

NATIONAL AGRICULTURAL POLICY

“A Vision for the Future of Agriculture in Barbados”



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A Vision for the future of Agriculture in Barbados

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ABBREVIATIONS AND ACRONYMS

ACP	African Caribbean and Pacific States
AHFCS	Agricultural Health & Food Control System
AIS	Agricultural Information System
BADMC	Barbados Agricultural Marketing Cooperation
BAMC	Barbados Agricultural Marketing Company Ltd.
BATT	Barbados Agricultural Trading Trust
BPoA	Barbados Plan of Action
CARDI	Caribbean Agricultural Research & Development Institute
CATCO	Caribbean Agricultural Trade Company
CIDA	Canadian International Development Agency
COTED	Council for Trade and Economic Development
CSME	CARICOM Single Market and Economy
CAFAN	Caribbean Farmers Network
CAP	Community Agricultural Policy
CET	Common External Tariffs
DFI	Direct Foreign Investment
ECLAC	Economic Commission for Latin America & the Caribbean
EPA	Economic Partnership Agreement
EU	European Union
FAO	Food and Agriculture Organisation
FTAs	Free Trade of the Americas
GAPs	Good Agricultural Practices
GMPs	Good Management Practices
HCCP	Hazard Analysis Critical Control Point
IICA	Inter-American Institute for Cooperation on Agriculture
IFPRI	International Food Policy Research Institute
ILO	International Labour Organisation
IPCC	Intergovernmental Panel on Climate Change
IP	Implementation Plan
IPPC	International Plant Protection Convention
MDGS	Millennium Development Goals
MIOA	Market Information Systems of the Americas
NPPO	National Plant Protection Organisation
OECD	Organisation for Economic Cooperation and Development
OIE	Office International des Epizooties
RPI	Retail Price Index
SPS	Sanitary and Phytosanitary Measures
SIDS	Small Island Development States
TBT	Technical Barriers to Trade

UNESCO	United Nations Educational and Scientific Cultural Organisation
USDA	United States Department of Agriculture
WISICA	West Indies Sea Island Cotton Association
VSD	Veterinary Services Department

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This document is a discussion draft and it is hoped that will be utilized as a base document to prepare final proposals for submission to the Minister and the Government of Barbados.

BACKGROUND

In early 2012, the Minister of Agriculture, Dr. the Honorable David Estwick, M.P. called for an overhaul of the Agricultural Sector of Barbados to meet the challenges of the 21st Century. The Ministry of Agriculture, Food, Fisheries and Water Resource Management (MAFFW) contracted the services of Dr. Chelston W. D Brathwaite, a former Director General of the Inter-American Institute for Cooperation on Agriculture and Chairman of the National Agricultural Commission to lead a process which would inform the development of a National Agricultural Policy for Barbados. This work was accomplished by the cooperation of the Inter-American Institute for Cooperation on Agriculture (IICA) and the Agricultural Planning Unit of the Ministry of Agriculture, Food, Fisheries and Water Resource Management.

The Ministry facilitated a National Consultation and held Town Hall meetings in Bridgetown, St. Philip, St. George and St. Peter to obtain the opinions and ideas of the society at large and farmers in particular in the development of the proposal.

This policy which includes input from these meetings, presents a new vision for the agricultural sector of Barbados. The paper examines the global context of agriculture and its impact on small developing states such as Barbados. The factors that have contributed to the decline of the agricultural sector in the island have been identified and reasons why the agricultural sector should be repositioned are presented.

It sets out a new vision to change the agricultural sector from an agricultural sector based primarily on the production of sugar for export to generate foreign exchange to a Food and Agricultural sector oriented to the production of food to improve food security, nutrition and health of the Barbados population

The Policy presents the view that an agricultural sector that is technology driven, competitive and market oriented can contribute to six aspects of national development.

These include:

- i. Contributions to foreign exchange savings by reducing the current food import bill which according to recent figures was estimated at \$653 million in 2011;
- ii. Provide safe, fresh nutritious food which will help to reduce the incidence of chronic non-communicable diseases such as diabetes, stroke, high blood pressure, heart attacks and obesity;
- iii. Promote agribusiness enterprises which can assist in the production of jobs and the reduction of the high unemployment level in the country;
- iv. Reduce food prices by producing foods closer to the market thus reducing transport cost, energy consumption and imported inflation caused by high food prices in international market;
- v. Support the local economy by indicating that money spent on food production in Barbados generated wealth in the local economy whilst money spent on imported food generates wealth in distant lands.
- vi. Preserve the beauty and aesthetic appeal of the country, as preservation of the beauty and aesthetic appeal of our country is important for the health of the nation and for maintaining our tourist industry. The sector also contributes to maintaining the biodiversity of our country, reduce the erosion of soils, restore the fertility of our soils thus reducing the need for expensive fertilizers and ensuring the preservation of our environment and our heritage.

The policy presents a National Food Plan to improve the food security of the nation and to provide healthy nutritious food for Barbados.

It presents the view that a modern Ministry of Food and Nutrition Security that is focused on feeding the nation and which coordinates food imports, food production, food safety, food quality and food security is a necessity of our time.

There is also recognition that the establishment of a market information system, farmer training, strengthening farmer organizations, investment in new technology and innovation, establishment of a wholesale market for farmers and promoting the production and consumption of more local foods can contribute to the modernization and growth of the sector.

The Ministry must continue to partner with regional and international donor and technical cooperation agencies in support of the implementation of this strategic plan.

It is felt that this policy will contribute to an improvement of the quality of life of the Barbadian people through the production of healthy food and products to make Barbados' agriculture an important contributor to the diversification of economy. The implementation of this policy will reverse the decline in the current agricultural systems, preserve the environment as we seek to establish a green economy, improve farmer's incomes, facilitate synergistic linkages with tourism, health and manufacturing sectors, generate jobs and preserve and improve the social stability of the Barbadian society.

The Vision for the Future

The change proposed in this document is premised on a vision that recognizes the following:

1. That agriculture is more, much more than primary production.
2. That an improved level of food security is fundamental to the growth and diversification of the Barbadian economy
3. That the linkages of the sector to health, nutrition, tourism and manufacturing, if emphasized and developed can rebound to the benefit of the society and the people.
4. That modernization of the sector is a prerequisite to poverty alleviation and the reduction in the cost of food and the high food import bill.
5. The production of food locally will contribute to employment creation and the creation of business enterprises.
6. Preservation of the agriculture sector is in the long term strategic interest of the country given the world food situation.

2.0 A Brief History of Agriculture in Barbados

The history of Barbados indicates that the early settlers produced large quantities of cotton and tobacco which were traded with Dutch merchants for food as the island could not produce enough food to feed its population. According to Greenfield (13) a direct result of this trade was the introduction of sugar cane cultivation into the island around 1630.

Since these early days, until today, sugar production from sugar cane has been the dominant economic activity in the agricultural sector of Barbados. In 1850, the island produced 40,000 tons of sugar. Production in 1922 was

57,000 tons, in 1947-119,000 tons, in 1952 – 170,000 tons and 1957 – 204,525 tons.

Sugar production from sugar cane was ideal for Barbados as it produced great wealth, fame and status for the island. Barbados became one of the most attractive British colonies when sugar was king. Sugar was the mainstay of the economy of the island from some 300 years until the 1990's when tourism and manufacturing became the principal sources of revenue.

The sugar industry today however is in a state of decline. In 2008 only 31,600 tons of sugar was produced. This production represents just 15.4% of the sugar produced in 1957 at the peak of sugar production in the island.

The decline in sugar production in Barbados can be attributed to many factors including declining yields, high operating costs, unreliability of cane harvesters, limited availability of labour, an aging farm population and competition for land due to an expanding tourist industry and urbanization. However, the most significant factor affecting the sugar industry has been the change in international trading arrangements.

“Up until October 2009, the Sugar Industry has been able to rely on guaranteed prices above the prevailing World market prices. The combined effect of the EU domestic reform, the denunciation of the Sugar Protocol as well as the negotiation of the reciprocal ACP-EU trade arrangements has resulted in a dramatic change in the long-standing sugar trade relations with the EU, which accounted for a stable and substantial income for this small and vulnerable economy.” (15).

The gap between export prices and the cost of production is increasing yearly. During 2005 sugar production cost reached US\$49.²⁰ per tonne of cane, by 2009 field production cost rose to US\$72 of which approximately 75 per cent was attributed to labour and machinery. Prices paid to farmers have been declining consistently since 1994. In 2010 farmers received US\$50.⁰⁰ per tonne of cane, when farmers' production cost was US\$80.⁰⁰ per tonne of cane. Accumulated losses by farmers have conducted to

disinvestment and accelerated decline in production. Sugar lands continue to be alienated at the rate of 400 acres per year. Alternative uses of sugar lands contribute to soil erosion.” (15).

In the light of these factors, a new strategy for the industry has been proposed. The proposal would involve a ‘single factory model’ approach to the future of the sugar industry. The single facility approach is to be implemented by the Barbados Cane Industry Corporation and ‘will see the eventual closure of the Portvale Sugar Factory and the upgrade of the Andrews Sugar Factory to function as a multipurpose facility. Outputs from the new facility will include: ‘food grade sugar for direct consumption; ‘increased volume of Grade A molasses’ for an expanding rum industry; electricity for sale to the national grid, and additional biomass, which would open up scope for ethanol production, improvements are also to be made at the field level to enhance ‘productivity, efficiency and sustainability of sugar cane grown locally. These proposals are apparently based on the findings of the 2011, EC-financed Institutional Review of the Barbados Sugar Industry by Landell Mills Development Consultants.

What-ever strategy is adopted for the sugar industry of the future; this proposal is of the view that the following actions are necessary:

1. Differentiate between the social and economic costs and benefits of the sugar industry.
2. Provide incentives for those currently producing sugar at low productivity levels e.g. less than 15 tons per acre to gradually become involved in food production.
3. Evaluate the labour needs of an expanding food production sector.
4. Train labour currently involved in sugar production to produce food crops.
5. Gradually incorporate labour from a declining sugar industry into food production enterprises.

6. Evaluate the allocation of land to sugar and non-sugar agriculture in the country.

3.0 Non-Sugar Agriculture

Over the years several attempts have been made to diversify the sector from a dependence on sugar production from sugarcane to other crops including onions, cotton, root crops and vegetables. While some progress has been made, the sector has suffered from a number of binding constraints such as:

- Limited financing and an inadequate level of new investment
- Inadequate research and development
- Reduced quantities of land owing to real estate and tourism growth
- Deficient legislation in such areas as food imports, praedial larceny and land use policy
- Weak marketing systems for local produce, to respond to the supermarket revolution
- Lack of adequately trained human resources
- The high cost of energy and water
- Increasing evidence of pests and diseases
- Limited investment in food processing and agro industry
- Adherence to WTO trade policies.

The Cotton Industry

History shows that Barbados was the first West Indian country to grow cotton as early as 1627. The West Indies Sea Island Cotton Association (WISICA) was formed in 1933 in Trinidad and Tobago to safeguard the interests of West Indian cotton producers and to regulate pricing and production. Since its inception the association has had several technical, financial and legal challenges. New initiatives are being considered which should culminate in the establishment of a viable reconfigured cotton industry. Challenges associated with this new thrust are:

- Need to incorporate value added.
- Deterioration of lint quality and;
- Yields that are insufficient to sustain profitability.

The solutions proposed are:

- Increase the acreage planted under cotton,
- Implement a cotton breeding programme to improve link quality and;
- Acquire the appropriate machinery to create a state of the art industry.

4.0 SWOT analysis of the Agricultural sector

In February, 2012, the Government of Barbados formulated a Medium Term Development Strategy 2010-2014 to give support to the long term-vision of becoming “A fully developed and people-centered society through new development pathways” by 2030. The Medium Term Development Strategy: 2010-2014 seeks to achieve the following broad objectives:

- Become a globally competitive and productive economy capable of sustaining a rate of growth of at least 3.0 per cent

per annum through exports to traditional and non-traditional markets and an increased focus on science and technology.

- Generate adequate levels of foreign exchange to help finance national development needs through an export led policy, while also seeking to attract greater investment by ensuring that the adequate fiscal, legal and human resource infrastructures are in place.
- Maintain low unemployment rates by, among other things, creating a cadre of entrepreneurs and small business persons and ensuring that the right investment climate is developed.-
- Preserve a stable macroeconomic environment by:
 - Ensuring a low rate of inflation while seeking to have a more sustainable fiscal and debt position;
 - Maintaining a sustainable external current account position by maintaining low imports and developing greater export potential: and
 - Maintaining a fixed exchange rate by ensuring that foreign exchange reserves are at adequate levels.
- Work towards the alleviation of existing pockets of poverty through the improvement in governance of resources, while ensuring that other social services such as health, housing and education/training, are adequately maintained.

- Ensure environmental sustainability, while seeking to address issues relating to climate change.

In Chapter 3, the Strategy states as follows:

“The Agricultural sector has undergone and will continue to undergo significant changes in order to combat the challenges inherent in the domestic and external environment. On the domestic front, agriculture continues to compete with other sectors for scarce resources such as land, labour and capital. In the light of this, how the agricultural sector addresses these macroeconomic issues will largely depend on the type of policy measures that will be formulated”.

The above statement clearly indicates that the agricultural sector will continue to face severe challenges and suggest the need for government to enact appropriate public policy measures accompanied by an appropriate enabling environment to arrest a rapidly declining sector. Moreover, a new vision and strategic direction is needed if the sector’s role is to be enhanced and contribute to the sustainable development of Barbados.

The SWOT Analysis for the Sector as prepared by the Ministry in their Strategic Plan 2002-2012 (19) is given below:

Strengths

- Exhibited strong demand for fresh local produce.
- Ability to form linkages/collaborate with various local, regional and international agricultural organisations such as CARDI, UWI, FAO, IICA, on research and development projects and for the provision of resources.

- Farmers generally knowledgeable in production techniques.
- Well developed regular air, sea transport network to major markets.
- Climate favourable for year round production.
- Presence of Internationally renowned, superior quality products such as West Indian Sea Island Cotton, Barbados Black Belly Sheep and Barbados Cherry.
- Existence of competitive advantage in commodities such as yam, hot pepper, sweet potato, as well as a vibrant fisheries sector.
- Well developed institutional infrastructure for R & D and support services.
- Demonstrated capability to manage harmful pest, diseases
- Experience in agricultural production, especially with plantations.

Weaknesses

- High cost of production due to costly inputs, leading to relatively high prices.
- Generally low productivity in main sub-sectors.
- Lack of accurate and reliable information for decision making and planning at all levels.
- Weak farmers' organisations and lack of coordination among farmers.
- Inconsistency in quality and supply of produce.
- Seasonality of production which leads to wide price and income fluctuations for farmers.
- Inadequate post-harvest handling of systems/mechanisms.

- Marketing systems are underdeveloped, ie. Farmers have limited capability in effective marketing of produce. Low number of farmers' markets with weak infrastructure.
- Small size of average farm precludes exploitation of economies of scale in most instances.
- Limited value added capability given insufficient infrastructure for processing.
- General aversion to basic agricultural work.
- Loss of arable lands to more lucrative non-agricultural activities.
- Competition for limited resources (physical, technical, financial).
- Absence of a cohesive regional fisheries agreement.

Opportunities

- Initiatives such as the Agribusiness Desk and a revamped R&D programme enable farmers to become more efficient and business like, leading to enhanced competitiveness and sustainability in the Sector.
- Linkages with other sectors, other agricultural organisations highlight the critical role of the Sector in the economy.
- Strong niche market potential for commodities like Sea - Island cotton, Barbados Black Belly Sheep, Barbados Cherry and value added products.
- Significant amount of idle, arable land can be brought into production, through initiatives such as the 'Land for Landless Programme'. Enhanced contribution towards domestic consumption and possibility for decreases in foreign exchange outflows and the food import bill.

- Knowledge base on island can be harnessed, exploited for improved productivity and reduced costs.
- Ability, under international trading arrangements, to capitalize on Special and Differential treatment provisions, such as technical assistance from developed countries, for the modernization of the sector.
- Opportunities for increased exports through trade liberalization
- Proximity to markets and existence of regular sea/air transport.

Threats

- Competition from cheap subsidized imports.
- Inadequate legislation to meet export requirements and for the protection of intellectual property and genetic resources.
- Business potential of farming not being capitalized on by farmers.
- Use of TBTs, SPS, to restrict the export of goods of interest to Barbados.
- Increased possibility of the introduction of new and exotic pests and diseases.
- Inherent bias of distributors towards imported products.
- High freight cost.
- Limited capacity to effectively participate in International negotiations bodies such as WTO
- Environmental degradation.

5.0 The Challenges faced by Small Economies and their Agricultural Sectors in the new Global Environment

The crisis in the Developed Economies

In 2008, a crisis developed due to the confluence of a series of interrelated factors and effects, which some analysts dubbed the “perfect storm.”

The subprime mortgage meltdown triggered a financial crisis in the United States and a credit squeeze; rising oil prices and higher inflation pushed up the costs of inputs and transportation, and fostered biofuel incentive policies; and a combination of increased demand for grains to produce biofuels, growing demand in emerging countries (especially China), and natural disasters reduced food stocks and caused unprecedented spikes in the prices of the main commodities, followed by great price volatility.

Amid optimistic predictions of an upturn in the U.S. economy, new signs emerged of a recession in Europe and in the economies of other developed countries like Japan. This has led observers of the recent trends in world growth to suggest that the global economy continues to face formidable risks (Oxford Economics, 23 April 2012).

Some of the signs were:

- Incipient recovery in the USA.

According to IMF data, the U.S. economy remains very sluggish (it grew at an annual rate of 0.4% in the first quarter and 1.3% in the second), with the recovery described as ‘weak.’ The latest data published by the Department of Commerce suggests that the world’s biggest economy grew at an annual rate of 3% in the last quarter of 2011, the highest in one and a half years.

As the U.S. still boasts the world's largest and the prices of the main commodities are fixed in dollars, the weakening of the U.S. currency has stimulated global imports, and pushed up international prices.

The price competitiveness of U.S. exports has risen nearly 15% over the last decade, resulting in record exports last July, and a 13.2% drop in the country's trade deficit.

- The economy of the European Union is slowing and the sovereign debt crisis is giving cause for concern.

The Euro is weakening and a financial crisis looms in Europe, due to high levels of borrowing and the burden of sovereign debt. According to Eurostat, the statistical office of the EU, the gross domestic product of the Euro zone contracted 0.3% in the last quarter of 2011 after growing 0.1% in the three previous months. In annual terms, the economy grew 0.7%, compared to 1.3% the previous year. As a result, several EU countries (Greece, France, Italy, and Spain) have fallen into recession (negative growth rates), and the measures adopted to shore up the economies most affected by the financial crisis are proving to be insufficient.

- Japan's economy has contracted and China's has slowed.
- Prices remain high and volatile: despite a fall in prices since the second quarter of 2011, prices are currently 19% higher than in September 2010. The impact on the world's economies varies, but in the case of small economies dependent on imports of inputs and foodstuffs, it is negative.

Lessons learned from the last crisis and the outlook for the current crisis

- *Globalization facilitates the confluence of interrelated factors and effects*

It is clear that economic ills spread rapidly in a globalized world in which national borders are largely irrelevant and the possibilities of sovereign responses by individual countries are limited.

- *The problems caused by insufficient regulation*

The U.S. financial crisis that went global highlighted the actions of important economic agents that could not be contained in unregulated markets. With mainstream liberal thinking in the ascendancy, especially in the United States, deregulation became the order of the day, based on the premise that markets would regulate themselves. The crisis showed that was simply not the case and measures to control market failures are now being adopted.

- *Public intervention policies are necessary*

Most governments have resorted to public intervention policies to deal with the crisis. Central banks have played an important role in policies aimed at stabilizing the situation and boosting production and employment. Further state intervention in some fields is being considered, especially regulation of the activities of economic agents, and tighter control of public finances.

- *Domestic markets are very important*

The government policies that proved most effective in dealing with the recession and food security problems, and produced the quickest results, were those that attached importance to domestic markets. The effects were

especially evident in countries with large domestic markets, such as Brazil and China.

- *Marked differences between net food importing and exporting countries*

The impact of the crisis on net food exporting countries was very different from the effect on net food importing countries. While the former saw their income rise due to high prices, the latter were faced with a bigger import bill. Some net food exporting countries also benefited more than others. The commodities whose prices rose the most were those produced in the temperate regions of the North and South, while the tropical countries that export fruits also import wheat, corn, rice, and sorghum.

- *FTAs did not shield economies from the impact on trade*

The impact of the economic recession on agricultural trade flows was **not** less in countries that export a larger percentage of their crops under FTAs. However, the regulatory framework created thanks to the signing of FTAs did mean that trading partners were unable to apply indiscriminate trade measures as part of their efforts to overcome the economic recession.

- *The exports of countries that sell to a small number of markets grew the least*

Exports to the markets most affected by the crisis contracted sharply. The countries whose export growth was affected the least were those with diversified markets, especially the fastest-growing developing countries.

- *The sectors hit the hardest were agriculture (in countries that do not produce important commodities), tourism, and construction*

The lack of financing and weak investment due to the economic squeeze affected the growth of net importing developing countries and those whose economy depends heavily on services such as tourism.

- *The fiscal situation made counter-cyclical policies possible*

In the years before the crisis, many Latin American and Caribbean countries had taken important steps to promote development based on healthy economies, debt reduction, and income adjustment. Those countries better withstood the effects of the global crisis.

The possible effects of the global recession

The focus of concern at present is the European crisis, but there are also worrying signs of a new global economic recession. Based on what happened during the last crisis and the current scenario, it would appear that the shock could be transmitted from the advanced economies, especially from the developed countries, to more vulnerable economies like the small island states of the Caribbean. The following are the possible mechanisms or channels via which the crisis effect could be transmitted. Many of them are already evident in those economies at risk.

The channels for transmitting the crisis in small Caribbean economies

A global recession could impact the small island economies of the Caribbean via two main channels and one secondary one. The first channel would be the effect of a fall in income in the developed countries and a consequent drop in the demand for imports (the exports of the Caribbean countries), a contraction in worker remittances, and a fall in tourism flows (see Figure 1).

The second channel would be the uncertainty created in the international financial system, which could lead to a fall in European direct foreign investment (DFI) and other financial investment in the Caribbean countries

(in the latter case, depending on the perceived country risk),¹ more volatile exchange rates, and tighter credit for public and private financing.

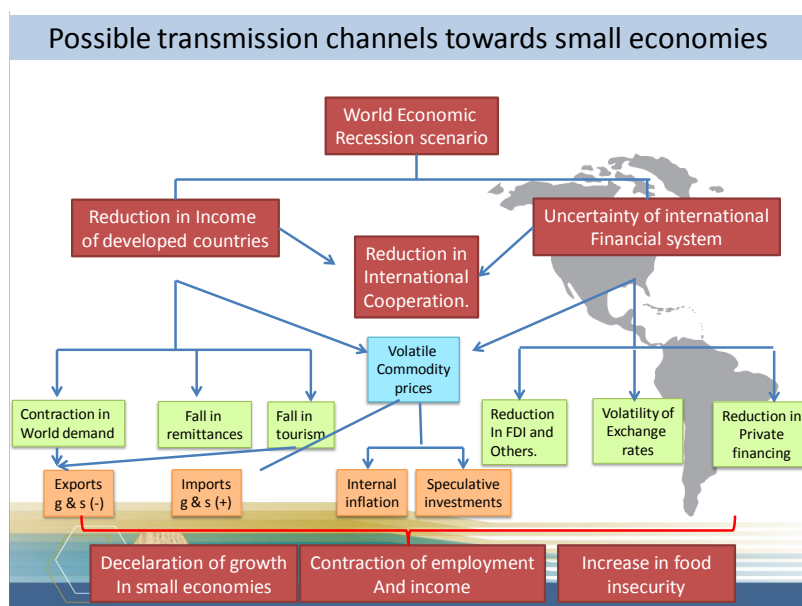
A by-product of the two other effects is the volatility of the prices of the main commodities. The Caribbean island nations are not major producers of the principal commodities (except for T&T, which produces oil), and although commodity prices (apart from the price of oil) have fallen recently due to the slowdown in the growth of the leading economies, they remain high and are expected to resume their upward trend once the recession has passed. Since the Caribbean island states are net importers of the main food commodities and raw materials, the effect of price volatility would be negative and could reduce imports. Further rises in oil prices would also drive up internal production costs and the transportation costs of external suppliers, both of which could have a negative effect on local inflation rates, especially where food is concerned.

Another secondary channel that affects the flow of resources from the developed countries to the small economies of the Caribbean is the reduction in international cooperation for development, which has been significant in the case of European cooperation with Latin America and the Caribbean.

In theory, a global economic recession could result in slower growth, a contraction in employment and income, and greater food insecurity in the small Caribbean economies.

¹ Countries with low perceived risk can attract surplus international liquidity. This has positive effects on their international reserves but negative ones on their currencies (revaluation), which makes their agrifood exports less competitive.

Figure 1



The current scenario of the Caribbean island nations

Some factors that must be borne in mind when analyzing the possible impact of a global recession are: (i) the economies are very open (to foreign trade and DFI); (ii) the drivers of growth in such economies are not in agriculture; (iii) the global crisis in 2008-2009 had a significant negative effect on them, but with major internal differences; (iv) interregional trade flows are limited; (iv) most of the countries have been obliged to adopt restrictive fiscal policies and, as a result, the capacity to implement counter-cyclical policies is limited.

The effects of a drop in income in developed countries (export markets) are expected to be negative. The Caribbean economies are very open and heavily dependent on foreign markets for their main sources of income. Tourism is the principal generator of foreign exchange for the vast majority of the islands (Bahamas, Barbados, Saint Lucia, Saint Vincent and the Grenadines, Antigua, Barbuda, Saint Kitts and Nevis, and Jamaica). Remittances and direct foreign investment (DFI) are also major sources of income.

This is important because intraregional trade would do little to offset the knock-on effects of a crisis in the developed countries, especially as the countries' exports are quite homogeneous, and, therefore, compete with, rather than complement, each other. Nor is the implementation of the Economic Partnership Agreement (EPA) between CARIFORUM (CARICOM plus the Dominican Republic) and the European Union likely to provide a lifeline in the current conditions, although slightly less than 30% of the region's exports are to the EU.

The differences among the countries were highlighted by the crisis of 2008-2009. Although the crisis had a severe impact in the region, some countries fared better than others, and the mainland Caribbean states (Guyana and Suriname) actually benefited from the higher international prices (ECLAC, 2011). As a result, the effects of a recession in the European Union will also vary from country to country.

Furthermore, inward tourism flows largely depend on the discretionary income of the inhabitants of high-income nations, so if the growth of those countries slows (or even turns negative), the Caribbean would be affected. The number of tourists who visited Central America and the Caribbean rose by 4% and 3%, respectively, during 2010, and continued to grow at a similar rate during the first eight months of 2011. However, this rate of growth was below that of the rest of the world (10%), and of South America in particular, where the number of tourists rose 13% in 2011 and 10% in 2010 (WTO, 2011). A recession in the European Union, especially with the Spanish crisis, will probably have a negative effect on the flow of tourists to the Caribbean region, especially the Dominican Republic.

Scenario for Barbados

Barbados is at a crossroads marked by the following elements:

- The country is heavily dependent on the tourism sector, which may benefit from the arrival of more North American visitors as the economic recovery kicks in, but will probably see a fall in the influx of European tourists as the crisis in the Old World deepens.
- The United States and the European Union continue to be the most important markets: they account for more than 50% of agrifood exports and imports. A recession in the European Union would affect more than one quarter of the agrifood exports of Barbados.
- If the European crisis spreads to the United States, the outlook will become more problematic.
- The fiscal situation is tight. The fiscal gap in 2010 was 8.6% of GDP, the highest of the 14 countries in the English-speaking Caribbean. That was nearly double the figure for the period 2008-09 (4.6%), and more than triples the figure for 2005-07(2.7%). This limits the possibilities of implementing counter-cyclical policies in the event of a crisis.
- High central government debt (97.2% of GDP, 8.6 points higher than the average for the Caribbean economies), also limits the possibilities of borrowing more money to implement programs designed to stimulate production.

- The currency has remained stable, but the weakness of the current account (balance of payments and foreign exchange revenues) could make it difficult for the Central Bank to defend the exchange rate. A depreciation of the currency would lower the international cost of the supply of services, and could help to improve the balance of payments situation.

A drop in income in the European Union, for example, would not affect exports of all products equally, as the situation depends largely on the income elasticities of European demand. Other important factors are the existence of institutional arrangements that afford preferential access to markets, and the volume of the country's exports, which account for only a tiny percentage of all European Union purchases.

Taking into account the income elasticities estimated for the European Union, a 10% drop in income would mainly reduce the demand for food preparations, beverages and tobacco (6%), shrimp (3.5%) and fruits (3%), as can be seen in Figure 2. The main exports to the European market (rum, beverages and cigarettes) make up one third of all agrifood exports.

