb.ualberta.ca/chinainstitute/nav03.cfm?nav03=54918&nav02=43617&nav01=43092>

²³ <http://www.ifpri.org/presentations/200802jvbbiofuels.pdf>

²⁴ http://www.gradingandexcavating.com/de_0511_tech.html

3.5 Personal Health, Wellness and Performance

Examples of growth indicators:

- Total US spending on health is expected to reach 20% of GDP by 2015 ⁽²⁵⁾.
- Global expenditure on erectile dysfunction drugs such as Viagra and Cialis reached over US\$ 2.7 billion in 2006 ⁽²⁶⁾.
- It is expected that the number of men suffering from erectile dysfunction will double from an estimated 150 million today to 300 million in 2020 ⁽²⁷⁾.
- Health and wellness product sales in the US alone were estimated to have reached US\$ 91 billion in 2006, up 15% on a year previously ⁽²⁸⁾.
- Identifying a health related 'Factor X' in New Zealand manuka honey has lifted its value by 2500% - from US\$ 5 / kg retail to over US\$ 120 / kg ⁽²⁹⁾.
- 50% of Germans will be aged 45 years plus by 2015 ⁽³⁰⁾.

Examples of the emerging opportunity niches for agriculture within this sub-sector include:

- **Nutraceuticals** – these are novel food products which have an added health and wellness factor manufactured into them. The trend behind this area of growth can be essential a quote attributed to Aristotle many centuries ago, 'Your food is your medicine. There is trend for increasing numbers of consumers to pay a premium for products that they perceive will help them with their personal health and wellness issues – e.g. cholesterol lowering spreads such as 'Flora' or products to help fight aging - 'Age Defiance'.
- **'Factor X' products** – this is an interesting market niche built around using scientific processes to prove that the consumption of certain types of natural products (either fresh or processed) will improve human health. Two excellent examples are high active manuka honey and pomegranates. Large value increases have been achieved for both based on such proof. A key driver favouring such products is the increase in spending on natural solutions for personal health and wellness.
- **Health and wellness products** – this is an area that doesn't rely on such a high level of scientific proof as the 'Factor X' area. Nevertheless, it does extract greater value for basic agricultural products because of a traditional association with a personal benefit derived from the consumption or use of such products. A good example is the 'Nut Med' pain relief products that use nutmeg extracts developed by Mr Denis Noell in Grenada. Other examples include expensive skin care products incorporating exotic extracts from unusual sources such as arctic cranberries and silk moth cocoons. The key drivers favouring such products are the increases in spending on natural solutions for personal health and wellness and 'Age Defiance'.
- **Personal performance enhancement** – this includes a whole range of growth trend opportunity areas focussing on sporting prowess, enhanced sexual libido and performance, improved intellectual and physical performance, and heightened levels of pleasure. This is a market area where price is not a major decider and perceived or

25 <http://www.ncbi.nlm.nih.gov/pubmed/16495287>

26 <http://www.fool.com/investing/dividends-income/2007/10/22/new-warnings-wont-sink-ed-drug-sales.aspx>

27 http://www.bioportfolio.com/cgi-bin/catalog/Erectile_Dysfunction_Market_Assessment_and_Analysis_2007_to_2022.html

28 <http://www.freelibrary.com/Best+business+opportunities+for+2007:+are+yoy+ready+to+pursue+your...-a0157033220>

29 http://www.tffi.net/article_view/77

30 NEXT Archives

real benefits are the main driver. Plant derivatives in particular are a primary source of solutions in all these areas. Caffeine is a well-proven example. Less well scientifically proven are traditional applications such as sexual performance enhancement attributed to 'bois bande' throughout the Caribbean and cocoa in Nigeria ⁽³¹⁾.

3.6 Environmental Uses, Aesthetic Uses, and Agro-tourism

Examples of growth indicators:

- The value of the global carbon credit trading market in 2006 was 300% higher than in 2005 and totalled US\$ 30 billion. Since 2006 trading markets have opened up in other very significant markets e.g. Australia and China ⁽³²⁾.
- Beijing aims to add 100,000 sq metres of roof gardens in the city each year from 2007 to 2012 ⁽³³⁾.
- Some 38% of US tourists currently have a strong interest in sustainability, the environment, and organic and natural foods and products - and this trend is strengthening ⁽³⁴⁾.

Examples of the emerging opportunity niches for agriculture within this sub-sector include:

- **Reforestation and carbon sinks** – this is an emerging opportunity area that is associated with the increasing cost of buying carbon credits globally to cover off excess CO₂ emission levels (above set quotas in many developed economies). For example, one Maori tribe in New Zealand receives US\$ 300 per hectare to leave 10,000 hectares of regenerating forest untouched so that the carbon sequestered each year in the forest can be traded off through a carbon trading agency in the UK against industrial and utility generated CO₂ emissions. The key trend behind this area is the growing cost associated with greenhouse gas emissions and the increasingly stringent targets being set by many governments to reduce these below 1990 emission levels.
- **Urban re-greening** – there are increasing opportunities for the nursery and ornamentals sector as greater numbers of cities go green. Green roof initiatives (e.g. in Chicago and Beijing) are one driver. Others include reclaiming the urban environment from the concrete jungle – as is happening in a number of Asian cities. Buildings and motorways are being pulled down and replaced by 'green oases' ⁽³⁵⁾. The trend is to move towards more sustainable cities and an improved quality of life that attracts and retains citizens. A number of large cities, such as Sydney and London, are losing population to other more attractive cities.
- **Balcony and roof gardens** - these are becoming a rapid growth niche opportunity in a number of large cities. Hong Kong, Singapore, and a number of US cities are leading the way. The key drivers behind this trend include a move towards greater sustainability in cities, aging populations who have more time to do things, and an increasing desire by some sections of the population to reconnect with nature.

³¹ http://www.worldhealth.net/news/viagra_works_but_chocolate_works_better

³² http://carbonfinance.org/docs/Carbon_Trends_2007- FINAL - May_2.pdf

³³ <http://www.independent.co.uk/news/world/asia/the-growth-of-highrise-gardens-let-a-thousand-rooftops-bloom-455165.html>

³⁴ http://www.deloitte.com/dtt/cda/doc/content/us_cb_THL Trends010108.pdf

³⁵ <http://www.guardian.co.uk/environment/2006/nov/01/society.travelsenvironmentalimpact>

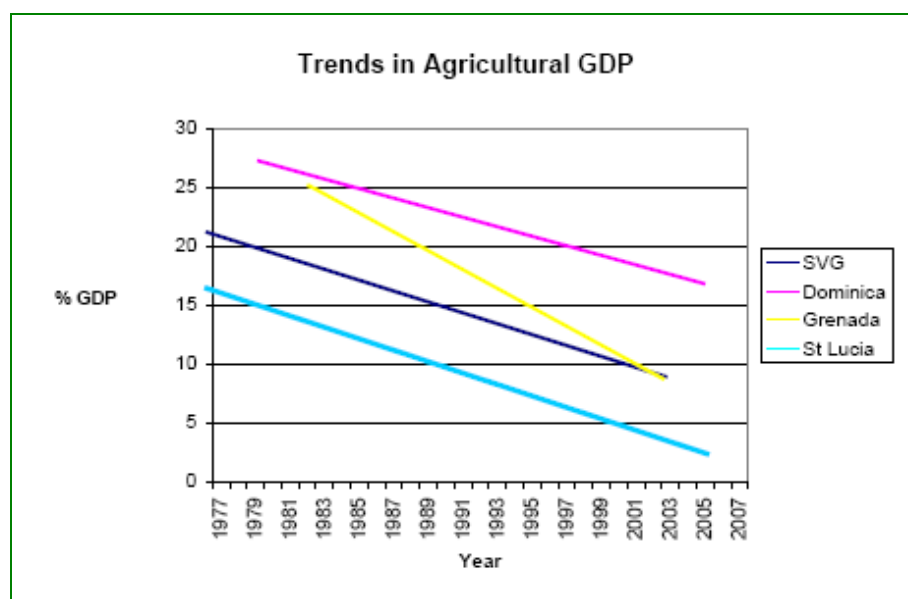
- **Agro-tourism** – there is a growing trend internationally favouring immersion and experiential tourism. This has led to the growing opportunities for farm stays and specialist interest destinations. The ‘Big Pineapple’ near Brisbane in Australia is a good example of exploiting tourist interest. However, the real growth is likely to be in a more ‘intimate’ experience where the tourist becomes immersed or interactively involved in the experience.

