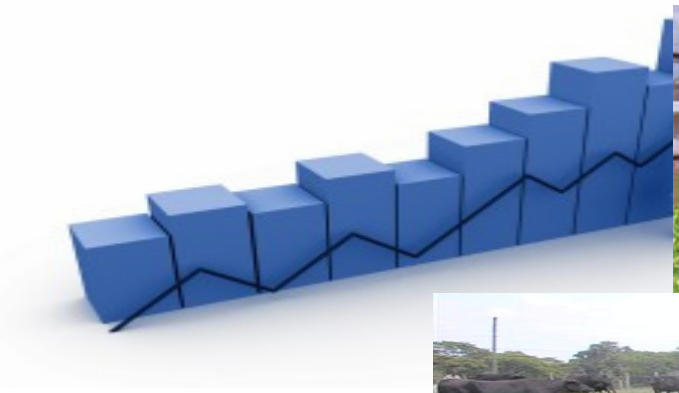
VISION 2030 JAMAICA

# Final Draft Agriculture Sector Plan



Agriculture Task Force

September 2009

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# 1. Introduction

## 1.1 Vision 2030 Jamaica – National Development Plan

In 2006, the Government of Jamaica (GOJ) mandated the Planning Institute of Jamaica (PIOJ) to lead the preparation of a comprehensive long-term National Development Plan (NDP) which will seek to place Jamaica in a position to achieve developed country status by 2030. Development of the Plan began in January 2007 and thirty-one Task Forces (TFs) including the Agriculture Task Force were established thereafter. The TFs represent sectors and areas critical to the achievement of the national goals and have been charged with responsibility for developing the relevant long-term sector plans.

The Agriculture Task Force commenced the plan preparation exercise in September 2007, leading to the completion and submission of a 1st draft report for the long-term development of the Agriculture Sector in Jamaica. Following review and stakeholder consultation, and preparation of an action plan for the sector, the Agriculture Sector Plan for Vision 2030 Jamaica was completed in 2009.

This Sector Plan for Agriculture is one of the strategic priority areas of the ***Vision 2030 Jamaica - National Development Plan***. It is one of thirty-one sector plans that form the foundation for Vision 2030 Jamaica – a 21-year plan based on a fundamental vision to make *'Jamaica the place of choice to live, work, raise families, and do business,'* and on guiding principles which put the Jamaican people at the centre of the nation's transformation.

Under the Agriculture Sector Plan the vision is for the dynamic transformation of the Jamaican agricultural sector through a sustained, research-oriented, technological, market-driven and private sector-led revolution, which revitalizes rural communities, creates strong linkages with other sectors and emphatically repositions the sector in the national economy to focus on production of high-value commodities and contribute to national food security.

The preparation of the Plan was supported by a quantitative systems dynamics computer model – Threshold 21 Jamaica (T21 Jamaica) – which supports comprehensive, integrated planning that enables the consideration of a broad range of interconnected economic, social and environmental factors. The T21 Jamaica model is used to project future consequences of different strategies across a wide range of indicators, and enables planners to trace causes of changes in any variable or indicator back to the relevant assumptions and policy choices.

This sector plan was developed using the following processes:

- Participation of Task Force Members[1] through Task Force Meetings[2] that were used to solicit ideas and views on Agriculture issues and challenges facing Jamaica as well as identifying a vision for Agriculture in Jamaica, and determining key goals, objectives and strategies for the sector
- Staging a Agriculture Stakeholder Workshop[3]
- Research on international best practices in Agriculture that could be adopted in the Jamaican context
- Review of relevant documentation on the Agriculture Sector
- Development of a detailed Action Plan with responsible agencies and time-frames for implementation

This Sector Plan for Agriculture is structured in the following main chapters as follows:

- Situational Analysis
- SWOT Analysis
- Strategic Vision and Planning Framework
- Implementation, Monitoring & Evaluation Framework
- Action Plan

## 1.2 Agriculture and National Development

The Agriculture Sector represents a critical component of any country in its impact on national development. The Agriculture Sector Plan also will have implications for other areas of national development including transport, distribution, tourism, urban and regional planning, environmental management, and mining and quarrying. During the period 2003-2008 Agriculture represented on average 5.0% of Jamaica's Gross Domestic Product (GDP).[4]

The planning for Vision 2030 Jamaica and the agriculture sector has taken place within the context of a global economic recession which commenced in US credit markets in 2007, and spread in 2008-2009 to affect the economies of developed and developing countries alike. The consequences for Jamaica are likely to include: reduced flows of direct investment; greater difficulty in sourcing financing from global capital markets; reduction in demand for Jamaica's exports; and a downturn in tourism earnings. The impact will limit the prospects for growth in our economy in the initial years of implementation of the National Development Plan, until recovery takes place.

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[1] See Appendix 1 for List of Members of the Agriculture Task Force.
[2] See Appendix 3 for Listing of Task Force Meetings.
[3] See Appendix 2 for List of Attendees at the Agriculture Stakeholder Workshop.
[4] Contribution to Total Goods and Services Production at constant 2003 prices, Economic and Social Survey of Jamaica, 2008.

## 2. Situational Analysis – Jamaica's Agriculture Sector

The Agricultural sector remains an important contributor to GDP, employment, foreign exchange earnings and rural life in Jamaica. It is comprised mainly of small and medium size farmers with 5 hectares or less, who account for 85.6% of total agricultural holdings. The sector, however, has experienced numerous challenges that have resulted in an overall decline in output and direct contribution to GDP over recent years. This has been as a result of increased trade liberalization, competition and low productivity *inter alia*. Other problems include heavy reliance on imports, use of inappropriate technologies, praedial larceny, high cost of capital and inadequate research and development. The sector is extremely vulnerable to shocks including weather conditions, pest infestations, impact of natural disasters, changes in export market prices and also trading regimes. The revitalization of the agricultural sector and its increased contribution to the national economy is contingent on the reorganization of the sector on the basis of modern technology and management, in order to achieve greater efficiency and competitiveness. Given the potential contribution of agriculture to GDP and the sustainability of rural livelihoods, it is therefore important that these issues be addressed urgently and careful planning implemented.

### 2.1 Agriculture – Sector Performance

#### 2.1.1 Contribution of Agriculture to Gross Domestic Product

Table 1 shows the annual contribution of Agriculture to GDP as well as the growth rate of the sector for the period 2004-2008.

**Table 1: Contribution of Agriculture to Gross Domestic Product at Constant Prices 2004-2008**

| Year | Agriculture GDP (J$M) | Growth Rate % | Total GDP (J$M) | Agriculture Contribution % to Total GDP |
|---|---|---|---|---|
| 2004 | 25,196.5 | -11.2 | 483,385.8 | 5.2 |
| 2005 | 23,487.4 | -6.8 | 488,362.9 | 4.8 |
| 2006 | 27,293.8 | 16.2 | 501,599.2 | 5.4 |
| 2007 | 25,655.7 | -6.0 | 508,765.8 | 5.0 |
| 2008 | 24,357.6 | -5.1 | 505,824.0 | 4.8 |

Source: ESSJ 2008

The agricultural sector declined by 3.3% in constant dollars over the period under review. Moreover the contribution of the sector fell from 5.2% of GDP in 2004 to 4.8% in 2008. In 2004 and 2005, the sector declined by 11.2% and 6.8% respectively due to the effects of Hurricanes Ivan, Dennis and Emily, in addition to drought conditions in the first four months of 2005.

### 2.1.2 Agricultural Production Index

The performance of the agricultural sector is also described in the agricultural production index (API) shown in Table 2. The main sub-sectors are export crops, Other Agricultural Crops, Animal Farming and fishing.

**Table 2: Agricultural Production Index (2003=100)**

| Years | Export Crops | Other Agricultural Crops | Animal Farming | Fishing | Total |
|---|---|---|---|---|---|
| 2003 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 2004 | 107.1 | 84.4 | 100.4 | 113.8 | 93.0 |
| 2005 | 74.7 | 81.4 | 103.2 | 112.4 | 85.1 |
| 2006 | 95.0 | 94.0 | 108.5 | 170.4 | 101.2 |
| 2007 | 104.7 | 86.4 | 107.9 | 136.8 | 95.9 |
| 2008 | 87.7 | 80.9 | 108.4 | 124.0 | 88.9 |

Source: ESSJ 2008 (Table 10.1 Pg 10.2)

According to the index, for the period 2003-2008, export crops declined by 12.3 points and Other Agricultural Crops by 19.1 points. The Animal Farming sub-sector experienced an overall increase of 8.4 points while fishing grew by 24.0 points. However the overall production index fell by 11.1 points over the period 2003-2008.

### 2.1.3 Foreign Exchange Earnings

The Agricultural sector remains a very important contributor of foreign exchange earnings to the Jamaican economy. The period 2004 – 2008 saw an increase in the overall value of agricultural exports by 5.1%. Agricultural exports contributed to 10.5% of total export earnings in 2004 and 5.7% in 2008. Table 3 shows that the value of non-traditional exports experienced an increase during the period, while Traditional Fresh Products declined. The earnings received for traditional export crops declined from US$56.6 million in 2004 to US$31.8 million in 2008, a decline of 43.8%, due primarily to significant declines in coffee and banana exports. Non-traditional exports increased by 35.7%, during the period, with foreign exchange earnings rising from US$90.4 million in 2004 to US$122.7 million in 2008.

**Table 3: Value of Agricultural Exports 2004-2008 (US$'000)**

| Export Category | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|
| **Agriculture:** | | | | | |
| **Traditional Fresh:** | | | | | |
| Banana | 12,814 | 4,692 | 13,412 | 9,222 | 37 |
| Citrus | 2,057 | 1,480 | 986 | 1,847 | 1,21 |
| Coffee | 38,683 | 16,334 | 29,649 | 27,158 | 26,777 |
| Cocoa | 910 | 318 | 1,002 | 1,985 | 1034 |
| Pimento | 2,164 | 2,856 | 1,410 | 2,077 | 2,119 |
| **Sub-Total** | **56,628** | **25,680** | **46,459** | **42,290** | **31,788** |
| **Non Traditional** | **90,405** | **88,547** | **94,361** | **92,146** | **122,704** |
| **Total** | **147,033** | **114,227** | **140,820** | **134,436** | **154,492** |

Source: ESSJ 2008

### 2.1.4 Employment

Over the period 2004 – 2008 employment in the agricultural sector increased to 216.5 thousand people, which accounted for 18.7% of the employed labour force in Jamaica in 2008. This represented an increase of 9.7% over the five-year period ending in 2008. Table 4 shows the levels of employment by each sector during the period 2004-2008.

**Table 4: Employed Labour Force by Industry 2004-2008 ('000 jobs)**

| Sectors | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|
| **Goods Producing Sector** | **377.3** | **382.6** | **394** | **408.9** | **408.3** |
| Agriculture | 197.3 | 197.7 | 201.7 | 211.6 | 216.5 |
| Mining | 5.8 | 5.0 | 6 | 8.3 | 9.7 |
| Manufacturing | 69.4 | 73.8 | 76.4 | 70.1 | 71.2 |
| Construction | 104.8 | 106 | 110 | 119.0 | 110.9 |
| **Services Sector** | **676.50** | **700.9** | **727.60** | **741.5** | **748.8** |
| **Industry Not Specified** | **1.4** | **2.3** | **2.1** | **2.2** | **1.7** |
| **Total** | **1055.2** | **1085.8** | **1123.7** | **1152.6** | **1158.9** |

Source: ESSJ 2003, 2005, 2006, 2008

## 2.2 Traditional Export Crops

The main traditional export crops produced in Jamaica are sugar cane, coffee, citrus, cocoa and pimento. These crops are very important as they contribute significantly to foreign exchange earnings and provide employment in rural areas of the country. Table 5 shows the export volumes for the major traditional export crops for 2004-2008.