6.0 THE IMPORTANCE OF AN AGRICULTURAL SECTOR FOR THE LONG-TERM SUSTAINABILITY OF THE BARBADOS ECONOMY

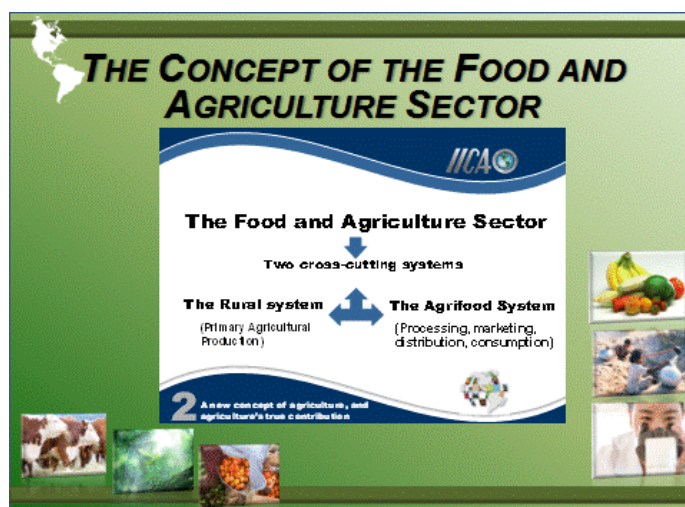
One of the significant results of the world food crisis of 2008 is that countries around the world began to appreciate the true contribution of a modern Food and Agricultural Sector to economic development. In the Caribbean, the importance of the agricultural sector to social and economic development has long been recognized (Lewis,1954) who visualized an

agricultural sector as part of an agro-industrial complex producing a flow of products from the primary sector to the manufacturing sector.

In recent times, Professor Norman Girvan in a commemorative lecture delivered on February 20th 2008, to mark the launch of the year of Sir Arthur Lewis as the first Caribbean Nobel Laureate highlighted Lewis's work and underscored the importance of agriculture for economic development. In the past, the agricultural sector has been much maligned due to the methods used to measure its contribution to economic development.

In studies, undertaken by IICA recently on an analysis of the true contribution of Agriculture to economic development have shown that when all the backward and forward linkages in the commodity chain are considered and measured the Food and Agriculture Sector's contribution to national development can be 3 to 7 times higher than the percentages reported for agriculture in national statistics.

That study was based on the concept that agriculture is a value chain of interrelated economic activities which provides backward and forward linkages to the rest of the economy and contributes to health, food security, energy security, employment opportunities, reduction in poverty, social stability and preservation of the environment.



The Food and Agriculture sector of an economy comprises of two interrelated systems, the rural system which is the primary agriculture production system and the agro-food system. The primary agriculture production system consists of the production of crops, livestock and forest products. The agrifood system consists of the processing, marketing, distribution and consumption of food products. The continuum results in the consideration of commodity chains or value chains.

Official statistics often measure the contribution of primary agricultural production to gross domestic product and the results derived from these measurements are often single digit percentages. For example, official statistics indicate that the production of milk is agriculture but the production of cheese from that milk is manufacturing. We argue that the production of cheese, wines, rum and all processed food is part of the agricultural sector's contribution to development. The contribution of the Food and Agriculture Sector (or the expanded agricultural sector) is therefore much greater than what is reflected in national statistics because it includes all backward and forward linkages in the commodity chains. Input supplies, transport, storage, agribusiness, contribution to exports, agro-industry, the food industry and financial services for agriculture are all part of the expanded agricultural sector.

For example, the study showed that in Argentina, the official statistics indicate that the agriculture sector contribution to GDP is 4.6% but when we consider all the backward and forward linkages this figure increased to 32.2%.

1. The true contribution of the Food and Agriculture sector to development in 11 Latin American Countries

Country	Primary Agriculture (Ag GDP/GDP)	Food and Agriculture Sector (GDP Expanded Agriculture/GDP)
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Argentina	4.6%	32.2%
Brazil	4.3%	26.2%
Canada	1.8%	15.3%
Chile	5.6%	32.1%
Columbia	8.0%	32.1%
Mexico	4.6%	24.5%
Peru	6.6%	31.8%
Uruguay	6.2%	34.8%
United States	0.7%	8.1%
Venezuela	4.0%	20.5%
Costa Rica	11.3%	32.5%

In Brazil, the figure grows from 4.3% to 26.2%, in Chile from 5% to 32.1%, in Mexico from 4.6% to 24.5% and in Costa Rica from 11.3 to 32.5%. In Jamaica, the study showed an increase from 6.14% to 11.34%. In the Dominican Republic, Belize and Trinidad and Tobago a similar trend has been recorded and we hope that the study will be expanded to all countries of the Hemisphere including Barbados. In repositioning the agricultural sector of Barbados it will be necessary to convince the Barbadian people and the decision-makers that the sector can in fact contribute to the economic development. It will be necessary to treat with this challenge as there is a general perception that the agricultural sector has many negatives.

- (i) the relationship to slavery and exploitation of labour
- (ii) uncompetitive and unproductive enterprises e.g sugar production
- (iii) low wages
- (iv) low esteem in a modern society

These negatives are supported by statistical data which shows that agriculture's contribution to GDP is about 5%. These negative perceptions are vividly expressed by the rather small allocation that is given to the Ministry of Agriculture when the national budget is prepared. Only 1.5% of Government expenditure is allocated to Agriculture in the 2011. When compared to other countries of the developing world this percentage is miniscule (see Table 2). It is therefore necessary to see the agricultural sector for its contribution to the rest of the economy and not as an isolated sector.

Table 2: Proportion of Government Expenditure Allocated to Agriculture

Region	Percentage
Sub Saharan Africa	6.3
Africa	5.0
Asia	6.5
Latin America	2.5
Barbados	1.5

Source: International Food Policy Research Institute and the Agricultural Planning Unit, Ministry of Agriculture.

We are convinced that when the true contribution of agriculture to the development of Barbados is carried out to include the backward, forward and historic linkages to other parts of the economy, a significantly higher contribution to the economy will be demonstrated

In summary, the data provided by these studies indicate that the contribution of the agricultural sector and agricultural enterprises to the economy cannot be judged solely on the basis of their contribution from primary production but by the contribution the sector makes by the linkages to other sectors especially health, the environment, employment

creation and poverty reduction. This is the most important lesson which must be learnt from these studies.

Globally, there has been increased investment in the food and agricultural sector and most bilateral and multilateral agencies have placed agriculture on their development agenda and are allocating resources to increase investment in the agricultural and rural sector.

The food and agricultural sector has remained a focus of attention at the national, regional and global levels. The evidence suggests that the observed increase in food prices is not a temporary phenomenon, but it is a trend that is more than likely to persist in the medium and even longer term. According to the agricultural outlook magazine 2011, all commodity prices in nominal terms will average 20% higher for cereals, and 50% higher for some meats compared to current prices, between 2011 and 2020, and global agricultural production is projected to grow at 1.7% annually compared to 2.6% in the previous decade. Leading institutions such as the World Bank, the OECD, USDA, IFPRI and IICA have estimated that higher agricultural prices are expected in the medium to long term. **Four** basic reasons have been advanced for this:

- (a) The continued high price of oil will increase the cost of inputs for food production and the cost of transportation of food.
- (b) The continued high cost of oil will continue to divert more corn and more land to the production of ethanol and other bio-fuels.
- (c) Food demand will increase due to higher incomes, population growth and urbanization especially in the developing world.

- (d) Climate change which results in floods, droughts and hurricanes will continue to reduce available food supplies. The recent drought in the USA, the worst in 56 years, can result in a new food crisis.

7.0 The Need to Enhance Barbados' Food and Nutrition Security

A fundamental premise for the need to reposition Barbados' agricultural sector is that if the country maintains its current path of increasing its dependency on imported food, the country will continue to suffer the negative impacts of costly food imports including importing food inflation and increasing the country's risk to external vulnerability.

The high dependency on imported food is already affecting the economy, the cost of living and the welfare of the population. **Recent data from the Central Bank indicate that inflation climbed from 3.7 % in 2009 to 9.4% in 2011 and the major component of this increase appears to be the increases in the price of energy and food.**

These increases in the cost living will have its greatest impact on the lower income group, the poor and vulnerable groups of the society. Increases in food prices not only impacts negatively on the health and nutrition of the poor but it contributes to poverty, and increased criminal activity in the society. The recent increase in crime and praedial larceny may be related to limited job opportunities (unemployment now estimated at 11.2%) and the high cost of food. Increased food production can increase food availability and provide employment opportunities for many in the economy.

Given the tight financial situation of the Government, high food prices and high dependency on imported food, the strategic options available to Barbados to reduce food prices and reduce living costs particularly for lower income groups are limited. Measures to reduce food prices through

subsidies or reducing tariffs will place great pressures on the government's resources which are already very limited to meet its recurrent expenditures.

Special programs such as targeted food subsidies to alleviate the impact of high food prices also require financial resources which are unsustainable. Augmenting food supplies and lowering food prices through domestic agricultural production is a more effective and sustainable strategic option for the country.

The world food crisis and the likelihood of higher food prices provide greater urgency for small developing nations like Barbados to take appropriate measures to ensure that its citizens have adequate access to food. The Ministry of Agriculture in its Medium Term Strategy has identified food and nutrition security as one of the priority areas for Barbados and the Government has set a major policy goal on this, to contribute to the Food and Nutrition Security of the Nation through the production of nutritious food at reasonable prices on a consistent basis. Initiatives to enhance the country's food security are:

- To put in place a comprehensive Food and Nutrition Security Policy and Plan, which seeks to ensure that the country is capable of feeding itself at all times, including under disaster situations, both through domestic production and goods sourced from our CARICOM neighbours.
- To put in place Trade Policy for food commodities/products that has as its focus the sustainability of the local agricultural sector.

The impact of Global Climate Change

Climate change is another of the mega trend affecting countries around the world and it is already impacting agriculture in various ways, particularly

production agriculture and food supplies. There is widespread agreement among scientists about the impact of climate change on agriculture. In 2001 the United Nations Inter-governmental Panel on Climate Change (IPCC) revealed evidence showing that the earth's climate is changing faster than previously thought.

Being an island-economy with limited land resources, it is of strategic importance to Barbados to increase its preparedness for managing the effects of climate change, particularly those related to food shortages and higher food prices as well as higher sea levels. The latter is also important given the role of tourism and the economy's dependence on this sector.

The scientific evidence on global warming points to an expected rise in temperatures ranging from of 1.4 degree C to 6 degree C over the next century, higher than what was earlier predicted. A rise of this kind is likely to result in:

- Rising sea levels and more frequent occurrence of extreme weather events, such as droughts, floods and violent storms.
- Severe water stress in the arid and semi-arid land areas in southern Africa, the Middle East and southern Europe.
- Decreased agricultural production in many tropical and subtropical countries, especially countries in Africa and Latin America.
- Higher worldwide food prices as supplies fail to keep up with the demands of a world population that is increasing by 78 million per year.
- Major changes in productivity and composition of critical ecological systems, particularly coral reefs and forests.
- Tens of millions of people at risk from flooding and intensity and rising sea levels in coastal areas.

The Need to Reduce the Incidence of Chronic Non-Communicable Diseases and Health Care Costs

In 2011, a high level meeting was held at the United Nations in New York to discuss the need for a global attack on the incidences of chronic non-communicable diseases. According to the UN documents, cardiovascular disease, cancer, chronic lung diseases, and diabetes are responsible for 60% of all deaths in the world today. The conference concluded that one of the risk factors that contribute to the incidence of these diseases is unbalanced processed foods and ready-to-serve meals that are rich in trans-fats, saturated fats, salts and sugars. Furthermore, the meeting indicated that chronic non-communicable diseases are a threat to development – these diseases contribute to low productivity, poverty and human tragedy. According to one UN expert “If we are serious about tackling the rise of cancer, diabetes and heart disease, we need to make ambitious and binding commitments to tackle one of the root causes – the food we eat”.

The Caribbean region and Barbados have not escaped the effects of expanding incomes on dietary and lifestyle changes. According to the Caribbean Food and Nutrition Institute - “Over the past 25 years notable changes have occurred in the Caribbean region with respect to food and nutrition”. The countries have experience substantial improvement in food available for consumption, as evidenced by the food balance sheets produced by the FAO.

The dependence on imported food has increased and a diet typical of developed countries has largely supplanted the traditional diet in the region. At the same time, nutritional problems have undergone an epidemiological transition: under-nutrition, manifested by energy-protein malnutrition, has declined, while over-nutrition, evidences by obesity – especially in adult women – has become common. In some countries more than half of the adult females and over a quarter of males are reported to be obese. It is not

surprising that these countries also report high mortality due to nutrition-related chronic diseases such as diabetes, high blood pressure, coronary heart disease, stroke, and cancer. Recent reports showed that about 30% of all adults, 35 years and over are hypertensive and 12% to 15% suffer from diabetes mellitus. Available evidence indicated that chronic disease problems are growing rapidly in the region.

The Chronic Diseases Research Centre, estimates that of 190,000 Barbadians age 20 years and older, 90,000 are overweight, 38,000 suffer from hypertension or high blood pressure, 19,000 are diabetic and one person suffers from a stroke every day.

A recent report indicates that the cost of health care in Barbados has moved from \$167million to \$486 million in 15 years, a 150% increase. In addition, the Minister of Health, the Honourable Donville Inniss is reported to have said recently that “the Country Report on Barbados showed that chronic non-communicable diseases (CNCDs) are estimated to account for 82 per cent of all deaths. Nearly half the population – 48.1 per cent – was physically inactive and 69.7 per cent of the population was overweight and 34.7 per cent obese. Of some concern was the fact that 76.7 per cent of females in Barbados are reported as being overweight.”

There is evidence to indicate that obesity in children is on the increase in the region. A recent report from Antigua/Barbuda noted that “one of the major concerns is feeding/eating patterns of our children and the food environment in schools where snacks which are high in sugars and fats are common. In addition, children have become less active as recreation today includes TV, video games and the computer instead of skipping, rounders, cricket and outdoor play”. Medical professionals around the Caribbean are warning that the importation and consumption of imported processed foods are contributing to rising levels of obesity in the Caribbean.

When data on spending on health and agriculture in Africa, Asia and Barbados are compared, it is seen that Barbados spends more of its GDP on health and less on agriculture than in Africa or Asia. The data shows that while agriculture gets 43.4% and 55.8% of spending in these two continents, Barbados spends only 14.4% on agriculture. The data also suggest that while there is an almost equal emphasis on both food and health in Africa and Asia, the emphasis is on health in Barbados. Furthermore, it suggests that the emphasis is on curative rather than preventative health care in Barbados, based on an allocation of 8.9% of the budget to health and only 1.5% to agriculture.

Spending on Health and Agriculture in Africa, Asia and Barbados

	Africa	Asia	Barbados
<i>Agriculture</i>	5.0%	6.5%	1.5%
<i>Health</i>	6.5%	5.3%	8.9%
Total	11.5%	11.8%	10.4%
Ag % Total	43.4%	55.8%	14.4%

World Development Report and IFPRI report based on IMF Statistics (Somma. A. 2008. The 10% that could change Africa) and Information provided by the Planning Unit, Ministry of Agriculture.

Expanding the production of food in general, but particularly foods that are nutritious offers a viable contribution to reducing the incidence of non-communicable diseases and health care costs. As the population ages, the costs of medical care will place undue pressure on the financial balance sheet of many countries in the region. A strategic option is to invest in expanding the production of nutritious foods and to invest in wellness programmes such as good food and nutrition rather than expensive medical care in the future. An important part of such a program is better nutrition, the consumption of healthy wholesome food, and an important aspect of the

production of healthy wholesome food is increased investment in food production.

In a country where these chronic non-communicable diseases are at an epidemic proportion, the consumption of wholesome healthy food should be promoted by:

- (i) Advocating the consumption of traditional foods such as yams, sweet potatoes and eddoes which are high in dietary fibre and complex carbohydrates.
- (ii) Promoting the consumption of more fruits, vegetables and fish in our daily diets.
- (iii) Eliminate the consumption of junk foods which are high in trans-fats, sodium chloride (salt) and sugars.
- (iv) Expand research on the nutritional value of our local foods.
- (v) Implement training programmes which show the nutritional benefits of the consumption of local foods.
- (vi) Promote healthy life styles including daily exercise and a regular medical checkup.

The Need to Strengthen Linkages between Agriculture and other sectors of the economy

The concept of backward and forward linkages in the industrial sector by Hirschman² has similarly influenced the need for other linkages among other key economic sectors. This is particularly true for the Caribbean where tourism is a leading driver in many economies. For Barbados, tourism contributes a high portion to GDP and accounts for over 70% of the foreign exchange earnings. As such, it represents a significant sector with potential for linkages with other sectors particularly in manufacturing and agriculture. In 2007, Barbados attracted over 574,000 persons to its shores.

Tourism and manufacturing make up only two (2) of the six (6) possible sectors that can benefit through stronger inter-sectoral linkages with Agriculture. Linkages with other sectors include Electricity, Gas and Water, Wholesale and Retail Trade, Transport, Storage and Communication and other Business Services including Banking can also benefit the economy.

The characteristics of Caribbean countries including Barbados offer unique opportunities for agriculture linkages to both tourism and manufacturing. The range of products on offer to rural tourists is expected to increase significantly in the next five to ten years with the growth of agro-tourism/ecotourism emerging as a clear trend. It is estimated that three per cent of all international tourists travel for rural tourism purposes. That translates to approximately 19 million people.

7.5.1 Agro-tourism/Ecotourism Linkages (the following is from IICA document on Agro-tourism policy for Barbados)

Agro-tourism is expanding worldwide and there are several reasons why it is gaining widespread attention and experiencing significant expansion:

- (i) Diversification of the farm operation. Adding a new enterprise such as farmer's market or an herbal garden

² Albert Hirschman noted economist

tour will add another source of income to a farm, and diversification is an ideal risk management strategy.

- (ii) Agro-tourism attracts customers to farms. Adding a seating area (benches), and a canteen to an existing farm
- (iii) Operation, or having open days, will not only draw international visitors but also domestic tourists.
- (iv) Agro-tourism contributes to the stability of the agriculture industry of the country.
- (v) Agro-tourism is an excellent means of supporting rural communities and businesses. Tourists bring in revenue to local businesses that keep farming communities alive and prosperous.
- (vi) Agro-tourism is an opportunity to increase agricultural awareness and education among the public, and promote agricultural products.

There are five dimensions of Agro-Ecotourism:

1. Agro-heritage Tourism
2. Farm based Ecotourism
3. Community Tourism
4. Health and Wellness Tourism
5. Culinary Tourism

One of the key principles of health and wellness is holistic cuisine including the use of indigenous foods, as well as organic vegetables and dairy alternatives to provide healthy, holistic meals. However, there is a growing segment of travelers who go on vacation in search of extraordinary culinary

experiences. **Culinary Tourism** is the most recent niche to emerge within the travel industry in years (International Culinary Tourism Association 2002). The true extent of culinary tourism was measured in the UK by World Travel Market (2005), with research revealing that more than half (53%) of travelers surveyed ranked eating traditional dishes as a 'very important' or 'important' part of their holiday.

Culinary tourists, referred to as 'foodies', seek unique and memorable food and drink experiences whether they be urban or rural. They go to restaurants, wineries, breweries, delis, road-side stands or food trucks. Some culinary tourists train with the chefs from the best restaurants, go to cooking schools and tour herbal gardens and farms that show where the food comes from.

One of the top food trends for 2006 (as identified by Robin Uler, Senior Vice President of food & beverage, spas and retail services, and Brad Nelson, vice president of culinary and corporate chef for Marriott International, Inc.) is that diners are looking for purity of product: fresh, wholesome and locally grown. Many chefs are utilizing their local farmers, purchasing product grown practically in their own back yards. Agro-tourism in its culinary form therefore represents a remarkable opportunity for Caribbean farmers and agro-processors to diversify and grow their business.

Closely related to the pursuit of indigenous foods is **Heritage tourism**. Cultural heritage tours emphasize authenticity and hands-on participation, with itineraries that include historic homes such as plantation houses, art galleries, theatres, and museums; cultural events, festivals and fairs; ethnic and regional foods and music; ethnic communities; architectural and archaeological treasures; and national parks.

Overall, the development of a **Caribbean Agro-tourism product** has the potential to stimulate sustained growth in the tourism sector. At any rate, the World Tourism Organization expects that tourism will contribute 16.4%

of the GDP in the Caribbean region for 2006. Caribbean Travel & Tourism is expected to grow 4.8% in 2006 and by 3.9% per annum, in real terms, between 2007 and 2016.

Agro-Heritage Tourism

Agro-heritage tourism promotes heritage, history and agricultural landscapes. Barbados' agro-heritage products consists of plantations and historic sites, as well as indigenous crafts made from wood, clay, grass, animal skins and other natural media. The United Nations Educational and Scientific Cultural Organization (UNESCO) has identified Codrington College, Morgan Lewis Windmill and St. Nicholas Abbey as three plantation sites crucial to the industrial heritage of Barbados. The Ministry of Agriculture also plans to develop a Living Sugar Museum. Heritage sites are key lures for traveling families and older generation tourists throughout the year.

Critical Issues

- There is an opportunity to officially launch and promote the Barbados Black Belly Sheep as a heritage breed livestock.
- The agro-heritage sites identified by UNESCO are highly underutilized and in dire need of preservation.

Farm Based Tourism

Farm-based tourism in Barbados exists on a very small scale and presently consists of horseback riding activities, one or two working sheep farms that offer tours and a rural eco-lodge with a restaurant and other facilities on site. Agro-ecotourism activities are more prolific. Local activities include several outdoor adventure tours, nature walks, fishing and diving tours.

Critical Issues

- Local farmers, as well as individuals with a sound knowledge of unexploited local trails, are not accustomed to organizing leisure activities for visitors as a complementary source of income. They lack business training and practical skills in tour guiding operations.
- Basic infrastructures such as seating, bathroom facilities, and concession stands at potential and existing farm-based and
- Agro-eco-sites are needed to allow visitors to fully experience Barbados' natural assets.
- There is a need to raise community awareness and increase their participation in the protection of our natural resources (illegal dumping on nature trails is a persistent problem). Farm based and agro-ecotourism is more likely to succeed if the surrounding community is supportive of the venture.

Community Tourism

Community tourism usually refers to visitor interaction with local people in the rural areas outside of the traditional tourist areas, but they can also be linked to urban neighborhoods. Apart from the Oistins Fish Fry and 'de heart uh Barbados' event hosted by the Environmental Special Projects Unit every summer, structured community tourism activities are very rare. However, the Barbados Tourism Investment Inc. recently announced plans

for the Hill Crest Amerindian Project on the East Coast of the island. This initiative is supposed to have an Oistins fish fry appeal.

Critical Issues

- Limited market knowledge about the quality, diversity and accessibility of Barbados' potential community tourism opportunities at the parish/village and national level, needs to be addressed.
- Community tourism development requires careful organization and investment and calls for policy planning at the governmental level. Logistical considerations such as access, accommodations and public service amenities in potential community-based tourism areas may need extensive upgrading.
- Community-based agro-tourism presents a vital opportunity to empower marginalized youth and women in rural and urban areas to earn a decent income through cottage industries and craft making.

Health & Wellness Tourism

Extensive global research and market trend analysis strongly points to a boom in spa health and wellness vacations. This phenomenon has significant implications for us in the Caribbean. Barbados' health and wellness activities fall into three categories; spas, alternative medicine practices and herbal and organic inputs. Spa treatments range from full body massages to signature therapies such as hydrotherapy. Local

alternative medicine practitioners offer a range of curative aids including therapy, holistic nutrition, and osteopathic health care. Additionally, there are several Barbadian skilled herbalists and organic specialists who produce herbal remedies, organic soaps, spices, juices and other products to optimize health.

Critical Issues

- There is no identifiable Health & Wellness tourism industry in Barbados. This is an area for industry development.
- A recent study suggests that Caribbean entrepreneurs should look to branded herbal remedies, holistic and alternative therapies as catalysts for developing a health and wellness tourism industry in the region.

Culinary Tourism

Background

Culinary tourism can be described as the search for and enjoyment of unique, memorable food and drink experiences. The roots of cuisine are in agriculture although culinary tourism is tailored to consumers' benefits first and farmers' benefits second. The focus is largely on prepared foods more than raw ingredients. Barbados' cuisine is internationally acclaimed and is one of its core tourism strengths. The offerings range from contemporary Caribbean, gourmet, to traditional Bajan foods.

Critical Issues

- The opportunities to make a significant impression on visitors with authentic Bajan eating and drinking experiences are under explored. Visitors often miss out on the opportunity to dine in rural and suburban

eateries or encounter characters that frequent the traditional village rum shops. Furthermore there is a dearth of festivals that celebrate our food.

There is a need to promote the use of local fruits and vegetables in menu options. Breakfast items for example often feature mush melon, cantaloupe and green melons instead of golden apples, papaws, guavas, mangoes, etc. Additionally local fruit juices such as carambola, tamarind, golden apple and soursop are not readily featured in popular dining establishments.

7.6 The Need to Generate Employment Opportunities

The current global economic situation is presented by Joseph Stiglitz, Nobel laureate and chairman of the committee set up by the UN to reform the financial systems in the wake of the global financial crisis. According to Stiglitz, “it is important to recognize that what began as a crisis in the financial sector has now become an economic crisis, but it is not only an economic crisis, it is also a social crisis. According to the International Labour Organization (ILO), some 200 million workers, mostly in developing economies, will be pushed into poverty if rapid action is not taken to counter the impact of the crisis. Even in some advanced industrial countries, millions are faced with the threat of losing their homes, their jobs, and access to health care.

Economic insecurity and anxiety are increasing among the elderly as much of their life savings disappear with the collapse of asset prices. The ILO estimated that unemployment in 2009 would increase by some 30 million compared with 2007 and reach almost 60 million if conditions continued to deteriorate”.

Employment opportunities in Barbados will continue to be constrained by the following realities:

- Structural adjustment programmes which have reduced the size of the public service
- New immigration policies in the developed economies which will limit the opportunities for emigration to traditionally developed economies such as the United Kingdom, United States and Canada
- The absence of protected markets for primary agricultural products in traditional markets.
- New technologies which reduce the need for manual labour and man-power in many industries

Youth unemployment is one of the greatest challenges in our quest for further growth and economic progress. The involvement of youth in agriculture will be important in the future development of the sector as the current farmers are aging. A new thrust in food and agriculture will imply the need for new human resources in production, marketing and consumption, in food production expertise such as greenhouse technology, organic agriculture, food processing, biotechnology, agro-energy among others.

In addition, in marketing, the need for persons skilled in food labeling, promotion of local foods, transport, storage, grading, packing and processing will be necessary. In the area of food consumption, expertise in nutrition, food preparation, in restaurants and hotels and food quality control will be necessary. There will also be the need for scientific expertise such as agronomists, plant pathologists, entomologists, agricultural economists, food scientists and soil scientists among others to provide the scientific input into a modern food and agriculture sector.

These skills can be supplied by our various vocational and technical schools and colleges and by the new faculty of Food and Agriculture at the University of the West Indies. In addition, the Ministry of Agriculture must

organize on-going training programmes to keep their technical staff up-to-date on new technologies and information relevant to the new thrust in food production.

7.7 The Need to Preserve the Environment and the Country's Natural Beauty

The sugarcane industry provides Barbados with a landscape that is aesthetically pleasing. In addition, the sugarcane plant helps to reduce erosion and add organic matter to the soils which helps to preserve our fragile ecosystems and the provision of water in our aquifers. The reorganization of the sugar industry must take into consideration environmental issues and the potential negative impact of the demise of the industry. For this and other reasons, this proposal supports the continuation of a sugarcane industry to provide energy, molasses and rum and as a base for crop rotation with food crops. We cannot allow our field to be overrun by bush which will harbor rats and other pests which could be a threat to public health and to the agricultural sector.

Barbados seeks to become a green economy. Such a goal must include sustainable agricultural systems based on good agricultural practices, organic agriculture and sustainable farming practices. These farming practices must include;

- the increased use of naturally and sustainably produced nutrient inputs; crop rotations; and livestock and crop integration;
- reducing soil erosion and improving the efficiency of water use by applying minimum tillage and cover crop cultivation techniques;

- reducing chemical pesticide and herbicide use by implementing integrated biological pest and weed management practices; and,
- reducing food spoilage and loss by expanding the use of post-harvest storage and processing facilities.

Hong (2009) defines green agriculture as a production system based on a green environment, through the investment of green substances, energy and capital, by the application of green technology, assured by the green policy and laws, promoting the labour's rational scientific behavior.

Organic farming is increasingly being viewed as a solution to several of the negative externalities that are directly caused by conventional farming methods.