4 CAPABILITIES & ENABLERS

4.1 The Overall Picture

Caribbean agriculture has been challenged by a need to transition from a traditional way of doing things – the old colonial commodity model – to a way that is in tune with modern consumer and market needs. The magnitude of the challenge is reflected in the decline of agriculture as a percentage of GDP in the region. Figure 7 demonstrates the trend for four small Caribbean island nations.

Figure 7: The declining contribution of agriculture to the national GDP in four small Caribbean island countries.



In St. Vincent and the Grenadines (SVG) the contribution of agriculture to the national GDP slumped from 21% in 1977 to 8.8 % in 2004⁽³⁶⁾. In Dominica the percentage contribution towards GDP dropped from 26.6% in 1980 down to 16.7% in 2006⁽³⁷⁾. In Grenada, agriculture's contribution to GDP dropped from 25% in 1984 to 8.5% in 2004⁽³⁸⁾. Hurricane Ivan was a major factor in the latter case. In St. Lucia agriculture's contribution to GDP dropped to 3.2% in 2006, down from 16% in 1977⁽³⁹⁾.

The ability of Caribbean countries to exploit emerging global growth niche areas depends upon the strength of the capability and enabler situation in the region and within each individual country to be able to develop agri-business solutions that match the

³⁶ 1977 figures <http://www.cnm.org/documents/studies/OECS/RNM%20Study%20-%20St.%20Vincent.pdf>; 2004 figures, http://www.caricom.org/jsp/community/donor_conference_agriculture/agri_profile_st_vincent_grenadines.jsp.

³⁷ Brief Situational Analysis of the Agricultural Sector – Dominica, Division of Agriculture, Commonwealth of Dominica, March 2007.

³⁸ 1984 figures <http://www.photius.com/countries/grenada/economy/sectoral.html>; 2004 figures http://www.fao.org/es/ESS/compendium_2006/pdf/GRN_ESS_E.pdf

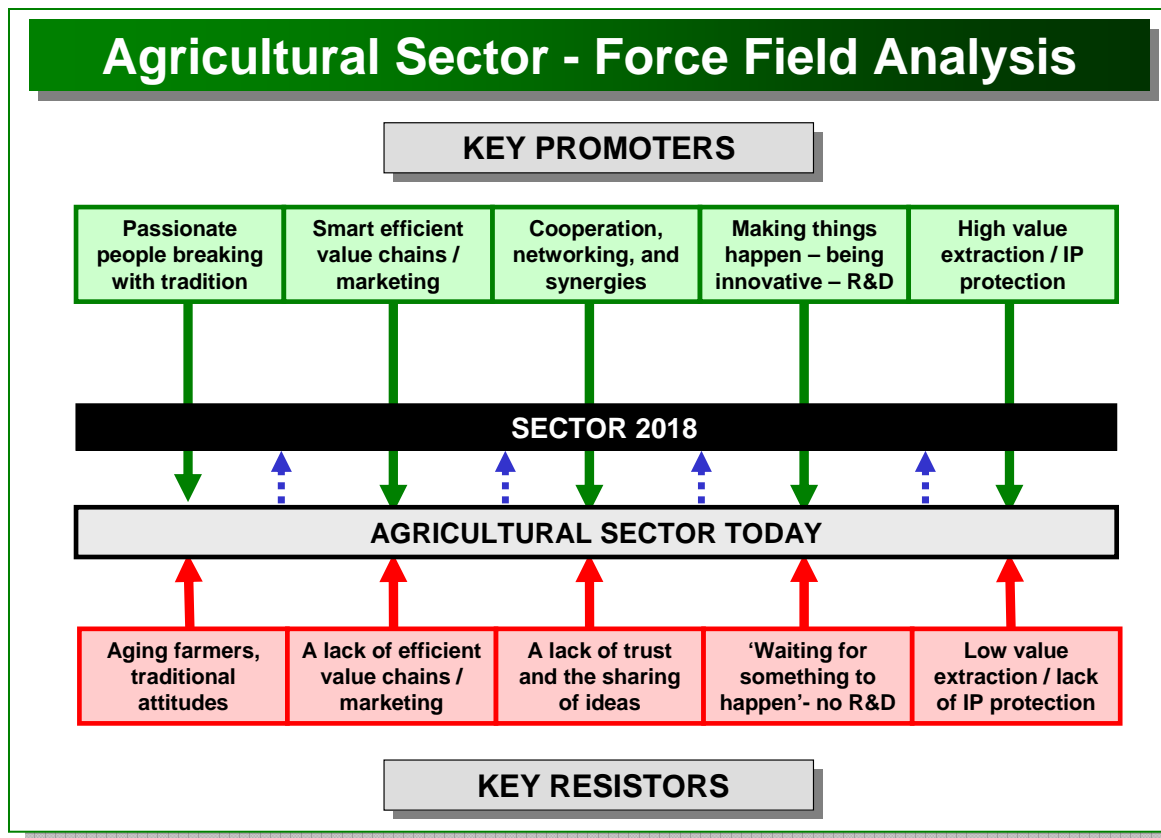
³⁹ 1977 figures <http://www.fao.org/docrep/004/y1997e/y1997e15.htm>; 2006 figures <http://www.cepal.org/publicaciones/xml/1/32401/L.140-1.pdf>

needs of those growth niche areas. The status of the capability and enabler situation plays a major part in determining which global growth niche areas are a practical or viable investment opportunity area for individual countries and the region.

The comments made in this section are based upon formal capability and enabler assessments made in Trinidad and Tobago, St Vincent and the Grenadines, St Lucia, Grenada, Dominica, and Barbados. They also include a synthesis of views from a number of regional workshops and working group sessions organised by groups such as the Caribbean Council for Science and Technology (CCST), the Organisation of American States (OAS), CARICOM, the Caribbean Development Bank (CDB), and other the Caribbean Association of Industry and Commerce (CAIC).

A simple overview of the regional and national capabilities and enablers, as they relate to progress in the agricultural sector, can be expressed in terms of factors which are 'promoters' and others which are 'resistors', is shown in Figure 8.

Figure 8: An overview of the 'promoters' and 'resistors' that impact upon agricultural sector development in Caribbean countries (40)

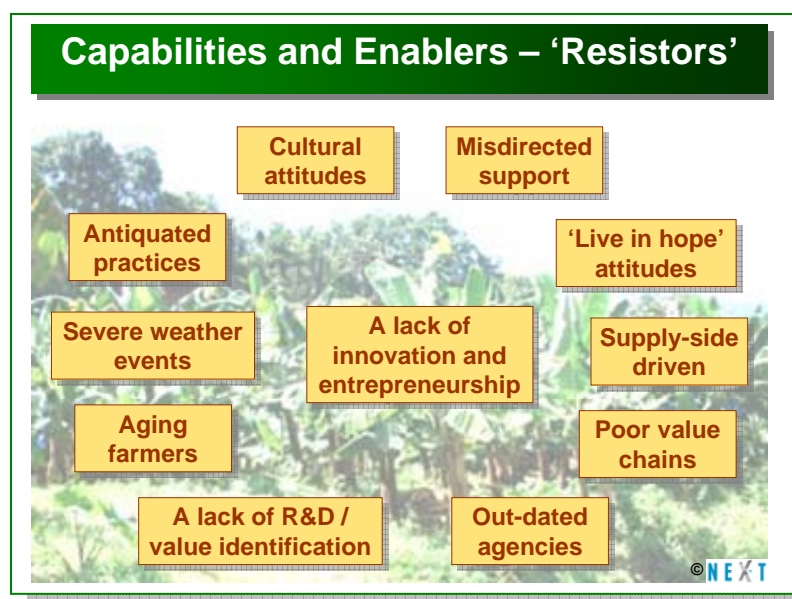


⁴⁰ NEXT archives

4.2 Key 'Resistors'

Before looking more closely at the global growth niche opportunity areas that offer potential to the agricultural sector in the Caribbean, an understanding of the factors that are 'resistors' – i.e. those that are likely to limit the potential exploitation of such niches – is necessary. From the work NEXT has carried out in the region, a number of such 'resistors' have been identified and categorised as shown in Figure 7.