**Table 5: Export Volume of Traditional Crops 2004-2008 (Tonnes)**

| Crops | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|
| Sugar | 159,908 | 112,928 | 140,445 | 153,053 | 136,070 |
| Bananas | 27,657 | 11,560 | 32,428 | 17,391 | 40 |
| Coffee | 1,721 | 864 | 1,448 | 1,183 | 1,133 |
| Citrus | 3,874 | 2,375 | 2,115 | 3,840 | 2,914 |
| Pimento | 297 | 419 | 255 | 453 | 502 |
| Cocoa | 670 | 200 | 204 | 471 | 275 |
| **Total** | **194,127** | **128,346** | **176,895** | **178,398** | **142,942** |

Source: ESSJ 2006 (Table 10.3, 10.5 Pg 10.2), Ministry of Agriculture Data Bank and Evaluation Division (for 2007 and 2008 figures, excluding sugar)

### 2.2.1 Sugar Cane

Sugar cane is the largest and single most important crop in Jamaica and the sugar industry contributes over 1% to GDP. The industry is the second largest employer of labour with some 38,000 persons directly employed and is the largest foreign exchange earner in agriculture.

**Background**

In the 1960s, all sugar estates were privately owned and the estates occupied a position of leadership in the industry, with government playing a minor role. This changed in the 1970s with the government playing a greater role through regulatory and ownership structures. By 1993, the industry had accumulated significant losses and required so much overhaul, modernization and capital restructuring that the government decided to divest itself of the factories that it operated. It was envisaged that the new owners, based on their business plans, would have brought an appropriate level of investment and management to the industry, which in turn would have ensured viability in the shortest possible time.

However, following five years of operations and huge losses, the government decided to reacquire the Sugar Company of Jamaica, which now owns five of the seven factories being operated in Jamaica. This action, together with a US$100 million loan support provided by the government to the industry, prevented its collapse and protected our export preferential markets. Some of these measures were seen as short term and transitional pending more lasting solutions to the problems besetting the industry.

**Industry Performance**

Over the years, the sugar industry has been faced with several problems, which include high cost of production, inefficient factory operations, low cane production and cane yields, poor cane quality, declining sugar and cane prices, increasing debt burden, high interest rates, weaknesses in the administration and management structure of the industry, low productivity and poor employee morale, and shortage of manual labour, among others. The cost of production of sugar produced locally ranges between US20-23 cents/lb and is among the highest within the ACP countries.

**EU Sugar Pricing Regime**

As a result of a challenge brought by Brazil, Australia and Thailand against the EU sugar regime, the WTO ruled in 2004 that the EC had allowed subsidized exports of sugar beyond the level formally notified by the WTO and was in violation of the WTO Agreement on Agriculture. As a result of the ruling, the EU took the decision to cut the sugar price to the ACP countries including Jamaica, by 36% over a four-year period ending in 2009. While the EU is also cutting the price to their own producers of beet sugar, they have decided to compensate them with subsidies of 60% of the cut in price, which they call decoupled aid. The ACP countries however have not benefited from such subsidies and the countries of the Caribbean cannot afford to subsidize their farmers in the same way.

**Jamaica Country Strategy**

The Government subsequently developed the Jamaica Country Strategy (JCS) for the Adaptation of the Sugar Industry: 2006 – 2015. The overall goal of the Jamaica Country Strategy is to achieve an effective transition to a sustainable sugar cane industry over the period 2006 – 2015. Three strategic objectives must be achieved: i) Develop a sustainable private sector-led sugar cane industry; ii) Strengthen the economic diversification, social resilience and environmental sustainability of sugar-dependent areas; and iii) Maintain progress toward macro-economic goals. The strategic approach recognizes that the costs of production must be reduced to competitive levels, and seeks to increase productivity by efficiency improvements throughout the entire production process, while transforming and diversifying the business model of the industry, with flexibility to address a range of outcomes based on the levels of improvement achieved within 2006-2015.

### 2.2.2 Banana

The major banana producing parishes in Jamaica are Portland, St. Mary and St. James but bananas can be found growing in backyards or in mixed cropping systems on small farms in all parishes of the island with significant pockets of production being found in the parishes of St. Catherine and Clarendon. Jamaica banana has focused on the export trade although the banana is a staple food in the Jamaican diet. Today, Jamaica's banana industry has seen increased competition from banana production in the Latin American countries, impact of diseases (black sigatoka) and natural disasters (droughts, winds, hurricanes, floods) and also the

reduction of preferential treatment that it once enjoyed from the EU. Since the 1990's, there has been significant changes in the traditional export market as a result of WTO trading requirements. This, in addition to adverse weather shocks led to a decline in the production and export of bananas which continued up to 2008. Since August 2008, banana exports from Jamaica ceased following the closure of the Eastern Banana Estate by the Jamaica Producers Group. The Jamaica Producers Group was the main exporter of bananas from Jamaica. Based on the challenges facing the industry, the Government is in the process of developing a policy and strategy to govern this industry, and to chart a sustainable future based on the domestic market and targeted export markets.

### 2.2.3 Coffee

Jamaica's Coffee Industry is regulated by the Coffee Industry Board which is a statutory body established by the Coffee Industry Regulation Act of 1948. The Board was established to encourage the development of the Jamaican coffee industry and to promote the welfare of the persons engaged in the industry. It is now the main exporter of commercial quantities of Jamaican Coffee. Jamaica's Blue Mountain coffee, considered one of the best coffees in the world, is known for its distinct flavor, body and aroma and is grown at altitudes between 914 and 1676 metres (3,000 and 5,500 feet), mostly by small growers. Jamaica also produces two other grades, High Mountain and Lowland coffee grown at lower altitudes for export. Jamaica's coffee growers must meet strict guidelines set by the Coffee Industry Board for export of coffee. The major export market is Japan but there is also a very strong demand in Europe and North America.

The volume of cherry coffee produced declined from 16,459 tonnes in 2004 to 9,035 tonnes in 2008.[5] During this period, the coffee industry was faced with numerous challenges ranging from excessive damage by hurricanes to trees and damaged farm roads, increased input costs of fertilizers and pesticide. The coffee industry faces an enormous challenge of establishing a suitable and sustainable insurance scheme. There is also the issue of protecting the integrity of the Blue Mountain Brand which is Jamaica's most sought after brand. At the end of crop year 2003/2004, the Coffee Industry Board through its legal department successfully secured registration of its trademarks for the Jamaica Blue Mountain and Jamaica High Mountain Supreme in the major markets overseas.

### 2.2.4 Citrus

The main types of citrus exported include Ugli, Sweet Oranges, Ortaniques and Grapefruit. Citrus has suffered a significant decline in export volume, falling from 4,695 tonnes for the year 2002 to 2,115 tonnes for 2006, a decline of 55%. The drastic decline over the period can be attributed to the negative effects of the Citrus Tristeza Virus (CTV), and some farmers are coming out of citrus production due to the disease.

[5] ESSJ 2008

### 2.2.5 Pimento

Pimento production also experienced a significant decline for the period under review. In 2006, 255 tonnes of pimento were available for export, down 50% from the 508 tonnes exported in 2002, due to diversion of production to the local market, including for use in jerk seasoning, and increased competition by other countries in international markets. The Ministry recently has launched a programme to encourage increased production and export of pimento by local farmers.

### 2.2.6 Cocoa

The cocoa farming population is comprised of 15,000 small farmers who grow cocoa commercially on 9,000 hectares of land in all parishes except St. Ann and Manchester. The Cocoa Industry Board is responsible for the marketing of Jamaica's fine-flavoured cocoa internationally. The Cocoa Industry Board also provides services such as promoting the growing of cocoa among farmers, providing technical support, purchasing and processing wet beans and selling dried and fermented beans. Processing takes place at two fermentaries located in the parishes of Clarendon and St. Mary and warehousing is done in Kingston.

Jamaica's cocoa beans are exported mainly to Europe, the United States, and Japan. During the period 1996 - 2006, the volume of cocoa exports suffered a significant decline of 85.5% with the amount being exported falling from 1,407 tonnes in 1996 to 204 tonnes in 2006. During this period, the cocoa industry was seriously affected by Hurricane Ivan. Production over recent years has declined for a variety of reasons including the decline in world prices. This affected the local price to farmers, resulting in a significant reduction in routine maintenance and rehabilitation of cocoa farms, leading to low yields in the major producing areas island-wide. The Cocoa Industry Board, in an effort to remedy the problems that have led to the decline in production, has embarked on a rehabilitation programme.

### 2.2.7 Coconut

The area in coconuts as at December, 2006 was 14,918 hectares. Coconuts are grown mainly in the parishes of St. Thomas, St. Mary, Portland, St. Ann and St. Catherine. During the period under review, coconut production experienced a marginal decline from 15,499 tonnes in 2002 to 15,402 tonnes in 2006. The coconut industry used to be a major exporter of copra but has discontinued exports due to insufficient production. Much of the coconuts produced currently are used locally for the jelly and coconut water trade and are also sold as dry nuts. The performance of the industry has been affected by insufficient applications of fertilizer and other inputs, improper agronomic practices and deaths of bearing coconut trees from lethal yellowing and other diseases.

The viability of the local coconut industry continues to be threatened by a resurgence of the lethal yellowing disease, which remained active in the major coconut-growing regions of the island. The Coconut Industry Board has taken the initiative to facilitate and stimulate investigation on controlling the disease, including research collaboration with local and overseas organizations. A planting programme was introduced as part of an effort to maintain the number of coconut trees that existed prior to the attack of lethal yellowing in late 1990's. However this has not been as successful as expected due to farmers' reluctance to replant the Malayan Dwarf and the Maypan hybrid, which are dying from lethal yellowing disease.

Notwithstanding the challenges facing the industry, the Board exported seeds to Florida in the United States during the period valued at US$2.55 Million dollars. There is a large market for seed coconut in Florida and the Coconut Industry Board is pursuing policies that will enable Jamaica to meet this demand.

## 2.3 Domestic Crop Production

The main categories of domestic crops in Jamaica include vegetables, legumes, fruits, plantain, roots & tubers, cereals and condiments.

**Table 6: Domestic Crop Production 2004-2008 (tonnes)**

| **Food Crops** | **2004** | **2005** | **2006** | **2007** | **2008** |
|---|---|---|---|---|---|
| Yam | 136,167 | 107,295 | 123,005 | 113,124 | 102,284 |
| Vegetables | 138,468 | 145,718 | 167,050 | 149,173 | 144,595 |
| Legumes | 4,700 | 4,905 | 5,499 | 5,644 | 4,457 |
| Condiments | 22,680 | 27,082 | 30,089 | 28,871 | 26,281 |
| Fruits | 35,235 | 34,661 | 45,889 | 39,619 | 42,257 |
| Cereals | 1,601 | 1,929 | 1,895 | 1673 | 1897 |
| Plantain | 17,760 | 8,952 | 21,986 | 19,087 | 15,035 |
| Potatoes | 25,143 | 32,966 | 36,027 | 33,531 | 30,725 |
| Other Tubers | 32,436 | 27,575 | 35,625 | 35,834 | 31,871 |
| Sorrel | 598 | 624 | 738 | 749 | 703 |
| **Total** | **414,788** | **391,707** | **467,803** | **427,305** | **400,105** |

Source: ESSJ 2008 (Table 10.8, Pg 10.8)

The parishes that contributed most significantly to domestic crop production during the period were St. Elizabeth, Trelawny, Manchester, Westmoreland and Clarendon. St. Elizabeth remained the largest contributor to domestic agriculture in 2008 despite a 5.5% drop in production when compared to 2007; notwithstanding the decline the parish accounted for 21.6% of the island's total domestic crop production.