A wide variety of vegetables and root crops are produced locally employing open field and greenhouse systems. A major limitation of the open field approach is weather variability. The recent introduction of greenhouse technology facilitates all year production of some crops. Access to modern technology and employment of good agricultural practices should enable domestic producers to satisfy the local demand for vegetables, some root crops and fruits, as well as penetrate niche export markets for products, such as hot peppers, and pepper sauce.” (From the Green Economy, Scoping study for Barbados, 2012.)

The Food and Agricultural sector must also assist in maintaining the biodiversity of our country, reduce the erosion of soils, restore the fertility of our soils thus reducing the need for expensive fertilizers and ensuring the preservation of our environment and our heritage.

7.8 The Need to respond to the Supermarket and Fast-Food Revolution

The increase tendency for the supermarket to be the main source of food in Barbados has created many challenges for small farmers who are not equipped to meet the new demands for quality, reliability and prices. In the first case, supermarkets do not wish to deal with large numbers of small producers whose products vary in quality and availability. Given the reality that supermarkets offer several advantages to the consumer including parking, hours of availability of food and price advantages, it is important to implement policies and actions that facilitate participation of small farmers in the supermarket supply chain. These measures should include the following:

- Organize small farmers into commodity groups.
- Organize produce collection centers, to collect, grade and sell farmers produce.
- Engage supermarkets in a dialogue between farmers, and supermarket purchasing managers and the Ministry to discuss quality, reliability and price issues.
- Train farmers in the production of quality produce and in the standards required by supermarkets.
- Promote the production of convenience foods e.g the soup packs, for supermarkets.

An important component of this strategy must be the education of farmers in the realization that their farm is a business that depends on consumers for its success. Consequently, the needs for the consumers must be taken into consideration in planning, producing, harvesting and marketing agricultural produce. Contractual arrangements between farmers and institutional consumers such as school, supermarkets, hotels, restaurants etc., must ensure compliance with quality, food safety, reliability and price

criteria. In recent times, farmers markets have been on the increase in many countries and since they provide the opportunity, for farmers to sell their produce directly to consumers, their establishment should be encouraged. In addition, the supermarket has become the most common place for most consumers to purchase their food, therefore farmers and producers must be trained in how to produce for the supermarket.

7.9 The increase in the Cost of Living, Poverty, Unemployment & Crime

Recent data from the Central Bank indicate that inflation climbed from 3.7 % in 2009 to 9.4% in 2011. The major component of this increase appears to be the increases in the price of energy and food. These increases in the cost living will have its greatest impact on the poor and vulnerable groups of the society. Increases in food prices not only impacts negatively on the health and nutrition of the poor in our society but it contributes to poverty, and increased criminal activity in the society. The recent increase in crime and praedial larceny may be related to limited job opportunities (unemployment now estimated at 11.2%) and the high cost of food. The level of poverty in Barbados was estimated by the IDB in a 1996/1997 study as 8.7% or 7000 households.

The recent report (Barbados Country Assessment of Living Conditions-CALC Report) indicates a number of programmes and initiatives which government is undertaking to cushion the impact of inflation and to reduce poverty in the country. Increased food production that lowers the cost of food can contribute substantially to these efforts when it is recognized that a substantial part of the income of the poor is spent on food. Efforts to increase the production and availability of local food can create employment opportunities for many in our society.

8.0 The Regional Context

Barbados is a member of the CARICOM Community (CARICOM) and hence party to the provisions of the 2001 Revised Treaty establishing the CARICOM Single Market and Economy (CSME). Within the Single Development Vision, agriculture has been identified as one of the economic drivers in the CSME and a sector that can lead the process towards production integration in the Single Market.

Deepening Regional integration, through the CSME, is promoted as a vital tool in overcoming a number of development challenges faced by Caribbean countries, particularly those countries with relatively small economies and domestic markets. This is well established in the opening statement of the Revised Treaty ... *“Recalling the Declaration of Grand Anse and other decisions of the Conference of Heads of Government, in particular the commitment to deepening regional economic integration through the establishment of the CARICOM Single Market and Economy (CSME) in order to achieve sustained economic development based on international competitiveness coordinated economic and foreign policies, functional co-operation and enhanced trade and economic relations with third States.”*

Among the several benefits of regionalism is the facilitation of movement of factors of production around the region, which will result in increases in the economic welfare of the region. This essentially speaks to liberalization beyond just facilitating intra-regional trade, to the creation of a Single CARICOM economic space that provides a base market to aid and grow industries and economies through free movement of factors and establishment rights.

For agriculture, the issue of ‘free movement’ of factors holds special significance and has been found relevance in discussions related to facilitating access to competitive sources, mainly from Haiti and Guyana, to the rest of CARICOM as one strategy to mitigate shortage and high relative cost. However, to date, it is unclear whether free movement of unskilled farm labour has been officially included in the CSME protocols and if so, where it is being used within CARICOM.

For agriculture the issue of ‘establishment rights’, is also significant to national development, especially in countries where land is a significant limiting factor to expansion. In fact, in 2008, in the height of the food price crisis, the region was very public in its recognition that within CARICOM, Guyana (Note #1) was the only ‘country with one of the inputs necessary for food production – land - something which is not much in abundance in a number of the CARICOM countries; Suriname and Belize also have an advantage in this area. These are countries in CARICOM that have a large capacity in terms of land’. Further, the expectation was that ‘a significant amount of any increase of the Region’s agriculture will take place right here in Guyana’.⁽³⁾

However, then President of Guyana, Bharrat Jagdeo admitted that “Guyana has been unable to move from simply expressions of interest by Caribbean agriculture investors as it relates to Guyana’s land use for expanding agricultural ventures and to aid in providing more food for Caribbean Community (CARICOM) countries.”⁴ Since then, a very limited number of CARICOM citizens and firms have established agriculture ventures in Guyana. Further, in 2012, the Guyana Government reaffirmed its ‘unwavering in its support for regional integration of the Caribbean Community’ and regional trade and investment facilitation remains an essential aspect of that commitment.⁽⁵⁾ It is expected that this renewed commitment will further improve the capacity for more CARICOM business interests to expand their national food production possibilities overseas – in Guyana.

While national agriculture and investment policies will be critical to enabling cross-border investments in food production, there is also need for complementary regional agricultural policy backed by effective regional

³ ‘Guyana helps CARICOM with food’ Friday, April 4, 2008 <http://guyana2.blogspot.com/2008/04/guyana-helps-caricom-with-food.html>, reporting statements made by former CARICOM Secretary General, Sir Edwin Carrington.

⁴ ‘We’ve been unable to move beyond expressions of interest’ -President says of agri- investment in Guyana Georgetown, GINA, April 15, 2008 <http://op.gov.gy/stories/080415.html>

⁵ <http://www.gina.gov.gy/archive/daily/b120403.html>

institutional arrangements that facilitate actual investment and free movement of food products from host to home country.

9.0 Relevance of the CARICOM 's Community Agricultural Policy

With respect to common policy, the Community Agriculture Policy has since been approved by the Council for Trade and Economic Development (COTED) in October 2011. The CAP is positioned as the overarching regional policy *“to strengthen the region’s agricultural production base in order gradually to reduce the level of food imports, enhance food security, create additional employment and reduce poverty in the region, while creating the enabling environment required to attract private sector investments”*.

These socio-economic goals for agriculture are generally consistent throughout the community and are reflected, in varying degrees of priority, in national agriculture and food security policies, strategic plans and Ministries of Agriculture annual work programmes. Such congruence of policy priorities between the regional and national should allow countries to benefit from joint actions (regional programmes, projects and institutions) aimed at addressing common challenges and/or establishing capacities and services that would be more cost-effective at the regional level.

The CARICOM CAP explicitly recognises and justifies the need for a ‘regional approach to developing agricultural production and food value chains’ as a means of helping countries to reduce risks associated with globalisation, market volatility and climate change impacts, and contribute to the achievement of food and nutrition security. The CAP also clearly states its intention to ‘harmonise agricultural policies across the member states and strengthen areas of comparative cost advantage’.

The CAP document is regarded as being ‘unique’ in that it ‘provides a comprehensive overview of the ways and means of achieving the CAP objectives stated in the Revised Treaty of Chaguaramas and the Liliendaal

Declaration'. It identifies priority areas for immediate action while linking the global, regional and national challenges to the needs of the regional farm sector, with emphasis on facilitating common interests of all regional private and public sector stakeholders and bringing Member states policy areas within the purview of regional institutions for joint actions.

Whether or not it is a 'community' versus 'common' region agriculture policy may remain an issue of semantics providing that the principles, policy priorities and the instruments for implementation are unambiguous with respect to its capacity to 'get agriculture moving' in areas of critical regional public goods for the benefit of national agriculture policy in member states.

Among the principles of the CAP, of critical relevance to the articulation of national agriculture policy, include:

- *Regionality: the policy envisages one regional space for production, processing, trade and investments where the regional approach ensures greater value added through collaborative actions by all Member States.*

In this regard, as Barbados seeks to develop a national policy for agriculture development, there is a need to clearly recognise limitations of 'national space' for which the principle of 'regionality' can add value.

- *Consistency: The CAP is said to be consistent with other policies of CARICOM and complements their efforts to enhance economic integration and development in the Region. Complementary with national agricultural policies and priorities of Member States are also integral to the formulation of the CAP.*
- *Affordable Food: The policy recognizes that food should be Produced and sold at a cost that generates sustainable profits for the producer and provides the consumer with access at an affordable price. Therefore food produced in*

the Region should strike a balance between the interests of consumers and producers with regard to prices and profits.

CAP defined 5 Pillars for regional policy action. These are:

- i. Food and Nutrition Security
- ii. Production-Trade (Value) Chains
- iii. Sustainable development of natural resources
- iv. Rural modernization and youth programmes
- v. A modern agricultural knowledge and information system

As noted previously, all these on its own and as part of an integrated development framework, find direct relevance for national agriculture development policy. Importantly, these policy pillars, as stated, are not the exclusive purview of the traditional 'agriculture sector' approach. In fact, these are best interpreted as among the key regional development goals in which the agriculture sector, broadly defined, plays a direct and in some cases, lead role in contributing to achieving the objectives. Of these 5 CAP Pillars, only Pillar 5 can be interpreted a specific to agriculture, since it calls for a modern knowledge and information management system for agriculture. It could also be argued that Pillar 5 could be positioned not as a policy pillar per sé but as an essential prerequisite for development in any sector, industry or firm.

While the CAP Pillars will have relevance for the national agriculture development process, some critical decisions need to be made first, in order to definitively assess how the CAP, and any other regional policy, can add value/complement national objectives and priorities for agriculture. These decisions are also necessary to determine the relative weighting and combined impacts on the direction and scope of agricultural development in Barbados and hence the range of options that could be exploited for more effective and efficient policy implementation.

Among these key defining decisions that national stakeholders must make in order to more effectively inform and guide the process for developing agriculture policy and identifying critical policy instruments to initiate its implementation with as short a time lag as possible, include:

- What constitutes the scope of the ‘agriculture sector’ in Barbados? This is important given the tradition of equating the primary sector alone as agriculture and the hence subject for agriculture policy. This scope will determine the parameters for policy.
- Specificity in terms of the priority focus for public policy on agriculture and what will constitute commercial agriculture policy and further, the process for articulating these policies in a manner that enhances cohesion and minimizes policy conflicts and bias in the macro-economy.
- Realistic assessment on the agriculture capabilities of Barbados and a cost-benefit analysis of pursuing any or all of these capabilities to either (a) a commercial success or (b) public good objective, and the criteria for decision-making
- What areas, how deep and what mechanisms and instruments will be required to align national agriculture policy with the CAP and any other official regional policy, including the RFNSP?

10. Defining the Opportunities: National priorities - Regional requirements

The development of a regional agricultural plan should identify the short, medium and long term objectives. These objectives should inform decisions

on the 'focus' for agriculture policy, as noted above. Given the realities of Barbados and the development challenges to which agriculture must contribute, the focus of agriculture policy will need to place priority on the following with similar attention placed on the type of policies and instruments that will be needed required over the short, medium to long term.

1. Food production, based on:
 - strategic food and nutrition security, including efficiency-based import substitution;
 - exploring production possibilities in land-rich CARICOM countries, mainly Guyana.
2. Supply of premium markets (whether export or in the local tourism industry). There are already good examples of high value Barbadian products that can be provided with well thought-out development support to enhance competitiveness.

These two proposed policy focus areas are both necessary and sufficient and can provide scope for development actions over a 7 to 10 year period, in the first instance. Further, they are sufficiently broad to integrate critical elements of sustainable development, including attention to environmental/climate change imperatives, socio-economic transitions from traditional industry development to value-chain agriculture, among others, and as well tangible cross-border investment and regional production and trade integration.

Short Term

In the short term there are a number of opportunities which need to be captured. These opportunities must be assessed from both a domestic standpoint in the country and also within the CSME. Domestically the issues of efficiency-based import substitution and supplying premium

markets plus strategic food security and nutritional security concerns should be among the core objectives.

Efficiency-based Import Substitution

In the short-term, efficiency-based import substitution will seek to substitute (or replace) on a cost-efficiency basis, the imports of vegetables, various meats and certain fruit and value added items from the food import bill. Importantly, it must be emphasized that this does not speak to, and cannot be managed from a 'business as usual' approach since to achieve the efficiency levels required to compete, a heavy infusion of technology and technological advances will be essential. Given its higher cost structure, Barbados will need to be more efficient in combining labour and capital, including research and technology, compared to other countries.

For example, a strategy to supply a substantial part of the market for vegetables using various and appropriate forms of 'protected agriculture' (such as shade houses, green houses) and production technologies (such as hydroponics, aquaponics, etc) that are not land-demanding, must be an integral part of this. The selection of vegetables and other food products must be informed market research (academics) of both existing and projected consumer demand based on trends in the substantial investments made globally in safe foods and healthy eating working with the private sector (traders).

10.1 Supplying premium markets

In premium markets, the ultimate consumer will be high end restaurants, cruise lines etc. Where possible the existing supply chain should be tapped into. However where elements of the supply chain have become inefficient for one reason or another, they may have to be eliminated. The same strategy outlined above for efficiency-based import substitution would be effective in supplying such premium markets. Barbados already has a good working model with the organization of production-market process for the

supply of high quality, locally grown carrots to leading supermarkets.⁽⁶⁾ It is worth reiterating that successful initiatives, such as this, need to be more readily enabled as opposed to Government leading investments in and carrying the burden of creating ‘artificial’ agribusiness ventures that would otherwise not have emerged on their own.

It should be evident that there exist possibilities for the sourcing of commodities and other raw materials which can be combined into valued added agricultural products. Therefore caution is advised to ensure that the strategy also gives equal consideration to value added products from agriculture as well as high valued and low valued (in bulk) agricultural products.

Medium Term

For a medium-term horizon, efficiency-based imports substitution should be viewed within the context of the regional market created by the CSME. Accordingly the domestic market, properly speaking, is really the CSME market as a whole and not solely the Barbados (local) market.

The same efficiency-based import substitution concerns therefore will apply to the Regional market. However, these efficiency considerations become even more critical as a number of accommodating policies now fall outside the purview of the Barbados Government. For example, within Barbados there exists a facility to use Special Agricultural Safeguard. While this is adequate for the items for which it has been reserved, in Barbados no such mechanism exists for the rest of CARICOM. In this regard, there will need to be a heavy leaning on Regional Trade Policy, which itself, remains a problematic area.

To overcome these same problems, a National Agricultural Strategy in Barbados in the Medium Term which truly aims at transforming the agricultural sector by expanding the market scope or space will rely heavily on the Community Agricultural Policy in addition to the Community Trade

⁶ the initiative led by Dr. Frances Chandler

Policy. The problem though, is that the Community Agricultural Policy needs to go well beyond a policy framework and create/activate a Common Agricultural Programme for various products which coordinates domestic agricultural policy in countries such as Barbados with trade, export support, research and other policy interventions.

This will, in essence, bring the single market as envisaged under the Revised Treaty, into tangible effect through for example, creation of a single commodity or commodity group market (e.g., cassava or more broadly for root crops). This would constitute a major shift for Barbados as the opportunities which emerge for instance in the Trinidad and Tobago market for cassava or in Suriname can be harnessed to create the scale necessary to drive a serious project based on modern technology for these products.

This type of policy instrumentation harmonized across countries cannot emerge using a business-as-usual approach to policy development and implementation at either the national or regional level. Indeed, policy, whether national or regional, needs, at some point in time, to evaluate and draw upon signals from private sector actions. There is a new initiative, driven by Caribbean farmers and supported by donor agencies ⁽⁷⁾ to give effect to the regional production integration and trade for a group of food commodities deemed essential to regional food and nutrition security.

Though laudable, the goals and results that this project seeks to accomplish are not new to the region. Regional production scheduling and free movement of the outputs of integrated regional production – agri-food commodities – have been policy goals since the articulation of the first regional policy in 1975 and the establishment of CATCO (Caribbean Agricultural Trade Company). The proposal therefore to establish a

⁷ The "Promotion of Regional Opportunities for Produce through Enterprises and Linkages" (PROPEL) project is a new market-led development project undertaken in the Caribbean Region by the Canadian NGO CHF. This 5-year, \$20 million project was recently approved by the Canadian International Development Agency (CIDA), with a matching contribution of \$1million from CHF. PROPEL will support about 28,000 smallholder Caribbean farmers to increase their capacity to supply high quality agricultural products to buyers primarily within the Caribbean region, thereby increasing the incomes of smallholder farming households, fostering economic growth and building a more integrated regional economy. (Extracted from 'Brief Overview of the new Canadian funded PROPEL Project' circulated by Jethro Greene, CAFAN coordinator, 30 June 2012)

‘marketing arm for CAFAN’ to facilitate free movement of food products within the region is reminiscent of CATCO.

In this regard, the lessons from CATCO and similar past efforts need to be well understood and avoided in this new attempt at creating a single market for a sub-set of agriculture and food products in the region. Enabling national agriculture and trade policies, that extend the spirit of the CSME, are pivotal in this regard.

In the new construct which is to be a strategic plan for Barbados’ agriculture, there exists tremendous potential if such a single market framework can be created where the Regional market is ring-fenced by a common sufficiently high CET, and where research, technology, market developments, consumer tastes and preferences are supported by strategic policy interventions at the local (Barbados) level.

At present, the COTED continues to receive requests to eliminate the CET on those items within the framework of both Partial Scope and Bilateral Trade Agreements (for instance the Partial Scope Agreement with Panama which proposes the elimination of the CET on Sweet Potatoes, Yams etc). In the new construct where Barbados could become a major production centre for one or more of these ‘special’ items within a Single Market for instance Sweet and Irish Potato, these items would not be eligible for inclusion in any trade agreement whether or not the Region has supplies for these products at a given point in time.

This could create a sea of change in the investment climate for projects of this nature by infusing certainty and predictability in the market arrangements. With such a scale created by the joining together of all the local markets in CARICOM into a Single Market, e.g. root crops, the economies of scale and scope can emerge such that possibilities for value added activities for instance, cassava flour could become a reality. There is a tremendous level of consumer interest for flour which combines traditional wheat flour with up to 30% or 40% of cassava flour and the potential impact of such an initiative for Barbados agriculture could be enormous.

The point to be underscored is that the development of a National Strategic Agricultural Sectoral Policy and Plan for Barbados holds implications or rather may be affected by the non-existence of a truly single market for various agricultural items in CARICOM at this time – a requirement of the CSME and hence an area for critical action under a CAP. The Strategic Policy and Plan for Barbados should properly become a catalyst for the creation for such a Single Market Framework on a product basis where such products have demonstrated a potential to be sourced/developed on an efficiency based platform by stakeholders in Barbados.

Another excellent example emerges within the construct of the beverages sector for which Barbados has developed recognition. A proper single market framework for CARICOM within the construct of the CSME could catalyze the Barbados private sector, developing substitutes for barley and malt in brewing and utilizing land in Member States such as Guyana for the growing of sorghum (substitute for wheat and barley). This demands a genuine exploration of the issue of cross-border investments in food production and hence the mechanisms required to give effect to same. Again, the Strategic Policy and Plan for Barbados could properly become a catalyst for creating the regional environment to enable the emergence of such investments in food production. Barbados, more so than several other Caribbean countries, particularly those which are small island development states (SIDS) cannot be challenged, under any circumstance in exploring all available and appropriate options to expand food production possibilities beyond its national borders.

In this context, and given the global challenges, the CAP therefore, should place concerted and consistent focus and efforts on the development of a true Single Market for Agriculture. Within this construct a research policy will have to be agreed to, and Barbados holds tremendous advantage having regard to its sugar cane research facilities. Research and development are being treated elsewhere in the Strategic Plan but it is important to note that from an economic perspective, there is a clear role for research and development since a significant part of the shift in competitiveness will be

accounted for by technological change which itself is driven by research and Development.

Domestic Agricultural Policy support will also need to be specifically targeted at areas where development needs are greatest. This is critical since the bottleneck for agriculture may not be through agriculture policy per sé but some other macro-economic intervention. Hence the precise nature of such policies must be informed by the identification and deeper appreciation of where the areas of deficiency exist since these deficiencies vary from product to product. For example, if there is a labour deficiency/constraint, economic theory (which has worked successfully) suggests that the focus should be a labour market intervention rather than a general product intervention since the labour market intervention more directly targets the specific deficiency impacting this product.

Similarly, if there is a research and development deficiency, the theory suggests that investment in research and development support rather than a subsidy or intervention at a general product level would more directly and efficiently address the problem.

With its status as a SIDS, climate change considerations would as a matter of necessity, have to be considered and built-into this framework. While there have been a number of initiatives in CARICOM, mainly workshops, and even with the existence of a CARICOM Implementation Plan (IP) for the Regional Framework for Achieving Development Resilience to Climate Change 2011-2021, which defines specific objectives, outcomes and project areas for the Agriculture sector, the interaction between climate change and agricultural policy is still not well understood. This observation is well accepted by the Caribbean Agricultural Research and Development Institute (CARDI), which assumed responsibility among CARICOM Institutions, to lead the process for developing comprehensive Agriculture Climate Change Adaptation Policy and Strategy, building on the regional Resilience Framework and IP. This regional-led process cannot be disconnected from national agriculture policy since climate change impacts, projected to have

severe consequences for food production especially in islands with water limitations, know no boundaries.

Barbados already has a well defined general framework for addressing environmental and climate change concerns, through the Barbados Plan of Action (BPoA) for Implementing the Mauritius Strategy for SIDs. Extending and re-orienting aspects of the BPoA to ensure consistency with climate change adaptation imperatives will be a logical extension, in this regard. At the conceptual level, though there is already a burgeoning body of policy and practice treating with environmental concerns. However, this process appears to be already well advanced through the existence of the Green Economy Scoping Study for Barbados – Draft Final Report, 2012 which provides both a conceptual and strategic approach to integrate natural and environmental resources and their services including the use of land, water and fishery resources within the integrated framework of growth and sustainable development. Indeed, this approach reflects of the Agro-Matrix conceptual framework for sustainable development of agriculture and rural communities.

Climate change and environmental concerns therefore must be ‘costed’ into the analysis of efficiency and competitiveness, and proper policies developed for mitigation and conservation and penalties (taxes) introduced to negate or reduce instances where the consequences may be shown to be negative. Here again, these issues can only be properly addressed on a product by product or sector level.

It is noteworthy to recognize that having regard to Barbados’ coral structure, sensitive ecological and environmental standing (coral beaches etc) that these issues must receive equal attention to other conventional factors typically considered in the development of a policy framework at a national level (energy cost, fertilizers and land utilization). Matters of subsidies will become increasingly important but these must also be considered within the framework of providing requisite support to efficiency-based agriculture and

to mitigating harmful subsidies which negatively impact initiatives on a product by product basis.

Again, these issues are best addressed from a Regional platform and better still within a construct for specific agricultural products. It is expected that one of the CAP Pillars - Sustainable development of natural resources – would provide a comprehensive framework for the environmental and climate change issues at both the national and regional policy levels. Even if this CAP Pillar is not as comprehensively addressed at the Food Security Pillar, then there are several other initiatives, including among others, the Low-Carbon Strategies of Guyana and more recently, Dominica that could add value to the process. Hence at least, from a regional policy perspective, the CAP Pillar should at least, identify these various policies/strategies and develop a coherent framework to guide member states in their own articulation of national agriculture sustainable policies and areas/mechanisms for integration into national policies/strategies.

With respect to the role of market information, as noted above, creating a modern AKIS is one among the five CAP pillars. In CARICOM, substantial work has gone into the role of market information systems at the national, sub-regional and regional levels. Currently, several countries in the OECS have/are developing EU-funded Agricultural Information Systems (AIS) that includes market intelligence and information. Further, there is a hemispheric initiatives –Market Information Systems of the Americas (MIOA)– with regional partnership, that is making interventions in this area.

It is strongly recommended that since agriculture and food markets are all integrally connected, then it would be prudent for Barbados, in the process of defining its marketing deficiencies and needs, to build on these various efforts. However after decades of trial and error in this area there ought to be a re-think since the benefits emerging from these macro approaches to market information have not been forthcoming. The Barbados Strategic Agricultural Plan should therefore, seek to vest market information as a decision making tool within the remit of the private sector and provide the

necessary national policy and institutional frameworks to allow the private sector to effectively manage this process over time.

There should therefore be some resistance to the development of agricultural market infrastructure as a stand-alone. This underscores the point made earlier in the discussion of the CAP Pillars that Pillar 5–A Modern Agricultural Knowledge and Information System should more appropriately be an essential service to support decision-making and implementation of the other 4 CAP Pillars and therefore not a Policy Pillar in its own right.

In going through its national process to develop an Agricultural Policy, Barbados stakeholders need to make an informed decision with respect to how the issue of marketing information, specifically, and agricultural information in general is treated and acted on. Inter-alia, this should include undertaking a strategic agricultural marketing study in the medium term, primarily with private sector leadership. This study will identify which markets, presently exist for Barbados agricultural products. Such products will either be from local primary agricultural inputs or from a combination of agricultural inputs, produced by Barbados specifically for export markets where CARICOM presently has market access or will do so in the near future.

Long-Term

There are no easy macro-economic or sectoral imperatives for the attainment of success. However a number of agricultural policy initiatives may greatly enhance the probability of success, and these include the following:

- a) Entrepreneurial development and entrepreneurial support;
- b) market based research and development capacity with strong, networking at the global level;

- c) high level of education in all spheres (agronomy, soil science, epidemiology, zoology, market research, agricultural economics, agri-business);
- d) accommodating trade policy instruments capable of responding to changes within CARICOM;
- e) well targeted domestic agricultural support instruments;
- f) leadership at CARICOM level in establishing critical regulation of environmental standards;
- g) leadership on interaction between agriculture and climate change.

With respect to market information, in the long run the focus will be on Barbados' agriculture accommodating the dynamic change of consumer taste and preferences (consumer market) and accommodating a change in technology (packaging, product innovation, changes in structure and conduct of the market) among other factors. Creating a mechanism by which Barbados agriculture can respond early to these market changes will hold the greatest potential for success if market participants themselves monitor and respond to these changes.

Financing Options

Accessing finance for private sector investment will continue to be an important aspect of the strategic plan for agricultural sector development in Barbados. It will not be useful to speak in abstraction about finance prospects. However, at least two critical types of programs will need to be financed.

Component 1: Public sector support and public/private partnerships.

An evaluation of the efficacy of the present financing from the public sector will need to be undertaken and existing financing re-directed to public support aspects and programmes. There remains the reality that public sector financing will be inadequate to meet the imperatives identified in the strategic plan and additional financing will be required.

An institutional audit will need to be undertaken. Key aspects which may benefit from public sector partnerships should be hived off for development using this modality. Important to all of this, particularly in view of the medium term and long run horizons which will need to be considered if the revised strategic plan is to be successful, must be a recognition that the public sector participation in the first instance should be limited to the provisions of regulatory monitoring and evaluation. Functions which may be regarded as public goods (e.g. protecting wholesomeness of the agricultural food system), hemispherically, on a 1:4 ratio, and at low interest rates, could also be included.

In all these instances the terms of lending should be on a commercial basis and priority given to establishing companies with a proven track record. There should also be earmarked financing for start-ups based on an overall risk assessment. The rate of failures with startups is recognized to be higher than other established companies.

In the long run (7-10 years), and within the framework of a single market for specific products within CARICOM, a mechanism for sharing revenues derived from duties and other taxes attaching to these single market products could form part of the financing for agricultural sector development.

At this conceptual stage, these various aspects should be included but as a short to medium term action. Those financing options over which Barbados retains jurisdiction/authority should be developed further. It should be evident that in all instances where capacity exists in developing specific private sector projects, that these should be developed on a client sector

basis (private sector basis) by actors already operating in the project financing sphere.

It is critical to recognize that prudent approaches to financing the strategic plan will continue as a strong determinant of the progress, or success of this most recent attempt to shift the agricultural sector's contribution to GDP to a higher trajectory.

The financing plan for the strategic plan for the agricultural sector in Barbados should therefore include a plan to finance what might be termed public goods and public services; a plan to finance and raise financing for public/private sector partnerships; and a plan to develop, raise and leverage capital for access by the private sector (which clearly relates to the public/private partnerships mentioned immediately above).