Figure 7: An overview of major 'resistors' that are hindering development of the agricultural sector in the Caribbean (⁴¹)



In brief each of these resistors can be described as follows:

- **A lack of innovation and entrepreneurship** – The agricultural sector in the Caribbean is largely built upon 'peasant farmers' who tend to have small holdings and low levels of education. Most are strongly supply side rather than demand side driven. Traditional production practices tend to be a major hindrance to agricultural sector development. Entrepreneurship and innovation has not been encouraged.
- **Cultural attitudes** – There is a prevailing attitude in many Caribbean societies that agriculture is for 'losers', particularly amongst those of African descent. There is still a deep-rooted association with 'slave labour'. Agriculture is often seen as being an occupation for those who have failed to make it in any other field.
- **Misdirected support** – There is a great deal of fragmentation in the sector, both within the farming community and between the support agencies. There is a lack of coordination of the efforts of such agencies and a significant dilution in the value received for the money spent on support services and development projects. There is no overarching goal for the region to aspire to and, as a result, no long term 'destination' to align their efforts.
- **'Live in hope' attitudes** – This attitude predominates in traditional sectors such as the banana and sugar production sectors. Instead of taking a proactive stance

⁴¹ NEXT archives

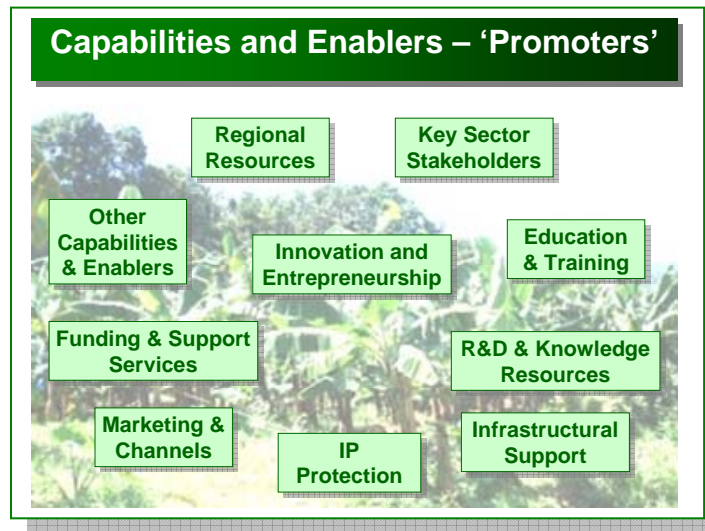
towards developing innovative solutions that would provide a new way ahead in the face of the inevitable changes that these sectors were clearly going to have deal with, too many involved in the agricultural and political sectors have been trying to 'defy gravity'. They have expended considerable energy in the hope of negotiating further concessions to continue what is essentially an uncompetitive position. This attitude also applies to the supply side driven mentality that many producers have. It tends to be based on the hope that there will be someone out there who will buy whatever is produced rather than developing an understanding of what customers really want to buy and how they can be turned into a viable proposition for the farmer.

- **Supply-side driven** – The sector is characterised by a production driven rather than demand driven approach. This results in market mismatches, a poor understanding of pricing practices, and poorly developed value chains that link producers and customers into mutually beneficial arrangements.
- **Poor value chains** – The lack of value chain development is a major hindrance to the agricultural sector in the Caribbean. For example, on the east coast of the Grenada there are a number of small farmers who own milking goats. There are hotels on the west coast that are prepared to buy goat's milk at an attractive price. However, there is no value chain that facilitates collection of the milk from the farmers, its pasteurisation, packaging, chilling, and delivery to the hotels. One source said a second hand pasteurisation unit would cost just US\$ 180.00.
- **Out-dated agencies** – These include statutory bodies such as the Grenada Cocoa Association, the Grenada Cooperative Nutmeg Association, the State Agricultural Inputs Warehouse in SVG, and the Dominican Export Import Agency. All have state backed monopoly control of various activities and are seen by a number of entrepreneurial persons to be perpetuating supply side driven thinking and hindering innovation and entrepreneurship.
- **A lack of R&D / value identification** – Not only is there a lack of R&D resources available, particularly at the national level, but many of the resources which do exist are in a poor state and lack funding and staff. The R&D focus is also often outdated and insufficient effort is being allocated towards developing future-focussed value adding solutions.
- **Ageing farmers** – In most Caribbean countries the average age of farmers is estimated to be close to 60 years. Young people are not being attracted into the sector because it does not offer a working environment, particularly from the technology and comfort of work perspectives, which is competitive with other sectors.
- **Severe weather events** – These are a fact of life for many Caribbean countries. Little effort has been made to develop 'hurricane-proofed' solutions for agriculture, even though there are numerous opportunities to do just that. A 'hurricane-proofed' solution is one which provides the quickest recovery path following such an event.
- **Antiquated practices** - Production practices, production scheduling, value leveraging, and value chain development appear to be 40 – 50 years behind the times. Only a tiny amount of protected cultivation is practised in the region and irrigated agriculture is not common. The agricultural sector is failing to deliver sufficient food and resources to satisfy the needs of internal markets, let alone exports. This is in spite of the high prices prevailing on many local markets for imported produce.

4.3 Key 'Promoters'

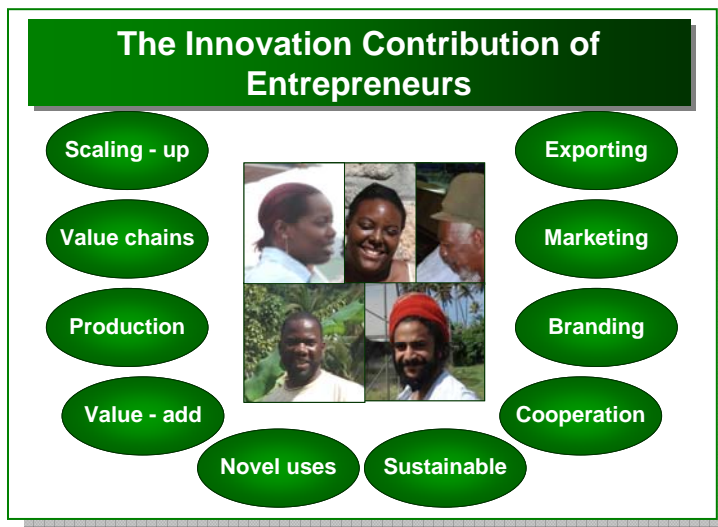
In spite of the 'resistors' described in the previous section, there are also numerous 'promoters' throughout the region that could be leveraged to develop a modern highly focussed agricultural sector. Figure 9 provides an overview of the key capability and enabler areas that have been identified and which have the potential to promote growth in the region's agricultural sector.

Figure 9: An overview of major 'promoters' that have the potential to enhance development of the agricultural sector in the Caribbean ⁴²



- **Innovation and entrepreneurship** – There is a significant (and growing) pool of entrepreneurial and innovative people in the region. The capability and enabling skills they possess is of great value to the sector and can be summarised as shown in Figure 10.

Figure 9: The capability and enabling skills of regional entrepreneurs



⁴² Figures 8 and 9 both NEXT archives

Examples of such innovation include ways of generating high revenues off small areas of land, developing value chains, customer driven business development, scaling up of operations, forming mutually beneficial alliances, developing unique locally adapted 'appropriate technology' solutions, developing high value-added products and solutions, and overcoming hurdles that many others see as being insurmountable.