The data in Table 6 shows the performance of each category of domestic crops for the period under review. For the period 2004-2008, total domestic crop production

experienced a marginal decline by 3.5% with significant fluctuation in production over the period. 2006 was the most favourable year with production increasing to high of 467,803 tonnes. Production however declined to 427,305 and 400,105 tonnes for the years 2007 and 2008 respectively, due to the effects of Hurricane Dean and Tropical Storm Gustav.

The Fruits category recorded a 19.9% increase in production representing the highest for the period; this was followed by Condiments (15.87%) and vegetables (4.4%). On the other hand, yam production declined for the period from 136,167 tonnes in 2004 to 102,284 tonnes in 2008, representing a decline of 24.8%.

For the year 2006, domestic crop production experienced an overall increase of 12.7% when compared to 2004. This was due mainly to the favourable weather conditions and also initiatives by the Government, which moved to increase budgetary allocation for the sector and initiated technological advancement through improved planting materials and the promotion of greenhouse construction and the use of hydroponics. The most common constraints to production during the period included lack of irrigation in many productive and potentially productive areas, high levels of praedial larceny, badly damaged farm roads, high cost of planting material and other inputs and inefficient farming methods leading to low productivity and high crop losses.

The major factors affecting production in 2008 were the hurricane of 2007 and the tropical storm in mid year. Other factors included unseasonably heavy rains in late 2007, high fertilizer cost and badly damaged farm roads which limited the transportation of inputs and outputs to and from farms. In an attempt to remedy the challenges faced, the Government worked assiduously to amend the fertilizer problem by the granting of a major subsidy on retail price, as well as embarking on an initiative to import the commodity at a significantly lower price.

### 2.3.1 Vegetables

The Vegetable group remained the largest contributor to domestic crop production for the period 2004 -2008 representing an average of approximately 35.4% of total domestic crop production. The production of vegetables experienced an overall increase of 4.4% during the period under review. The vegetables that accounted for the largest increases in production for 2004-2008 are Pumpkin (10.8%), Carrot (8.2%), and Tomato (3.9%); on the other hand, production for Cucumber, Cabbage and Callaloo declined by 18.2%, 8.9% and 3.0% respectively.

### 2.3.2 Yams

Yams are the second largest contributor to domestic agriculture. The major yam-producing parishes are Trelawny, Manchester and Clarendon. During the period 2004-2008, Yellow, Negro and Lucea Yam accounted for 61.9%, 10.1%, and 9.2% respectively of total yam production. The export earnings from yam increased from

US$ 15.2 Million in 2004 to US$ 24.4 Million in 2008. The major constraint to yam production during the period was the high cost of inputs such as fertilizer and labour costs.

### 2.3.3 Other Tubers

This group comprises dasheen, cassava and coco. The average production of other tubers during 2004-2008 amounted to approximately 32,668 tonnes. However, 2005 accounted for the lowest production of 27,575 tonnes. This was due mainly due to several hurricanes that affected the island in 2004.

### 2.3.4 Fruits

Pineapple, Watermelon and Papaya accounted for the Fruits category. Fruit production fluctuated significantly during the period. In 2004, production stood at 35,234 tonnes, rising to 42,257 tonnes in 2008 or an increase of 19.9%. Pineapple production accounted for an average of 47% of total fruit production. Watermelon production increased by 46.46% from 8,350 tonnes in the year 2004 to 12,230 tonnes in 2008. In 2004, papaya production stood at 7,618 tonnes, however in 2008 declined to 7,156 tonnes, a decrease of 6.06%. This decrease can be attributed to lingering effects of Hurricane Dean and Tropical Storm Gustav and high cost of inputs.

### 2.3.5 Condiments

The main condiments produced in Jamaica are Escallion, Sweet Pepper and Hot Pepper, which accounted for an average of 38.3%, 29.8% and 25.1% respectively of the total production of condiments over the period 2004-2008.

## 2.4 Livestock Production

Jamaica's livestock sector had mixed results during the period under review. The major decliners in the livestock grouping were beef cattle and dairy cows. The table below highlights the trend in major livestock production for cattle, sheep, goats and pigs along with their respective yields from 2002-2008.

**Table 7: Livestock Production 2002-2008**

| Years | Cattle slaughtered (hds) | Sheep slaughtered (hds) | Goats slaughtered (hds) | Pigs slaughtered (hds) | Poultry (000kgs) | Fish Marine (000kgs) | Fish inland (000kgs) | Eggs (million) | Milk (million litres) |
|---|---|---|---|---|---|---|---|---|---|
| 2002 | 63,520 | 387 | 38,647 | 90,373 | 83,839 | 7,233 | 6,000 | 129 | 21 |
| 2003 | 66,532 | 327 | 36,908 | 102,916 | 94,242 | 7,906 | 4,350 | 131 | 18 |
| 2004 | 52,379 | 437 | 39,944 | 119,530 | 96,475 | 9,496 | 3,137 | 125 | 16 |
| 2005 | 49,624 | 1,029 | 47,596 | 158,853 | 101,513 | 8,398 | 2,475 | 93 | 15 |
| 2006 | 28,451 | 498 | 39,515 | 134,002 | 104,012 | 13,068 | 8,019 | 157 | 15 |
| 2007 | 23,413 | 541 | 40,121 | 112,820 | 107,262 | 11,838 | 5,600 | 115 | 14 |
| 2008 | 22,053 | 1,877 | 41,369 | 122,857 | 106,721 | 9,475 | 5,880 | 121 | 14 |
| | | | | | | | | | |

*Source: ESSJ 2002-2008 and the Ministry of Agriculture and Fisheries*
*kgs: kilograms; hds: heads*

### 2.4.1 Cattle

The production of beef has trended downward during the period with an overall decline of approximately 65 %. Despite the increasing demand for beef, resulting in unprecedented farm gate prices, local beef production continued to decline, decreasing by more than 200%, to a low of 6 million kilograms in 2006. The low volume of cattle presented for slaughter in 2008, though primarily a result of the decimation of the local herd, post liberalization, can be attributed also to a commitment by farmers to forego present high prices for greater future gains by rebuilding their herd at this point. Stakeholders in the beef sub-sector have developed a strategic plan for the resuscitation of the sub-sector, given the very favourable market conditions locally and globally, which is forecasted to prevail for at least the next two decades.

### 2.4.2 Sheep

Sheep production has being punctuated with highs and lows during the period. In 2005 and 2008 the industry saw a dramatic increase in sheep production, which can be attributed to improved breeding systems and the importation of sheep.

### 2.4.3 Goats

Goat production over the period improved marginally; increasing by just over 7% at the end of 2008, when compared to 2002. The highest level of production was recorded in 2005 with 47,596 goats being slaughtered, producing 765,000 kilograms of chevon. Goat production has been bolstered over the years with the importation of new varieties with higher yielding carcasses such as the Nubian and Boer. The production of goats has also been facilitated through the goat revolving programme setup to increase farmer participation in goat rearing.

### 2.4.4 Pigs

The production of pigs and pork trended upward during the period with the number of pigs slaughtered in 2008 up by 36% when compared to that of 2002. Likewise, the production of pork was up by approximately 14%. The increase in pig production over the years, especially in 2005, was the result of improved breeding systems and rearing techniques being practiced by farmers, and the contribution made by a pig improvement programme supported by Canada.

### 2.4.5 Poultry

The poultry sub-sector has performed creditably given the occurrence of natural disasters that have impacted the island. The figures reveal that poultry production in 2008 was up by approximately 27.3% when compared to that of 2002. The main reasons for this increase are improved animal husbandry and the implementation of the tunnel system housing across the island by a number of poultry farmers, as well as the high demand for poultry meat spurred by the expansion of fast food outlets.

### 2.4.6 Fish

Jamaica's fisheries resources include coastal coral reefs as well as the Exclusive Economic Zone (EEZ) of Jamaica which extends in principle 200 nautical miles from the island and includes the Pedro Banks and other cays. Fish production performed relatively well in both categories, within the time frame. Marine fish production fluctuated slightly, however the overall trend was positive. The production of marine fish in 2008 when compared to that of 2002 was approximately 31 % higher. The production of inland fish, which is more susceptible to natural disasters such as flooding and hurricanes suffered tremendously during Hurricane Ivan and from the effects of Emily and Dennis in 2005. However the industry recovered significantly in 2006 to surpass the figure recorded for 2002 by 33.7 %. The introduction of ornamental fish also has increased the range of production and exports by the sub-sector.

Due to over-exploitation of Jamaica's fisheries resources, the Ministry has adopted a comprehensive approach to the sustainable management of the country's fisheries resources. The Ministry of Agriculture has been re-designated as the Ministry of Agriculture and Fisheries, and the Fisheries Division is to be transformed into an Executive Agency. A Fisheries Advisory Board was appointed in 2008 to guide the development and management of this Agency. A total of nine (9) fish sanctuaries have been declared in 7 areas around the coastline of Jamaica under the Fishing Industry Act (1975), and will be managed through a collaborative effort between Government and local community organizations, including fisher organizations and non-governmental organizations (NGOs). A Fisheries Management Fund has been established and will be funded by a levy on the export of conch. The Government has also enacted the Fishing Industry (Spiny Lobster) Regulations 2009 to regulate the sale, storage, importation and export of spiny lobsters.

The Ministry is also drafting a Fisheries Bill and has also developed a Draft Fisheries Policy for sustainable production of capture fisheries and aquaculture. All capture fisheries will be managed by Fisheries Management Areas under Fishery Management Plans that will be agreed upon by all major stakeholder groups. The Government also will complete the establishment of the National Fisheries Advisory Council to encourage partnerships with stakeholders in the sector, and to strengthen the role of non-governmental organizations in fisheries management.

### 2.4.7 Eggs

The production of eggs fluctuated slightly during the period with the lowest recorded figure occurring in 2005 with 93 million eggs produced. This decline was related to the passage of Hurricane Ivan in 2004 with many egg producers losing their brooding stock to flooding. Although, there was a slight decrease in 2008 of approximately 6% when compared to 2002, egg production improved by 30.1 % in 2008 when compared to 2005.

### 2.4.8 Milk

The dairy sub-sector continued to decline during the period under review. Milk production reached a 20-year low of 14 million litres in 2008. The doubling of the international price of milk solids in recent years has, however, presented unprecedented opportunities for the restructuring and redevelopment of the sector. This will require industry reorganization to allow primary producers to take advantage of the opportunities now being presented to develop a strong, competitive sub-sector especially since the current demand for milk exceeds supply. The dairy sub-sector should also benefit from diversification into value-added products which have heretofore been uncompetitive. A partnership between the state and producer organizations will be to the dairy sector's advantage in propelling the sector forward and will benefit the traditional small farmers so that they can achieve increased economies of scale through proper organization and collaboration.