The precise elements of this financing plan will elaborate on an intervention by intervention basis, or by an initiative by initiative basis, some of which it will not be possible to determine in the context of a strategic plan at the macro level. However, providing financing options and attracting funding at rates appropriate for the agricultural sector initiatives should form a focus of the strategic plan, even in the broadest terms at this stage.

There is however a recognition that, for various reasons relating to returns to investment, profitability and risk, etc. areas which should properly reside in the private sector space, may be unable to attract the interest or support of private sector investment and that in these circumstances public support will continue to be required. Even at this stage there can be no doubting the fact that many public functions can be shifted to the private sector thereby reducing the burden on public finance and freeing up these resources for re-direction to an area where public sector participation is critical.

The precise areas for treatment within the several scenarios mentioned will need to be identified at a later stage. In terms of private sector financing there will need to be a range of modalities developed to accommodate access on terms competitive with other competing private actors in other countries.

Pursuing funding avenues which blend various types of financing instruments including grant funding are among the facilities that would need to be developed. An early candidate for the procurement of such financing might be where Government leverages the existing funding allocated to agriculture and borrows against this funding in low interest rate markets.

11.0 Climate Change and the Barbadian Agricultural Economy

The agricultural segment of Barbados' First National Communications to the United Nations Framework Convention on Climate Change (2001) reports a change in the frequency of rainfall, with increasingly common dry spells. The increase in frequency and length of dry spells severely impact penetration of rainfall into Barbados' limestone aquifer which affects the sugar cane crop, and in turn the quantity and quality of sugar.

Higher atmospheric temperatures in Barbados are influencing soil temperatures and affecting the growth and development of local commercial crops. This phenomenon, together with periods of severe drought and flooding, pose serious challenges for the local agriculture industry. For some vegetables, germination within recent years has been very poor due to increasing soil temperatures. A period of extended drought begun during the 2009 dry season causing major concern to the country's farmers. This drought was followed by the passing of Tropical Storm Tomas in October 2010. Then over 230 farmers suffered huge financial losses on account of the heavy rains which led to flooding. Thousands of dollars in crops and young seedlings were destroyed and harvesting for others was made difficult due to the saturated fields. The damage assessment in the aftermath of Tomas indicated losses in crops, livestock as well as structural damage.

In 2009, carrot growers observed that the extremely dry conditions in Barbados caused an increase in the soil fungus, *Pythium*. This occurrence was one of the principal factors influencing the exceedingly high level of imports for carrots that year as farmers incurred serious losses from significantly decreased yields. Local farmers also observed a marked increase in the incidence of the bacterial disease *Erwinia* in onion crops before harvest. Traditionally, *Erwinia* is a post harvest disease which appears on bulbs in storage. However, the disease manifests more aggressively with increased soil temperatures. In terms of livestock, poultry birds have shown the greatest vulnerability to increasing temperatures and local farmers have sustained considerable losses as a result of heat related illnesses. Heat stresses have also reduced both meat and milk production in ruminants.

Local meat and milk production are expected to decrease as daily temperatures increase. Already, these products are imported in large quantities, especially meat, for supply to the local hotel sector. The projected changes in temperature threaten to exert pressure on foreign reserves as import levels increase to address expected shortfalls. Moreover, the quality and quantity of grasses consumed by large ruminants (cows, sheep, goats, etc.) are significantly reduced on account of low rainfall. Livestock farmers have therefore been facing increasing challenges and costs to ensure that their farm animals receive an adequate amount of food and nutrition.

12. Agricultural Health and Food safety and the Barbadian Agricultural Economy

In recent years many countries have seen increased incidences of food-borne illness outbreaks and the incursion of new pests and diseases. The latter in many instances is due to the increase in global trade. As a result countries have sought to modernise their agricultural health and food control systems, especially with regards to food safety and quality. They have applied

sanitary and phytosanitary measures according to their rights as signatories to the World Trade Organisation's (WTO) Agreement on the Application of Sanitary and Phytosanitary (SPS) Measures. The Sanitary and Phytosanitary measures under the WTO Agreement are defined as any measures applied to:

- protect human or animal life from risks arising from additives, contaminants, toxins or disease-causing organisms in their food or beverages;
- protect human life from plant- or animal carried diseases (known as “zoonoses”);
- protect animal or plant life from pests, diseases, or disease-causing organisms;
- prevent or limit other damage to a country from the entry, establishment or spread of pests.

Food safety and quality systems and sanitary and phytosanitary measures have become embedded in many national on-farm food safety policies, practices, and programmes.

A modernised Agricultural Health and Food Control System (AHFCS) is a farm to fork approach that seeks to ensure the safety and quality of food from the farm (production) to the consumer's table (consumption). Hence the use of the phrase “farm to fork” or “boat to throat”. An ideal system has the infrastructure to trace the origins and destination of whole and processed food and their inputs. Traceability here refers to the implementation of measures to ensure that, at any stage of the food chain, the path of a food item and the relevant information about it are known.

An AHFCS should include an appropriate legislative (Acts and Regulations) framework which sets out certain mandatory requirements as well as

effective enforcement procedures; preventative approaches such as Hazard Analysis Critical Control Point (HACCP), Good Agricultural Practices, Good Hygiene Practices; surveillance and monitoring programmes at all aspects of the food chain, from farm to fork or boat to throat; inspection services as well as laboratory services should also be included.

In developing their AHFCS, Governments must be cognizant of the WTO's Agreement on the application of SPS Measures. This requires that Governments harmonise or base their national requirements on the international standards, guidelines and recommendations developed by international organizations such as the:

- Joint FAO/WHO Codex Alimentarius Commission (Codex) for food safety;
- World Organisation for Animal Health (previously known as the Office International des Epizooties - OIE) for animal health; and
- International Plant Protection Convention (IPPC), based in Food Agriculture Organization (FAO) for plant health,

These standards, guidelines and recommendation are the ones which are also used in the settlement of trade disputes.

The importance of AHFCS to farmers

Many of the recent food borne illnesses or outbreaks have been associated with the consumption of fresh produce. In addition, the incursions of pests and diseases have generally been the result of the movement in trade of infected plants and animals.

By employing good agricultural practices on their farms farmers will enhance the chances of their produce/products entering both local and export markets since the onus these days is for the fresh-cut produce processor and the fresh meat processor to be aware of the conditions under which their fresh produce is grown, harvested/slaughtered, packed and transported.

Farmers must be cognisant of the fact that generally anything that comes into contact with fresh produce has the potential to contaminate it, and unsanitary on-farm practices can lead to infected plants and animals.

Since fresh produce can be contaminated at any point along the farm to fork continuum, farmers must use good manufacturers practices and good manufacturing practices in those areas over which they have control. The list of contaminants may include:-

- Indirect or Direct contact with animal or human faeces;
- untreated manure used as a soil amendment;
- contaminated water;
- infected workers
- unsanitary conditions in the field or packing facility, e.g, unclean containers;

In addition, they also must ensure that they transport their produce in clean vehicles and containers since unclean vehicles can contribute to contamination with pathogens. Once fresh produce has been contaminated, removing or killing the microbial pathogens is very difficult. Prevention of microbial contamination at all steps of the farm to table continuum is preferable to treatment to eliminate after it has occurred. In addition, the indiscriminate use of agricultural chemicals including the non-adherence to with drawl periods can result in the presence of unacceptable levels of residues.

Weaknesses of the Barbados AHFCS

Currently, the AHFCS in Barbados is fragmented; resulting in gaps and overlaps in responsibilities of various departments. Responsibilities for various aspects of the system are found in the Ministries of Agriculture, Health, and Commerce and Trade but are not well coordinated. There are no formal mechanisms for their interaction. In addition, many farmers have not implemented documented agricultural health and food control systems.

The legislation in Barbados is outdated, has several gaps and is not in line with international norms. Also, the lack of regulations which provide guidelines for enforcement makes it difficult for officials to carry out their responsibilities, and for the industry to determine how to meet the requirements.

As a result there are several pieces of legislation that need to be amended or rewritten and the requisite regulations drafted to reflect the international standards of the OIE and Codex as well as the requirements of the SPS Agreement. For example:

The existing Plant Protection Act 2007 needs to be amended and the Regulations to implement the Act need to be drafted. This would provide farmers with guidelines to follow in growing their crops and, the plant protection officers with criteria by which to determine if the requirements have been followed and if not, providing them with the power to enforce the requirements.

In addition, there is the need for a General Food Safety Act and Regulations which would detail the acceptable food safety criteria. Regulations establishing requirements for Prerequisite Programmes such as Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP) as well as Food Safety Management Systems practices such as Hazard Analysis

critical Control Point (HACCP) and traceability in establishments are required.

Current legislation with respect to certification of animals and animal products including foods of animal origin are inadequate with respect to international standards. In addition, there is no legislation that provides the Senior Veterinary Officer with the regulatory oversight of meat inspection in Barbados, including the inspection of abattoirs and meat processing establishments, as is required under OIE.

However, with respect to the export of animal products, there is some oversight in the slaughter house and export certification is provided by the Veterinary Services Department (VSD) on an “as needs” basis despite there being inadequate legislation. The exportation is conducted according to the importing country’s requirements and export procedures/protocols have not been formally established. Hence, there is the need for a Meat and Poultry Inspection Act and the accompanying Regulations. Additionally there is no Veterinary Drug Act and Regulations to ensure that drugs are used by the right persons and not abused.

As a result of these deficiencies, including clear identification of the competent authority and the chain of their command, enforcement, which is an important component in an AHFCS, is not a routine part of the current system. Hence, the lack of adequate and consistent regulatory capacity and enforcement contributes to a lack of confidence and trust in the Government of Barbados’ agricultural health and food control programmes.

Another component of an AHFCS is inspection. Although some inspection does occur in all areas of the farm to fork continuum, it is not adequate and, there is need for appropriate tools and training.

Monitoring and surveillance programmes are inadequate. There is no comprehensive and consistent monitoring of the quality or the safety of the food at all aspects of the food chain (farm to fork). These programmes are

necessary to ascertain the incidence of food-borne illness as well as to detect the presence of contaminants, harmful pests and diseases, affecting animals and plants.

Additionally, such monitoring or surveillance programme will assure regulatory agents that the agricultural or food products are safe and of good quality. They will also guarantee that the prevalence of selective pests and diseases are under control and contaminants are below the required thresholds. For example, there is the need for a pest surveillance unit within the Plant Protection Unit that would be responsible for planning and assisting in the conduct of and reporting on statistically valid and scientifically sound plant pest surveys.

This is necessary, so as to be able to detail to the importing country the pests which are present and to provide scientific evidence of the absence or distribution of plant pests. The Pest Risk Analysis scientists and the nation's bilateral negotiators will be provided with the scientific information required to defend the country's National Plant Protection policies. Countries need to know the pests present so that they can determine during their risk assessment if the importation of plant material from Barbados could potentially contain pests that could pose a threat to their agricultural sector.

One of the core principles of the WTO and the International Plant Protection Convention (IPPC) is the principle of transparency. Transparency requires that the science based plant health policies, surveillance information, and Pest Risk Assessments (PRAs) must be available for review by the National Plant Protection Organisation (NPPO) of trading partners. What is available from Barbados is inadequate since there is no adequate infrastructure to address the regulatory, scientific and inspection matters for agricultural inputs (pesticides, seeds and fertilizers).

There are no monitoring programmes, including those for the determination of the presence of pesticide residues, trace metals and other chemical

contaminants, for food produced locally, and no written or legislated standards to which the food product must comply.

Laboratory services do exist albeit in buildings that were not purpose built and are in need of repairs or upgrade. Although the laboratories may follow internationally recognized analytical procedures, the laboratories do not all have up to date documented quality manuals, and are not accredited for the tests they conduct.

Barbados, based on its current agricultural health and food control system and the requirements of the importing countries, is unable to export products of animal origin including fish and fishery products into the European Union (EU) and to some extent the USA readily export other agricultural and/or food commodities. This is despite the fact that individual companies may have Hazard Analysis Critical Control Point (HACCP) plans or quality assurance and quality control programmes in place. It is the inadequacy of Government oversight of these establishments and the farm to fork continuum as well as Government's SPS framework and systems that is preventing the export of the products. Such inadequacy cannot engender absolute confidence in the food supply for the Barbadian consumer.

The Way Forward

The Government, cognisant of these short comings, entered into an investment loan agreement in 2010 with the Inter-American Development Bank to modernise the current National Agricultural Health and Food Control Programme (NAHFCS). The aim of the programme is to ensure that Barbados' animal health, plant health and food safety systems comply with international standards and enhances the competitiveness of Barbados' agricultural and fisheries sectors in the international arena.

The Programme has two components: Component 1 - Development of the legal, regulatory and institutional framework of the NAHFCS and

Component 2 - Upgrading of the Agricultural Health and Food Safety laboratories and related facilities that support the NAHFCS.

The activities in the programme seek to identify the gaps and weaknesses in the NAHFCS, to provide clear guidance on the requisite infrastructure (human, physical and financial) necessary to update the AHFCS, and to implement the requirements. The following activities are anticipated in Component 1 and 2.

Component 1 - Development of the legal, regulatory and institutional framework of the NAHFCS

- (i) Improvement of the legislative and regulatory framework through drafting and updating of legislation;
- (ii) assessment of the status of implementation of quality assurance and quality control programmes at the laboratories; and development and implementation of programme to support laboratory accreditation;
- (iii) development and implementation of guidelines for Good Agricultural Practices (GAPs) in sectors such as egg and poultry, beef and dairy; fresh fruit and vegetables;
- (iv) development and implementation of Good Hygiene Practices (GHPs), and protocols for the above mentioned sectors;
- (v) development and implementation of Good Manufacturing Practices (GMPs) and guidelines for the food industry;
- (vi) development of programmes to improve the regulatory services for plant health, animal health, veterinary public health and food safety – inspection system for fish

and sea food sector, veterinary public health meat, general food safety, import/export; and

- (vii) development of monitoring and surveillance systems for selected plant pests; selected animal and zoonotic diseases; and the development of food safety emergency response system for food recall procedures;

Component 2 – Upgrading of the Agricultural Health and Food Safety laboratories and related facilities that support the NAHFCS

- (i) Laboratory complex to accommodate improved facilities for the seven laboratories constructed and equipped;
- (ii) airport Inspection and quarantine facilities upgraded; and
- (iii) seaport inspection and quarantine facilities upgraded.

Ultimately, a modernized AHFCS protects public health by reducing the risk of food borne illness; protects animal and plant health by reducing the introduction and spread of diseases and pests; protects consumers from unsanitary, unwholesome, mis-labelled or adulterated food; and contributes to economic development by maintaining consumer confidence in the food system and providing a sound regulatory foundation for domestic and international trade in food and/or produce.

The AHFCP is currently preparing for the commencement of its activities identified for its Implementation during this Financial Year 2012/2013 to enable the modernization of Barbados' AHFCS.

13.0 A National Food and Nutrition Plan for Barbados

A Food and Nutrition Security Plan will only be successful if there are seven important elements:

1. Political will and commitment
2. Institutional Reform and Institutional change
3. Availability of Financial Resources
4. Appropriate human resources
5. Appropriate Policies
6. Consumer education
7. Farmers linked to the market

The major institutional change recommended is the establishment of a Ministry of Food and Nutrition Security which should have as its fundamental role the feeding of the nation.

This proposal is aware that efforts to increase food production in the Caribbean in the past have met with many challenges. According to a recent CARICOM document “domestic food crop production has been a by-product of export agriculture, largely relegated to marginal lands and encouraged primarily as a means of reducing the cost of feeding the plantation workers. At the same time, the marketing and distribution system, port and transport infrastructure and customs procedures were geared to facilitating food imports. This has given rise to a strong and continuing national and regional preference for imported agricultural goods and services that is now being further fuelled by changing lifestyles and tastes. Indeed, together with the vested interests that have arisen around it and the strong acquired taste and preferences for foods that are not produced in the region, this situation has resulted in declining levels of demand for local food commodities that have constrained the growth of the regional food sector and the emergence of a vibrant food processing and distribution sector based on domestic food production.”

As a result, the greater (and increasing) part of the food products consumed in the Region is imported in a raw or intermediate state for further

processing e.g. wheat, maize, soybeans, grains, to be transformed *inter alia* into flour, animal feed and beverages. Thus the Region is almost entirely dependent on foreign producers and processors for supplies of the main food.

The CARICOM Food and Nutrition Security Policy document also identifies a number of constraints to the food chain:-

- *Institutional constraints*, including a lack of supporting regional/national bodies for research & development, risk management, information management, health/food safety & standards certification (e.g. Hazard Analysis Critical Control Point (HAACP), European Good Agricultural Practices (EUREPGAP) and “on the ground” extension services for farmers;
- *infrastructural constraints*, including lack of appropriate processing capacity, production structures, standard-certified machinery and production facilities;
- *human resource constraints*, particularly high/rising labour costs, weak human resource management, insufficient vocational-technical training and a lack of an entrepreneurial, commercial mindset among some smaller regional producers, particularly in terms of training in key business concepts (e.g. profits, fixed, variable and unit costs, operating margins, budgeting and record-keeping); and
 - *services constraints*, particularly with respect to high costs from airlift and sea freight, local transportation, port inefficiencies, security/insurance and product marketing.”

These constraints are very much part of the Barbados food production scenario and unless removed or reduced will continue to make the achievement of food security difficult. Implementation of the Plan must also

be based on attainable goals where short term, medium term and long term targets are identified. In addition, the factors that will promote change must be clearly understood, communicated and agreed to by the people and their leaders in order for any meaningful progress to be made.

Given these realities, the successful implementation of a food plan in Barbados must be accompanied by organizational and social change to confront the challenges of the past and chart a new future. Three fundamental changes will be needed:

- (1) A programme of consumer education that emphasizes the nutritional value of local foods and the benefits to the local economy of spending on locally produced foods.
- (2) A strategy of institutional change that promotes coordination of policies and strategies that impact food production and consumption.

Policy Coordination is fundamental to progress in the implementation of food security programmes because of the multifaceted and multifunctional nature of agriculture. This can be seen readily when one Ministry has the responsibility to import food, and another ministry has responsibility for food production.

A possible solution is the establishment of a Ministry of Food and Nutrition Security that would coordinate food imports, food production, food safety, food and nutrition policy, and evaluate the impact of national and international macroeconomic factors on the food security.

- (3) Leadership that understands the strategic role of a Food and Agricultural sector in economic development.

By focussing on food security, the nation will produce more of what it consumes and create more employment opportunities. The proposal is based on the concept that agriculture is a value chain of interrelated economic activities which provides backward and forward linkages to the rest of the economy and contributes to health, food security, energy security,

employment opportunities, reduction in poverty, social stability and preservation of the environment.

A National Food and Nutrition Plan is necessary as the recent increases in food prices is not a temporary phenomenon but structural change based on increases in the price of oil, increased transportation costs, climate change and the use of agricultural products for bio-fuel production. World demand for food will continue to increase as population growth and urbanization continues especially in India and China. The National Food and Nutrition Plan should have as its fundamental objective an increase in the production and consumption of safe, fresh, healthy food for the nation, to assist in reducing the high incidence of chronic non-communicable diseases in the country.

A Food Plan should also aim to reduce the food import bill, assist in reducing the high food prices, provide employment opportunities in the food production and food services sector, contribute to the diversification of the economy, save foreign exchange and contribute to a reduction in inflation. The Plan recognizes that the core elements of our current food consumption are products that are not produced in any quantity in Barbados e.g wheat, corn, rice, soyabean and white potatoes. Consequently, the country cannot seek to become self sufficient in food in the short term.

What a Food Plan seeks to do is to produce more of those commodities that can be produced locally and which are part of the traditional Bajan diet and which may replace in the medium term some of the products which are currently imported. The current imports of wheat, rice and corn represent a significant part of the food import bill but large sums are also spent on meat, dairy products, fruits and vegetables (see Table).

A Food Plan should take into consideration, current and future land and water use, current and future food consumption patterns, current population and future population growth, current and future demand for the products to be produced, land capability studies and the impact of new technology on food production.

According to a recent report on the current and future population growth of the Americas, Barbados population will reach 291,000 in 2020, 293,000 in 2030, 286,000 in 2040 and 274,000 in 2050. (U.S.A. Bureau of the Census-International DataBase). A food and nutrition plan must take into consideration this increasing population. The major influence of population on nutrition is the significant increase in the number of persons who will be 65 years old and over in the future population. While calorie intake is reduced, a diet rich in cereals, fruits and vegetables is normally recommended for this population.

This Food Plan must also take the following trends into consideration:

1.0 According to a recent World Bank report (Repositioning Nutrition as central to development, 2005) “Malnutrition remains the world’s most serious health problem and the single biggest contributor to child mortality. Nearly one-third of children in the developing world are either underweight or stunted, and more than 30 percent of the developing world’s population suffers from micronutrient deficiencies. Unless policies and priorities are changed, the scale of the problem will prevent many countries from achieving the Millennium Development Goals (MDGs)—especially in Sub-Saharan Africa, where malnutrition is increasing, and in South Asia, where malnutrition is widespread and improving only slowly. There are also new dimensions to the malnutrition problem. The epidemic of obesity and diet-related non-communicable diseases (NCDs) in developed countries is spreading to the developing world.

Many poorer countries are now beginning to suffer from a double burden of under-nutrition and obesity. This phenomenon, which some have termed the “nutrition transition,” means that those national health systems now have to cope with the high cost of treating diet-related NCDs at the same time they are fighting under-nutrition and the traditional, communicable diseases. Malnutrition is also linked to the growing HIV/AIDS pandemic; malnutrition makes adults more susceptible to the virus, inadequate infant

feeding aggravates its transmission from mother to child; and evidence suggests that malnutrition makes anti-retroviral drugs less effective.”

- The supermarket has become the source of food for most Barbadian households.
- Consumers are increasingly buying fresh, local food products.
- Awareness of the link between food quality and the incidence of obesity, diabetes and other chronic non-communicable diseases is on the rise.
- Farmers markets are becoming popular places to purchase fresh fruits and vegetables.
- Media and celebrity chef programmes are being watched increasingly by members of the public.
- On-line purchases of food are becoming common.
- Caribbean foods are becoming increasingly popular in international markets.
- The people of Barbados seem to purchase more processed foods, prepared meals and convenience foods. Cooking at home seems to be on the decline.
- The Food Plan while taking all the above into consideration must also recognize that food security must also be based on sustainable production systems where food quality and safety are important considerations. In this regard the use of pesticides, herbicides and inorganic fertilizers in food production systems must be carefully managed and reduced where possible.

Pesticides and herbicides have, until recently, been seen as essential elements of modern day farming. They, however, pose tremendous health hazards to farm workers, to residents in the vicinity and to consumers. Many commonly used pesticides have been found to be carcinogenic and mutagenic. It has also been shown that children are more likely to suffer from pesticide poisoning. In addition to the direct effects of pesticides, the

presence of pesticide residues in foods is now considered to be a very serious health hazard as judged by recent consumer attitude surveys.

Pesticides can also result in pollution to the ecosystem and in particular to rivers, streams, ground water, soils and the marine environment. As such, pesticide pollution can cause irreversible changes in the earth's ecosystems. The adverse effects on the ecosystem can result in the destruction of wildlife and the reduced diversity of flora and fauna generally, including the permanent loss of certain species. Of significant concern to agriculture are the development of resistance by certain pests to pesticides and the increasing virulence of those pests. There are numerous examples, worldwide, of the increasing resistance of pests and certain weeds to pesticides and the growing dominance of difficult to control weeds in certain ecosystems.

Synthetic fertilizers were once seen as indispensable and a major component in the modernization of agriculture worldwide, and have been adopted as an essential farming practice in most developing and developed countries. There were an essential component of the Green Revolution of the 1960's and 1970's during which the improved varieties were bred with increased ability to respond to fertilizer application. More recently, however, there has been growing concern about the deleterious effects of excessive and continuous use of fertilizers on the environment.

In particular, it has been demonstrated that runoff from fields treated with fertilizers finds its way into streams, underground water, lakes and the marine environment, thus, resulting in significant changes in the flora and fauna and in water quality. There is particular concern about the increased levels of nitrates and phosphates in the water systems due to increased fertilizer use worldwide. As a result, most developed countries have now implemented policies of integrated fertilizer use aimed at increasing the efficiency of fertilizer application, thus minimizing the adverse effects of nutrient runoff. Also, many countries and agencies are now promoting organic farming in which only natural sources of fertilizers are utilized.

The production and consumption of organic foods is becoming increasingly common in the region.

Food as a major contributor to Inflation and the High Cost of Living in Barbados.

The National Policy Framework for addressing the rising cost of living states that the cost of living has increased significantly in the last 8 years.

According to the Framework :

“The cost of living, as measured by the Retail Price Index, increased by an average of 5.8% between 2005 and 2007 compared with an average of 1.1% between 2002 and 2004. Over the period, there was significant increase in the price of food by an average of 7.4% between 2005 and 2007, compared with 3.0% between 2002 and 2004.”

A review of the average annual retail price for food during 2004 to 2011 revealed that between 2004 and 2011, the index for food increased from 106.65 to 177.38.

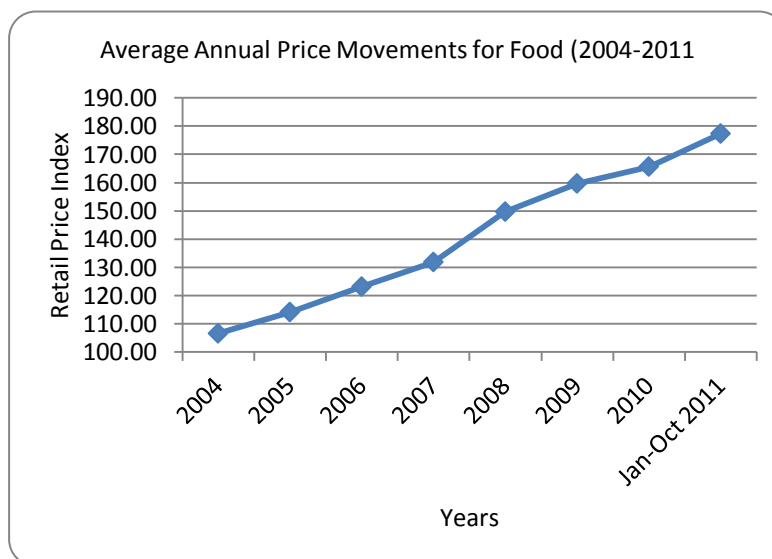


Figure III: Average Annual Price Movements-Food (2004-2011)

Source: Barbados Statistical Service, Statistical Bulletin, Index of Retail Prices

This 66.3% increase in the retail price of the index for food has had a dramatic effect on the cost of living and the disposable income of the citizens of the country.

Analysis of Cost and Prices Trends in Barbados - Groups in the Index of Retail Prices

The Retail Price Index (RPI), which measures changes in the prices of a particular basket of goods and services bought for household consumption, consists of nine major groups, namely:

- Alcoholic Beverages and Tobacco;
- Clothing and Footwear;
- Education;
- Recreation and Miscellaneous;
- Food
- Fuel and Light;
- Household Operations and Supplies;
- Housing;
- Medical and Personal Care; and
- Transportation.

The highest weight is accorded to Food (34%), while the lowest is assigned to Alcoholic Beverages, Tobacco, Clothing and Footwear (4%).

Figure I below sets out the weights of the various items in the Retail Price Index.

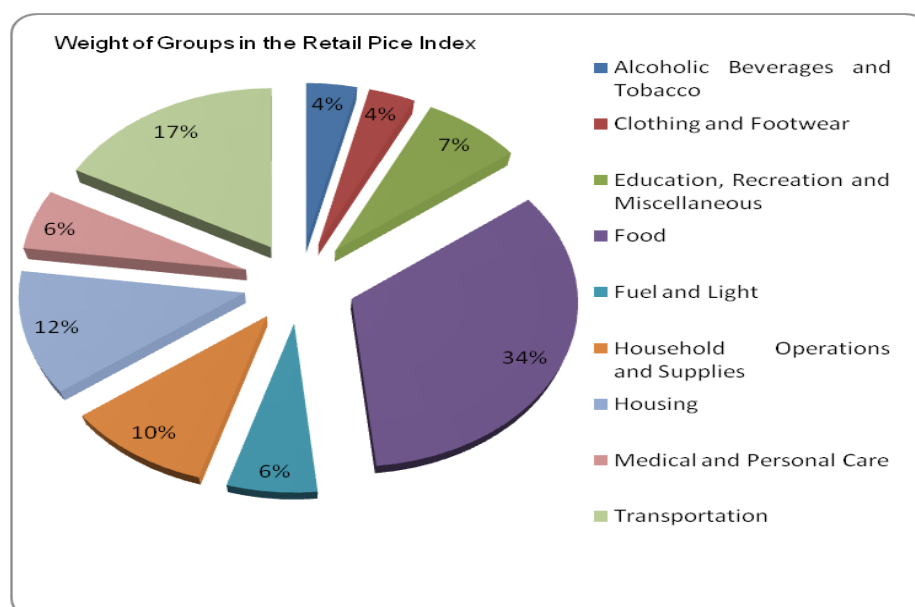


Figure II: Groups in the Retail Price Index

Source: Barbados Statistical Service, Statistical Bulletin, Index of Retail Prices

These data indicate, that given the high weight of food in the Retail price index, increases in food prices will contribute significantly to increasing inflation in Barbados..