- **Key sector stakeholders** – From the public sector perspective much of the positive contribution tends to come from specific individuals who have a drive and passion to see the sector and individuals within it succeed. They are a small minority, as in the private sector, but play a crucial role in developing the agricultural sector. From the private sector perspective there are a few 'incumbents' who have been in business for a long time who are keen to help with progressing the sector and who are willing to work with others who are highly entrepreneurial and innovative. From the non-governmental organisation (NGO) perspective, once again there are a number of individuals from specific agencies who are providing a valuable contribution.
- **Education and training** – The resources within most of the smaller countries are very limited. This means regional institutions such as the University of the West Indies (UWI) need to play a leading role. Many entrepreneurs have learned what they need to know by being proactive, taking time out to learn what they need to know (sometimes offshore), or availing themselves of specific learning opportunities that public and NGO sector agencies offer from time to time. There is a need to strengthen the regional educational and training input at national level.
- **R&D capabilities and knowledge resources** – R&D resources are limited within many smaller nations. However, facilities do exist in both the public and private sector that could be leveraged a lot more with the right strategic approach. These can be complemented by regional R&D resources that exist at institutions such as UWI, CARDI, CARIRI, CABI and other such organisations – provided a more coordinated and focussed approach is adopted. There is also a pool of people who have extensive knowledge relating to Caribbean agriculture and about ways that could potentially derive far greater value adding. The challenge is to develop a better means of connecting the people who have the knowledge with those who are in need of it.
- **Infrastructural support** – Regional and international freight and transport is a real challenge. However, a number of entrepreneurs have found ways around the limitations that exist. For example one is chartering a ship to transfer produce between a number of the Eastern Caribbean states; another has developed such high value added products that the cost of airfreight is not a constraint; another new business amalgamates consignments with an incumbent player in a win-win arrangement; another uses charter flights to ensure reliable transport in and out of Dominica rather than having to deal with the unreliable service offered by LIAT. National road networks are vital for providing access to rural properties and transporting produce from farms to buyers. There is a lot of improvement required in this area.
- **Intellectual Property (IP) protection** – There is a considerable pool of intellectual property available in the region, such as a range of new *Anthurium* cultivars developed at UWI St Augustine in Trinidad and Tobago. The legislation to back IP protection is largely in place throughout much of the region. The challenge now is to develop a consortium type model that joins professional financiers with IP developers to maximise the revenue generation potential such IP offers.
- **Marketing and channels** – An area that needs considerable development is the availability of e-commerce processing systems and packages from the banking and finance sector so that local products can be sold internationally over the Internet.

Currently entrepreneurs in many Caribbean countries have poor access to such services. Where it is available, it tends to be high cost by international standards. There is not enough global thinking by the region's financial sector in this regard. It is a potentially huge opportunity area for Caribbean agriculture. Another important area is the development of value chains that link producers and manufacturers in the most efficient way with end customers locally and in global markets. There is huge potential in this area as the development of new era value chains is poor throughout much of the region, even for simple things such as delivering bananas from the farm to the doors of retailers and hotels in a major banana growing country such as Dominica. One entrepreneur is doing very well financially by just doing this.

- **Funding and support services** – Funding of business start ups and their ongoing development is always an issue. Most of the best entrepreneurs seem to be able to pull together sufficient funds to start off their business dreams but face problems when they wish to expand. There are two issues in this area. The first is the traditional approach the finance sector takes to lending in agriculture which is largely based upon securing loans against physical assets as collateral. However, some 50% of the agricultural sector loans made by a development bank in Dominica have been defaulted on in recent years. The challenge is to find a way of backing lower risk entrepreneurs who have already found a way to leverage substantial value adding for the agricultural sector and have a proven track record – but who did it without having to invest heavily in assets. This means taking a more innovative approach with regard to lending e.g. upon the basis of current and future revenue streams, profitability assessments and securing risk against future revenue streams. This is a model that has been adopted by a number of highly successful lending institutions in advanced economies. One good example is Sequoia Capital in the USA (⁴³). It is also not just a matter of lending funds but also protecting that investment by providing mentoring and other business development assistance that all entrepreneurs need to successfully realise their aspirations.
- **Other capabilities and enablers** – Self mentoring groups and networking are two critical factors for developing successful businesses. Overcoming the highly individualistic attitudes of many in the islands is an area that needs to be addressed. There have been some innovative approaches to addressing this challenge taken which have been very successful. Examples include the dasheen growers network facilitated by Mr Jethro Greene in SVG, the young agriculturalist networks and self-mentoring groups being developed by Ms Cindy Eugene in St Lucia and Mr Delroy Williams in Dominica, and the Bellevue Growers Cooperative in St Lucia.
- **Regional resources** – Many Caribbean countries have small populations and very limited resources. Attempts have been made to do more on a regional basis to compensate for national limitations. This has seen the evolution of a number of institutions such as UWI and the Eastern Caribbean Institute for Agriculture and Forestry in the educational field, CARDI, CARIRI, WINREF, and CABI in the research and development field; OAS and CCST in the science and technology field; the CDB, IDB, and World Bank in the development financing area; CTA, Peace Corps, Oxfam, IICA and many others in the advisory and support areas; the CRNM, Caribbean Export, and CAIC in the trade area. The biggest challenge is to try and align all such groups and their agendas into one go-forward strategy for the region. Currently the situation appears to be somewhat akin to that of a number of individuals sitting in a boat with many paddling in different directions.

⁴³ <http://sequoiacap.com>

5 POTENTIAL OPPORTUNITY AREAS

Based upon the global sub-sector overviews presented in section 3, a matrix has been developed that describes and rates the potential opportunities for the agricultural sector in Caribbean countries using several defining parameters. These ratings are based upon a combination of the author's knowledge of market niches evolving within a foresight context and formal assessments of the capabilities and enablers that exist in a number of Caribbean countries derived from projects carried out over the past two and a half years.

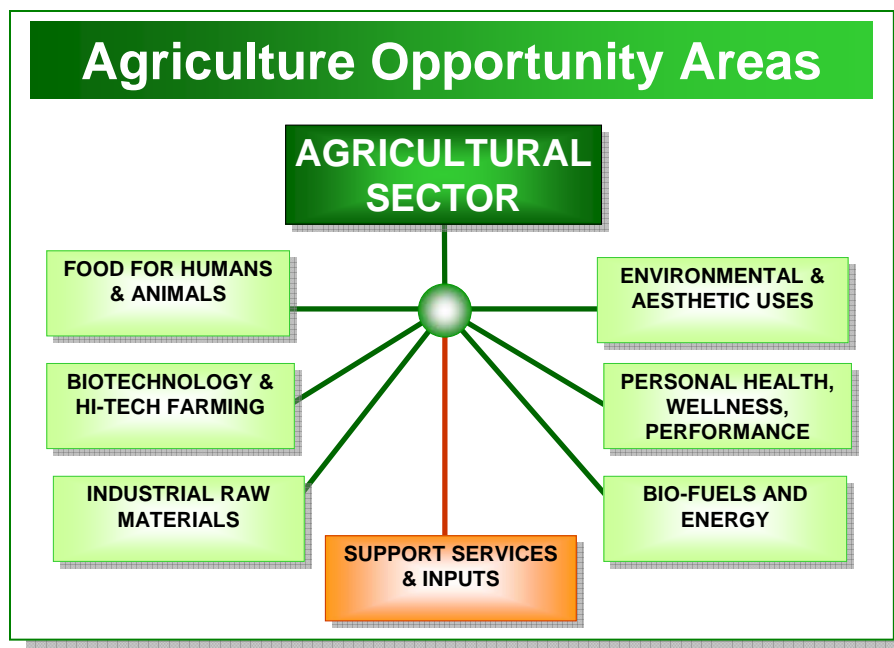
The ratings should be interpreted as follows:

- ◆ This niche area has low potential for the region because of a lack of basic resources to build the opportunity on; a lack of capabilities in terms of people skills, enabling frameworks, R&D resources, technology, and facilities; a low potential value-add for the region because of the nature of the niche.
- ◆◆ This niche area has moderate potential based upon the factors described above.
- ◆◆◆ This niche area has high potential based upon the factors described above.