## 2.5 New Initiatives

### 2.5.1 Production and Productivity Programme

The Ministry has embarked on a Production and Productivity programme to boost production and productivity and enhance food security. This will be achieved through the application of good agricultural practices, technology transfer, and pest management for the selected vegetables and food crops. In addition, the productivity improvement is being supported by soil testing to determine the best fertilizer regime and training of farmers in best practices.

This programme has targeted 12 priority crops selected on the basis of:

- size and elasticity of end-user market demand, focusing mainly on domestic demand for the commodity or food products of the commodity;
- profitability or potential profitability;
- farmer interest and experience in producing the crops;
- processor interest and capacity to use and sell more raw product; and
- high potential to increase productivity with affordable technology and better farming practices.

### 2.5.2 Centre of Excellence for Advance Technology in Agriculture

In order to strengthen the nexus between research and development and technological dissemination, the Ministry has established the Centre of Excellence for Advanced Technology in Agriculture (CEATA). This Centre of Excellence will provide training for extension officers, farmers, and relevant stakeholders in agricultural technologies and provide for the dissemination of research findings. It will also coordinate research being carried out by various bodies in the agricultural sector and provide the latest technologies in agricultural production including crop irrigation systems, soil fertility management, agricultural education, and training farmers and extension workers.

A 15-member advisory board has been established and comprises representatives from critical areas, such as agro-processing; as well as the Food & Agricultural Organization (FAO), the Inter-American Institute for Co-operation on Agriculture (IICA), the Heart Trust, the University of the West Indies (UWI), University of Technology (UTECH) and Northern Caribbean University (NCU). The operations of the centre are being partially funded by the Spanish Government.

### 2.5.3 Agro Invest Corporation

In an effort to stimulate investment in Agriculture and promoting Agriculture as a viable business opportunity, the Ministry will be merging the Agricultural Development Corporation with the Agricultural Support Services & Productive Project Fund Limited to form the Agro-Invest Corporation. The AIC will function as the Ministry's business facilitation entity and have overall responsibility for investment promotion, market development and industry development. The entity will offer services through the Project Development, Joint Venture, Industry Development and Marketing Development Departments.

### 2.5.4 The Diary Revitalization Programme

The Dairy Revitalization Programme aims to stimulate expansion and increased productivity within the dairy sub-sector to enable its sustained international competitiveness and enhanced contribution to national food security, livelihood

protection and rural development. The Programme is being implemented by the Jamaica Dairy Development Board. The project consists of three main components:

- Expansion of National Dairy Herd through improved genetics and importation of seed stock;
- Increase Productivity Levels through pasture resuscitation, etc; and
- Institutional Support through the provision of low cost loans to farmers

The programme will provide significant economic and social benefits nationally, with rural communities standing to benefit most directly.

### 2.5.5 Projects beings implemented by the Ministry of Agriculture and Fisheries

- **Gustav Rehabilitation Project**

Against the background of tropical storm Gustav's negative impact on the agricultural sector, the United States Agency for International Development (USAID) has approved a grant of US$3.2 million to assist the Government of Jamaica (GOJ)/Ministry of Agriculture and Fisheries with the tropical storm Gustav sector recovery. The project aims to assist in the rehabilitation of the Jamaican agricultural sector through improvement in rural road infrastructure and in the production and productivity of targeted crops.

- **Improving Jamaica's Agricultural Productivity Project (IJAP)**

The Improving Jamaica's Agricultural Productivity Project (IJAP) will focus on two areas, namely: the Green house industry, and the Capture Marine Fisheries sub-sector. The greenhouse component seeks to increase the productive capacity of Jamaican agriculture through the use of greenhouses in vegetable production. In addition, the project will establish agricultural clusters involving a number of small farmers around a packaging facility. The packaging facility will be private sector-driven, and responsible for the sorting, grading, packaging and logistics management, as well as marketing to end-users.

The fisheries component seeks to improve environmental management in small scale fisheries and will focus on beach rehabilitation and establishment of artificial lobster breeding shelters. The project is being funded by the Canadian Development Agency (CIDA) and the Government of Jamaica.

- **Tractor Programme**

The Tractor Programme forms part of Government's efforts to mechanize the small and medium farming sector through the utilization of appropriate technologies and to bring appropriate equipment within the economic reach of the average small and medium sized farmer. The programme is being implemented by RADA and was

seeded with a pool of fourteen (14) tractors. These Tractors will be made available for hireage to farmers and agro processors to facilitate land clearing. Drivers will be recruited and trained in the operations of the tractors.

- **EC Food Facility**

The EC Food Facility was set up by the European Commission in response to the Global Food Security Crisis of late 2007 and 2008. The Food Facility is focused on boosting production in beneficiary countries to improve their food security status. In Jamaica, the project will focus on three areas: increased availability and use of local food crops through enhanced agricultural production and productivity; market driven small stock production; strengthening data collection systems to monitor food prices and agricultural production. The project will be implemented over a two year period and financed by a grant of €5.8 million.

The project will assist small-scale farmers living in food insecure households by enhancing food production and safety nets, overcoming immediate food shortages; gaining self sufficiency in household food production; and offsetting the impact of rising food prices.

- **Fruit Tree Crop Development Project**

The Ministry of Agriculture and Fisheries will promote the revitalization of the fruit tree crop industry through the implementation of a new Fruit Tree Crop Development Project. This project will promote long term development and sustainability of the fruit tree crop industry as an important source of income for farmers, fresh fruit for the domestic market, raw material for the agro-processing industry and non food products such as fodder, nutraceuticals and industrial products. In addition, the project will promote nutrition for the general populace. The development of Jamaica's fruit tree crop industry is essential in guaranteeing a reliable supply of fresh fruits to the local and international markets.

The general objectives of the project are to:

- Increase long-term income by developing and producing commercial orchards of traditional fruit tree crops.
- Increase the availability and diversity of economically viable and nutritionally important fruit trees.
- Provide foreign exchange earnings through exports of fresh and processed fruits.
- Encourage the development of the food processing industry by the provision of raw material.
- Reduce environmental degradation and encourage long-term conservation measures.

There are five (5) components to the Fruit Tree Crop Development Project:

1) **Rehabilitation of Bodles Nursery and production of seedlings –** This component consists of the construction of a new nursery on 0.4 hectares of land at a cost of approximately $9 million with an irrigation system (sump and pond liner) and potting shed.
2) **Collaboration with private nurseries** - Private nurseries will supplement the production of three (3) selected crops, namely avocado, breadfruit and sour sop.
3) **Training of farmers and development of existing staff-** The component will seek to train persons in the areas of plant propagation, nursery management and modern tree crop production techniques.
4) **Establishment of orchards across the island -** Seedlings will be provided free of cost to selected farmers under this component. The project also will provide a grant of $16,000 per hectare (minimum 1 hectare) to assist in defraying the costs of land preparation and crop establishment.
5) **Urban Fruit Tree Production –** This component aims to establish various fruit tree crops in the homes of corporate area residents.

### 2.5.6 Agro-Forestry

The first priority of forest management is to protect forest ecosystems for their watershed and biodiversity values. However forests also represent important productive resources to meet a wide range of national demands, including for foods, timber and fuel. Under the Strategic Forest Management Plan 2009-2013, emphasis will be placed on encouraging the development of agro-forestry plantations, particularly on suitable private lands. The private sector has more land appropriate for commercial forestry than the government and their participation will reduce the exploitation pressure on natural forests and sensitive areas. Over the next five years, increased participation of landowners in agro-forestry will be encouraged by improved incentives for maintaining existing forest and for establishing or restoring tree cover.

## 2.6 Competitiveness of Agricultural Sector

The competitiveness of Jamaica's agricultural sector is a fundamental consideration in planning for the long-term development of the sector. The competitiveness of the sector has become increasingly important with the progressive liberalization of trade regimes affecting the domestic market and export markets, including the erosion of preferential treatment of sugar and banana exports to the EU, the progressive integration of regional markets under the Caribbean Single Market and Economy (CSME), and the current Doha Round of negotiations under the WTO for trade liberalization of world trade including in agriculture, non-agricultural market access and services.

The range of challenges facing the competitiveness of the agricultural sector include relative cost and productivity of labour, high levels of praedial larceny, inadequate infrastructure and marketing systems, high cost of some productive inputs including energy and other utilities, low levels of investment in modern technology and business practices, limited economies of scale, and limited domestic availability and high cost of credit.

The impact of these challenges have been reflected in the declining performance of many aspects of the sector as highlighted in previous sections, including declines or lack of growth in the agricultural production index, contribution to GDP, foreign exchange earnings and export volumes of traditional crops. However, more detailed analysis also has indicated the lack of competitiveness at the level of specific agricultural commodities. For example an assessment carried out in 2000 based on a range of measures of competitiveness (Hertford 2001) indicated that Jamaica was most competitive at that time in the production of selected root crops and vegetables including dasheen, yams, sweet potatoes, carrots, scallion and hot peppers. By contrast the commodities in which Jamaica showed the lowest levels of competitiveness included dairy livestock, sugar, ginger and export bananas.

The development of a competitive agricultural sector will require sustained improvement in the key areas affecting the performance of the sector. The Ministry has included a competitiveness officer on its staff to increase the focus on this aspect of sector development.

## 2.7 Institutional Framework of Sector

### 2.7.1 Ministry of Agriculture and Fisheries

The Ministry of Agriculture and Fisheries (MOAF) has the responsibility for guiding the long-term sustainable development of the Jamaican agricultural sector. The Mission of the Ministry of Agriculture and Fisheries is to advance the development of a modern, efficient and internationally competitive agricultural sector and the sustainable management of our land and aquatic resources to promote food security, land tenure, and contribute to rural development and the overall well-being of our people. The MOAF in carrying out its mission of promoting food security development, competitiveness and efficiency within the sector, provides support to farmers and other stakeholders through a number of services, including: crop and livestock research, training/extension services, produce inspection, and support for select export products, through its commodity boards. The Ministry has four (4) directorates: - Technical Services; Policy Coordination and Administration; Agricultural Planning Policy; and Land Policy and Administration.

The Ministry also has responsibility for a number of agencies and statutory boards, including the Rural Agricultural Development Authority (RADA), Jamaica Agricultural Society (JAS), Jamaica 4H Clubs, Agri-Business Council of Jamaica,

and the Agricultural Development Corporation (ADC). The Commodity Boards include the Banana Board, Cocoa Industry Board, Coconut Industry Board, Coffee Industry Board, Dairy Development Board, Export Division (Pimento), Sugar Industry Authority, and the Citrus Growers' Association. The Limited Liability Companies include National Rums of Jamaica Ltd, Sugar Company of Jamaica and Wallenford Coffee Company. The National Land Agency is an Executive Agency, while the Forestry Department and the Fisheries Division are entities designated to be Executive Agencies.

### 2.7.2 Rural Agricultural Development Authority (RADA)

The Rural Agricultural Development Authority (RADA) was established as the extension arm of MOAF to provide training and technical assistance to farmers. RADA's extension services are carried out through thirteen parish offices, one located in each parish except Kingston. The parishes are currently divided into 98 extension areas with a total of 134 extension and livestock officers, complimented by field assistants assigned to monitor the extension areas.