Barbados Food Import Bill

A recent document of the CARICOM Secretariat shows the following for Barbados food imports between 1968 and 2008 (see Table 1).

Table 1: Food Imports for Barbados 1968 to 2008 (CARICOM)

Years	Food Imports	
	US\$ (millions)	BDS\$ (millions)
1968	16.4	32.8
1978	53.5	107
1988	80.7	161.4
1998	133.8	267.6
2008	265.2	530.4

(Reducing the CARICOM Food Import Bill and the real cost of food. Policy investment and Options CARICOM Document 2011).

These data indicate a dramatic rise in the food import bill from BDS \$32.8 million in 1968 to BDS \$530.4 million in 2008.

An analysis of food imports as a percentage of total imports shows that food imports as a percentage of total imports moved from 15.02% in 2000 to 24.92% in 2011 (**see Table 2 and Graph below**).

Table 2: Food as a Percentage of Total Imports (2000-2008)

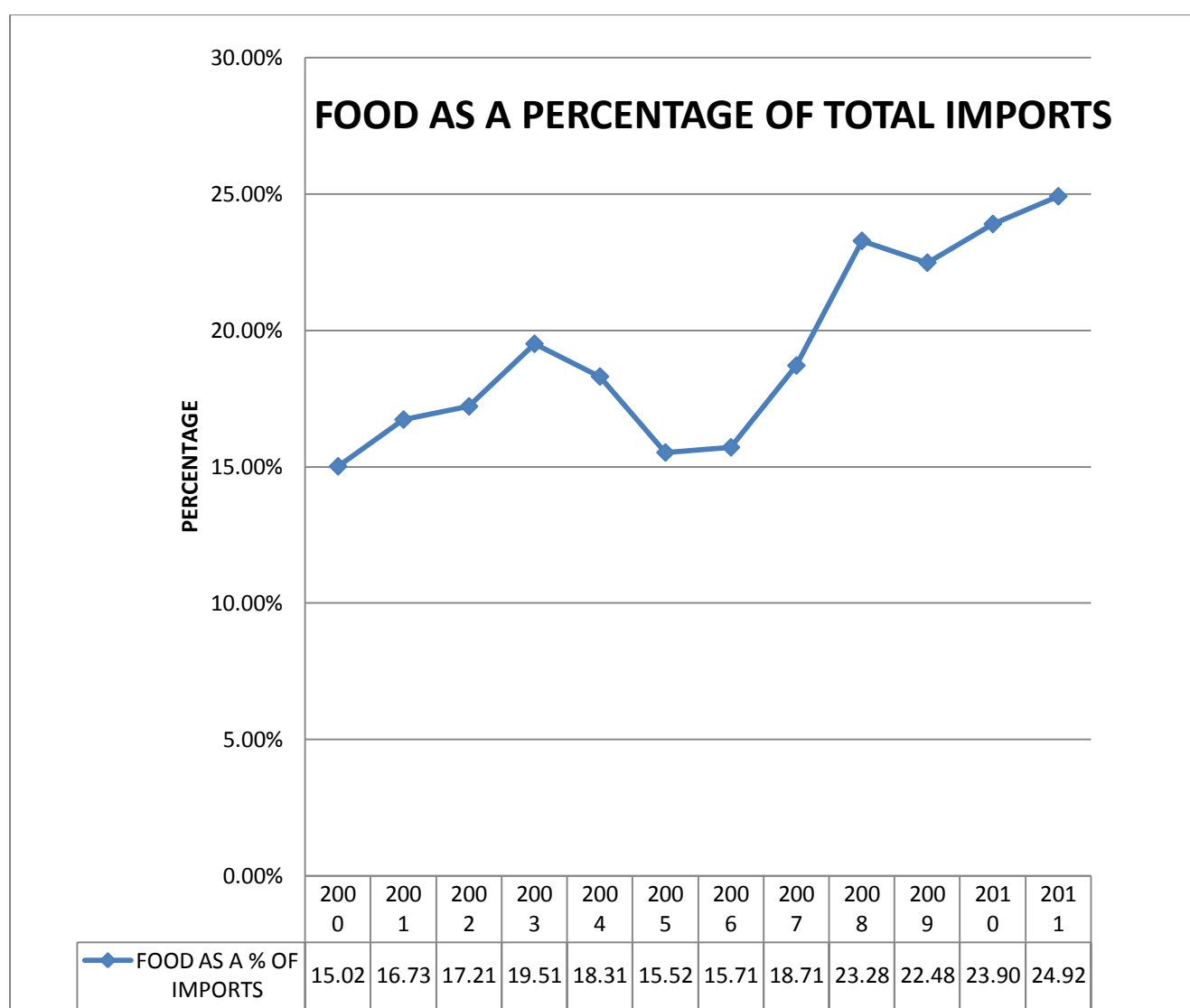
YEAR	TOTAL IMPORTS	FOOD IMPORTS	FOOD AS A % OF IMPORTS
2000	\$ 2,312,076,038.00	\$ 347,215,623.00	15.02%
2001	\$ 2,137,260,692.00	\$ 357,572,208.00	16.73%
2002	\$ 1,936,464,080.00	\$333,350,183.00	17.21%
2003 (Jan. - June)	\$ 869,097,318.00	\$ 169,569,173.00	19.51%
2004	\$ 2,181,349,327.00	\$ 399,375,112.00	18.31%
2005	\$ 3,104,413,968.00	\$ 481,904,593.00	15.52%
2006	\$ 3,032,747,244.00	\$ 476,495,064.00	15.71%
2007	\$ 2,791,426,965.00	\$ 522,329,588.00	18.71%
2008	\$ 2,996,450,639.00	\$ 697,719,622.00	23.28%
2009	\$ 2,359,233,850.00	\$ 530,468,206.00	22.48%
2010	\$ 2,391,051,406.00	\$ 571,562,450.00	23.90%
2011	\$ 2,623,436,131.00	\$ 653,793,312.00	24.92%

(Data obtained from Agricultural Planning Unit Database)

The Food import data for the period 2006-2011 is presented in the Appendix. The data indicate that the food import bill can be divided into two groups of commodities. Group1 commodities comprise processed foods, grains and cereals, coffee, teas and spices, oils and fats and nuts. Barbados produces limited quantities of these commodities. In 2011, these commodities accounted for 48.39% of the food import bill or \$316 million Barbados dollars. Group 2 commodities comprise the cost of importation of products, more of which, can be produced locally e.g. vegetables, fruits, root

crops, corn, cassava, lamb, pork, beef and fish. This group makes up 51.1% of the food import bill or \$337 million Barbados dollars.

Since the products of Group 1 are not produced in any large quantity in Barbados, attempts to reduce the food import bill during the first five years (2013 to 2017) will seek to reduce the importation of the commodities of Group 2. In the next 5 years (2018 to 2022) the emphasis will be on reduction of the food import bill of group 1 commodities. This is because any reduction in the import bill for Group 1 commodities, imply a radical change in the diet of the Barbadian people and the establishment of an agro-processing industry to convert local products into value-added products. These changes will take time and can be initiated in the first phase i.e. 2013-2017 but will become more of a reality in the second phase of the plan (2018-2022.)



These data indicate that food imports represent a significant and increasing percentage of imports. To give you some comparison, recent data indicate that in Trinidad and Tobago food imports represent 10% of total imports.

This paper presents the view that there are five strategic areas for immediate attention which could result in a significant reduction in the food import bill in the commodities listed in group 2 of the food import bill.

This list was prepared based on the concept of “Potential for Competitive Import Replacement” as described by CARICOM and the results of the national consultation. The products must:

- (i) Be viable to replace a major item
- (ii) Exhibit potential for competitiveness in terms of price, taste and quality.
- (iii) Exhibit value chain characteristics whereby public or private investment can result in competitiveness and increases in production.

The five strategic areas identified which could form the basis of a National Food and Nutrition Plan are:

- (i) Increased production and consumption of fresh fruits and vegetables.
- (ii) Increased production and consumption of root crops
- (iii) The development of a Barbados Black Belly Sheep Industry
- (iv) The production of cassava for human consumption and as inputs for animal feed to reduce imports of corn.
- (v) Increased production and consumption of fish.

Table 3.0 Import Value of the Seven Strategic Commodities in the Food Import Bill

Commodity Group	Commodity Class	Total Import Value (BDS\$)
Vegetables	Fresh	\$ 11,712,608.00
	Frozen	\$ 3,830,802.00
Fruits	Fresh	\$ 10,425,468.00
	Frozen	\$ 2,620,599.00
Root Crops	Fresh	\$ 88,858.00
	Frozen	\$ 103.00
Fish	Fresh	\$ 324,369.00
	Frozen & Fillets	\$ 28,877,990.00
Corn	Other Maize & Maize Seed	\$ 24,140,643.00
Cassava		\$ 5,631.00
Lamb	Fresh & Frozen	\$ 10,780,588.00
Total		\$ 92,807,659.00

A closer examination of the commodity groups shows that in the vegetable subgroup, the major imported products were broccoli, onions, carrots, cabbages, pumpkins, lettuce and sweet peppers. The cost of importation of these commodities was \$10,475,574 (**see Table 4**).

Table 4: Import Quantities and Values of Top 7 Vegetables in the Food Import Bill

Commodity	Quantity Imported (Kg)	Value (BDS\$)
Broccoli	1,124,028	\$ 4,124,640.00
Onions	2,212,691	\$2,565,209.00
Carrots	679,869	\$ 1,306,962.00
Cabbage	468,773	\$ 825,548.00
Lettuce	287,620	\$ 680,155.00
Pumpkins	536,139	\$ 514,213.00
Sweet Peppers	170,782	\$ 458,847.00
Total	5,479,902	\$ 10,475,574.00

14.0 Current Food Production and the Elements of the Food Plan

The food plan is based on a basket of commodities with greatest potential for local production and which are components of the traditional Barbadian diet. These commodities are also products where some success in production and high consumption has been recorded. The products also have the potential to be processed to produce value added products and the base of a new agro-industry in phase 2 of this proposal. The proposal does not exclude the possibility of including new products in the future or the development of an export market for local products.

The list of commodities is based on consultation with farmers and consumers and is presented in Table 3 with their current import values.

These products had an import value of \$ 69,762,260 Barbados dollars in the 2011 food import bill.

The data in the Appendix show the production and imports of these commodities for the period 2007-2011. This data indicate considerable variation in local production during the period.

Table 5.0 Imports of Products in 2011 food import bill which could be produced locally.

Vegetable Crop	ImpNetMass (KG)	ImpValue (BDS\$)	2011 Imports ('000Kg)
Beans (String)	489.00	\$ 1,556.00	4.89
Beet	31,258.00	\$ 58,623.00	31.26
Cabbage	468,773.00	\$ 825,548.00	468.77
Carrot	679,869.00	\$ 1,306,962.00	679.87
Corn	N/A	N/A	N/A
Cucumber	100,063.00	\$ 165,440.00	100.06
Lettuce	576,979.00	\$ 1,510,466.00	576.98
Watermelon	617,685.00	\$ 823,823.00	617.69
Okra	N/A	N/A	N/A
Peas	N/A	N/A	N/A
Pepper (Hot)	3,654.00	\$ 10,093.00	36.54
Pepper (Sweet)	170,782.00	\$ 458,847.00	170.78
Pumpkin	536,139.00	\$ 514,213.00	536.14
Squash	N/A	N/A	N/A
Tomato	181,311.00	\$ 493,145.00	181.31
Root Crop	ImpNetMass (KG)	ImpValue (BDS\$)	2011P
Cassava	3,495.00	\$ 5,361.00	3.50

Eddoes	106,335.00	\$ 88,578.00	106.34
Potato (sweet)	234.00	\$ 222.00	2.34
Yam	25,220.00	\$ 18,640.00	25.22
Onion	2,212,691.00	\$ 2,565,209.00	2212.69
Peanut	111,054.00	\$ 267,482.00	111.05
Meat	ImpNetMass (KG)	ImpValue (BDS\$)	2011P
Pork	1,153,725.00	\$ 7,859,451.00	1,153.73
Beef	1,791,699.00	\$ 18,888,317.00	1,791.77
Veal	N/A	N/A	N/A
Mutton	1,022,810.00	\$ 10,780,588.00	1,022.81
Poultry- Chicken & Turkey	979,433.00	\$ 4,657,685.00	979.43
Eggs	N/A	N/A	N/A
Milk	2,849,402.00	\$ 18,730,030.00	2,849.40

The table 6 and chart below show that that in 2011 local production of eggs, sweet potato, cassava, poultry, cucumber yam and tomato , satisfied more than 80% of local demand for these commodities. In pork ,hot pepper, milk ,sweet pepper, beets, lettuce, cabbage and pumpkin, local production provided between 23 and 65% of demand while for melons ,carrots, eddoes, onions, lamb, beef ,peanuts and broccoli, local production provided less than 20% of current demand. The Table 6.0 shows how increasing demand by 10% over the period 2013-2017 to compensate for projected population growth and demand we can calculate the annual increase in local production needed to satisfy this increased demand. The projected land area needed to produce the increased production is presented in Table 6

Table 6.0 Current production, imports, demand and projections for production and demand during the next five years of selected commodities						
Commodity	Current Production ('000 Kg)	Current Imports ('000 Kg)	Current Demand ('000 Kg)	Production % of Demand	Annual Production Increase Needed ('000 Kg)	Production in 5 years ('000 Kg)
Beets	48.50	31.26	79.76	60.8%	7.85	87.73
Cabbage	261.66	468.77	730.43	35.8%	108.36	803.47
Carrot	145.66	679.87	825.53	17.6%	152.48	908.09
Cucumber	1,144.80	100.06	1,244.86	92.0%	44.91	1,369.35
Lettuce	499.01	576.98	1,075.99	46.4%	136.92	1,183.59
Melon	156.31	617.69	774.00	20.2%	139.02	851.40
Hot Pepper	82.80	36.54	119.34	69.4%	9.69	131.28
Sweet Pepper	314.35	170.78	485.13	64.8%	43.86	533.64
Pumpkin	166.42	536.14	702.56	23.7%	121.28	772.82

Tomato	812.95	181.31	994.26	81.8%	56.15	1,093.68
Cassava	308.38	3.50	311.88	98.9%	6.94	343.07
Eddoes	19.52	106.34	125.86	15.5%	23.79	138.45
Sweet Potato	506.52	2.34	508.86	99.5%	10.65	559.75
Yam	243.10	25.22	268.32	90.6%	10.41	295.15
Onions	392.45	2,212.69	2,605.14	15.1%	494.64	2,865.66
Broccoli	0.26	1,124.03	1,124.29	0.0%	247.29	1,236.72
Peanuts	4.64	111.05	115.69	4.0%	24.52	127.25
Pork	2,657.05	1,153.73	3,810.78	69.7%	306.96	4,191.86
Beef	150.63	1,791.77	1,942.40	7.8%	397.20	2,136.64
Lamb	113.24	1,022.81	1,136.05	10.0%	227.28	1,249.65
Poultry	14,577.60	979.43	15,557.03	93.7%	507.03	17,112.73
Eggs	2,107.54	-	2,107.54	100.0%	42.15	2,318.30
Milk	5,681.58	2,849.40	8,530.98	66.6%	740.50	9,384.08

Commodity	Annual Production Increase Needed ('000 Kg)	Annual Estimated Land Required (Acre)	Total Acreage Needed Over 5 years (Acres)
Beets	7.85	1.73	8.65
Cabbage	108.36	11.94	59.72
Carrot	152.48	22.41	112.06
Cucumber	44.91	4.95	24.75
Lettuce	136.92	18.87	94.33
Melon	139.02	15.32	76.62
Hot Pepper	9.69	1.07	5.34
Sweet Pepper	43.86	7.44	37.19
Pumpkin	121.28	29.71	148.54
Tomato	56.15	8.25	41.26
Cassava	6.94	1.02	5.10
Eddoes	23.79	2.10	10.49
Sweet Potato	10.65	1.68	8.38
Yam	10.41	1.91	9.56
Onions	494.64	27.26	136.31
Broccoli	247.29	54.52	272.59
Peanuts	24.52	10.81	54.07
TOTAL		220.99	1,104.97

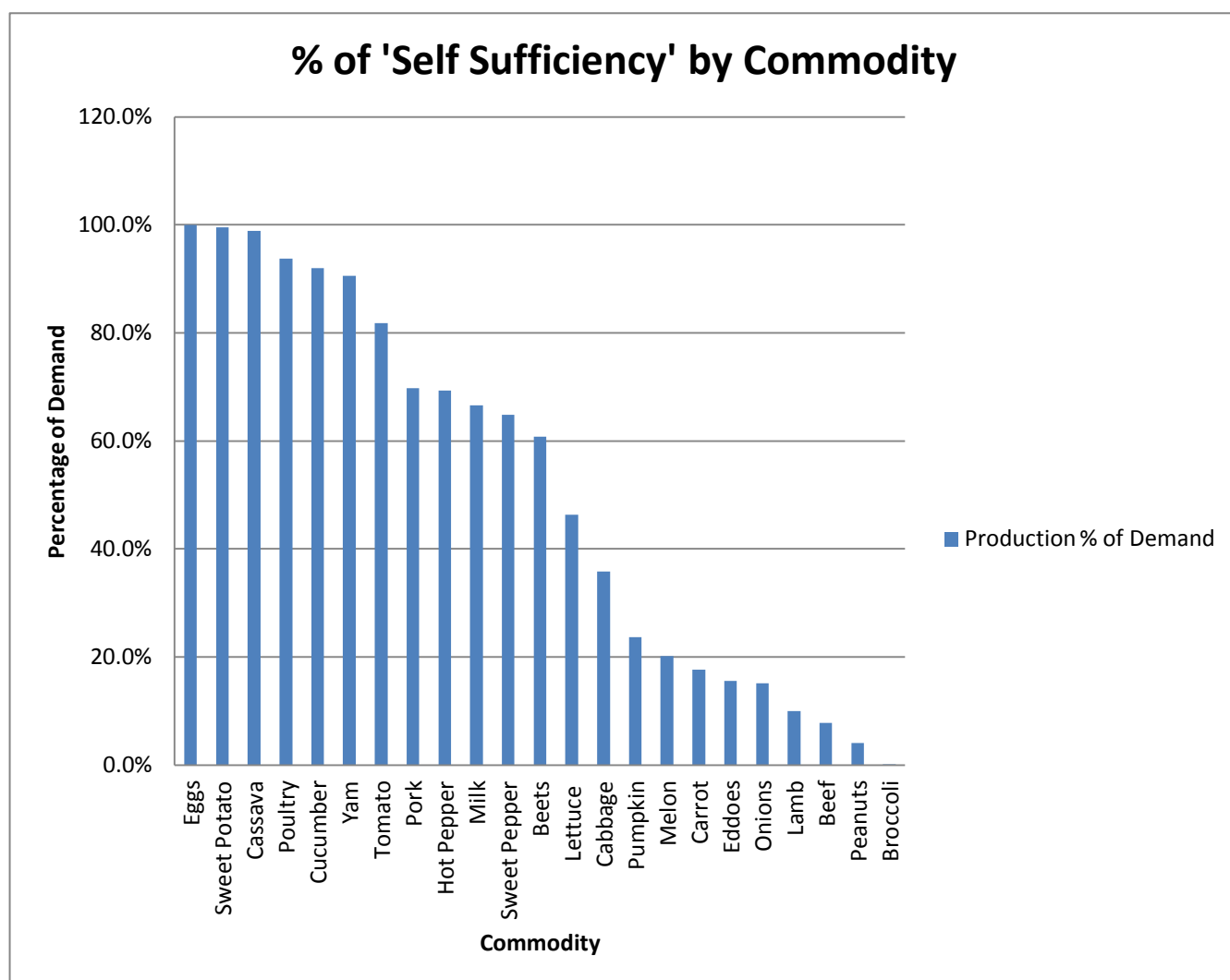
MELONS INCLUDES WATERMELON, CANTALOUPE AND MUSKMELONS

BROCCOLI IS NOT PLANTED REGULARLY IN BARBADOS

POULTRY INCLUDES CHICKEN AND TURKEY

Table 6 above presents the level of increase in the production of the commodities that could result in self sufficiency in 5 years (2017). These are based on a projected increase in demand of 10% per annum during the period. The current level of self sufficiency of these commodities is presented. The land area that would be required to produce the increased production and based on the current levels of productivity is presented. This data may be modified by improved levels of productivity and the application of greenhouse and other technologies.

When local production is examined as a percentage of consumption the data indicates that local production provided less than 80%% of the local demand for the following commodities; beet, cabbage, carrot, lettuce, melon, hot pepper sweet pepper, pumpkin, eddoes, onions, pork, lamb and milk. We must be aware that for commodities such as sweet pepper, hot pepper and milk as recently as 2010, production contributed more than 80% to local consumption; however, during 2011 the data suggests a significant reduction in local production.



Given this data, a food and nutrition plan could be developed by promoting increased production of these basic commodities improve the level of self sufficiency in those commodities contributing less than 80% of demand and to continue to increase the production of those that are close to self sufficiency in order to satisfy increased demand related to population growth and the potential for agro-processing.

This proposal therefore suggests a plan to increase the production of these commodities by varying percentages during the period 2013 to 2017 in order to cope with increased demand and increased consumption. While we recognize that this may be subject to the availability of resources, weather conditions and other factors which are all unknown at this stage we think this should be established as a goal.

15.0 Linking Agriculture and Manufacturing

Phase 2 of National Food and Nutrition Plan

In this phase of the plan, and based on the changed patterns of consumption and increased production, it is anticipated that the country will move to a new level of food self sufficiency in which a new agro-industrial complex will be established. This complex will require even higher levels of food production. The raw material requirements of each sub-industry will have to be determined. Feasibility studies must be carried out to identify the infrastructure, technology, human resources and investment requirements of an agro-industrial complex. Production of viable industries - snacks from root crops e.g. sweet potato chips, yam flakes, cassava bread, breadfruit chips, sausages, local juice concentrates ,yoghourts, butter, cheese and livestock feed. The quality of these products must be high to be able to satisfy consumer demand and for an export market within CARICOM and further afield. The agro-industrial complex will generate new jobs in food processing, food labelling, food quality control, packaging storage and transport. The food import bill will be reduced considerably as consumers begin to replace the cereals, grains and processed foods from abroad with locally produced products.

The level of reduction of the food import bill cannot be predicted at this stage as this will depend on the rate of change of consumption patterns and the rate of development of the agro-industrial complex.

The development of an agro-industrial complex in Barbados will require the cooperation of the private sector for investment in the processing of the products of the primary sector. Legislation to protect the products of the complex from cheap imports will be necessary. Quality and reliability will now be more critical in the food production sector and commercial farms, greenhouse and shade-house technologies and farmer cooperatives will be necessary. In anticipation of this agro-industrial thrust studies on the production and processing of foods to replace wheat, rice, soyabean,

imported corn and white potatoes should be a priority of our planning unit, our university and our research centres.

We recognize that more scientific studies are necessary to arrive at an understanding of the supply and demand that may influence achievement of these goals. The University of the West Indies and other national and regional institutions can provide the scientific inputs to make these plans a reality through the work of the proposed Centre for Food Security and Entrepreneurship.

This centre could be the catalyst to promote small business enterprises based on adding value to products of primary agriculture. It is recognized that small businesses can be “an engine of economic growth” and a source of employment opportunities.

This plan has been complimented by a proposal for a Fruit and Vegetable Industry prepared by Ms. Keeley Holder and a policy for the development of the fisheries subsector prepared by Mr. Stephen Willoughby. These documents are attached. A draft proposal for the development of the cassava industry prepared by Mr. Leslie Brereton and a draft proposal on the challenges in the development of a Black Belly Sheep Industry by Mr. Wayne Smith require additional inputs and will be submitted later.

The Planning Unit or appropriate body should prepare project profiles and business plans for each crop in the proposal. These profiles must include;

- i. Cost of production per acre, current yields, potential yields, strategies for moving from current to potential yields, research and technology needs, investment needs for production and agro-processing and other appropriate information.

16.0 Strategies for Implementation of a Food and Nutrition Plan

Successful implementation of the food plan will depend on several factors. The 7 most important will be:

1. Institutional Reform
2. Appropriate Government Policies
- 3 Establishment of Farmers Training Centre and Model Farm
4. Development of appropriate Human Resources
5. Promotion of Consumer Education
- 6 The incorporation of New Technology into Production and Marketing
7. Establishment of a Marketing Facility

Institutional Reform

Reform of the Institutional Framework for the delivery of the services in support of a modern Food and Agriculture sector will be necessary in order to implement the Food Plan. Coordination of policies, actions and activities that impact the food sector is critically important for the successful implementation of a National Food Plan. The plan cannot be implemented with one Ministry having the responsibility for importing food supplies and another having the responsibility for food production with limited communication between Ministries. The first step in this process will be to reform the current Ministry of Agriculture and the establishment of A Ministry of Food and Nutrition Security with responsibility for feeding the Nation. This new Ministry should have the following responsibilities.

1. Determine the food and nutritional needs of Barbados
2. Coordinate the production and importation of food for the nation.
3. Implement the national food plan and formulate, implement and coordinate Government's Policies in the food and agro-food Sector.
4. Implement appropriate agricultural health and food safety standards and legislation.
5. Provide policy advice to Government on the impact of macroeconomic policies on the food sector.
6. Collaborate and coordinate with private sector entities, farmers organizations and other organizations in the implementation of National food policies.
7. Coordinate, implement and facilitate the implementation of mandates/agreements and obligations that result from the Government relationship with regional and international organizations.
8. Coordinate relief efforts for food supplies during an emergency or national disaster including development of a national food bank and a food reserve.
9. Develop and train the human resources needed to implement a national food plan.
10. Monitor present and predict future food needs of the country and develop appropriate strategies to satisfy those needs.
11. Promoting increases in productivity

The Ministry of Food and Nutrition Security should focus on Food supply, Food demand, Food safety, Food Quality, Nutrition and Future Food demand and must promote increases in productivity by:

1. Expanding development and use of modernizing technology.
2. Boosting access to quality seeds, fertilizer, irrigation, credit and mechanization.
3. Linking small producers to markets.
4. Strengthening agricultural value chains, including organizing farmers, establishing warehouse receipt systems, increasing access to loans.
5. Strengthening national and regional trade and transport corridors; and
6. Encouraging private investment in agriculture.
7. Building partnerships with the private sector, farmers and strengthening Farmers Organizations.
8. Be the voice for farmers and consumers in the search for equitable food prices.

In each strategic area of the plan, the Ministry must promote the functional inputs in the following areas:

- Infrastructure
- Marketing

- Finance
- Training
- Technology

The establishment of goals in each area and the targets to be achieved will constitute the strategic plan for each subsector. In order to clearly identify the goals to be achieved, meetings with the entire value chain for each area should be held. Farmers and producers should be identified and a business approach developed. This approach will have the following components:

- Attainable goals
- Implementation strategy
- Monitoring and Evaluation System
- Reporting mechanism to the Minister

The Ministry must designate a leader for each strategic area with responsibility for results. The reform of the Ministry of Agriculture must ensure that the new model promotes cooperation and closer ties between the Ministry and Ministries of Health and Tourism, with farmers and with the private sector. This should be considered within the framework of a strong National Agricultural Commission that is structured to assist in promoting these linkages and an Agrotourism Council.

Dimensions of the new Ministry of Food and Nutrition Security

A modern Ministry of Food and Nutrition Security should have the capacity to manage the following dimensions;

- i. Identify global economic trends and their potential impact on food and agriculture in Barbados.
- ii. Provide research and technical advisory services to the food and agriculture sector.

- ii. Provide for the management and implementation of international agreements
- iii. Facilitate investments in the sector
- iv. Facilitate inter-ministerial cooperation
- v. Provide the nation with a long term vision for the future of food and agriculture in the country.

A new relationship should be forged with UWI Cave Hill (in the development and implementation of a Model Farm in Food Security and Entrepreneurship) and with the new Faculty of Food and Agriculture of the University of the West Indies in Trinidad and Tobago. The research work of the Ministry should be coordinated with the University and with the Caribbean Agricultural Research and Development Institute (CARDI). Subject matter specialists should lead the new areas of focus and these should be persons knowledgeable in the particular area of work.

The Ministry needs to be reformed and the development of a program of continuous training for farmers, entrepreneurs and extension officers in the new technologies of production will be important for success of the plan. Graeme Hall should become the site of a wholesale market for farmers.