These ratings are followed by explanatory comments and specific examples of opportunities for the Caribbean region.

In addition to the six sub-sectors identified in section 3 of this report, there is one other area included in this section that offers potentially attractive growth opportunities for entrepreneurs and financiers – the agricultural support services and inputs area as shown in Figure 10.

Figure 10: Investment opportunity areas for the Caribbean agricultural sector



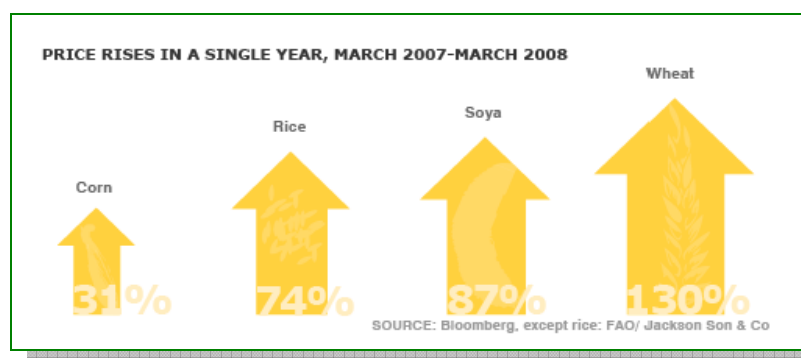
5.1 Food for Humans and Animals

Sub-sector niche	Opportunity area	Potential resource availability	Rating	
			Potential capability availability	Potential regional value-add
National food security	To produce more food internally but by using modern growing technologies.	♦♦	♦♦	♦♦
Organic food	To produce organic products for the tourism, processing, and export sectors.	♦♦	♦	♦♦♦
Alternative sources of animal feeds	To develop alternatives to increasingly costly imported animal feed.	♦♦	♦♦	♦
High value gourmet food products	Aimed at the high-end connoisseur market locally and globally.	♦♦♦	♦	♦♦♦
Ethnic food products	More sophisticated, well branded, and well marketed ethnic food products.	♦♦♦	♦♦♦	♦♦♦
Heritage fruits and vegetables	Mainly for the regional tourist trade but there may be some specialist export.	♦♦	♦	♦♦♦
Exotic meats	To exploit high value niche opportunities for unique farmed 'wild meats'.	♦♦	♦	♦♦♦

Explanatory Comments:

- Producing more food internally is largely a commodity activity and requires investment in highly efficient growing systems to produce competitively priced food without subsidies. However, with global food prices rising strongly, the potential value add for the region is in removing a dependency on high cost imports and creating more opportunities for employment locally – although such employment will need to be in a far more modern form of agriculture in order to young attract people to work in the sector. This is currently a major challenge with farmers throughout the region aging fast – most are approaching 60 years of age or are older.

Figure 11: Rising world prices of food staples – that may continue until 2015 ⁽⁴⁴⁾



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http://www.khaleejtimes.com/DisplayArticle.asp?xfile=/data/business/2008/April/business_April420.xml§ion=business

- The growth in demand for organic food is strong around the world and little has been done to exploit it in the region – except in Cuba. The potential value-add is high if linked into tourism and specialist niche markets.
- The animal feeds market is a commodity market and will add little value, but there are different ways of thinking about solutions as shown in the examples that follow.
- High value gourmet food products are already produced by a few smart operators in the region – there is potential for a lot more.
- Ethnic food products exist but few stray beyond traditional local markets. Thus there is expertise in making them but little for smart international positioning and marketing.
- Producing heritage fruits and vegetables is a small high value niche that is likely to largely benefit from the high-end tourism and restaurant sector within the region.
- Currently ‘wild meat’ is endangered by over-exploitation of limited wild stocks in many Caribbean countries. The Australians farm crocodiles, emus, and kangaroos, for ‘wild meat’ production, and civets and other unusual species are farmed in Asia. The potential value is many times that for commodity meats such as pork and chicken.

Examples of Caribbean Opportunity Areas

- **Rice and extensive crop growing in Guyana** – The world rice price has increased by 71% in the past 12 months and major exporting countries such as Thailand are restricting exports in response to consumer protests within their home countries. Guyana has considerable land areas suitable for large scale agricultural production but there is a need to evaluate which growth market niches provide the best potential for the country over the next 10 years. There will also need to be considerable investment in the equipment and technology required to pursue such large scale production and post-harvest handling operations. However, Indian machinery manufacturers are developing low cost models of equipment, such as combine harvesters, that can cost less than 10% that of traditional machines⁽⁴⁵⁾.
- **Cassava flour in Jamaica** – A considerable amount of research has focussed on developing cassava flour in Jamaica and the first commercial products are already on the market. This may prove to be a real winner in light of the 130% increase in the world wheat price in the 12 months to March 2008. Breadfruit flour is another possibility - but it is still in the research and development stage.
- **Demand based production** – one St. Vincent grower generates annual revenues of EC\$ 400,000 off just 2.5 acres of land by focusing on the demand-based production of high value vegetable crops for the local retail and tourism sector.
- **Organic food and heritage crop production** – The Bellevue Growers Cooperative in St Lucia generates a greater monetary surplus from its current 2 acre protected organic herb and heritage vegetable production unit than the combined total for all the other activities relating to the production and marketing of its 200 members’ crops. The Cooperative is now expanding the protected production area and has aspirations of reaching 25 acres within the next few years.
- **Alternative sources of animal feeds** – One particularly interesting investment opportunity area relates to an idea that Dr Penial Mwasha, currently on secondment from Tanzania with the Ministry of Agriculture in Grenada, is working on. He discovered that the local ‘yardie’ chickens that live in villages and around farm houses are far better scavengers than pure bred strains such as leghorns and have a grain

⁴⁵ <http://www.machinery.globalsources.com/gsol/I/Tractor/a/9000000080858.htm>

feed requirement as low as 20% of that for such purebreds. He believes it may be possible to breed new strains of chickens for the broiler industry, using the local 'yardie' gene pool, that have a much lower requirement for costly imported grain-based feeds.

- **Gourmet and ethnic food production** - Baron Foods Ltd in St Lucia is an excellent example of a highly successful Caribbean based business that exports a range of high value gourmet and ethnic sauces to Europe and North America. Another is the Walkerswood food processing operation in Jamaica that has built up a significant export business around jerk seasoning and other local ethnic products (see Sector Success Stories).
- **Gourmet food production** – The Grenada Chocolate Company is an excellent example of a business that has developed an organic high cocoa chocolate product derived from Grenadian cocoa that commands a large premium in high-end retail outlets in Europe and North America.
- **Exotic meats** – Dr Gary Garcia at UWI St Augustine has developed a prototype agouti farming system. Agouti wild meat can sell for US\$ 44+/kg compared to pork which retails at around US\$ 3.00 / kg. Another good example is the development of conch farming in the Turks and Caicos Islands.

5.2 Biotechnology and Hi-tech Farming

Sub-sector niche	Opportunity area	Rating		
		Potential resource availability	Potential capability availability	Potential regional value-add
Genetic modification	Developing innovative solutions for agriculture using GMOs.	♦	♦	♦?
Medical applications	Using 'pharming' to develop new medical applications (GMO).	♦	♦	♦
Medical applications	Using 'pharming' to develop new medical applications (non-GMO).	♦♦	♦♦	♦♦♦
Industrial applications	Bio-fermentation systems.	♦♦	♦	♦
Natural pest and disease control	There are many opportunities to develop natural protection systems for plants and animals.	♦♦♦	♦♦	♦♦♦
Environmental applications	Developing natural solutions for environmental challenges.	♦♦♦	♦	♦♦♦
Plant & animal improvement and IP	Producing high value strains of tropical belt plants and animals that attract IP rights licensing payments e.g. <i>Anthurium</i> plant variety right royalties.	♦♦♦	♦♦	♦♦♦
Urban agriculture	High technology solutions that produce food within city boundaries.	♦	♦	♦

Explanatory Comments:

- Producing GMOs requires high-tech environments and strict controls. It is questionable whether many Caribbean countries have the resources and capabilities to exploit opportunities in this field.
- However, 'pharming' using non-GMO techniques could provide opportunities based around many of the region's plant and animal species which are purported to have specific human health benefits – including scorpions, snakes, and centipedes.