The main objectives of RADA include: provision of a technical extension advisory service primarily to farmers in rural Jamaica in an effort to increase production and productivity; training and development of extension personnel at all levels; administration of farmer training programmes; stimulation of agricultural credit and inputs for small farmers; assistance to small farmers and intermediaries in organizing co-operative marketing ventures and dissemination of timely marketing information to farmers; co-operation with agencies involved in the development of rural infrastructure with a view to improving the quality of life in rural communities; development and operation of rural agricultural service centers at strategic locations; to be the implementing agency for selected projects that impact on the farming biological environment; liaison with agricultural research organizations; and provision of a channel for the free flow of inputs from farmers upwards, and for the implementation of policy decisions taken by the policy makers.

### 2.7.3 Regional and International Partners

The agricultural sector is very important to Jamaica's economy and embraces many important sub-sectors. Involvement with several International Organizations is necessary to accommodate the diverse needs of the sector and to help provide financial, technical and human resources for its development. The main International Partners for the agricultural sector include:

- The European Union (EU)
- Food and Agriculture Organization (FAO)
- Inter-American Institute for Co-operation in Agriculture (IICA)
- Common Fund for Commodities (CFC)
- The International Fund for Agricultural Development (IFAD)
- Inter-American Development Bank (IDB)

- Caribbean Development Bank (CDB)
- US Agency for International Development (USAID)
- Technical Centre for Agricultural and Rural Cooperation (CTA)
- Canadian International Development Agency (CIDA)
- Spanish Agency for International Co-operation (AECI)

Some of the regional agencies under CARICOM which impact on the agricultural sector in Jamaica are:

- Caribbean Agricultural Research and Development Institute (CARDI)
- Caribbean Agricultural Health and Food Safety Agency (CAHFSA)
- Caribbean Agri-Business Association (CABA)
- Caribbean Regional Fisheries Mechanism (CRFM)
- Caribbean Regional Negotiation Machinery (CRNM)
- Caribbean Regional Agricultural Policy Network (CaRAPN)

## 2.8 Financing of Sector

### 2.8.1 Agricultural Credit

Agricultural credit in Jamaica is accessed through the Development Bank of Jamaica via the Peoples Cooperative Banks and other financial intermediaries such as commercial banks. The degree of access to farm credit is directly related to farm size with larger farmers having greater access to credit than small farmers. Small farmers are at a major disadvantage in accessing loans from banks and other formal financial organizations because they often lack collateral and do not feel that their needs are adequately catered for by these financial institutions. The majority of the small farmers concentrate on producing domestic crops and livestock. As shown in Table 8 below, the total loan allocation by the DBJ to the agricultural sector has increased from J$583.9 million in 2004 to J$890.0 million in 2008, or by 52.4% over the period. The sub-sectors receiving the highest levels of loan allocation were livestock, export crops and agro-processing.

**Table 8: Loan Allocation by Development Bank of Jamaica (DBJ) to the Agricultural Sector (J$'000)**

| Sub-Sectors | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|
| **Domestic Crops** | 2,301 | 10,098 | 3,660 | 25,625 | 14,348 |
| **Livestock excluding Poultry and Fisheries** | 4,720 | 17,770 | 11,115 | 16,032 | 42,100 |
| **Poultry and Fisheries** | 52,304 | 317,616 | 57,161 | 199,582 | 325,023 |
| **Export Crops including Sugar Cane** | 91,658 | 8,630 | 4,140 | 32,321 | 234,433 |
| **Farm Infrastructure & Equipment** | 68,000 | 0 | 1,260 | 15,229 | 14,225 |
| **Agro-Processing** | 364,923 | 151,000 | 294,000 | 28,000 | 231,346 |
| **Total Agricultural and Agro-Industry Loans** | **583,905** | **505,114** | **371,336** | **316,789** | **889,959** |

Source: ESSJ 2008

### 2.8.2 Budgetary Allocations to the Agricultural Sector 2004-2008

The allocation of funds to the Agricultural sector as a percentage of the total GOJ budget over the last five years has averaged 1.1 % as opposed to an average of 11.0 % for the Education sector, 4.7 % for the Health sector, 6.6 % for National Security and 0.3 % for the Industry and Commerce sector. The Estimates of Expenditure for the various sectors over the past five (5) fiscal years are shown in the table below.

**Table 9: GOJ Budgetary Allocations for Various Sectors 2004 - 2008**

| | Agriculture | | Industry and Commerce | | Education | | Health | | Security Services | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Budgetary Allocation JA$ (millions) | As % of Budget | Budgetary Allocation JA$ (millions) | As % of Budget | Budgetary Allocation JA$ (millions) | As % of Budget | Budgetary Allocation JA$ (millions) | As % of Budget | Budgetary Allocation JA$ (millions) | As % of Budget | Total Budget JA$ (millions) |
| 2003 / 04 | 2,721.8 | 1.0 | 907.6 | 0.3 | 28,864.8 | 10.1 | 11,762.9 | 4.1 | 17,019.3 | 5.9 | 287,968.4 |
| 2004 / 05 | 4,093.9 | 1.2 | 928.1 | 0.3 | 30,585.6 | 9.3 | 15,838.3 | 4.8 | 17,885.1 | 5.4 | 330,218.6 |
| 2005 / 06 | 3,359.9 | 0.9 | 1,146.7 | 0.3 | 37,410.6 | 10.9 | 14,281.0 | 3.8 | 21,229.8 | 6.1 | 348,567.5 |
| 2006/ 07 | 4083.3 | 1.1 | 1,065.0 | 0.3 | 44,736.0 | 12.2 | 18,910.4 | 5.1 | 28,031.1 | 7.7 | 366,309.2 |
| 2007/ 08 | 5897.1 | 1.5 | 1,924.6 | 0.5 | 52,079.4 | 12.7 | 23,349.4 | 5.7 | 32,524.0 | 8.0 | 408,663.4 |

Source: ESSJ 2008

## 2.9 Infrastructure and Inputs

### 2.9.1 Irrigation

The National Irrigation Commission Ltd. (NIC) is an agency within the Ministry of Agriculture and Fisheries. It was established in 1986 and became operational in May 1987 with the following objectives: to manage, operate, maintain and expand such existing and future irrigation schemes and systems as may now or hereafter be established by the Government of Jamaica or by any Department or agency.

The main types of irrigation are surface irrigation, sprinkler irrigation system, and drip irrigation system. Approximately 25,000 hectares, or 10% of cultivated lands in Jamaica, are currently irrigated. Of these irrigated lands, 50% are served by public irrigation systems managed by the NIC; the other half are on commercial estates, such as banana, papaya, and sugarcane, and individual private systems.

The Government of Jamaica (GOJ) and the Caribbean Development Bank (CDB) have undertaken to fund three flagship projects under the National Irrigation Development Plan (NIDP); namely Beacon/Little Park and Hounslow Rehabilitation in St. Elizabeth and Seven Rivers in St. James. The Government of Jamaica and the Inter-American Development Bank (IDB) have embarked on projects in St. Thomas, St. Catherine and Manchester which are programmed for implementation over the next four years. Under this programme, irrigation systems are to be built or rehabilitated in Essex Valley and St. Dorothy. Other improvements will take place in Yallahs, St. Thomas and Colbeck, St. Catherine.

The National Irrigation Development strategy is based on the following objectives aimed at sustaining and increasing agricultural production:

- To increase farmer's awareness of the role of irrigation in increasing farm income and their life in general;
- To motivate farmers to utilize the scarce water resources more efficiently;
- To protect, operate and maintain the irrigation hardware.

### 2.9.2 Farm Roads

Farm roads, parochial community roads represent a significant component of Jamaica's road network. While there are some 1,500 km of farm roads, community roads accounts for 4,200 km of the total road network. The maintenance of farm roads is the responsibility of the Ministry of Agriculture, through the Rural Agriculture Development Agency (RADA). Rehabilitation of Farm roads through the STABEX 2000 project was implemented in March 2002. The project purpose is to diversify and expand the agriculture production as well as its marketing opportunities in the project areas, through the rehabilitation of parochial and farm roads and market access for groups of small-scale farmers.

### 2.9.3 Agricultural Inputs – Equipment, Fertilizers, Chemicals and Animal Feed

The agricultural sector depends on imported equipment including tractors used in agricultural production. Fertilizers are important to crop productivity and ultimately profitability for agricultural enterprises that use them as critical inputs. The main categories of fertilizers used are ammonium sulphate, urea, potassium sulphate and ammonium nitrate. With the closure of Antilles Chemical Company, Newport Fersan is the only company that supplies fertilizers to the country. Farmers are faced with high cost of purchasing these commodities for their farms. During 2008, Government took the decision to import a range of fertilizer blends at a cheaper cost than the locally manufactured product. The distribution of the product was monitored by Government to ensure that farmers benefited from the best possible prices.

The main types of chemicals that are used in farming are Herbicides, Fungicides, Insecticides and Pesticides. Imports of herbicides accounted for an average of 831 thousand kilograms during the period 2001 – 2006 with fungicides and insecticides averaging 698 thousand kilograms and 273 thousand kilograms respectively. Farmers depend on these chemicals to protect plants in order to maximize their yield. However serious consideration needs to be given to the environment and chemical usage. An important national issue in Jamaica is the degradation of water quality from the prevalent use of fertilizers and pesticides on agricultural land. The issue is of interest to all because of the possible impacts on water use such as for drinking, irrigation, recreation, and sustaining aquatic life.

The category of animal feed raw materials includes corn, millet, oats and soybeans. Government continues its effort to promote the production of root crops such as cassava as an input for animal feed rations and as a substitute for corn.

The opportunity exists for reduced imports of agricultural inputs including fertilizers through the greater use and conversion of local sources of biomass and biofuels.

## 2.10 Technology, Research and Development

In Jamaica, the widespread application of modern technology outside the traditional export agriculture has been limited. However, efficient and competitive commercial agriculture will require the systematic application of modern technology in all areas of agricultural production including crop development, disease control, irrigation, crop/land yields, security, farm management and marketing. In this regard, successful practices elsewhere will be adapted to Jamaican conditions (e.g. hydroponics and other water management systems that are not dependent on seasonal rainfall). At the same time, care must be taken to ensure that technology solutions are effective in meeting the needs of competitive agriculture in the Jamaican context.

In order to promote an efficient technology-driven Agricultural Sector, Government will need to strengthen the research capacity of the Ministry of Agriculture and Fisheries, revitalize the programmes of regional research stations (Bodles, Orange River, Montpelier), improve coordination of research bodies (SRC/FTI, SIRI, CARDI, CASE), and establish new research mandates for targeted products. In addition, support should be given to farmers' efforts to access technology (e.g. irrigation, tillage, harvest and post-harvest technologies).

New approaches to agricultural research and development, in keeping with current international best practice, will need to be examined. For example, on-farm demonstration and "model farms" should be coordinated with the activities of central research stations in a more cost-efficient and effective way. In addition,

Government, through RADA and in collaboration with research institutes and farmers' organizations, will support overseas study tours for local farmers.

### 2.10.1 Technology in Agriculture

The traditional plantation commodities, sugarcane, coffee, cocoa and coconut, as well as cattle (beef and dairy) continue to remain a priority to the Ministry of Agriculture and Fisheries. The non-traditional and emerging export crops – vegetables, root crops and herbs/spices/medicinal plants, and swine production remain on the priority list.