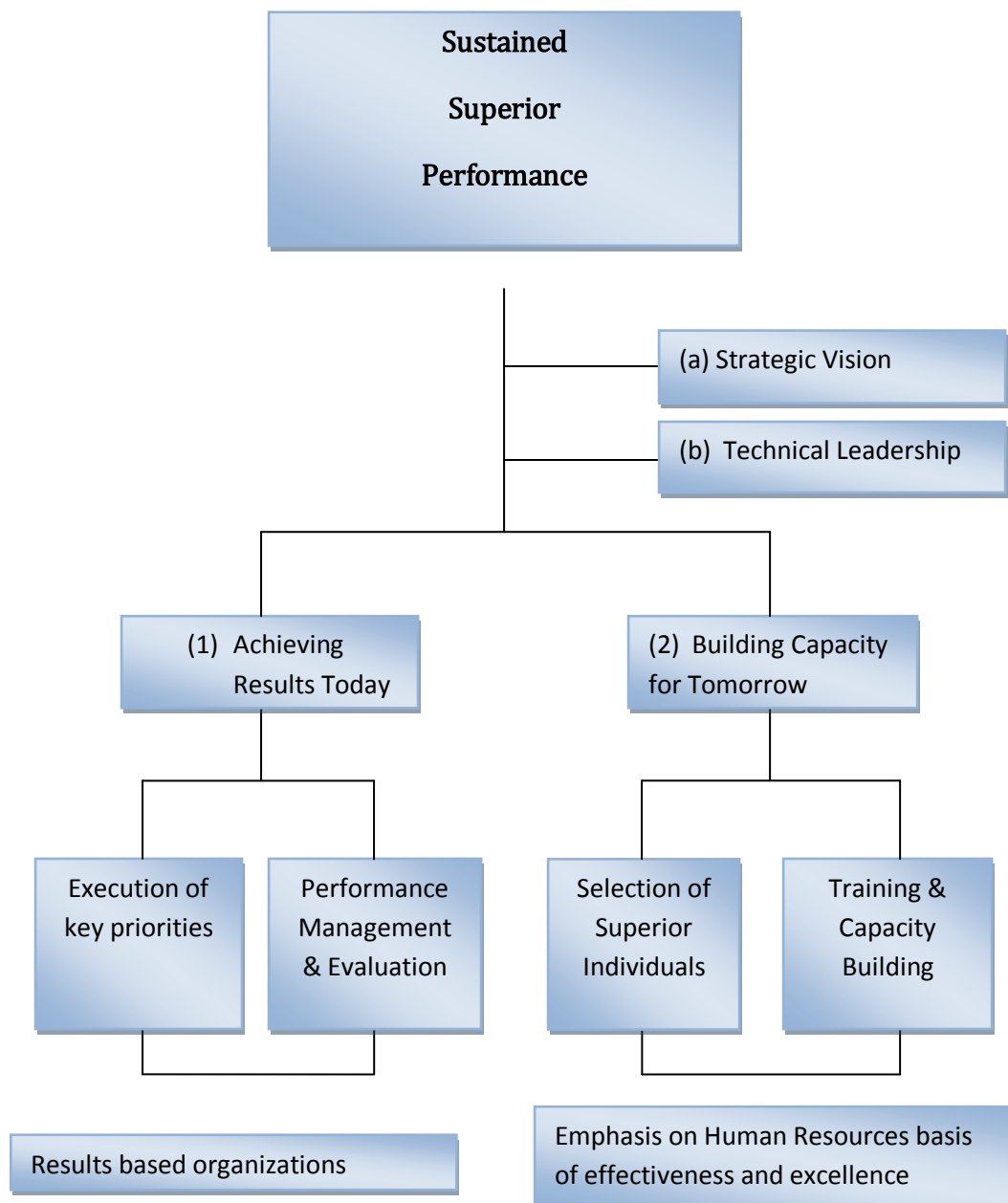
A Ministry of Food and Nutrition Security will be the national entity that must provide the strategic vision for the sector and the technical leadership for achieving results today and building capacity for tomorrow. In this regard, the Ministry must ensure execution of key priorities of Government policy and at the same time promote training and capacity building for now and the future. See figure (1).

Other Non-food Agricultural Industries such as Sugar, Cotton and Floriculture could be managed by public sector/private sector agencies or boards with specific mandates for these commodities, either reporting to the

Minister of Food and Nutrition Security or located within a Ministry of Industry.

Figure (1)

Role of a Ministry of Food and Nutrition Security



Some issues for consideration by a Ministry of Food and Nutrition Security Agriculture in the 21st Century

Equity Issues	Environment al Issues	Health Issues	Trade Issues	Energy Issues	Economic Issues
Poverty Reduction	Climate Change	Food Safety	Subsidies	Agroenergy and the balance with Food Production	Food Security + consumption + nutrition Contribution of Sector to Economic Growth (multisectorial dimension) Tourism, Health Energy, Nutrition
Small Farmers	Natural Disasters	Diseases of international dimension	WTO		
Equity Concerns	Water for Agriculture	Agricultural Health Infrastructure	Doha development agenda Regulations for Exports and Imports		

The Change Process to create a Ministry of Food and Nutrition Security

The change process in institutions is complex and normally involves 7 steps.

- i. Establishing a Sense of Urgency
- ii. Creating the Guiding Coalition
- iii. Developing a Vision and Strategy
- iv. Empowering Employees for Broad-Based Action
- v. Generating Short-Term Wins
- vi. Consolidating Gains and Producing More Change
- vi. Anchoring New Approaches in the Culture

The development of vision and strategy are critical factors in the transformation of any institution. It is envisaged that this proposal will form the basis of the vision for the sector and the catalyst for change.

17.0 The Policy Agenda

Land Use Policy

Barbados has a total landmass of 166 square miles (106 000 acres), a population of over 280,000 people, and very limited natural resources. As one of the smaller islands along the Caribbean chain, Barbados is an import dependent country which has been focusing mainly on the tourism sector for the generation of its foreign income. The effect of climate change on the level of food production across the world and in turn the availability of food is a cause for great concern. It is therefore crucial for Barbados to increase its level of self-sufficiency in food

production by ensuring the proper utilization of its limited, yet viable natural resource of land.

The main challenge in the management of our land resources is competition from housing and tourism development, which has contributed to a reduction in the arable land available for agriculture. This has posed a potential threat to the country's food security.

In the development of a sustainable agriculture legal-regulatory framework, every effort should be made to identify a viable compromise between competing economic development alternatives for the limited land resources. However, in doing so, it must be ensured that the requirements of the agricultural sector are not sacrificed.

Within the current land use planning and control framework there is no emphasis on agriculture's importance in comparison with other land uses. This view of agriculture is believed to correspond with Barbados' overall push towards being a services economy. For that reason, there is a great need for a public education programme to emphasize the importance of sustainable agriculture to the economic development of Barbados in order to change the perception of agriculture.

The goal of the Land Use Policy is to protect agricultural lands and ensure that a certain significant mass of land is preserved for the sustainable development of the agricultural sector, with a view to assuring the population of Barbados, both now and in the future, an adequate level of self-sufficiency in food production.

Recommendations

- i. An Agriculture Protection Act should be drafted and incorporated into the Town and Country Planning Act accordingly amended.

- ii. The Town Planning Department should be encouraged to take into account the Government of Barbados' stated policy of conserving agricultural land for agricultural purposes.
- iii. The Town and Country Planning Act should be amended to give effect to Government's policy that any application for a change of use of land from agriculture, will require a two-thirds (2/3) majority of both Houses of Parliament.
- iv. Applications for a change of use of agricultural land measuring ten (10) hectares or more should be referred to Parliament for approval.
- v. Approximately 45 000 acres (18 000 hectares) of land, but no less than 30, 000 acres, will be reserved for agricultural use.
- vi. There will be strict adherence to Land Use Policy with active consultations being held between the Chief Town Planner and the Ministry of Agriculture when considering planning applications for the change of use of agricultural land.
- vii. Land classified as Category I must not be subdivided.
- viii. Every effort should be made to ensure that development is not only directed to lower land type classes, but also to non-agricultural land, if this can be used, to minimise the loss of productive or potentially productive agricultural land.
- ix. Land designated as agricultural within the urban corridor will remain in agricultural use, provided this does not impact on demand for the release to development of other agricultural land outside the urban corridor.

- x. Subdivision of agricultural land should be strictly controlled to avoid speculation and loss of agricultural activity.
- xi. Subdivision of land for agricultural purposes will be:
 - Limited to those areas of small holder concentration suggested for possible development by the Chief Town Planner (CTP) and Chief Agricultural Officer (CAO); or
 - Limited to a minimum of 5 hectares in an area with irrigation resources available and 10 hectares elsewhere; or
 - Regarded as generally permissible when sub-division of a plantation is into substantially larger plots, or
 - Permissible as an addition to existing agricultural holding, where in the opinion of the Minister of Agriculture, it will assist in the creation or maintenance of a viable agricultural holding; or
 - Permissible if it is reasonably required to support permission for change of use from a plantation.
- xii. The policy should seek to effect tax reform and other incentives for agricultural land to discourage idle arable land, possibly through the levying of a tax on the conversion to non-agricultural uses of important agricultural land in areas designated for agricultural land preservation. Part of the

proceeds from this tax will be distributed to those persons who remain in active production within agriculture.

- xiii. Arable lands that are idle should be placed in a land bank and commercially competitive long-term leases (10 to 20 years) should be facilitated through the BADMC.
- xiv. Prime agricultural lands should be protected for long-term agricultural use and a funding scheme should be developed to enable farmers to maintain their farms in agricultural production. The development of an appropriate funding mechanism to facilitate this should be researched.
- xv. The National Agricultural Commission (NAC) should act as an advisory committee to provide advice to the Minister of Agriculture on agricultural land use and farm related issues.
- xvi. The creation of new lots/parcels within agricultural areas by sub-division of existing lots/parcels should be discouraged, unless recommended by the National Agricultural Commission.
- xvii. The severance of a farm property into two or more parcels should only be permitted if the applicant can demonstrate that each of the resulting properties will be sustainable as an independent farm operation.
- xviii. The only permitted uses on prime agricultural lands should be for agricultural purposes; secondary uses compatible with the surrounding agricultural operations; and home-based businesses located within the existing dwelling.

- xix. Agricultural uses shall include, but are not limited to, general farming, livestock operations, including livestock breeding, cash crop farming, specialty cropping, forestry, market gardening, aquaculture, orchards, apiaries, greenhouses, horticulture, nurseries and agricultural research.
- xx. Other permitted uses should include: secondary farm operations, home occupations and bed and breakfast/farm vacation operations that are complimentary to and conducted on farm properties; commercial and industrial activities that are primarily and directly related to agriculture and necessary in proximity to farming operations.
- xxi. Programmes should be developed aimed at forging a greater awareness among the farming community with respect to the need to operate sustainable and viable agricultural production systems.
- xxii. Farming practices that seek to reduce the volume of agricultural wastes, through, for example, recycling, should be encouraged.
- xxiii. Degradation control and land rehabilitation should be an integral part of all farming systems within the Scotland District.
- xxiv. While it is recognized that the existing urban corridor will continue to grow to accommodate an ever increasing population, nevertheless, urban expansion should only be allowed onto abutting agricultural lands after pursuing the

redevelopment of underused, vacant areas within the urban boundaries.

xxv. Urban expansion onto abutting agricultural land should be focused on the lower class agricultural land where presently adjacent to the existing urban boundaries.

xxvi. Provision must be made for the appropriate protection of agricultural land within irrigation districts.

Land Tenure in Barbados and the need for Food Production Zones

According to the Physical Development Plan (Amended 2003):

- The conversion of agricultural lands for tourism purposes, specifically golf course, epitomizes the conflict between competing economic development alternatives. Land continues to be alienated from agriculture at the rate of approximately 1,000 acres annually, which is a considerably faster rate than that estimated in the 1986 Physical Development Plan (200 acres annually). If this trend continues, within a generation large scale agriculture will not be possible in Barbados.
- The Physical Development Plan Amended 2003, policies, seek to ensure sufficient land use levels to meet Barbados' export market and current levels of domestic production, translating into the need for approximately 18,000 ha (45,000 acres) in agricultural use, of which 10,000 ha (25,000 acres) would be under cultivation for sugar and 1600 hectares (4000 acres) for cotton. Agriculture presently occupies 53275 acres of which it is estimated that approximately 10,000, is in fallow”.

In a country with total land area of 106,000 acres (166 square miles) the availability of land for all the development needs will always be an important

issue. In addition, Barbados is considered one of the most densely populated countries in the world.

The statement of the Plan is of great concern because the removal of agricultural land at 1000 acres per year implies that in 53 years there will be no agricultural land in Barbados, if this rate of removal continues the conservation of agricultural lands should be a national priority.

POLICY ON LAND TENURE

No plan for increase food production in Barbados, can be successfully implemented without a clear policy on land and land tenure. According to Beckles (1994) two major land tenure systems exists in Barbados – the plantation system and the small holder system in which 1% of the farming units controls 86% of the land and the other 99% of farming units are left with 14% of the land.

Beckles makes the point that “any effort at land reform in Barbados should seek to:

1. Create farmers who own their land and are therefore able to control their destiny.
2. Prevent speculation in the land market.
3. Control and/or prevent foreign ownership.
4. Maintain a land price structure which is both within the reaches of the small farmer and relate to the profitability of farming.

The price of agricultural land must be maintained at a price that makes it profitable for the small farmers to engage in farming”.

Current land prices in Barbados are not only prohibitive for the acquisition of house spots by the average Barbadian but can also limit agricultural development.

According to Alleyne (1994) an ideal tenure system should “operate to make available to competent farmers good arable land in the right farm sizes under conditions that are conducive to long term planning”.

PLANTATIONS

The number of plantations in the country has been decreasing, the land area dedicated to plantations has been decreasing but the average size of plantation has been increasing. These indicate that there has been an amalgamation of estates.

According to Beckles (1994)

Between 1860 and 1976 the area of land controlled by the plantation decreased from 89,264 acres to 58,000 acres or by 35% while the average size of units increased from 195 acres per unit in 1860 to 367 in 1966, but subsequently declined to 290 acres by 1976. In addition, the number of plantations declined while on the other hand no change in the plantations’ share of total agricultural land occurred. This trend has been the result of amalgamation of estates in the early stage and sub-division in the latter.

Beckles presents further evidence to show that while large estates increased their share of plantation acreage, medium and small plantations decreased in acreage.

Estimates in 1994, showed that 2500 small farmers existed and occupied 12 000 acres of land.

IDLE LANDS

According to Beckles (1994) there has been an upsurge in the acreage of idle land in the country due to one or a combination of the following factors:

- Small-holders becoming unable or unwilling to work and the fact that sugar-cane production was gradually becoming unprofitable on such units;
- Run-down plantations;
- The unavailability of labour to work for both small farmers and plantations; and
- The sale of two and four acre lots to “white collar” workers.

The 1971 census noted that 1585 acres of land were lying idle. There is a view that this area has increased considerably in recent years.

This information needs to be updated to determine whether idle land is the mechanism for the conversion of agricultural holdings into land for real estate and to evaluate whether the recent policy of Government to bring idle land into production is working. The under-utilization of agricultural land must therefore be of national concern, given the report of the Physical Development Plan that land is moving out of agricultural production at the rate of 1000 acres per year.

It is therefore incumbent on the country to seek to preserve agricultural lands for the future food security of the nation. The current food plan proposal suggests the need for approximately 1000 acres of agricultural land in its initial phase.

There are three possible sources of this land:

- i. Acquire the same from land currently under the management of the BAMC.
- ii. Expand the current Spring Hall Land Lease Project.
- iii. Designate food production zones in the fertile areas of Barbados e.g on the soils of the St. Philip Plain, the St. George Valley, the St. John Valley or the Grey Brown Association Soils of St. Lucy.

THE ESTABLISHMENT OF FOOD PRODUCTION ZONES

Government may wish to evaluate the possibility of the establishment of 4 or 5 food production zones in the country. These areas would be designated based on the availability of good agricultural land, access to irrigation water and the provision of the support services necessary for the efficient production of food crops.

The objective of these food production zones would be to:

- i. To mobilize a group of modern farmers who are committed to agriculture and food production.
- ii. Achieve a measure of food security by reserving lands for food production now and in the future.
- iii. Act as the nuclei of agricultural activity to stimulate agricultural production in the surrounding districts.

In order for these production zones to be successful, a number of institutional changes will be needed.

- i. Each food production zone should have a Food Production Manager who is a member of staff of the

Ministry, and who lives and works in the food production zone.

- ii. The Manager will have the responsibility to coordinating all Government assistance to the zone and to seek solutions to the problems of the farmers. The Manager will cooperate with the extension service and the research division to provide the appropriate technical inputs into the food production operations.
- iii. The Manager will also cooperate with the Marketing Facility to ensure the production and marketing of farmers produce in the quest for quality and reliability.

Each food production zone would be driven by a single project which addresses seven (7) dimensions.

- i. A research and development element that defines the crops to grow, the most appropriate technologies and production systems.
- ii. An agricultural extension element that provides the technical and market information necessary for high productivity.
- iii. A public information system that educates the community on the project and on the benefits of the consumption of local foods,
- iv. A marketing component that coordinates the marketing of the products of the production zone.
- v. A financial component that can direct farmers to sources of funding and provide business management, record keeping and financial education for farmers.
- vi. An organizational component that develops and strengthens farmers' organizations focused on the food production zone.

- vii. A marketing component that links strategically to the proposed marketing facility.

Government should carry out an evaluation of the Spring Hall Land Lease Project and use the information obtained to inform the development of the food production zones.

Policy on Food Imports

The successful implementation of these projects will depend on the implementation of effective information and monitoring system to determine supply and demand and the restriction of imports when local supplies are available.

In many developing countries today, the adherence to WTO regulations is undermining the local agricultural sector. There is a view that cheap imports and cheap food is good for the economy and will stimulate economic activity and alleviate poverty. This is not totally correct. What cheap imports do is undermine local production, destroy potentially competitive industries and exports our wealth to the developed world.

All over the world, countries are waking up and realizing that trade agreements in the agricultural sector are not being respected by some of the same countries that were the architects of the WTO. There is no country in the world that is pursuing an agricultural development model that does not use policy and legislation to support its farmers. Farmers in the USA, Canada, Japan and the European Union are still being subsidized by the state, in spite of repeated efforts to reduce agricultural subsidies. It will be necessary to use policy and legislation to protect subsectors with potential for replacing imported products.

It is important to recognize that the Green Box Measures such as Research and Development, Pest and Disease Control Measures, Inspection Services, Marketing and Promotion, Infrastructural Development and Domestic Food Aid are legitimate measures to support the agricultural sector. Development

measures include Investment Subsidies, Agricultural Input Subsidies and De minimis provisions which gives developing countries the right to provide subsidies to their agricultural sector of up to 10% of the annual value of total agricultural production

No policy, plan or strategy for modernization of the agricultural sector in Barbados can be successfully implemented without a clear policy on food imports. The policy on food imports should have the following elements.

- (a) The Ministry of Agriculture or a State Agency must have sole legislative authority to approve the Importation of food and monitoring and planning system must be in place to determine how much and the frequency of imports of the commodities based on their availability in the local market.
An effective market information system will be vital to the success of these efforts.
- (b) A policy on grades and standards for local produce must be established, so as to ensure that locally produced food meets the expectations of consumers in quality and price.
- (c) The policy on food importation must be flexible to allow for imports in times of natural disaster or severe dislocation in the local supply due to unfavorable weather such as hurricanes or droughts.
- (d) The foreign exchange savings realised through by the promotion of the consumption of local produce should be assessed. A list of currently successful farmers should be drawn up and these should be classified on the basis of their capacity to produce the selected commodities.

- (e) Those lacking appropriate resources including land should be provided with land on lease-term arrangements.

Policy on Agricultural Health and Food Safety

In recent years many countries have seen increased incidences of food-borne illnesses outbreaks and the incursion of new pests and diseases. The latter in many instances is due to the increase in global trade. As a result, countries have sought to modernise their agricultural health and food control systems. Their control has focused not only on food safety and quality but also on the application of sanitary and phytosanitary measures according to their rights as signatories to the World Trade Organisation's (WTO) Agreement on the Application of Sanitary and Phytosanitary (SPS) Measures. The Sanitary and Phytosanitary measures under the WTO Agreement are defined as any measures applied to:

- Protect human or animal life from risks arising from additives, contaminants, toxins or disease-causing organisms in their food or beverages;
- Protect human life from plant or animal-carried diseases (known as “zoonoses”);
- Protect animal or plant life from pests, diseases, or disease-causing organisms; and
- Prevent or limit other damage to a country from the entry, establishment or spread of pests.

Food safety and quality systems and sanitary and phytosanitary measures have become embedded in many national on-farm food safety policies, practices, and programmes.

A modernised Agricultural Health and Food Control System (AHFCS) is a farm to fork approach. It seeks to ensure the safety and quality of food from the farm (production) to the consumer's table (consumption); hence the use of the phrase “farm to fork” or “boat to throat”. An ideal system has the infrastructure to trace

the origins and destination of whole and processed food and their inputs. Traceability here refers to the implementation of measures to ensure that, at any stage of the food chain, the path of a food item and the relevant information about it are known.

An AHFCS should include an appropriate legislative (Acts and Regulations) framework which sets out certain mandatory requirements as well as effective enforcement procedures; preventative approaches such as Hazard Analysis Critical Control Point (HACCP), Good Agricultural Practices, Good Hygiene Practices; surveillance and monitoring programmes at all aspects of the food chain, from farm to fork or boat to throat; inspection services as well as laboratory services.

In developing their AHFCS Governments must be cognizant of the WTO's Agreement on the application of SPS Measures since it requires that Governments harmonise or base their national requirements on the international standards, guidelines and recommendations developed by international organizations such as the:

- Joint FAO/WHO Codex Alimentarius Commission (Codex) for food safety;
- World Organisation for Animal Health (previously known as the Office International des Epizooties - OIE) for animal health; and
- International Plant Protection Convention (IPPC), based in Food Agriculture Organization (FAO) for plant health.

These standards, guidelines and recommendation are the ones which are also used in the settlement of trade disputes.

Why are AHFCS of importance to farmers?

Many of the recent food borne illnesses outbreaks have been associated with the consumption of fresh produce. In addition, the incursions of pests and diseases have generally been the result of the movement in trade of infected plants and animals.

By employing good agricultural practices on their farms, farmers will enhance the chances of their produce/products entering both local and export markets since the onus these days is for the fresh-cut produce processor and the fresh meat processor to be aware of the conditions under which their fresh produce is grown, harvested/slaughtered, packed and transported.

Farmers must be cognisant of the fact that generally anything that comes into contact with fresh produce has the potential to contaminate it, and that unsanitary on-farm practices can lead to infected plants and animals. Once fresh produce has been contaminated, removing or killing the microbial pathogens is very difficult. Prevention of microbial contamination at all steps of the farm to table continuum is preferable to treatment to eliminate after it has occurred. In addition, the indiscriminate use of agricultural chemicals including the non-adherence to withdrawal periods can result in the presence of unacceptable levels of residues.

Many state Governments in the USA and in Egypt, France, the U.K. and Denmark have begun to impose taxes on fatty and sugar-rich foods in an effort to dissuade consumers from purchasing junk foods in order to reduce the obesity of their populations, and a study by WHO found that these taxes can influence consumption particularly for young people.

We also need to ensure that the food we import is safe. In the USA there are 76 million cases of food borne illnesses every year. We found no data on the number of cases of food borne illnesses that are due to imported food in Barbados but we must incorporate into our process of modernization, facilities for agricultural health and food safety and the monitoring of imported food. We should not continue to import processed foods that are full of trans fats, sugars

and salt into Barbados where the population is already suffering from high levels of chronic non-communicable diseases such as diabetes.

As a food import dependant country, Barbados is susceptible to being a dumping ground for produce and foods rejected by the more developed countries, for example;

- Peanuts that may be rejected due to small size and high microbial presence;
- High pesticide residual levels;
- Genetically modified (GM) foods;
- Radio-active contaminated food.

The objective of a policy on food safety is to protect consumer health and interests while facilitating the production and distribution chain “from farm to fork”. The functions of a food policy are to:

- Ensure, so far as is reasonably practicable, safety and absence of risks to health in connection with the production, storage, transport, handling and use of food, facilities and equipment; and
- Identify and assess the risks associated with all food related activities with the aim of eliminating or controlling the risks, so far as is reasonably practicable.

This involves the establishment, control and policing of standards for food and food product hygiene, animal health and welfare, plant health, and preventing the risk of contamination from hazardous substances. It concerned also with labeling of food products. This applies both domestic produce and products and those imported from CSME and third countries.

Activities include food laws and regulations, food-borne disease surveillance and epidemiology, public health microbiology and food microbiology, food production and processing, food sanitation and hygiene and inspection of food processing facilities.

These activities involve several state agencies and require a high level of coordination, strong information management systems and constant review and adjustments to remain abreast of scientific advancements. Usually a Food Safety Working Group is formed to facilitate this coordination and a Food Safety Oversight Review Committee should be convened every five years to:

- Review of the priorities of each agency involved in food safety and how effectively it is implementing actions to address these objectives;
- Review scientific advancements and the legal and regulatory frameworks to ensure Barbados remains on the cutting edge.
- Decide on new projects for funding and implementation.

The recommendations for action include:

- I. Regulation, control and policing are three (3) functions that should be located in separate agencies. Review and improve where necessary the institutional arrangements for food safety;
- II. Strengthen the institutions to better deliver programmes;
- III. Review and publish protocols;
- IV. Review and improve the curriculum and delivery of food safety programmes offered at tertiary institutions;
- V. Strengthen Laboratory Infrastructure and
- VI. Promote training and consumer education in Food safety
- VII. Increase the bounty on Barbados Green Monkey tails to make it attractive to licensed hunters.

Policy on Praedial Larceny

Praedial larceny is one of the greatest limiting factors to the implementation of this Food Plan. The following are recommended:

- a. Review and strengthen existing legislation.
- b. Establish a technology-based Praedial Larceny

- c. Coordination Unit within the Ministry of Food and Nutrition Security. The Unit would be staffed by a middle-ranked Police Officer seconded to the Ministry
- d. Establish a database of farmers.
- e. Maintain database of incidents.
- f. Liaise with farmers to secure premises.
- g. Police traders for traceability.
- h. Attend and document case hearings.
- i. Respond to farmers' suggestions and queries.
- j. Establish traceability system to track movement of domestic agriculture produce.
- k. Establish a long-term research programme into the cost of praedial larceny. This can be undertaken in collaboration with UWI towards a graduate degree.
- l. Establish an incentive scheme for security systems such as invisible and tamper-proof electronic laser fencing.
- m. Investigate methods to track the security/integrity of livestock, for example, the use of subcutaneous electronic chips.
- n. Investigate the feasibility of Farm Area Patrols in high density farm districts, for example, the Spring Hall Land Lease and the Gibbons Bogg Smallholdings.
- n. Investigate the effectiveness of interventions in other countries with view to the implementation, for example, the Agricultural Produce Receipt Book Programme of Jamaica.
- o. Implement frequent programmes to sensitize the Police and Judiciary about praedial larceny and to devise responses and solutions to sensitize farmers about protection and security.
- p. Investigate the cost, terms and conditions of farm and produce insurance.
- g. Increase the bounty on Barbados Green Monkey tails to make it attractive to licensed hunters.

A National Policy on Food and Nutrition

A recent report indicates that the cost of health care in Barbados has moved from \$187 million to \$486 million in 15 years, a 150% increase. These costs will continue to increase unless there is more emphasis on wellness and the control of chronic non-communicable diseases.

An important part of a wellness programme is better nutrition, the consumption of healthy wholesome food. An important part of the production. The recent outbreak of E-Coli bacteria which contaminated food in Europe is significant. A highly infectious strain, it resulted in the death of approximately seventeen persons. More importantly for us, it is a reminder of the serious consequences which could result from our continued dependency on imported food. A national policy on Food and Nutrition is a necessity for Barbados; it will fuel the new thrust in local food production and contribute to improving nutrition and health.

It must be clear to all that the epidemic of chronic non-communicable diseases must be confronted. One way of reducing their impact on the society is to improve the nutritional content of our foods with an emphasis on wellness. Producing healthy local food and promoting its consumption can therefore play a key role in the control of these diseases. As has been stated recently by Dr. Curtis McIntosh, former head of the Caribbean Food and Nutrition Institute, "a well nourished population has a greater potential for energy, output and productivity, learning capacity, longevity and socially acceptable behavior." The elements of a National Policy on Food and Nutrition can be obtained from the recent policy document on a Caribbean Food and Nutrition Strategy prepared by the CARICOM Secretariat.

For too long, the health sector and the agricultural sector have proceeded in their separate ways without taking serious consideration of the nexus between food, nutrition and health. A national nutrition strategy would be vital to the success of a National Food Plan.