- With the move towards sustainable and organic farming systems, the demand for better natural pest and disease control measures is increasing.
- Biotech-driven industrial applications are likely to be capital intensive and only produce commodity priced outputs – so they would probably be a lower priority in the region unless the volume x price equation was viable.
- There are increasing opportunities for developing and producing environmentally related applications from natural sources.
- There is considerable potential to generate significant revenue streams around regionally produced unique cultivars of plants e.g. the bacterial disease resistant strains of *Anthurium* that provide new opportunities for this sought after crop throughout the tropical belt of the world. There are associated processes, such as genotype screening techniques, that can also be patented and generate revenue.
- The area of high-tech urban farming is probably too 'distant' for the region.

Examples of Caribbean Opportunity Areas

- **Non-GMO 'Pharming'** - A number of new medical treatments are being developed from snake, scorpion and spider venoms for the treatment of heart disease, cancer, and pain. They can also be used to develop natural plant protection agents⁽⁴⁶⁾. The region has a number of potential flora and fauna resources that offer potential in this area along with persons who have considerable knowledge about their potential use in the local traditional herbal sector. The 'Caribbean Herbal Pharmacopoeia' produced by TRAMIL in 2007 provides a valuable resource base relating to potential herbal remedies⁽⁴⁷⁾. Several potential sources of useful compounds appear to be *bios bande* and seamoss – they come up regularly in discussions.
- **Natural pest and disease control** – Dr Ulrike Krauss, based in the regional office of CABI in Trinidad, has identified a strain of the *Trichoderma* fungus species which grows systemically in cacao trees and provides a high level of protection against several debilitating diseases – such as 'frost disease'.
- **Environmental applications** – Anti-fouling paints based on tributyltin compounds have been used on boat hulls for a number of decades. However, they have an adverse effect on small marine animals and this is leading to bans and restrictions on their use in many parts of the world. There is evidence that naturally derived anti-fouling paints could be developed using extracts of capsaicin from hot peppers⁽⁴⁸⁾.
- **IP protected plants** – New strains of *Anthurium* bred by Dr Pat Umaharan at UWI St Augustine, if accorded Plant Variety Right protection, have the potential to generate tens of millions of dollars in revenue for Trinidad and Tobago, without the need to produce any flowers or planting material, through international licensing agreements. This is a highly hurricane-proofed agricultural sector business investment option. For more details refer to the 'Examples of Caribbean Best Bet Investment Opportunities in Agriculture' document.

⁴⁶ <http://www.chm.bris.ac.uk/motm/spider/page7.htm>

⁴⁷ <http://funredes.org/endacaribe/traduccion/tramil.html>

⁴⁸ <http://www.itrc.org/reports/paints/paints.pdf>

5.3 Industrial Raw Materials

Sub-sector niche	Opportunity area	Rating		
		Potential resource availability	Potential capability availability	Potential regional value-add
Natural fibres	Growing high strength fibres for use in industrial applications.	♦♦	♦	♦
Bio-plastics	Growing crops that can be converted into bio-plastics.	♦♦	♦♦	♦
Pharmaceuticals	Growing new crops that provide raw materials for pharmaceutical products.	♦♦	♦	♦♦
Eco-housing	Growing base materials that are used to produce eco-housing components.	♦	♦	♦

Explanatory Comments:

- Growing high strength fibres and raw materials for bio-plastics are both commodity focuses and probably not suited to smaller scale Caribbean operations, but may have a place in countries such as Guyana that have larger land areas.
- The pharmaceutical opportunity area could offer some potential for deriving value from a number of legal and illegal crops, and indigenous resources, growing in the region.
- The eco-housing area is still a tiny global niche. Some of the concepts are modern versions of old traditional building designs and systems – such as mud brick houses. However, there is probably little opportunity for the agricultural sector to extract much value from this niche in the Caribbean.

Examples of Caribbean Opportunity Areas

- **Bio-plastics** – Whilst this is likely to be a lower value commodity area, it may be possible to produce bio-plastics from high lignin crop residues that arise as by-products from timber or sugar cane processing. Only 18% of the raw sugar cane is actually used to derive value - sugar. The other 82% is currently waste (bagasse) that is little used. A New Zealand company, Biojoule Ltd, has successfully developed a process for making polyurethane at globally competitive prices from lignin containing waste streams⁽⁴⁹⁾. This may be an option for Caribbean countries such as Guyana, Jamaica, and Barbados as they still produce significant quantities of sugar. Deriving value from waste streams is a high opportunity area as the raw material already exists in large quantities.
- **Pharmaceuticals** – One oft quoted example in the region is the possibility of developing legal medical remedies derived from marijuana for pain relief and other medical problems as it is so ubiquitous throughout the region. It could provide an opportunity to not only generate new legal revenue streams from this widespread resource but also to direct regional expertise away an association with the illegal drug culture that plagues many Caribbean countries. There is already at least one legal medical product derived from marijuana on the market in the USA – Marinol⁽⁵⁰⁾.

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<http://www.genesis.co.nz/Press+Releases/2007/GREEN+PLASTIC+PRODUCED+FROM+BIOJOLE+MATERIAL.html>

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<http://www.usdoj.gov/dea/ongoing/marinol.html>

5.4 Biofuels & Energy

Sub-sector niche	Opportunity area	Potential resource availability	Rating	
			Potential capability availability	Potential regional value-add
Bio-fuels	Produced from crop residues such as bagasse.	♦♦	♦	♦
Bio-energy	Community-based total sustainable energy solutions built around sustainable biomass production and utilisation.	♦♦♦	♦	♦♦♦

Explanatory Comments:

- The whole concept of biofuel is commodity oriented. Producing biofuel from local resources may only end up being a global transitional solution. It is an area that the region should enter with caution as there are a lot of negative warning signs associated with this area. For example, there are negative consequences associated with clearing forested areas to grow biofuel crops. The carbon equation payback period can be hundreds of years. Recent reports indicate that a number of crops that currently being grown to produce biofuels, e.g. corn and soybeans, do little to reduce growing carbon emission levels. There are also a number of alternatives to the combustion engine being developed that will not need traditional hydrocarbon-based fuels. Fuel cell powered vehicles are already entering the market.
- On the other hand, bioenergy is a quite different concept. It uses biomass to provide biogas for motive power, for electricity generation and heat energy production for a range of potential uses, including water heating or cooling. There is considerable potential to develop totally sustainable systems that are fuelled using agricultural waste streams, or biomass cultivation and harvesting, to provide sustainable community energy solutions. These are also likely to provide significant local employment. The biggest value-add factor is removing the risk of dependency on high cost imported fossil fuels derived from a finite resource base, creating a new opportunity to add value to local crop waste streams, and creating additional local employment.

Examples of Caribbean Opportunity Areas

- **Bioenergy** – There is a major opportunity to develop community-based 100% sustainable energy supply businesses throughout the Caribbean (and further afield) that use biomass. Poorly or underutilised crop wastes, such as bagasse in Jamaica, Guyana, and Barbados, coconut husks, rice straw, and sawmill waste streams, could be used as primary fuel sources to produce competitively priced energy and remove the need for countries and communities to depend on high cost imported fossil fuels. The high energy costs prevailing in countries such as Barbados, Grenada, and Dominica are likely to make such an option economically viable. The communities of Jühnde in Germany (800 people) and Güssing in Austria (27,000 people) provide excellent examples of what could be achieved. More details can be found in the Sector Success Stories report. The key is to be able to develop innovative funding models that amortise the up front technology costs over a period of years so that a long-term highly competitive sustainable solution can be cost-effectively implemented.