Current R&D efforts are broadly targeted to the areas of:

- Germplasm development/improvement (breeding, plant propagation, varietals selection, biotechnology)
- Agronomy and production systems
- Plant and animal health
- Value added product development

### 2.10.2 Agricultural Business Information System (ABIS)

The Agricultural Business Information System (ABIS) project was implemented by RADA with the goal of providing the appropriate information required to boost the capacity and competitiveness of stakeholders (primarily farmers) and provide better measurement of capacity and performance to Government.

The purpose of the project is to:

1. Establish and operate a database driven system to process data on stakeholders and their activities;
2. Be a repository of technical information (from new research and tried and proven cultural practices);
3. Assist stakeholders to buy and sell produce and production inputs and forecast key agricultural variables.

The ABIS uses traders who facilitate on-line linkages between prospective sellers and buyers of agricultural produce or production inputs. Trackers record in detail the monthly activities of representative samples of each stakeholder group and monitor the availability of produce and prevailing price levels in key foreign markets. Other activities undertaken by the project includes training of Eastern and Western Zone marketing officers and Pilot Farms are used for training in the Parishes of Hanover, Manchester, St. Mary and St. Ann.

## 2.11 Land Use and Administration

### 2.11.1 Land and Soils

Jamaica has a total area of 11,244 kilometres and is the third largest island in the Caribbean. Jamaica is 236 kilometres long and between 35 and 82 kilometres wide. The island is extremely mountainous. Less than one-fifth of the land is relatively flat in the form of coastal plains, inland valleys, flood plains and river terraces. Of the remainder, much of the land is very steep. The highest peaks are the Blue Mountains in the east which peaks at 2,256 metres. More than one-half of the country is at least 305 metres above sea level and over one- half of land has slopes of over 20 %.

About two-thirds of the country is covered by limestone, which is concentrated on the central and western parts of the island, and the other third by igneous and metamorphic rocks, shales and alluvium. There are four main groups of soils: (a) the soils of the upland plateau which account for approximately 64 % of the island's soils; (b) alluvial soils which are found on the relatively flat land estimated at 14 %; (c) the highland soils, found in the east and central region, account for 11 % and (d) the remaining soils account for 11 % of the total area of soils.

### 2.11.2 Land Use

The decline of agricultural holdings over the years and associated rural-urban drift, along with low productivity of agricultural lands are among the major factors that constrain agricultural production. According to the Census of Agriculture (2007), the total area in crops declined by 13% in eleven years, between 1996 and 2007, while the number of farm holdings increased by 21.8%. During the same period, the average size of holdings decreased from 2.2 hectares in 1996 to 1.4 hectares in 2007. The structure of the sector exhibits a profound dichotomy, as about two thirds of farms account for only 15 % of area in farm land. Issues relating to land use and administration include:

- Land under agricultural cultivation totaled 325,810 hectares in 2007
- Loss of agricultural lands including to human settlement and housing development
- Outdated Development Orders and land use plans that provide inadequate zoning of land for agricultural and related uses

In recent years, the contraction of lands under cultivation has continued, while significant holdings in the public and privates sectors continue to be under-utilized and idle. An increase in the acreage of lands under cultivation, as well as their increased productivity, is a necessary prerequisite for the revitalization of the agricultural sector.

### 2.11.3 Land Administration

The Rural Physical Planning Division (RPPD) of the MOAF is responsible for undertaking and maintaining comprehensive inventory and evaluation of the country's soils and land use resources. The activities carried out by the RPPD include:

- Planning and execution of local, regional and national soils and land use surveys
- Collection and analysis of data for land evaluation
- Giving advice on land use proposals and recommending lands for agricultural and non-agricultural purposes
- Providing advice on soil fertility management
- Giving advice on and making recommendations for land use and cropping practices
- Preparation of Rural Development Plans

The RPPD also has embarked on various initiatives such as fostering the amendments to Crown Property Vesting Act (Divestment) and the amendments to Local Improvement Act (local government reform).

The Land Settlement Schemes were set up by GOJ to make land and housing accessible and affordable and to provide security of tenure to lower socio-economic groups. Under the Land Administration Management Project (LAMP), titles were issued with the passage of a Special Provisions Act in 2005, which saw the reduction in processing fees required for transactions. The GOJ is concentrating on acceleration of land titling as a priority, including development of a national cadastral map of Jamaica.

## 2.12 Environmental Issues

Agricultural practices can have an adverse impact on the natural environment. Pollution of soil, water and air, fragmentation of habitats and loss of wildlife can be the result of inappropriate agricultural practices and land use. The agricultural sector, and especially farmers, must be encouraged to head off the risks of further environmental degradation and play a positive role in the maintenance of the countryside and the environment by targeted rural development measures which ensure profitability in farming operations and at the same time conserve the natural environment. National agri-environmental programmes which promote proper agricultural practices include integrated farm management and organic agriculture, management of low-intensity pasture systems; preservation of landscape and historical features such as woods, marshes and mangroves, rivers and streams and conservation of natural habitats and their associated biodiversity. These programmes can have a range of beneficial environmental effects including soil conservation, improved soil fertility, carbon sequestration, and improved water availability.

### 2.12.1 Water Resources and Watershed Management

Agriculture is the major user of the island's water resources accounting for 75% of annual water consumption, compared with 15% for urban domestic water supply, and 10% for other uses including industrial use, rural domestic water supply and tourism. Jamaica is divided into 26 watershed management units, each of which has portions considered to be very degraded, with higher levels of soil erosion, increasing siltation and turbidity, and reduced quality of water being experienced in 19 of the 26 watershed management units. Agriculture may affect the availability and quality of freshwater in several ways, including through:

- Over-intensive cultivation on steep slopes, resulting in soil erosion where proper soil conservation techniques are not used
- Poisonous residues from agricultural chemicals affecting freshwater sources
- Leakages of fertilizers which contribute to water pollution and eutrophication

### 2.12.2 Bio-Diversity

Agriculture also affects bio-diversity through the impact of land cultivation on habitats and fragile ecosystems. For example, large-scale cultivation of coffee has taken place in the Blue Mountains over the past three decades, replacing some of the most biodiverse habitats in the mountains. Jamaica's marine resources are also threatened by unsustainable harvesting and inadequate fisheries management, and Jamaican waters have been declared the most over-fished in the entire CARICOM area. Biodiversity also may be affected over the long term by unforeseen effects of the introduction of genetically modified crops.

### 2.12.3 Waste Generation and Pollution

The agricultural sector also contributes to waste generation and pollution through a number of sources, including sewage from manure produced by intensive livestock breeding (e.g. pig farms), adverse effects from agricultural chemicals and fertilizers, and disposal of dunder as a byproduct of rum production.

### 2.12.4 Land Degradation and Deforestation

Degradation of agricultural land and decline in soil fertility are long-term threats to food security and sustained agricultural productivity, including in developing countries. Soil productivity can decline as a result of a range of factors, including wind and water erosion of exposed topsoil, soil compaction, loss of soil organic matter and water holding capacity, salinization of soil and irrigation water, and overgrazing. Deforestation also is a threat, resulting from clearing of hillsides, illegal settlements, conversion to monoculture farming and uncontrolled harvesting. The impacts of deforestation include watershed and water quality degradation, increased soil erosion, siltation of coral reefs, loss of biodiversity and habitats, and increased flooding effects. Total forest area in Jamaica fell from 3,439.4 sq. km. in

1989 to 3,402.1 sq. km. in 1998, representing an annual deforestation rate of 0.1%. Only 30% of the island has natural forest remaining, and only 8% represents closed primary forest with minimal disturbance.

### 2.12.5 Environmental Initiatives

The agricultural sector has seen a number of environmental initiatives in recent years, aimed at reducing the harmful impacts of the sector on the environment. These include:

- Establishment of environmental codes of practice by the sugar and coffee industries
- Accession to Stockholm Convention on Persistent Organic Pollutants (POP), Stockholm, 2001

## 2.13 Rural Development Policy

The agricultural sector is crucial to sustainable rural development and can provide an improved quality of life for rural dwellers, contribute to food security through local production, provide increase in foreign exchange through export agriculture, reduce unemployment and under-employment, stem rural-urban migration and maintain the livelihoods and culture of rural peoples.

The Planning Institute of Jamaica (PIOJ) has formulated a draft Sustainable Rural Development Policy which was prepared in 2004. Agriculture has a critical role to play within rural development strategies and the modernization of agriculture should be a central theme in any Sustainable Rural Development Policy, as it means not only improvements at the farming level but creates backward and forward linkages with the larger rural economy. The modernization of the agricultural sector also will make agricultural investment more attractive to young people, many of whom who do not now see the linkages between agriculture and a better way of life.

The vision for any sustainable rural development policy must include the preservation of the character of rural life. The cultural identity of rural populations should be preserved as special and not replaced with urban values. The rural character and spirit should never be compromised in the modernization of rural areas. The uniqueness of the Jamaican culture is rapidly being eroded by a lack of recognition of its importance. This uniqueness is the quality that endears visitors to our shores and these qualities can be used to promulgate the development of ecotourism and heritage tourism investments in agricultural areas.

Rural development also should contribute to the achievement of equity and equality of opportunities, particular with regards to gender and age considerations, especially since it has been shown in several studies that rural non-farm employment is the primary source of employment for rural women and young rural people.

## 2.14 Food Security

Food Security is defined as *"a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."* [6]

Food security may be considered to have three dimensions: food availability; accessibility; and biological utilization. Food availability considers how domestic food requirements are met, whether from local production or imports. Food access relates to the ability of households and individuals to have the resources necessary to obtain food for nutritious diets, while utilization takes into account socio-economic aspects of household food security including food preparation and conversion of food into energy. Food insecurity exists when individuals are unable to meet their food needs, either on a chronic or transitory basis.

On average, food accounts for approximately 43% of the consumption expenditure of Jamaicans, which means that food accounts for the greatest proportion of national consumption and leaves consumers vulnerable to price shocks.[7]

Over the three decades, Jamaica has moved increasingly toward a higher fat, more refined diet,[8] and these dietary changes contribute to obesity and nutrition-related chronic diseases. Despite progress, the country has not fully achieved the objectives of the Food and Nutrition Policy[9] to provide adequate food and nutrition for all, due in part to issues of affordability and poor food choices. Nutrition is particularly important to the health of certain population groups, including children, adolescents, pregnant and lactating women, and the elderly. Our country remains at risk with respect to the supply of adequate nutrition to vulnerable segments of our population, and therefore the long-term health of the population is at risk.

The need for food security has emerged as a national priority, as global economic and environmental forces combine to threaten long-term food supply and prices. The agricultural sector makes an important contribution to food security through domestic food production. The national strategy for food security integrates actions among health, environment, agriculture, foreign trade and hazard mitigation. Food security for Jamaica will provide for adequate, safe food supplies for proper dietary requirements, increased domestic food production for the population, informed food choices for a healthy lifestyle, and mitigation against food shortages resulting from natural and man-made hazards and emergency situations.

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[6] Food and Agricultural Organization. 2002. *The State of Food Insecurity in the World 2001*. Rome.

[7] Ministry of Agriculture. (2008). *Food Security in Jamaica.* p. 20.

[8] Turner-Pitt and Edwards (2006). *Situational Analysis of Food and Nutrition in Jamaica*. Ministry of Health, Kingston.

[9] The Food and Nutrition Policy was first established in 1974 and has since undergone several revisions. The policy is currently undergoing further revision.