Water Policies

Barbados has been classified as a water scarce country by the United Nations as the water supply is threatened by increasing population levels, the high standard of living and climate change. The current Green Economy scoping study notes that “with some exceptions such as sugar cane, most crops in Barbados require some form of irrigation. In an effort to conserve water, efforts have focused on promoting drip irrigation. This has been successful. However, this does not remove the practice of over irrigation. There is certainly the case that there is a need to match water application to the growing stage and water needs of the crops. The Ministry of Agriculture has identified this as an area that needs attention along with access to dependable supplies of water. Also, more needs to be done to develop rainwater capture systems that specifically support agriculture. Although there is a need for some experimentation and research, particularly to match localised growing and crop conditions to water needs, most of the techniques and technology required to support irrigated agriculture and improve its water use efficiency are relatively well-known and freely available. The stumbling block is the ability to make a sound economic case to farmers and to disseminate the knowledge and information to the sector as well as to ensure that the appropriate support services are available”.

One of the major deficiencies in the agricultural sector is a lack of data on actual water usage, including levels of abstraction and delivery. Although there are some 112 licensed abstraction wells in Barbados, there is no up to date information on their status, characteristics or usage, no requirement for record keeping, no monitoring or quantity or quality

Policy on Exports

The export market for agricultural products has traditionally been developed for sugar. In recent times there has been some success with the export of some of the products of non-sugar agriculture. We recognize the importance of an export

sector to contribute to the small domestic market to level the production surpluses and shortages that have affected the sector. Recently, the imposition of a number of non tariff barriers have had a negative impact on export markets. These include plant quarantine regulations, pesticide residue requirements food safety legislation and packaging and labelling requirements. In spite of these challenges, there is increasing interest in Caribbean products in international markets. We should move to capture these markets especially those for diaspora markets in North America and Europe. The products being requested include root crops, organic vegetables and spices.

The regional market also continues to be important, not only CARICOM but also the CARIFORUM countries, which would include the Dominican Republic, a market of about 20million people. In addition, recent agreements with Cuba, Costa Rica and others have increased our market size. Furthermore, Barbados must exploit the transient population of some 500,000 tourists per year by preparing special culinary events for them based on local agricultural produce.

In any effort to promote an export market, competitiveness, standards and quality become important issues and increases in productivity become critically important. In these circumstances, training, the development of standards and the application of technology become very important to export competitiveness. The proposed Marketing Facility will be key in the coordination and organization of production, packaging and processing of products for export. The Facility will assist in reducing transaction costs which are normally high in the Caribbean owing mainly to lack of institutional infrastructure for marketing of agricultural products both locally and internationally.

18.0 A Farmers Training Centre and Model Farm

There is need for a Farmers Training Centre and a Model Farm. Capacity building by training farmers, producers, extension officers and other

professionals will be necessary in the implementation of this plan. Accrued benefits will include:

- a. The transfer of appropriate technology to farmers at the field level. This could be done through the proposed Centre for Food Security and Entrepreneurship at Cave Hill.
- b. The continuous delivery of capacity building training programmes in such areas as green house technology, organic farming, pest and disease control, food safety etc.
- c. Development of a training course in management and leadership for farmers. This course could be developed in cooperation with the University at Cave Hill.
- d. Identification of persons for university level training in key areas for the future e.g. biotechnology, information technology for agriculture, agro-tourism among others.

The idea of a model farm is a place where we can demonstrate a series of best practices and the latest in modern agricultural technology that is suitable to our conditions. The farm would demonstrate the production of healthy, wholesome food and would be based on the production of fruits, vegetables, root crops and small ruminants. The farm would also serve as place for training the next generation of farmers and would be managed by a capable farm manager and should seek to be self financing in the medium term.

The farm would be used as a teaching facility for students, extension officers, researchers and farmers. The farm will demonstrate precision farming, permaculture, use of solar technology in agriculture and such other technologies as are relevant to local agriculture. This should be developed in cooperation with the University of the West Indies.

Development of appropriate Human Resources

Capacity building and the need for a New Educational Curriculum in Schools and Universities

Educational institutions in the region have been slow in adjusting their curricula to new circumstances. These have included:-

- a) changing employment opportunities in agriculture;
- b) rapid scientific progress and technical change;
- c) increased awareness of environmental issues;
- d) increased awareness of gender issues and the role of women in agriculture;
- e) the need to include population issues in agricultural education; and
- f) the need for an inter-disciplinary approach to agricultural education, research and extension and
- g) emphasis on such new areas as Trade Negotiations, Biotechnology, Organic Agriculture, Agro-Energy and Agro-Tourism.

We are still teaching agriculture as a primary sector in our schools. We need to teach the value chain and the importance of food and nutrition security for development of our countries. The recent introduction of training in Agriculture at Harrison College is a step in the right direction and should be emulated by all schools.

There is a need to revisit the approach to agricultural education as a whole. Current research suggests that what we need today in a first-degree level agricultural graduate is greater understanding of business practices, the ability to communicate with diverse rural groups and to support these groups in collective problem solving, and the ability to assist small family farms advance from subsistence agriculture to commercial production. This requires a curriculum that uses practical examples to emphasize the holistic nature of the agricultural production process throughout the entire food chain and exposes students to real life situations that are relevant to modernize the Food and Agriculture Sector.

Agricultural education must respond to the market's demand for graduates and must take national policies and strategies into account. The new curriculum must assist in unlocking the talent and creativity of the youth of our nations so that they can contribute to finding innovative solutions to the complex problems facing our world.

It must also provide an environment for collaborative efforts so the new world of cooperation we want to build is inculcated in the youth in the early stages of their development. Students must also be taught that leadership of others begins with leadership of self. The basic principles of integrity, impartiality, professionalism, flexibility, loyalty, prudence, responsibility and respect for others as human beings must be addressed in the new curriculum. Leadership of self precedes leadership of others.

We must develop a strategy for strengthening education and training in food and agriculture. It has four components:

- (i) To contribute to the modernization of higher and vocational agricultural education centres, agricultural training systems and institutions in order to improve the relevance and quality of their products.
- ii. To support training programs for the agribusiness community and for the staff of public and private

agricultural organizations in order to strengthen their competitive capabilities and improve their position in international markets.

- iii. To systematize and disseminate experiences on the modernization of agricultural education and training, and strengthen cooperation among institutions; and
- iv. To train students about the entire value chain and not only about primary production.
- v. This approach will be part of the goal of the proposed Centre for Food Security and Entrepreneurship at Cave Hill which will be linked to the new Faculty of Food and Agriculture at UWI St. Augustine.

19.0 The Centre for Food Security and Entrepreneurship at Cave Hill.

The Plan identified the need for a Model Farm and a Farmer's Training Centre. Recently, a wealthy Barbadian family, The Edghills of Dukes Plantation, St. Thomas agreed to donate 28.3 acres of land to the University to develop a centre for training and research in Agriculture. The University has agreed to establish a Centre for Food Security and Entrepreneurship on the lands.

Concept of the Centre

The Centre will act as a platform for education that helps to change attitudes and behaviour about food and agriculture and their role in development. It will incorporate the latest and the best in agricultural technologies that is consistent with the concept of a green economy. It will also promote commercially viable enterprises using cutting edge agricultural technologies, produce professional farmers and agricultural professionals, focus on generating wealth from

enterprises based on food and agriculture and be self sustaining in the medium term

Mission of the Centre

To promote training, research, entrepreneurship and outreach in Food Production, Food Processing and Marketing that support the thrust of Barbados to achieve higher levels of Food Security.

Vision

A catalyst for the promotion of sustainable food production and food security in Barbados through the development of competitive enterprises by the application of modern sustainable technologies.

Objectives

- Provide the human resources that are necessary for a modern food sector.
- Provide an environment for experiential learning in sustainable food systems
- Support relevant research to remove the constraints to commercial food production.
- Promote viable enterprises that contribute to adding value to Barbados agricultural products.
- Promote innovation and entrepreneurship in Food production, processing and marketing.
- Demonstrate best management practices through training and research.

Components of the Centre

- i. A facility for the training of Barbadian farmers, entrepreneurs and professionals in the basics of agricultural science and technology, both for crop production, livestock production and fish production

at the Diploma level. We believe that students trained here and who desire can then go to St. Augustine in Trinidad and Tobago or elsewhere to complete their degrees in two years rather than three years.

- ii. A facility for conducting research on crop and livestock sustainable production systems including the development of organic farming and good agricultural practices.
- iii. A facility for the promotion of entrepreneurship in Agriculture based on the use of locally produced agricultural produce which can be transformed into agribusiness enterprises.
- iv. A facility which incorporates a commercial component that contributes to the long-term financial sustainability of the Centre by promoting viable University

The importance of the Centre for the University. The Centre will contribute to the University through the following basic objectives:

- a. To provide a place where the University staff and students can carry out teaching and research in the biological and chemical sciences and demonstrate the latest technologies in Food Production e.g. greenhouse technology, organic agriculture, precision agriculture, and environmental science, among others.
- b. To contribute to the recent thrust towards food security in Barbados through the development of competitive, sustainable production systems and agribusiness.
- c. To contribute to the reduction in the use of harmful pesticides and inorganic fertilizers.
- d. To contribute to the conservation of the soils of Barbados.
- e. To produce food that is safe, fresh and wholesome with a UWI-Cave Hill Brand.

The Centre will emphasize Sustainable Production systems

Barbados seeks to become a green economy. Such a goal must include sustainable agricultural systems based on good agricultural practices, organic agriculture and sustainable farming practices. These farming practices must include:

- the increased use of naturally and sustainably produced nutrient inputs; crop rotations; and livestock and crop integration;
- reducing soil erosion and improving the efficiency of water use by applying minimum tillage and cover crop cultivation techniques;
- reducing chemical pesticide and herbicide use by implementing integrated biological pest and weed management practices; and,
- reducing food spoilage and loss by expanding the use of post-harvest storage.
- Food security must also be based on sustainable production systems where food quality and safety are important considerations. In this regard the use of pesticides, herbicides and inorganic fertilizers in food production systems must be carefully managed and reduced where possible.

20.0 Promotion of Consumer Education -Promotion of the consumption of locally produced foods -Obtaining Public Support for the National Food and Nutrition Plan

An integrated communication programme using print, radio and television must be implemented to educate and inform the public of this new thrust in food and agriculture. The program must demonstrate the benefits to the economy and to the consumer of a policy based on the production and consumption of local food. The programme should emphasize the following:

1. The nutritional value of local foods

2. The health benefits of the consumption of fresh local foods in relation to lifestyle diseases – diabetes, stroke, high blood pressure, etc.
3. The contribution of the Food and Agriculture sector to employment opportunities.
4. The contribution of the sector to the diversification of the tourism industry.
5. The contribution of the sector to saving foreign exchange.
6. The contribution of the sector to reducing poverty, unemployment and crime; and
7. Barbados' culinary heritage.

21.0 Research, Innovation and Training

The agricultural sector and the food production subsector in particular will have to embrace new relevant technology, research and training. We can no longer continue to do research that is conceived in the minds of scientists, that is planned and executed without the involvement of those for whom it is intended; that is presented at scientific meetings and placed on the shelves of our libraries for posterity.

The research needs of today are for research that is client led, that is creative and seeks to solve real problems which limit the growth and development of an agribusiness enterprise or primary production or marketing of crops or livestock.

The research of the future must respond to the needs of the productive sectors of the economy and this will open new doors for private sector participation in the agenda for research. In fact, the private sector will then be encouraged to finance research that is in their interest.

Research results must be an input into the production of products by an enterprise and not an output of the Ministry of Agriculture. This is the paradigm shift that we must make. The programmes of the Caribbean Agricultural, Research and Development Institute (CARDI) must be oriented to support the research programmes of the Ministry of Agriculture, and should report to the Minister of Agriculture on the achievement of common goals based on a joint work programme.

What is needed are competitive agricultural research funds where farmers, the producers and managers of agricultural enterprises, along with the researcher, determine the agenda for agricultural research and present their proposals for consideration to a national research board for funding.

Education and training will be an important element of a new approach to food and agriculture. A national training program to improve the productivity, reliability and quality of local produce will be necessary. The commodities listed above will be the focus of this training. The program must emphasize the value chain and the need to take into consideration the needs of the consumers in planning production. Emphasis must be placed on new technology and the reduction of post harvest losses in the marketing of agricultural produce.

22.0 Knowledge based competitiveness and ICT Technology

There is need for the application of the new information technology tools in Agriculture generally. According to Chesney and Francis “The internet is at the centre of the revolution that is transforming the business environment. While the Caribbean has fully embraced this in other activities such as the services

sector, there is still much to be done to bring knowledge and information of practical value to the rural territories in general and participants in the primary agricultural sector specifically. This is required to bring Caribbean agriculture to the level of not only the developed countries, but more importantly, other developing countries with similar circumstances”. Information technology has an important role to play in the development of an efficient information marketing system and in revolutionizing agricultural extension services in Barbados so that the sector can become more knowledge based. In addition, there is need for new human resources with the capacity to manage information using the new technologies. The new farmers who we hope to attract to the sector and appropriate training programmes will help to correct these deficiencies.

23.0 New Markets and Marketing Infrastructure

In order to improve the marketing of agricultural produce, there will be the need to improve local marketing systems and information about supply and demand. A marketing information system and new marketing infrastructure are necessary. We propose the establishment of a Barbados Agricultural Marketing Facility at Graeme Hall to market fresh fruits, vegetables, root crops and local meat supplies. We believe that the Graeme Hall lands provide an excellent location for this wholesale facility where packing, grading, labelling of local agricultural produce can be promoted. The recent initiative by Supercentre supermarkets in setting up a Produce Facility to purchase local produce from farmers is a step in the right direction. However, a more structured facility is necessary. The facility would be a place for the wholesaling of farmers produce and would have the following objectives:

1. Determine demand and supply for agricultural products in the Barbados market through the efficient implementation of a Barbados Market Information System. This system must be based on the collection on a regular basis of prices and quantities of produce in the

- market place and to communicate reliable information to, farmers stakeholders, the private sector, traders, policy makers and consumers.
2. Predict future supply and demand based on historical data, weather data and other relevant information
 3. Link farmers to the market by providing them with a place to sell their produce and to link with wholesalers in the hotels, cruise ships, restaurants and super market's business.
 4. Promote grades and standards for local produce.
 5. Provide a place for storage, refrigeration and warehousing of perishable produce.
 6. Provide a place for the establishment of a National Food Bank.
 7. Provide for the coordination of export sales and for compliance with international health, safety and labelling standards and for the promotion of quality and reliability.
 8. Provide training and technical information for farmers and wholesalers on good agricultural practices and the WHO and FAO norms and procedures for production and marketing of agricultural produce.
 9. Provide a place where Government, the private sector and farmers can work together on the issues related to Food security of the Nation.
 10. Provide a place for entrepreneurs to market their products especially fruits, vegetables, herbs, spices, condiments sauces and juices in a Farmers Mall which will complement the Marketing Facility. The Mall can have a food court where local food can be prepared and sold and an area to showcase Bajan cuisine.

11. Become a one stop Facility in the Food Industry for Barbadian enterprises involved in the production, marketing, distribution and promotion of local food.

The Facility would be managed by a CEO under a Board made up of Government, the Private sector and Farmers. The fundamental objective of the facility is to facilitate the decisions that must be made rapidly and effectively with respect to marketing, decisions that cannot wait on the slow processes of the public sector, especially when dealing with perishable commodities. Details of the governance structure will be left to the Task Force selected to develop the Facility.

The Facility will emphasize that the market of the 21st Century is characterized by:

- Increasingly stringent food safety laws worldwide; most of the developed countries have recently enacted new food safety laws or plan to enact such laws in the immediate future;
- Rapid growth in the Fresh Fruit and Vegetables sector; currently the fastest growing sector in the food industry worldwide.
- Rapid growth in the demand for Organic Produce; consumers are increasingly demanding produce to be free of pesticide residues and other additives.
- Rapid growth in the demand for Natural Products;
- Increasing demand for exotic foods; and
- Internationalization of raw material supply for all-year round availability to consumers
- The demand for Caribbean foods is increasing in international markets.

24.0 Linking Farmers to the Market

The establishment of strong linkages between farmers and consumers is fundamental to the success of this plan. Consumers are seeking quality, reliability and a fair price and farmers are seeking a reasonable return on their investment. Farmers must be organized with commodity groups (e.g. onion producers, yam producers, sweet potatoes producers, vegetable producers etc.) and meetings must be held with these producer groups to identify the constraints to production and marketing and the strategies necessary for increased production and productivity. In addition, farmers must be linked to the market more strategically especially the Government institutions (schools, prisons, hospitals) and to hotels, restaurants and supermarkets.

Production and marketing contracts should be signed between farmers and the institutions and the Ministry should ensure compliance with contracts and the delivery of produce of high quality. The increase in the supermarket as a source of food in Barbados has created many challenges for small farmers who are not equipped to meet the new demands for quality, reliability and price.

In the first case, supermarkets do not wish to deal with large numbers of small producers whose products vary in quality and availability. Given the reality that supermarkets offer several advantages to the consumer including parking, hours of availability of food and price advantages, it is important to implement policies and actions that facilitate participation of small farmers in the supermarket supply chain through the new Marketing Facility

The following are the recommendations of this paper:

1. Organize small farmers into commodity groups.
2. Organize produce collection centers to collect, grade and sell farmers produce.

3. Engage supermarkets in a dialogue between farmers, and supermarket purchasing managers and the Ministry to discuss quality, reliability and price issues.
4. Train farmers in the production of quality produce and in the standards required by supermarkets.
5. Promote the production of convenience foods.

An important component of this strategy must be the education of farmers in the realization that their farm is a business which depends on consumers for its success. Consequently, the needs of the consumers must be taken into consideration in planning, producing, harvesting and marketing agricultural produce. Contractual arrangements between farmers and institutional consumers such as schools, supermarkets, hotels, restaurants etc., must ensure compliance with quality, food safety, reliability and price criteria.

In recent times, farmers markets have been on the increase in many countries and since they provide the opportunity, for farmers to sell fresh produce directly to consumers, their establishment should be encouraged.

It will be necessary to identify lands for increased food production and the targets to be achieved. Government may wish to consider the designation of Food Production Zones based on the results of the survey of agricultural lands and appropriate land capability studies.

25.0 The Barbados Food and Nutrition Council should be established

The Food and Nutrition Council should be a partnership mechanism between the Ministry of Food and Nutrition Security,, the Ministry of Health, the Private Sector, Farmers Organizations, the University of the West Indies and the Trade

Union Movement to promote coordination of national efforts to improve food security, and the health and nutrition of the Nation.

The Council should replace the current National Agricultural Commission and should have the following objectives:

- 1.0 Monitor the progress of the implementation of actions to improve food and nutrition security in Barbados and report to the Minister and the Cabinet on progress made.
 - 1.1 Act as a link between the Ministry of Food and Nutrition Security, the Private sector and the Farming Community.
 - 1.2 Identify global trends and bring these to the attention of the Ministry of Agriculture, Food, Fisheries and Water Resource Management.
 - 1.3 Advise the Minister on the potential impact of national macroeconomic policies on the food and agricultural sector.
 - 1.4 Define new opportunities for food and agricultural development in Barbados.
 - 1.5 Act as a Food Prices Commission to monitor food prices in the country.
 - 1.6 Promote research and innovation projects that will improve food security in Barbados.
- The Council should be provided with an appropriate budget and personnel to carry out these responsibilities.

26.0 An Agrotourism Council should be established

The Council should have as its fundamental objective the promotion of effective linkages between the agriculture and tourism sectors of the economy. The

Council should comprise of representatives from the Ministry of Agriculture, Food, Fisheries, and Water Resource Management, the Ministry of Tourism, the Private Sector, Farmers Organisation, and the Trade Union Movement. The Council will define its *modus operandi*, and a plan of work based on the proposals for Agriculture / Tourism linkages defined in this document.

27.0 Backyard Gardens, Family Farms and Community Gardens

Backyard gardens can contribute to reducing the food import bill by helping citizens to produce more of their own food. A recent document entitled “Sow and reap the benefits - Gardening to reduce your food bill and to improve health”, prepared by McGill University, IICA and the Canadian International Development Agency which provides information on the preparation and management of backyard gardens, should be circulated to all households in Barbados. A project should be developed to provide householders in Barbados with seeds, and small garden tools. Persons should be encouraged to produce seedlings for backyard gardens as a viable small business. Gardens are also places for recreation and relaxation.

Many psychologists and health care professionals have emphasized the importance of maintaining balance in our daily lives. They have pointed out the value of healthy eating habits, regular exercise, relaxation, and a connection with nature as important aspects of this balance. There is no activity that provides all of these all at once, except gardening.

Gardening, the growing of flowers, fruits and vegetables in a small plot of land near to the house can provide a rich combination of benefits that are therapeutic and curing for those afflicted by any disease, and can help those who are healthy from becoming ill. The activity of gardening provides exercise by weeding, planting, pruning, forking and other acts of caring for the plants.

The act of gardening provides healthy foods which can be organically grown without chemicals and dangerous pesticides.

The act of gardening provides relaxation from stress as the activities involved allow one to use parts of the brain that are not normally utilised in the daily routine of the office or other places of employment.

The act of gardening provides a connection with nature and the satisfaction of sowing and harvesting, achievement of seeing things grow from seed to maturity.

The act of gardening provides a base for conversation, especially among the elderly. It is an opportunity to learn new things about nature, about biology, and the wonders of plant growth and maturity. Every home should have a garden as a place to relax, to exercise, to connect with nature and to produce healthy fruits and vegetables.

This proposal recommends a garden for each home for the aged to provide those who are in the 'evening of their lives' with something to do, and a place of relaxation and peace where creativity can be explored and the connection with nature maintained.

In this fast pace world where everything is becoming electronic and computerized, a garden reminds us that nature and its slow processes are still the basis of life. A garden can provide youth with a sense of purpose, achievement and an understanding of the wonders of our environment.

The most important part of gardening is that it provides the opportunity to share the knowledge acquired and to share the fruits of the garden with family, relatives and friends. This strengthens relationships and builds the community. This proposal recommends the establishment of a garden in every home in Barbados as a place of relaxation, sharing, caring, inspiration, happiness and peace.

Family Farms

Family farms where family provide the management; capital and labour for an agricultural enterprise should be encouraged. In many countries of the Americas, family farms are a major contributor to food security. For example, in Brazil, 70% of the food delivered to Brazilian households is produced on family farms.

Community Gardens

There is land for the development of community gardens in many communities in Barbados. These gardens could be part of the activities of the recently established community councils. These gardens could be places for recreation and for the production of fresh fruits and vegetables for the community.

School Gardens and Urban Gardens

Every school in Barbados should have a school garden as a place where students can learn to produce food, especially fruits and vegetables. Urban gardens can be found in London, San Francisco and other cities in urban areas. The time has probably come for Barbados to promote backyard gardens in urban areas to assist in improving food security and a place to promote the teaching of the practical aspects of the biological sciences and to promote a love for nature, the environment and agriculture among our youth. It should also be a place to demonstrate the production of healthy wholesome food. The recent introduction of a school garden at Harrison's College should be applauded by all as a step in the right direction.

28.0 Barbados Agricultural Trading Trust

A private sector led Barbados Agricultural Trading Trust (BATT) has been proposed that would coordinate individual markets e.g cruise ships, hotels, restaurants, vendors, agro-processors, supermarkets with farmers, farmer

organizations and all suppliers. The proposal was apparently presented to Government since 2009 and has recently been approved by the National Agricultural Commission. The trust could be virtual in its operations. In addition, a State Trading Enterprise with sole responsibility for food imports and to coordinate with local supply has also been proposed. These mechanisms require further discussion and analysis in order to arrive at the most appropriate institutional structure to ensure implementation of an enlightened food policy.

29.0 Agribusiness Approach, the Private Sector and the need for training in Agribusiness.

The implementation of the Food Plan must be based on an agribusiness approach where each of the subsectors is seen as an industry. In this context, the concept of agrifood chains is relevant. According to the recent IICA document prepared by M. Garcia et al. “an agrifood chain is a system that brings together economic and social stakeholders who participate in coordinated activities that add value to a particular good or service, from its production until it reaches the consumer. The chain includes producers, providers of inputs and services as well processing, industrialization, transportation, logistics and other support services, such as financing. “

This concept of an agrifood chain allows participation of farmers, private sector and government in all aspects of the sub-sector. The term replaces the concepts of value chain, supply chain and clusters used in the business world. The key to successful management of agrifood chains lies in the establishment of discussion groups with the cooperation of all the links of the chain.

This concept is important to ensure that agriculture is seen not as a simple process of primary production but as a comprehensive and integrated value-added system, capable of generating the quantity and quality of products required by the markets. The chains also provide a space for strengthening human relationships within the sector. A strategic partnership with the private sector will be necessary because the nation cannot be fed by a large number of

small farmers producing products of varying quality in an unplanned production programme. What will be needed are strong farmer organizations that can coordinate production and marketing among small farmers.

Larger farms of 5 to 50 acres using the new technologies, planning and sound business principles will be necessary. We believe that the traditional private sector, who are involved in food imports will welcome a local food production initiative as long as price, quality and reliability can be guaranteed. The private sector must therefore be incorporated into our plans and programmes.

There are five specific actions in which private sector participation will be necessary:

1. To carry out a survey of all agricultural land in the country
2. To establish an Agricultural Development Bank.
3. To cooperate with the establishment of an Agricultural Marketing facility to distinguish between commercial farmers and hobby farmers.
4. To evaluate the social, economic and environmental cost of the sugar industry.
5. Training in Agribusiness

Agriculture as a business needs to be emphasized at every level of the industry and subsectors. A course in agribusiness management should be developed by the university in cooperation with the Ministry for all farmers, producers, marketing personnel and farmers organizations and their leaders.

30.0 An Agricultural Development Bank

Agricultural enterprises have special financing needs which are not normally part of the policy of commercial banks. This is why most countries with a successful agricultural sector have developed agricultural development banks to

respond to the special needs of the sector including lack of collateral by small farmers.

An agricultural development bank should provide financial resources for the farming community and the agro-industrial sector taking into consideration the risks and the special characteristics inherent in the sector. The bank could also manage the Government incentive programme for the sector.

31.0 The Role of Leadership

No policy, no strategy, no plan to modernize the agricultural sector in Barbados can be successfully implemented without strong and decisive leadership. Leadership will be necessary to change the status quo and to convince the population, consumers, farmers, the private sector and the society that there is need for a change in the direction of the sector.

This leadership dimension is crucial because circumstances have changed.

The 20th Century Minister of Agriculture was seen as a Minister of Production and therefore a Minister of the Farming Community: Today, with the emphasis on health, nutrition, food safety and food security, the Minister of the 21st Century is also the Minister of Consumers. The Minister is to ensure that the food supply of the nation is adequate, safe and reasonably priced. The Minister of Agriculture of the 21st Century must therefore have a global multisectoral vision and must be able to network nationally and internationally to achieve his/her goals.

The wide range of dimensions and the rate at which the world is changing, means that the leader of agriculture of the 21st Century must keep abreast of many areas but since this is impossible, decision making has to be distributed across the organization and collaboration with other institutions is vital.

This means that we need leaders at all levels of the organization and someone at the top who can lead leaders and so one of the most important attributes of the Minister of Agriculture of the 21st Century is knowing how to lead leaders.

Five lessons have been identified for the leader of leaders.

1. The ability to lead others arises not just from a position, resources, or charisma but from will and skill. If we want to lead other persons, especially leaders, we have to work at the job of leadership.
2. The basis of leadership, particularly with other leaders, is our relationship with the persons we lead. Trust in the leader is a necessary element of leadership, and persons are more disposed to follow a leader in whom they have trust than one they do not trust.
3. Communication is our fundamental tool in building those relationships and building trust.
4. The key process of leading leaders is communication through one-on-one interactions with the persons we would lead. If we lead other leaders, we have to engage them and personally connect with them.
5. In developing our leadership strategies and tactics, we need to take account of the interest of the persons we would lead. Leading leaders is above all interest-based leadership. Leaders will follow us not because of our position or charisma but because they consider it in their interest. Our job as a leader is to convince them that their interest lies with us. Leadership depends on having willing followers.

These lessons are quoted from the book. Leading Leaders by Jeswald W. Salacuse published in 2006 and considerable information on the application of these lessons in a variety of organizations can be found in this book.

32.0 The Role of Education, Schools and the Media

The change proposed in this paper will depend on the implementation of an educational programmes in schools and colleges that emphasize the importance of good nutrition for health and general well being. The emphasis must be on the need to consume fresh wholesome food for good health and the nutritional value of our local foods must be taught in schools.

The Media (print, TV, Radio and ICT platform) has an important role to play in the implementation of the National Food and Nutrition Plan. The media must:

1. Develop and promote programmes that emphasize the nutritional benefits of Barbadian foods with a view to increasing consumption of these foods.
2. Promote an appreciation of the link between the consumption of fresh, wholesome Barbadian foods and the reduction in the incidence of chronic non-communicable diseases.
3. Enlist Barbadian chefs to prepare various bajan dishes from locally produced meats, fruits, vegetables and root crops to show case to the public on TV programmes.
4. Dedicate time on your various media for sharing information on successful experiences in food production and consumption that contribute to good health.
5. Initiate a new programme on "Food and Development" or "Food and the Economy" to demonstrate the critical importance of local food production for national well-being and for economic growth of the economy.