5.5 Personal Health, Wellness and Performance

Sub-sector niche	Opportunity area	Rating		
		Potential resource availability	Potential capability availability	Potential regional value-add
Nutraceuticals	To develop unique processed food products with an added health benefit.	♦♦	♦	♦♦
'Factor X' products	To identify and quantify 'Factor X' components in crops such as cocoa and nutmeg, prove health connections, and market professionally.	♦♦♦	♦♦	♦♦♦
Health and wellness products	Associate traditional benefits with products derived from local unique agricultural crops.	♦♦	♦♦	♦♦
Health and wellness products	Derive high quality extracts from unique plant or animal species for the global cosmetic sector.	♦♦♦	♦	♦♦♦
Health and wellness products	Develop unique products – such as soaps and body lotions – that use local herbs and medicinal plants to differentiate – and sell the story.	♦♦♦	♦♦	♦♦♦
Personal performance enhancement	This could be as simple as developing a standardised measure for the phenylethylamine component (the 'pleasure factor') in different strains of cocoa and leveraging value from high level biotypes.	♦♦♦	♦♦	♦♦♦
Personal performance enhancement	Proving scientifically performance enhancements traditionally associated with regional flora and fauna, such as sexual performance attributed to ' <i>bois bande</i> ', and marketing aggressively.	♦♦♦	♦♦	♦♦♦

Explanatory Comments:

- Producing nutraceutical products does require considerable skills and technological resources in the food technology and the clinical health fields. It may be too complex a field for the types of enterprises operating in the Caribbean region.
- 'Factor X' products offer huge potential. This is where a factor in a crop, e.g. theobromine or methylglyoxal in cocoa, is linked scientifically with human health and wellness benefits and a simple scale for measuring the effectiveness of different lines is developed – such as the 0 – 20 scale developed for New Zealand's 'active' manuka honey – which connects with end customers. The region has the capabilities to exploit this area but needs to refocus current research and development priorities away from traditional areas.
- There are good examples of small businesses starting to leverage considerable value-adding from local herbs, spices, and other plant species through traditional health and wellness associations throughout the region.
- There are a few '*bois bande*' based products being produced in the region but proof of effect, consistency, quality control, branding and marketing are areas that need addressing. The 'natural Viagra' market is potentially huge.

Examples of Caribbean Opportunity Areas

- **'Factor X' products 1** – Cocoa is an excellent example. Trinitario cocoa is regarded as one of the best types in the world and is often blended one part to nine with African cocoa to improve the latter's overall quality. Cocoa contains at least four unique compounds that are reported to have a positive impact on human health, wellness, and pleasure. But no-one in the region is leveraging the inherent potential value associated with such potential 'Factor X' components. For more details refer to the 'Examples of Caribbean Best Bet Investment Opportunities in Agriculture' document.
- **'Factor X' products 2** - Other sources of potential high value 'Factor X' derivatives include *bois bande*, seamoss, conch, tamarind, golden apple, prickly pear cactus, golden cactus, gloricida, ginger, breadfruit, nutmeg and a whole lot more. The traditional health and wellness uses associated with many local herbs, spices and other natural products provide a useful guide to potential 'Factor X' based opportunities.
- **Health and wellness products 1** – A good example of a successful regional business is based on the 'Nut-med' range of pain relief products developed by Mr Denis Noel in Grenada and marketed internationally – including through internet portals ⁽⁵¹⁾. Another is the 'Natural Botanicals' range developed by Sharon Jones in Dominica ⁽⁵²⁾.
- **Health and wellness products 2** – One recent example of the potential value that can be generated from traditional agricultural crops is the 'Pom' story from California ⁽⁵³⁾. In just four years this company increased turnover from US\$ 12 million to US 91 million. The product that drove this growth was pomegranate juice. But it was backed by a US\$ 10 million investment into research that proved measurable human health and wellness benefits associated with consumption of the product – which has high levels of anti-oxidants.
- **Health and wellness products 3** – The 'Coal Pot Soap Company' in Dominica is another example of high value adding being achieved in the Caribbean through the creation of unique products that connect with strong value propositions associated with end customers. The soaps this company produces contain local herbs, oils, and other natural ingredients derived from the agricultural sector. The cost of these soaps is at least 400% greater than standard soaps. But wealthy people in the region and internationally are buying a unique 'experience' rather than soap, and so they are prepared to pay this premium. For more details see the 'Sector Success Stories' document.
- **Health and wellness products 4** – The Dominican Essential Oil and Spice Cooperative has had many years experience with extracting, distilling and marketing bay leaf oil to offshore customers. They have developed a new 5 year plan based around leveraging greater value from the cooperative's bay leaf oil by developing their own brands and product ranges.
- **Personal performance enhancement 1** – One obvious investment opportunity is to develop a high quality standardised formulation of a sexual performance enhancement product derived from *bois bande*. There is increasing international interest in such a product but the current products available are largely 'backyard' manufactured and do not offer the standard wealthy international consumers expect and demand. At least one regional business is working on the development of such a

51 http://www.tffi.net/article_view/156

52 <http://naturalbotanicalscaribbean.com>

53 http://www.tffi.net/article_view/107

product. It has the potential to generate hundreds of millions of dollars of revenue on an annual basis. For more details refer to the 'Bwa Bande' best bet case in the 'Examples of Caribbean Best Bet Investment Opportunities in Agriculture' document.

- **Personal performance enhancement 2** – There are opportunities that could be developed around the 'pleasure factor' in Trinitario chocolate – phenylethylamine. There are several examples of companies offshore developing highly innovative products related to this field. See the 'Cocoa Brown Gold' best bet case in the 'Examples of Caribbean Best Bet Investment Opportunities in Agriculture' document.

5.6 Environmental Uses, Aesthetic Uses, and Agro-tourism

Sub-sector niche	Opportunity area	Rating		
		Potential resource availability	Potential capability availability	Potential regional value-add
Reforestation and carbon sinks	An opportunity to leverage value from protecting natural forestry resources.	♦♦	♦♦	♦♦
Urban re-greening	To develop innovative solutions for re-greening major urban environments.	♦	♦	♦
Balcony and roof gardens	To develop unique plants that can be grown in balcony and roof gardens and the associated growing systems.	♦♦	♦♦	♦♦♦

Explanatory Comments:

- For those Caribbean countries that still possess significant forest resources, or that need to pursue reforestation programmes, there is an opportunity to generate revenues from the carbon capture potential of regenerating forests through international carbon credit trading agencies.
- Urban re-greening is a rapid growth area overseas but there is probably not much potential for Caribbean businesses to exploit this opportunity area – unless they can supply knowledge-based or high value components for such solutions.
- The rapid growth of interest in balcony and roof gardens provides unique niche opportunities for miniature and hardy plants that will grow in such environments. Some of the biggest growth areas are in the tropical belt. There may be opportunities to exploit unique plant types and PVRs to extract value from this market.

Examples of Caribbean Opportunity Areas

- **Reforestation and carbon sinks** – This is a potential opportunity area that could generate revenue from marginal or eroding agricultural land areas. One Maori tribal group in New Zealand receives revenues of US\$ 3 million a year from a UK based carbon trading group for allowing 10,000 hectares of forest to naturally regenerate and capture carbon. Costa Rica has also benefited economically from a similar approach that protects existing forested areas and assists with funding reforestation projects⁽⁵⁴⁾.
- **Balcony and roof gardens** – There are a number of plant species in the region that could form the basis of a smart IP-based or licensed production business for unique

⁵⁴ <http://www.ncbi.nlm.nih.gov/pubmed/10977882>

plant species and cultivars suited to the growing balcony and roof garden sector in the sub-tropical and tropical belt e.g. Singapore, Dubai. Dwarf fruit trees are one aspect of this growth area. There are possibilities, for example, with dwarf nutmeg trees, dwarf golden apple trees, as well as miniature pomegranate trees that grow in Trinidad.