## 2.15 Policies and Programmes

In order to carry out its mission and achieve the goals and objectives implied by its vision, the Ministry has been developing a number of policies and operational plans which are currently being pursued such as the Draft Plant Health Policy, Draft Animal Health Policy, Draft Organic Agriculture Policy, National Fisheries Policy, Banana Industry Policy, Biosafety Policy and Biosafety Act. The goals of the agriculture sector as expressed in the Vision 2030 Jamaica Agriculture Sector Plan are for:

1. Efficient Competitive Diversified Value-Added Agricultural Production
2. Strong Marketing Systems for Domestic and Export Markets
3. Competent and Adequate Human Resources
4. Enabling and Facilitating Framework, Infrastructure and Support Services
5. Contributor to Long-Term Rural Development
6. An Environmentally Sustainable Sector
7. National Food Security

## 2.16 Demographics and Labour Force

The demographic structure and labour force of the agricultural sector is also relevant to the planning for the long-term development of the sector. The main sources of information on these aspects of the sector are the decennial *Census of Agriculture* and the annual *The Labour Force* publications of the Statistical Institute of Jamaica (STATIN). Based on the 2007 Census of Agriculture carried out by STATIN there were a total of 210,853 individual holders of agricultural lands of which 139,965 or 66.3% were male. The Census indicated the extent of the demographic challenge facing the sector as 33% of holders of agricultural lands in 2007 were 55 years and over in age.

## 2.17 Educational and Training Institutions for Agricultural Studies

### 2.17.1 College of Agriculture, Science and Education (CASE)

The College of Agriculture, Science and Education, a multidisciplinary tertiary institution, is committed to providing education and training of the highest quality in agriculture, science, and teacher education (and allied disciplines) to men and women in Jamaica, and also other Caribbean countries, through teaching, research and outreach.

Currently, the academic programmes of the Faculty of Agriculture are the:

- Diploma in Agriculture
- Associate of Science Degree in General Agriculture
- Bachelor of Technology in Agri-Production & Food Systems Management

The future development of CASE includes the potential for upgrading to full University status.

### 2.17.2 Ebony Park

The HEART Trust/NTA continues to prepare certified workers to successfully pursue careers in the agricultural sector. The Trust, with the assistance of industry partners, has invested heavily in agro processing technology and has a close collaborative relationship with the College of Agriculture, Science and Education. Its flagship training institution, the Ebony Park Academy in Toll Gate, Clarendon offers multi-disciplinary curriculum in agricultural skills. It also serves as a demonstration site where farmers can observe appropriate layout and disciplined systematic approach to agricultural enterprises, and be introduced to new crops and advanced farming techniques.

### 2.17.3 Secondary Institutions

There are also some secondary schools which offer agricultural training. These include Carron Hall Vocational School, Knockalva Agricultural School and Sidney Pagon High School.

### 2.17.4 School of Agriculture (UWI St. Augustine Campus, Trinidad)

The University of the West Indies (UWI) has its School of Agriculture in Trinidad, which comprises the departments of Agricultural Economics & Extension, Food Production, and Life Sciences, has a long history in teaching, research and outreach activities in Tropical Agriculture. Students are part of a school that is committed to solving agricultural and environmental problems of the tropics and benefit not only from the experience and expertise the Faculty has to offer. Students have the opportunity to participate in exchange programmes with the Universities of Wisconsin-Madison, Virginia Tech, Grand Valley State, Florida International and Georgia, thus allowing them to broaden their experience, understanding and perception of agriculture in a different environment.

## 2.18 Youth in Agriculture

The future of the farming sector in Jamaica depends on the involvement of a new generation of farmers. Against the background of the aging population of farmers, and constraints faced by a growing number of young people who wish to go into farming, the Ministry of Agriculture and Fisheries has created a Youth in Agriculture Programme to encourage entrepreneurial opportunities for young people, through agricultural investment.

The main objectives of the Youth in Agriculture Programme are:

- To promote involvement of young people in farming activities
- To contribute to employment among 18-30 year olds

- To stem rural-urban drift
- To attract young graduates from tertiary institutions to view agriculture as a viable career and business

## 2.19 Trade Policy

With the rapidly changing global environment, Jamaica, along with other countries within the CARICOM region, is engaged in major trade negotiations that impact on agriculture. The most important at this time are the WTO Doha Round of Trade Negotiations, and the ACP/EU Negotiations. Active participation in all the relevant fora and a consistent policy aimed at maximizing Jamaica's advantages, fostering competitiveness and promoting agricultural development will be pursued.

### 2.19.1 Agricultural Trade Policy

In order to tackle the trade challenges faced by the country the Government has drafted the Agricultural Trade Policy to guide Jamaica's international negotiating positions and domestic trade policy, with the following objectives:

- Differential treatment for Jamaica's agricultural products and support measures by Government
- A slower pace of liberalization
- Assistance from the international community to make adjustments to changes in market conditions for traditional exports
- Consolidation of recent agreements regarding the subsidizing of agricultural exports of developed countries
- Adherence to international standards for increased competitiveness including those pertaining to food safety

### 2.19.2 Caribbean Community (CARICOM)

The implications of the CARICOM Single Market and Economy (CSME) for the domestic agricultural sector will be monitored with a view to ensuring that adequate safeguards are in place. This will facilitate the enactment of measures designed to safeguard domestic producers and assist exporters of agricultural products.

The Treaty of Chaguaramas establishing the Caribbean Community including the Caribbean Common Market was signed by Barbados, Guyana, Jamaica and Trinidad and Tobago on 4$^{th}$ July, 1973 and came into effect on 1$^{st}$ August, 1973. The Caribbean Community and the Caribbean Common Market replaced the Caribbean Free Trade Association. Jamaica is one of the now fifteen (15) Member Countries of CARICOM, which also has five (5) Associate Member Countries.

The CARICOM Single Market and Economy (CSME) is intended to create one large market and integrated economic zone among the participating member states.

The Single Market and Economy (CSME) will be implemented through a number of phases, the first having been the CARICOM Single Market (CSM). Key elements of the CSME include:

- Free movement of goods and services
- Free movement of labour
- A Common External Tariff and Trade Policy
- Free circulation and Free movement of capital
- Right of Establishment
- Harmonization of Laws
- Coordination of Economic, Fiscal and Monetary Policy measures

## 2.20 Issues and Challenges

### 2.20.1 Competitive Production

Jamaica's agricultural sector will have to achieve competitive production levels in order to reverse the declining trends that have characterized its path over the past two decades. The loss of competitiveness of agricultural production has manifested in the trade balance through declining exports and rising imports, and also has been evident in those traditional crops that have seen reduction in preferential treatment in export markets, particularly sugar and bananas. The factors that constrain competitiveness in the agricultural sector include small size of landholdings, high cost of inputs, praedial larceny, and limited application of modern technology and efficient production systems. The improvement of long-term competitiveness will require a number of measures; including:

- Increased use of modern technology in all areas of agricultural production including disease and pest control, farm management, and improved crop varieties
- Adoption of farm systems with the potential for higher productivity including greenhouse and hydroponics
- Use of model farms for demonstration of new technologies and farm practices
- Increased business approach to farming and use of commercial farm practices

### 2.20.2 Extension Services

The extension services will have to be strengthened in order to assist farmers in making the transition to more modern and efficient farm practices particularly in the small farmer sub-sector. The following measures will assist in improving the extension services:

- Increasing the number and capacity of extension officers including thorough training and logistical support
- Increased role of farmers organizations and private sector in provision of extension services

- Collaboration between RADA and other government agencies and programmes including the Social Development Commission (SDC) and National Poverty Eradication Programme (NPEP), as well as with non-governmental organizations (NGOs) and community- based organizations (CBOs)

### 2.20.3 Infrastructure

Improvement in competitiveness also will require investment in key infrastructure of the sector including:

- Improved maintenance of feeder roads in key agricultural areas
- Enhanced irrigation works in keeping with the National Irrigation Development Strategy
- Sorting, grading and packaging facilities as part of the marketing strategy
- Warehousing and storage facilities including cold storage

### 2.20.4 Marketing

The agricultural sector experiences a number of weaknesses in the marketing of its products, including high levels of informality in marketing and distribution channels, limited market information services, lack of a coordinated marketing system and relatively weak linkages to non-traditional export markets. The challenges involved in the expansion of markets for Jamaican produce may include:

- Development of a branding strategy for agricultural products to encourage consumers to value the Jamaican brand locally and abroad. The strategy should be to align these products with the mystique of Jamaica as a brand itself, using the quality of the products, the unique climatic conditions and topographical characteristics that enhance the flavour of most of the product offerings and tie it in with the image which Jamaica has as an exotic tourist destination. The development of labelling and packaging will add product differentiation characteristics even for primary products, which will assist in showcasing the products to the positive attention of consumers. Labelling or packaging of products emphasizing the Jamaican brand would have to be quality products so as not to tarnish the Jamaican image.
- Providing greater interaction with customers, through sensitization sessions, meetings, workshops and conferences, farm visits, media advertisements and programmes etc.
- Putting emphasis on diversification and quality products such as organic, hydroponics, greenhouse and fair trade products which can form the basis for new niche markets
- Carrying out market studies and surveys to determine the needs of Caribbean migrants in the US, UK and Canada for Jamaican agricultural products with a view to improving market share in those niche markets
- Making use of the Caribbean Single Market, identifying potential markets for agricultural products which can have duty-free access to CSM countries

- Increasing information on possible markets and consumer needs, analyzing market trends and assessing relevant global and regional issues
- Providing training in marketing techniques and branding strategies for commodity organizations, farmers' associations, agro-processors and exporters
- Strengthening linkages with other sectors such as tourism, manufacturing and agro-processing to determine demand for products and to negotiate contracts and guaranteed markets
- Identifying new uses of existing products and re-packaging existing products in new ways

### 2.20.5 Demography and Human Resources

Managing the demographic trends within the sector will require a number of steps to ensure the long-term availability of adequate human resources, including:

- Training opportunities for existing farmers based on capacity for adaptation to the transformation of the sector
- Programmes to increase involvement of young people and entrepreneurs in agriculture
- Increased capacity of education and training institutions for agriculture

### 2.20.6 Land Use

Rural to urban migration has increased problems of squatting, uncontrolled development of land, deforestation and watershed deterioration. Agricultural lands are being lost to urban settlement and housing development, and now cover less than 40% of total land area, down from 62% in 1968. It will be important to ensure that long-term land use planning in Jamaica addresses the need to ensure sustainable use of the island's agricultural land resources, particularly prime agricultural land, and should include the following:

- Zoning of land for agricultural and related uses in land use plans and Development Orders
- Facilitating increased utilization of available agricultural lands including government-owned lands
- Targeting crop production to lands with optimal characteristics for each crop
- Expansion of opportunities for urban agriculture
- Consideration of zoning of agricultural lands approval process for land use applications

### 2.20.7 Structural Changes

The development of a suitable agricultural sector will require changes in the long-term structure of the sector, including:

- Consolidation of land holdings to create commercial farm units that are efficiently sized, including farmsteads, clusters and mother farms
- Strengthening of collaborative structures particularly among small farmers including for coordinated procurement and marketing

- Establishment of water users groups to improve efficiency of irrigation water use
- Grouping of farmers into economic blocs or clusters to achieve economies of size with centralized services to be provided by private contractor or large estate including shared use of farm equipment for operations such as tillage, cultivation and harvesting