33.0 The Vision for the Future

The change proposed in this document is premised on a vision that recognizes the following:

7. That agriculture is more, much more than primary production.
8. That an improved level of food security is fundamental to the growth and diversification of the Barbadian economy.
9. That the linkages of the sector to health, nutrition, tourism and manufacturing, if emphasized and developed can redound to the benefit of the society and the people.
10. The sector is a prerequisite to poverty alleviation and the reduction in the cost of food and the high food import bill.
11. The production of food locally will contribute to employment creation and the creation of business enterprises.
12. Preservation of the agriculture sector is in the long term strategic interest of the country given the world food situation.

34.0 Conclusions and Recommendations.

The Food and Nutrition Plan will be implemented by providing farmers with the land, technology, market information, infrastructure and incentives and the various other inputs necessary for increased production of the commodities listed above. This plan will not be successful unless there is coordination of actions especially with the Ministry of Health, Education, Finance, Commerce, the Private Sector and farmers. The policies and political will to bring about change in the Food and Agriculture Sector must be in place.

The strategy for implementation of the Food Plan must be driven by four factors:

- i. Attainable goals

- ii. An implementation strategy to achieve the goals
- iii. A monitoring and evaluation system
- iv. A reporting mechanism to the Minister and to Cabinet
- v. The plan must have the appropriate level of financial resources to meet its objectives either through reactivation of the Agricultural Development Fund or the establishment of an agricultural development bank.
- vi. It must be product focused and consumer driven and must ensure effective linkage between farmers and the market. The plan should be endorsed by the Prime Minister and the Cabinet of Barbados
- vii. The plan for each commodity must have short term, medium term, and long term strategic goals.
- viii. The Food plan must recognize that Barbados will not become self sufficient in food supply but can increase its food security situation by producing more of what the country consumes. A bold objective of the plan should be to cut the food import bill by 10% every year for the next 5 years i.e. cut the food import bill by 50% by 2017

The successful implementation of the Food and Nutrition Plan will depend on important changes in our current arrangements. These include:

1. The introduction of New Technologies including mechanization and food processing into the sector.

2. New Marketing arrangements which respond to the Supermarket Revolution.
3. Improvements in the technical and managerial capacity of our farmers.
4. New consumer thinking which values fresh, locally produced food.
5. New investment in food processing, food storage, greenhouse technology, and food packaging facilities.
6. A permanent mechanism for cooperation between the Private Sector, Farmers, the University, the Trade union movement and the new Ministry of Food and Nutrition Security.(The Food and Nutrition Council)
7. A National market information system that monitors supply, demand and prices of agricultural produce for farmers, wholesalers and retailers.
8. Implementation of Agricultural Health and Food Safety legislation and regulations.
9. Establishment a Ministry of Food and Nutrition Security that is focused on food production, food imports, food safety, food security and providing safe nutritious food for the nation.

10. Increased investment capital from both the public and private sector for the Food and Agriculture Sector.
11. Establishment of an Agrotourism Council to facilitate better linkages between the Agriculture and tourism sectors.
12. Establishment of a Food and Nutrition Council to promote coordination of Food and Nutrition Policies.
13. Establishment of an Agribusiness Unit in the Ministry of Food and Agriculture to facilitate access by farmers to Government Incentive Programmes and to prepare project proposals for funding.
14. Engagement of the commercial banking sector and the credit union movement to make financial resources available to farmers and other sector workers by reducing the cost of credit.
15. Modernize the fisheries subsector increasing the national fishing fleet, markets and access to Caribbean fishing waters.
16. Engage regional and international agencies to which Barbados is a member to support this Food and Nutrition Plan.
17. Review trade policies which impact negatively on production by allowing cheap imported products to undermine local production initiatives.

18. Promote value added linkages, agroindustry and agroprocessing to add value to local produce and to regulate the supply chain.
19. Promote a favourable, enabling environment for farmers by promoting reasonable access to credit, efficient access to incentives, reasonable and reliable access to fertilizers, water, market information, access to technology, a fair price for his/her products and the assurance that he/she can make a comfortable standard of living from the pursuit of an investment in the food and agriculture sector.
20. Development of a Farmers Training Centre and a Model Farm in cooperation with the University of the West Indies at Cave Hill.
21. Increase the allocation to the Food and Agriculture sector gradually to 10% of the national budget.

35.0 Goals to be achieved and the way forward

(1) Policy

- A national Food and Nutrition plan be implemented
- A policy on food imports to be developed
- A national award for food security be established
- A national backyard garden competition to be promoted
- Food safety policy developed as a priority.
- Land use policy implemented to preserve land for agriculture and food security.

- A land bank must be promoted in order to provide lands for youth and persons interested in Agriculture but who have no land.
- Farmers organization needs to be strengthened

(2) Infrastructure

- Model farm and Farmers Training centre developed which demonstrates the new technologies developed.
- A Marketing Facility with a wholesale market for farmers established

(3) Information and Communication

- A modern market information system developed and implemented.
- A traceability system implemented.
- A public information program to educate the public on Health and the nutritional value of local foods developed.
- New information technology incorporated into development plans in support of the Market Information System and to modernize the agricultural extension service to provide farmers with technical advice and market information.

(4) Capacity Building

- A training program for farmers developed in the new Centre for food security and entrepreneurship.

- Training at all levels of the sector provided

(5) Institutional Reform

- A proposed Ministry of Food and Nutrition Security established.
- A Ministry with a business approach to Food and Agriculture promoted.
- Establish Food and Nutrition Council and an Agro-tourism Council to promote linkages between agriculture and tourism.
- An investment seminar for attracting new investment with the Agricultural Sector to be held
- Establishment of an Agribusiness unit within the Ministry to facilitate delivery of Government financial assistance to the sector, including management of the incentives programme
- Barbados Agricultural Trading Trust examined.
- One extension/ information officer should be allocated to each parish to collect relevant information on production and to link with a Market Information System that monitors supply and demand for agricultural products.
- Review current agriculture incentive scheme with a view to providing new incentives for the promotion of food and nutrition security and exports.

36.0 The Way Forward - The Implementation of the Recommendations

Step I.

Host Consultations to discuss this draft Green Paper with:

- (ii) The Ministry of Agriculture Staff

- (ii) The Minister of Agriculture and the Cabinet
- (iii) Farmers Organizations
- (vi) The Private Sector
- (vii) The Chamber of Commerce
- (viii) The Social Partners
- (ix) The Media
- (x) The International Organizations related to development
- (xi) The Banks and the Financial Sector
- (xii) The National Agricultural Commission

Step II.

Develop the project profiles presented into projects for local and international financing viz:

- (i) Increased production and consumption of fresh fruits, vegetables and root crops.

The development of a Barbados Black Belly Sheep Industry
- (ii) The production of cassava for human consumption and as inputs for animal feed to reduce imports of corn.
- (iii) Increased production and consumption of fish.

Step III.

Seek approval of Cabinet for the implementation of the Food and Nutrition Plan.

Step IV.

Put into place the legislative and institutional framework to implement the Food Plan including the establishment of a modern ministry of Food and Nutrition Security and two councils.

- (i) Agrotourism Council and a Food and Nutrition Council.

Step V.

Engage the Society in a process of dialogue for change for taking Barbados into the 21st Century as a country with balanced development in which the Food and Agriculture Sector contributes to the economic development, the health and nutrition of the nation and the preservation of the environment. Emphasize the contribution of Agriculture to health and nutrition. At all levels of the society and schools therefore there should be training which includes:

- (i) Advocating the use of local foods in the feeding programs of Government Institutions.
- (ii) Enlisting the Barbadian chefs to prepare nutritious tasty dishes based on Barbadian produce.
- (iii) Promoting Barbadian cuisine in hotels and restaurants.

- (iv) Engaging the media as part of their responsibility to the nation that they should promote local cuisine, success stories of local farmers, promote the link between agriculture and good nutrition and awareness of the nutritional benefits of Barbadian food.
- (v) Define a Barbados Food Festival where Farmers, Chefs, Hotels, Purchasing Managers, Schools and the public can participate.

Impediments to implementation of the National Food and Nutrition Plan

In the development and implementation of this food plan, there will be challenges and impediments. It is important to understand and address these challenges as we seek to go forward.

Impediment (1):

Resistance to institutional change to establishing a Ministry of Food and Nutrition Security.

Possible Solution:

Promote the benefits that can be obtained from the establishment of a modern Ministry of Food and Nutrition Security including coordination of policy implementation and efficiency in operation by having all issues related to food considered in a single institutional unit.

Impediment (2):

Lack of political will for a National Food Plan

Possible Solution:

The state of food insecurity in the country and the negative impact of high food prices on the social and economic stability of the nation must be explained to the Cabinet.

Impediment (3):

Lack of adequate human resources to implement the Plan.

Possible Solution:

Relocation of existing resources from institutions of the sector where food is not the priority. Train new resources in areas which are needed.

Impediment (4):

Lack of capital for investment

Possible Solution:

Share successful experiences in Agriculture and work with the private sector to prepare investment projects and invite local and international investors to an investment forum.

Impediment (5):

Farmers' resistance to change to move from a production-oriented focus to a market oriented production.

Possible Solution:

Train farmers in the needs of consumers and the requirements of the market.

Impediment (6):

Lack of appropriate technology for implementation of the food plan.

Possible Solution:

Link with institutions regionally and globally where the technologies exist.

Impediment (7):

Unavailability of land for food plan.

Possible Solution:

A vision for the future of agriculture in Barbados

Evidence suggests that there is enough land as considerable areas of land are currently under utilized.

Impediment (8):

Lack of consumption of local food by the population

Possible Solution:

Promotion of local food in the media, in restaurants, in hotels and in the schools.

Impediment (9):

Slow process of implementation of the Food Plan

Possible Solution:

Leaders of the sector must instill a sense of urgency in their teams.

Impediment (10):

Need for a national commitment to a new vision for Food and Agriculture.

Possible Solution:

A political message that indicates that agriculture is important for a sustainable, green, balanced economy in Barbados.

Impediment (11):

Problems of an aging farmer population.

Possible Solution:

Attract young farmers by demonstrating the success stories and experiences in agriculture.

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38.0 APPENDICES

Data on the food import bill by category for the last five years (2006-2011) are presented below:

2006 FOOD IMPORTS BY CATEGORY

CATEGORY	OVERALL IMPORT VALUE
PROCESSED FOODS	\$ 115,454,412.00
JUICE CONCENTRATES, ETC.	\$ 93,749,757.00
GRAIN & CEREALS	\$ 50,608,473.00
ALCOHOLIC BEVERAGES	\$ 45,694,026.00
DAIRY	\$ 42,701,210.00
FISH	\$ 27,169,924.00
FRESH VEGETABLES	\$ 21,645,894.00
FRUITS	\$ 15,779,247.00
OILS & FATS	\$ 15,691,877.00
BEEF	\$ 13,280,084.00
PORK	\$ 11,823,270.00
LAMB	\$ 8,750,096.00
COFFEE, TEAS & SPICES	\$ 5,248,084.00
POULTRY	\$ 4,848,030.00
VEGETABLES FROZEN & DRIED	\$ 3,003,307.00
NUTS	\$ 982,815.00
ROOT CROPS	\$ 64,558.00

\$ 476,495,064.00

2007 FOOD IMPORTS BY CATEGORY

	CATEGORY	OVERALL IMPORT VALUE	
1	PROCESSED FOODS	\$ 129,131,667.00	25%
2	JUICE CONCENTRATES, ETC.	\$ 98,697,180.00	19%
3	GRAIN & CEREALS	\$ 63,229,578.00	12%
4	ALCOHOLIC BEVERAGES	\$ 50,386,794.00	10%
5	DAIRY	\$ 49,661,105.00	10%
6	FISH	\$ 26,129,521.00	5%
7	OILS & FATS	\$ 20,513,983.00	4%
8	FRESH VEGETABLES	\$ 19,997,300.00	4%
9	FRUITS	\$ 16,469,520.00	3%
10	BEEF	\$ 13,961,731.00	3%
11	PORK	\$ 12,086,143.00	2%
12	LAMB	\$ 9,834,313.00	2%
13	COFFEE, TEAS & SPICES	\$ 5,752,587.00	1%
14	VEGETABLES FROZEN & DRIED	\$ 2,997,424.00	1%
15	POULTRY	\$ 2,276,615.00	0%
16	NUTS	\$ 1,147,708.00	0%
17	ROOT CROPS	\$ 56,419.00	0%

\$ 522,329,588.00

2008 FOOD IMPORTS BY CATEGORY

CATEGORY	OVERALL IMPORT VALUE	
PROCESSED FOODS	\$ 162,637,351.00	23%
GRAIN & CEREALS	\$ 120,164,665.00	17%
JUICE CONCENTRATES, ETC.	\$ 117,042,084.00	17%
DAIRY	\$ 66,514,432.00	10%
ALCOHOLIC BEVERAGES	\$ 60,559,148.00	9%
OILS & FATS	\$ 38,849,010.00	6%
FISH	\$ 30,002,633.00	4%
FRESH VEGETABLES	\$ 21,142,388.00	3%
FRUITS	\$ 20,660,087.00	3%
BEEF	\$ 19,264,941.00	3%
PORK	\$ 13,612,419.00	2%
LAMB	\$ 3,004,376.00	2%
COFFEE, TEAS & SPICES	\$ 6,461,513.00	1%
VEGETABLES FROZEN & DRIED	\$ 4,336,985.00	1%
POULTRY	\$ 2,180,947.00	0%
NUTS	\$ 1,182,530.00	0%
ROOT CROPS	\$ 104,113.00	0%

\$ **697,719,622.00**

2009 FOOD IMPORTS BY CATEGORY

	CATEGORY	OVERALL VALUE	IMPORT
1	PROCESSED FOODS	\$ 147,435,040.00	28%
2	JUICE CONCENTRATES, ETC.	\$ 100,895,867.00	19%
3	GRAIN & CEREALS	\$ 72,423,214.00	14%
4	DAIRY	\$ 42,445,017.00	8%
5	ALCOHOLIC BEVERAGES	\$ 42,369,290.00	8%
6	FISH	\$ 22,677,091.00	4%
7	FRUITS	\$ 19,135,517.00	4%
8	OILS & FATS	\$ 18,670,050.00	4%
9	FRESH VEGETABLES	\$ 17,035,172.00	3%
10	BEEF	\$ 13,834,675.00	3%
11	PORK	\$ 10,753,923.00	2%
12	LAMB	\$ 9,587,063.00	2%
13	COFFEE, TEAS & SPICES	\$ 5,709,048.00	1%
14	VEGETABLES FROZEN & DRIED	\$ 3,393,808.00	1%
15	POULTRY	\$ 2,879,863.00	1%
16	NUTS	\$ 979,549.00	0%
17	ROOT CROPS	\$ 78,300.00	0%

\$

530,302,487.00

2010 FOOD IMPORTS BY CATEGORY			
	CATEGORY	OVERALL VALUE	IMPORT
1	PROCESSED FOODS	\$45,925,483.00	26%
2	JUICE CONCENTRATES, ETC.	\$ 110,661,225.00	19%
3	GRAIN & CEREALS	\$ 68,465,135.00	12%
4	DAIRY	\$ 53,497,567.00	9%
5	ALCOHOLIC BEVERAGES	\$ 49,289,780.00	9%
6	FISH	\$	4%
7	FRUITS	\$ 21,205,740.00	4%
8	FRESH VEGETABLES	\$ 21,130,120.00	4%
9	OILS & FATS	\$ 18,836,747.00	3%
10	BEEF	\$ 16,959,121.00	3%
11	LAMB	\$ 15,240,891.00	3%
12	PORK	\$ 12,703,874.00	2%
13	COFFEE, TEAS & SPICES	\$ 5,635,302.00	1%
14	POULTRY	\$ 3,959,752.00	1%

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15	VEGETABLES FROZEN &		1%
	DRIED	\$ 3,538,822.00	
16	NUTS	\$ 1,190,872.00	0%
17	ROOT CROPS	\$ 94,962.00	0%
		\$	
		571,918,493.00	
			100%

2011 FOOD IMPORTS BY CATEGORY

	CATEGORY	OVERALL IMPORT VALUE	
1	PROCESSED FOODS	\$ 162,612,698.00	25%
2	JUICE CONCENTRATES, ETC.	\$ 106,330,432.00	16%
3	GRAINS & CEREALS	\$ 93,666,183.00	14%
4	DAIRY	\$ 53,538,743.00	8%
5	ALCOHOLIC BEVERAGES	\$ 46,968,702.00	7%
6	FISH	\$ 29,202,359.00	4%
7	NUTS	\$ 28,994,619.00	4%
	FRUITS	\$ 26,303,122.00	4%
9	OILS & FATS	\$ 24,391,795.00	4%
10	FRESH VEGETABLES	\$ 23,304,386.00	4%
11	BEEF	\$ 19,724,389.00	3%
12	PORK	\$ 13,021,774.00	2%
13	LAMB	\$ 10,780,588.00	2%
14	COFFEE, TEAS &	\$ 6,350,917.00	1%

	SPICES		
15	POULTRY	\$ 4,657,685.00	1%
16	VEGETABLES FROZEN & DRIED	\$ 3,830,802.00	1%
17	ROOT CROPS	\$ 114,118.00	0%

2011 Imports of Products that can be produced locally

Vegetable Crop	ImpNetMass (KG)	ImpValue (BDS\$)	2011 Imports ('000Kg)
Beans (String)	489.00	\$ 1,556.00	4.89
Beet	31,258.00	\$ 58,623.00	31.26
Cabbage	468,773.00	\$ 825,548.00	468.77
Carrot	679,869.00	\$ 1,306,962.00	679.87
Corn	N/A	N/A	N/A
Cucumber	100,063.00	\$ 165,440.00	100.06
Lettuce	576,979.00	\$ 1,510,466.00	576.98
Watermelon	617,685.00	\$ 823,823.00	617.69
Okra	N/A	N/A	N/A
Peas	N/A	N/A	N/A
Pepper (Hot)	3,654.00	\$ 10,093.00	36.54
Pepper (Sweet)	170,782.00	\$ 458,847.00	170.78
Pumpkin	536,139.00	\$ 514,213.00	536.14
Squash	N/A	N/A	N/A
Tomato	181,311.00	\$ 493,145.00	181.31

Root Crop	ImpNetMass (KG)	ImpValue (BDS\$)	2011P
Cassava	3,495.00	\$ 5,361.00	3.50
Eddoes	106,335.00	\$ 88,578.00	106.34
Potato (sweet)	234.00	\$ 222.00	2.34
Yam	25,220.00	\$ 18,640.00	25.22
Onion	2,212,691.00	\$ 2,565,209.00	2212.69
Peanut	111,054.00	\$ 267,482.00	111.05
Meat	ImpNetMass (KG)	ImpValue (BDS\$)	2011P
Pork	1,153,725.00	\$ 7,859,451.00	1,153.73
Beef	1,791,699.00	\$ 18,888,317.00	1,791.77
Veal	N/A	N/A	N/A
Mutton	1,022,810.00	\$ 10,780,588.00	1,022.81
Poultry- Chicken & Turkey	979,433.00	\$ 4,657,685.00	979.43
Eggs	N/A	N/A	N/A
Milk	2,849,402.00	\$ 18,730,030.00	2,849.40

The table and chart below show that that in 2011 local production of eggs, sweet potato, cassava ,poultry, cucumber yam and tomato , satisfied more than 80% of local demand for these commodities. In pork ,hot pepper, milk ,sweet pepper, beets, lettuce, cabbage and pumpkin, local production provided between 23 and 65% of demand while for melons ,carrots, eddoes, onions, lamb, beef ,peanuts and broccoli, local production provided less than 20% of current demand. The Table shows how increasing demand by 10% over the period 2013-2017 to compensate for projected population growth and demand we can calculate the annual increase in local production needed to satisfy this increased demand. The projected land area needed to produce the increased production is presented in Table

Current production, imports, demand and projections for production and demand during the next five years of selected commodities

Commodity	Current Production ('000 Kg)	Current Imports ('000 Kg)	Current Demand ('000 Kg)	Production % of Demand	Annual Production Increase Needed ('000 Kg)	Production in 5 years ('000 Kg)
Beets	48.50	31.26	79.76	60.8%	7.85	87.73
Cabbage	261.66	468.77	730.43	35.8%	108.36	803.47
Carrot	145.66	679.87	825.53	17.6%	152.48	908.09
Cucumber	1,144.80	100.06	1,244.86	92.0%	44.91	1,369.35
Lettuce	499.01	576.98	1,075.99	46.4%	136.92	1,183.59
Melon	156.31	617.69	774.00	20.2%	139.02	851.40
Hot Pepper	82.80	36.54	119.34	69.4%	9.69	131.28
Sweet Pepper	314.35	170.78	485.13	64.8%	43.86	533.64
Pumpkin	166.42	536.14	702.56	23.7%	121.28	772.82
Tomato	812.95	181.31	994.26	81.8%	56.15	1,093.68
Cassava	308.38	3.50	311.88	98.9%	6.94	343.07
Eddoes	19.52	106.34	125.86	15.5%	23.79	138.45
Sweet Potato	506.52	2.34	508.86	99.5%	10.65	559.75
Yam	243.10	25.22	268.32	90.6%	10.41	295.15
Onions	392.45	2,212.69	2,605.14	15.1%	494.64	2,865.66
Broccoli	0.26	1,124.03	1,124.29	0.0%	247.29	1,236.72
Peanuts	4.64	111.05	115.69	4.0%	24.52	127.25
Pork	2,657.05	1,153.73	3,810.78	69.7%	306.96	4,191.86
Beef	150.63	1,791.77	1,942.40	7.8%	397.20	2,136.64
Lamb	113.24	1,022.81	1,136.05	10.0%	227.28	1,249.65
Poultry	14,577.60	979.43	15,557.03	93.7%	507.03	17,112.73
Eggs	2,107.54	-	2,107.54	100.0%	42.15	2,318.30
Milk	5,681.58	2,849.40	8,530.98	66.6%	740.50	9,384.08

Commodity	Annual Production Increase Needed ('000 Kg)	Annual Estimated Land Required (Acre)	Total Acreage Needed Over 5 years (Acres)
Beets	7.85	1.73	8.65
Cabbage	108.36	11.94	59.72
Carrot	152.48	22.41	112.06
Cucumber	44.91	4.95	24.75
Lettuce	136.92	18.87	94.33
Melon	139.02	15.32	76.62
Hot Pepper	9.69	1.07	5.34
Sweet Pepper	43.86	7.44	37.19
Pumpkin	121.28	29.71	148.54
Tomato	56.15	8.25	41.26
Cassava	6.94	1.02	5.10
Eddoes	23.79	2.10	10.49
Sweet Potato	10.65	1.68	8.38
Yam	10.41	1.91	9.56
Onions	494.64	27.26	136.31
Broccoli	247.29	54.52	272.59
Peanuts	24.52	10.81	54.07
TOTAL		220.99	1,104.97

PLEASE

NOTE:

MELONS INCLUDES WATERMELON, CANTALOUPE AND MUSKMELONS

BROCCOLI IS NOT PLANTED REGULARLY IN BARBADOS

POULTRY INCLUDES CHICKEN AND TURKEY

In Table above is presented the level of increase in the production of the commodities that could result in self sufficiency in 5 years (2017). These are based on a projected increase in demand of 10% per annum during the period. The current level of self sufficiency of these commodities is presented. The land area that would be required to produce the increase production base on current levels of productivity is presented. This data may be modified by improved levels of productivity and the application of greenhouse and other technologies.

	SELF SUFFICIENCY COMMODITIES (,000 kgs) Less than 75% of production														
Vegetable Crop	2007 Local Prod	2007 Imports	2007 local Prod of Consumpti on	2008 Local Prod	2008 Imports	2008 local Prod of Consum ption	2009 Local Prod	2009 Imports	2009 local Prod of Consum ption	2010 Local Prod	2010 Imports	2010 local Prod of Consum ption	2011 Local Prod	2011 Imports	2011 local Prod of Consum ption
Cabbage	253.54	441.40	36%	437.5	416.50	59.95%	254.34	426.20	38.21%	60.44	508.65	10.62%	261.66	468.77	36%
Carrot	305.44	409.30		252.8	444.90		198.13	898.70		263.65	707.04		145.66	679.87	18%
Beet	109.77	15.20		28.9	20.60		51.95	22.90		30.5	29.84		48.50	31.26	61%
Lettuce	417.53	254.20		143.6	305.30		572.05	470.50		339.08	548.81		499.01	576.98	46%
Melon	477.38	575.60	42%	185.1	445.40	29.57%	243.11	473.20	28.95%	240.81	664.77	23.06%	156.31	617.69	20%
Pepper (Sweet)	419.49	44.20	91%	220.9	77.30	82.07%	293.86	102.70	74.95%	317.52	108.89	74.46%	314.35	170.78	65%
Pumpkin	159.51	482.40	25%	249.3	548.60	38.58%	191.23	673.10	22.02%	179.74	446.96	28.68%	166.42	536.14	24%
Eddoes	151.43	71.80	68%	40.50	115.10	29.89%	23.48	63.70	21.74%	228.32	86.31	72.57%	19.52	106.34	16%
Onion	287.34	1819.60	14%	333.20	1922.90	9.50%	625.96	2064.40	23.31%	497.93	2026.53	19.35%	392.45	2212.69	15%
Pork	2,742.63	1,219.70	67%	2,636.80	1,147.00	69.69%	2,746.67	1,212.40	71.28%	2,745.40	1,094.91	51.97%	2,657.05	1,153.73	70%
Beef	136.06	1,738.00	7.26%	144.39	2,137.10	6.33%	150.84	1,794.30	7.12%	161.24	2,195.39	3.86%	150.63	1,791.77	8%
Mutton	72.37	3,815.00	1.86%	85.14	1,803.70	4.51%	89.29	1,454.10	5.50%	106.10	1,818.86	5.46%	113.24	1,022.81	10%

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	SELF SUFFICIENCY COMMODITIES (,000 kgs) More than 75% production of consumption														
Vegetable Crop	2007Local Prod	2007 Imports	2007 local Prod of Consumpt ion	2008 Local Prod	2008 Imports	2008 local Prod of Consumpt ion	2009 Local Prod	2009 Imports	2009 local Prod of Consump tion	2010 Local Prod	2010 Imports	2010 local Prod of Consump tion	2011 Local Prod	2011 Imports	2011 local Prod of Consump tion
Beans (String)	252.04	0.17	100%	167.7	0.12	99.95%	170.28	0.11	99.99%	222.13	0.05	99.98%	270.01	4.89	98%
Cucumber	1,449.95	32.70	98%	811.6	9.80	99.43%	1,119.70	45.50	97.98%	1,148.12	48.84	95.92%	1144.80	100.06	92%
Okra	658.12	0.04		423.6	0.01		244.56	-		302.77	0.13		311.75	0	
Peas	—	NA	NA	25	NA	NA	29.15	NA	NA	61.39	NA	NA	27.25	NA	NA
Pepper (Hot)	114.17	10.90	92%	124.4	23.00	89.50%	178.14	2.70	98.36%	76.06	2.99	96.21%	82.80	36.54	69%
Squash	—			292.9			565.46			682.99			792.68		100%
Tomato	1,224.22	154.00	89%	815.3	138.60	88.19%	718.54	91.90	90.10%	717.54	240.85	74.87%	812.95	181.31	82%
Root Crop	2007	2007	2007	2008	2008	2008	2009	2009	2009	2010	2010	2010	2011	2011P	2011P
Cassava	448.10	1.70	100%	466.20	1.80	99.75%	690.53	3.40	99.53%	399.48	0.73	99.82%	308.38	3.50	99%
Potato (sweet)	1334.56	0.20	101%	884.00	36.40	97.80%	1202.25	1.00	100.11%	1176.36	9.99	99.07%	506.52	2.34	100%
Yam	646.45	17.30	99%	279.60	20.70	95.06%	824.29	8.60	99.20%	806.57	22.69	97.26%	243.10	25.22	91%
Meat	2007	2007	2007	2008	2008	2008	2009	2009	2009	2010	2010	2010	2011	2011P	2011P
Veal	6.29	NA	NA	8.33	NA	NA	9.61	NA	NA	5.78	NA	NA	5.27	NA	NA
Poultry- Chicken	14,653.68	514.30	98%	14,387.95	397.20	100.97%	14,473.79	703.00	96.43%	14,090.91	812.88	99.23%	14,405.70	979.43	94%
Turkey	280.34	NA	NA	239.46	NA	NA	219.00	NA	NA	271.61	NA	NA	238.37	NA	NA
Milk	6,762.30	3,031.90	109%	6,694.39	2,658.50	105.02%	7,013.69	2,606.30	99.02%	6,700.98	2,732.47	92.31%	5,810.27	2,849.40	67%