- **Agrotourism** – Several good examples of how agriculture and tourism can be combined to create successful businesses include the Ballenbouche Estate in St Lucia (an immersion tourism experience within a natural and organic production environment accompanied by a lot of stories) and Walkerswood in Jamaica (another agricultural sector related immersion experience but built more around a unique community self-help model).

5.7 Support Services and Inputs

Sub-sector niche	Opportunity area	Rating		
		Potential resource availability	Potential capability availability	Potential regional value-add
E-commerce	An opportunity to provide internationally e-commerce packages including transaction processing services.	◆◆◆	◆◆	◆◆◆
Investment and business development	More innovative investment models based on new risk-based paradigms and which include mentoring and business development support components.	◆◆◆	◆◆	◆◆◆
Input supplies	The development of regional supplies of competitively priced and timely key inputs.	◆◆	◆◆	◆◆◆
IP Protection	An opportunity to identify and leverage the inherent value of IP through setting up the right business models.	◆◆◆	◆◆	◆◆◆
Value chains, branding and marketing	Setting up the most efficient and highest value adding value chains for national and international marketing.	◆◆	◆◆	◆◆◆

Explanatory Comments:

- E-commerce is becoming an essential part of business to business and business to customer business relationships. It is especially important for businesses in small countries because they can go global through the Internet and connect with substantial niche groups of customers that are essential for developing businesses of substance. Currently such an option is not available for small to medium sized businesses in most Caribbean countries. It offers huge growth potential for the region.
- The challenge for the investment community is to develop a modern approach towards investment in agriculture. Major players in the ICT sector, e.g. in California, are now investing heavily in green businesses, which include a number in the agricultural sector, as they see the future potential in such investments. Such investment requires a far more innovative approach to the security requirements and the completeness of the investment offer. It's not just a matter of money but also of mentoring, business planning and development, marketing, and assisting with the formation of strategic alliances.
- Shortages of key inputs are a major hurdle to the agricultural sector in the region. Fertiliser is a good example. There are numerous opportunities to develop regional

input supply companies that can supply competitively priced and appropriately formulated input products and services.

- Adding value through the development and protection of IP is an area that is seriously undeveloped in the region. Few patents and Plant Variety Right registrations exist. Even trade mark protection is at a very low level e.g. Parry W. Bellot & Co. Ltd. in Dominica have no protection for their band name – and they have been in business since 1945.
- The chain of connections between the producer and the end customer is critical for the success of any business. The traditional old models are cumbersome and include many players who add substantially to the costs of moving product from the supplier to the end-customer. Typically if a product costs US\$1.00 ex-factory, it is likely to cost US\$ 5.00 – 6.00 by the time the end consumer purchases it. New value chains offer more efficient options that substantially reduce the gap – for example an ex-factory price of US\$ 1.00 increasing to around US\$ 3.50 for the end consumer.

Examples of Caribbean Opportunity Areas

- **E-commerce** – Currently most Caribbean e-marketers have to sell their products through offshore portals because of the paucity of e-transaction services available from the banking and finance sector in the Caribbean. The few banks that offer such a service charge high rates by international standards. This forces smart entrepreneurs such as Mr Denis Noel to market his ‘Nut-med’ products through offshore portals. As a result the value adding contribution Grenada receives is reduced. In the smaller countries the main opportunity is to provide this service to companies that are going global as that is where the real revenue streams lie, not within national markets. In larger countries more innovative ways of managing payments are needed. For example, only 15% of Trinidadians have a credit card the country has 1.6 million mobile phones and a population of 1.3 million. Mobile phone payments are a major growth opportunity area overseas. There are many growing small and medium sized businesses in the region which are frustrated by the lack of locally based e-commerce facilities.
- **Investment and business development models** – One good commercial model is the government funded National Entrepreneurship and Development Company (NEDCO) in Trinidad and Tobago which complements a small loan facility for SME owners and start-up entrepreneurs with business planning, market entry, branding, and mentoring assistance. Many start-ups are involved in agribusiness e.g. ethnic food producer Tropicple⁽⁵⁵⁾. The success rate is said to be 80% of all start-ups after 2 years.
- **Investment and business development models** –Bramco International⁽⁵⁶⁾ is a company in St Lucia which is using a model similar to the Y-Combinator in the USA⁽⁵⁷⁾. It is essentially a private sector incubator and supports groups of young people to develop innovative and entrepreneurial new businesses – including those interested in agri-business. Bramco receives a shareholding in each successful new venture as a reward for its initial support. The business is still in its infancy but already has several small projects up and running.
- **Input supplies 1** – There is a real opportunity to develop a business that supplies biological control solutions to regional problems and the growing organic sector.

55 http://www.tffi.net/article_view/40

56 <http://www.freewebs.com/bramco758/4hintl.htm>

57 <http://ycombinator.com>

Organic growing is expanding in every Caribbean country. Dr Ulrike Krauss at CABI has already identified and tested several options with regard to cocoa. There are problems with pests and diseases such as the pink mealy bug, the coconut red spider mite and frost disease in cocoa, that cause huge losses to growers in the region. Chemical control options are often impracticable. Biological control agents are now the primary method of control for major crops in many countries e.g. the greenhouse tomato growing sector. A number of Australasian businesses have been built around this growth opportunity area ⁽⁵⁸⁾.

- **Input supplies 2** - In many parts of the Caribbean the cost and continuity of supply of fertilisers is a real issue for producers. SVG growers suffered from major shortages late in 2007 due to the buying constraints imposed on the state monopoly importing agency. There is a real opportunity to develop a business in the region that provides a consistent and cost effective supply of synthetic and natural/organic fertilisers. The latter area offers considerable potential as it is a business area that can be built on the efficient use of local natural waste streams instead of costly fossil fuels or diminishing resources of phosphate rock. The conversion of bagasse to compost is already occurring in some Caribbean countries – such as Trinidad and Tobago.
- **IP protection** – There is a huge potential opportunity associated with the *Anthurium* cultivars developed at UWI in Trinidad. However, that opportunity requires the formation of a multi-party consortium that combines the right mix of expertise and competencies required to build and manage a global business.
- **Value chains** – There are three examples of businesses within the region that demonstrate the high levels of value adding that can be achieved simply by setting up the right sort of value chain models. They are a 100% value increase achieved by the Dasheen growers network in SVG; developing new local market sales of 50 – 75 boxes of bananas a day - achieved by a smart entrepreneur in Dominica who set up the country's first door-to-door delivery chain after returning from 15 years working in the logistics sector in the USA; achieving a 500% increase in returns for growers of yellow sweet peppers in St Lucia through the use of demand-side management for production scheduling and export price benchmarking.

⁵⁸ <http://www.goodbugs.org.au/suppliers.htm>

6 FINAL COMMENT

This brief document is not intended to be a comprehensive review of all the possible opportunities for the Caribbean agricultural and agri-business sectors. The intent is to provide an overview of growing global opportunity niche areas and develop some sort of view of what might be practical for the region to pursue in terms of the resources and capabilities available and the potential value adding that could possibly be achieved to help advance economic growth and social development.

There are certain to be differing opinions with regard to this 'first cut' attempt to identify potential opportunities. That is precisely the purpose of this report – to stimulate big picture thinking and to look at opportunities that largely fit outside the traditional thinking paradigms which prevail in the region's agricultural sector.

It is only by doing this that the sector can break out of its traditional shackles – something which has led to a significant decline in the contribution agriculture makes to national GDPs in the region over the past several decades.

A number of the brief examples alluded to in this report are covered in more detail in the associated 'Sector Success Stories' and 'Examples of Caribbean Best Bet Investment Opportunities in Agriculture' documents that form the other two deliverables for this CARICOM funded project.