### 2.20.8 Supporting Institutional and Legislative Framework

The sector will require an institutional and legislative framework that will provide support in a range of areas including the following:

- Coordinated policy, planning and regulatory framework provided by the Ministry, agencies and external organizations
- Enforcement of the amended Praedial Larceny Act
- Improved phytosanitary and quarantine facilities
- Marketing support systems for farmers including market information services (e.g. ABIS) and coordinated marketing system
- Access to credit through institutions that address the specific requirements of the agricultural sector

### 2.20.9 Research and Development Capacity

One of the challenges facing the long-term transformation of the sector is the limited capacity for research and. development (R&D), which will require a range of measures including:

- Strengthening R&D capacity of the public sector, agricultural research stations and other institutions
- Increasing the collaboration with the private sector in agricultural R&D
- Access to relevant research from regional and international sources

### 2.20.10 Linkages with other Economic Sectors

The strongest forward linkages between agriculture and other economic sectors are with tourism and agro processing which represent markets for agricultural produce, as well as with the transport and distribution sectors. Steps to increase the economic value of these linkages include:

- Improving coordination on production and marketing between farmers and end users including in tourism and agro-processing
- Ensuring consistency in quality and volumes delivered by farmers and end-user
- Minimizing delays in payment to farmers by end users

### 2.20.11 Forestry

Forest resources include approximately 336,000 hectares of total forest cover (or 30% of the island) with some 88,000 hectares of closed broadleaf forest.[10] The

[10] Forestry Department. (2001). *National Forest Management and Conservation Plan.*

long-term sustainable use of the island's forestry resources will be guided by the National Forest Policy and the National Forest Management and Conservation Plan, which seek to address the main challenges facing the sub-sector including:

- Protecting the forest resource from a wide range of threats including natural and man-made hazards, soil erosion, and illegal logging
- Restoring tree cover and conserving biodiversity of forest species
- Ensuring long-term economic contribution of forests including agro-forestry and fuelwood
- Enhancing the use of forests for recreation and tourism

### 2.20.12 Fisheries Development

The long-term development of Jamaica's marine fisheries resources will require the adoption of sustainable fishing practices to counter the threats to stocks of fish and crustaceans posed by over-harvesting, habitat destruction and pollution. A major challenge is the protection of the fishery resources from incursions by fishing vessels from other countries including Colombia and Honduras. The development of inland fisheries will require improved research and development, expanded infrastructure and fingerling production, and addressing the environmental impacts of aquaculture.

### 2.20.13 Environmental Issues

The long-term development of the sector also must address the many environmental issues associated with agriculture, including:

- Soil erosion from over – cultivation and inadequate soil conservation techniques in hillsides farming
- Use of chemicals fertilizers which pollute groundwater and food supplies
- Deforestation resulting from clearing of hillsides, illegal settlements, conversion to monoculture farming and uncontrolled harvesting of trees.

### 2.20.14 Agricultural Hazards

Weather related shocks accounted for the most significant losses in agricultural production during the period 2004-2008. Damage and losses to the agriculture sector from a combination of five hurricanes and two tropical storms were estimated at $15.0 billion. More efforts should therefore be generated in investigating mitigating strategies such as comprehensive risk insurance, early warning systems and strengthening linkages with emergency preparation and response systems at national and community levels. Measures to mitigate the effects of drought should continue to be concentrated on provision of suitable irrigation alternatives.

# 3. SWOT Analysis


Agriculture is an essential component in the sustainable development of nations. A standard tool of strategic analysis is SWOT analysis, which seeks to identify the main strengths, weaknesses, opportunities and threats for a given entity, ranging from a nation to a sector to an individual enterprise. For the Agriculture Sector in Jamaica the identification of strengths and weaknesses represents the internal assessment of the sector while the consideration of opportunities and threats represents the analysis of the external environment for the sector.

The SWOT analysis, along with the Situational Analysis, form the basis for identifying goals, objectives and strategies that may be employed to apply the strengths and address the weaknesses of the sector, and capitalize on the opportunities and mitigate the threats to the long-term development of the sector.

The SWOT analysis for Jamaica's Agriculture Sector is presented in Table 10 below.

**Table 10: SWOT Analysis – Agriculture**

| Internal Analysis | |
|---|---|
|  **Strengths** | **Weaknesses**  |
| • Strong human resource base: relatively highly qualified workforce at the technical levels<br>• Experienced and technical capacity of Ministry of Agriculture and Fisheries staff, which provides support services to the sector<br>• Access to technical information via internet and intranet by technical staff for dissemination to farmers<br>• Linkages with national and international organizations<br>• Agricultural Policy Framework and Medium Term Plan, Agricultural Development Strategy formulated to guide the development of the sector<br>• Development of local breeds of animals, including cattle breeds developed in Jamaica for local conditions<br>• Development of germplasm material for some plants<br>• Internationally recognized superior taste and quality of some crops (coffee, cocoa, ginger, pimento) which obtain premium prices from niche markets<br>• Local production of most poultry products consumed locally<br>• Experience in export of fresh and processed foods to the major markets of the US, Europe and Japan<br>• Various functioning farming organizations (Jamaica Agriculture Society, commodity boards and farmer associations)<br>• Secondary and tertiary level agricultural teaching institutions<br>• Strong farming traditions in some areas<br>• Farmers organizations supported by Government | • Government budgetary constraints resulting in inadequate research and development, deteriorating extension services and the inability to properly maintain and upgrade facilities and equipment<br>• Limited application of technology<br>• Use of inefficient/outdated technologies and production systems<br>• Weak linkages between other Sectors/Divisions/Departments<br>• Inability to consistently supply markets due to declining production and productivity<br>• Uncompetitive production of some local foods when compared with some imported foods<br>• Small size of landholdings<br>• Insecure land tenure arrangements and difficulties in obtaining land titles for many farmers<br>• High cost of inputs<br>• High levels of praedial larceny<br>• Poor marketing and distribution systems<br>• Inadequate infrastructure<br>• Farmers' organizations not well funded or supported by farmers<br>• Inadequate funding by Government for projects and programmes<br>• Average age of farmer over 55 years<br>• Young persons show little interest in agriculture<br>• Many farmers are poorly educated<br>• Limited agricultural research<br>• Locally developed breeds of animals |

| | |
|---|---|
| • Comparative advantage in some products<br>• Good quality agricultural lands available<br>• Different microclimates to sustain several types of crops<br>• Extensive network of roads<br>• Good ground water resources<br>• Irrigation systems in some areas<br>• Long-standing tradition and history of agricultural sector<br>• Access to technical information via internet and intranet by technical staff for dissemination to farmers | such as cattle at risk of extinction<br>• Loss of some plant germplasm material<br>• Limited credit facilities for farmers and other investors in the sector<br>• No venture capital facilities<br>• Communication between Government and the private interests in the sector weak<br>• Limited opportunity for farmer training and development<br>• Neglect of rural villages and towns<br>• Many large, medium and small tracts of agricultural land lying idle<br>• Poor condition of rural and farm roads<br>• High transportation cost<br>• Few available tractors or other equipment for hireage<br>• Poor ICT connectivity in deep rural areas and little use of cell phones for dissemination of information<br>• Poor farm business/management practices |

# SWOT Analysis

## External Analysis

### Opportunities

- Value-added production and niche markets for an increasing range of food products
- Possibilities for the introduction of new farm (including greenhouse cultivation, hydroponics etc.) and post harvest technologies
- Modernization of the sector would allow for more internationally competitive local production
- New production and marketing opportunities through organic and fair trade products
- Potential for satisfying demand from the tourism and manufacturing (agro-processing) sectors for agricultural goods and services
- Potential for increased profitability by negotiation of contracts on behalf of farmers to replace informal marketing arrangements
- Potential to produce animal feeds from local ingredients
- Expansion of fruit tree production for agro-processing and fresh fruit markets
- Livestock investment options becoming more competitive because of increased world prices for meat and dairy products
- Sugar cane industry can be expanded to include the production of ethanol for biofuels and bagasse for co-generation
- New and emerging markets such as China and India for some of our products such as coffee and pimento and other spices and herbs
- CSME could provide new markets and investments within CARICOM
- Increasing access to world markets under WTO regulations
- Possible utilization of Government and private lands for agricultural development
- Proximity to the US for exports and for imports of agricultural inputs

### Threats

- High level of reliance on imports
- High cost of capital
- Uncertainty of international funding for projects and other support systems
- Globalization – impact of further liberalization on an uncompetitive agricultural sector
- Impact of economic downturn on availability of government funding for agricultural sector
- Drastic reduction in preferential prices for major export crops of sugar and bananas
- Possible outbreak of diseases from external sources
- Aggressive international competition
- Degradation of environment/landscape
- Competing uses for agricultural lands such as for housing development
- Contamination of agricultural export shipments with contraband (e.g. illegal drugs such as marijuana) at our major sea ports and airports
- Climatic change due to global warming resulting in increasing frequency and severity of flooding and droughts, as well as greater intensity of hurricanes
- Rising prices of imported staples used for animal feeds and local consumption due to their global use as biofuels
- Rising price of imported oil and its impact on costs of inputs including transport and fertilizers
- Challenges in implementation of Common External Tariff (CET)
- Farmers lack information on Caribbean government supported programmes

| | |
|---|---|
| • Market led preference system<br>• Increased development of organic agriculture | • Lack of information of liberalization standards<br>• Increase in non-tariff trade barriers (e.g. WTO) |

# 4. Vision Statement for Agriculture Sector

The long-term process of planning for the Agriculture Sector is guided by a Vision that describes a future for the sector that is desirable for its stakeholders and that can be achieved through their own efforts within a realistic time frame. The Sector Plan contains an overall Vision for the Agriculture Sector, which reflects the contributions of the stakeholders represented on the Agriculture Task Force during the Vision 2030 Jamaica planning process.

## 4.1 Vision Statement

The Vision Statement for the Agriculture Sector for Vision 2030 Jamaica is:

> ***"The long-term vision is the dynamic transformation of the Jamaican Agricultural Sector. Within the ambit of a supportive and responsive environment of targeted government policies, programmes and institutional support, and commitment to human resource development, the sector will experience a sustained, research oriented, technological, market-driven and private sector led revolution, which revitalizes rural communities, creates strong linkages with other sectors and emphatically repositions the sector in the national economy. With clear focus on production of high value commodities which can command strategic advantage in the global marketplace, agricultural producers will operate highly integrated, competitive and profitable enterprises which significantly enhance wealth creation capabilities and at the same time, make considerable contribution to national food security, employment generation and the enhancement and sustainability of the environment."***

**Adapted from Agricultural Development Strategy**
**Ministry of Agriculture & Fisheries**
**www.moa.gov.jm**

### 4.1.1 Strategic Vision

The long-term strategic vision for the Agriculture Sector in Jamaica is built on a number of fundamental elements, including the following:

i) An Agriculture Sector that is competitive in Jamaica and in regional and international markets;

ii) An Agriculture Sector that is driven by private sector investment within a policy and regulatory framework that fosters competition and transparency;

iii) An Agriculture Sector that contributes to the long-term socio-economic development of Jamaica;

iv) An Agriculture Sector that is environmentally sustainable with increased use of renewable energy sources and minimal harmful environmental impacts; and

v) An Agriculture Sector that is knowledge-driven based on widespread use of appropriate technology and supported by relevant research and development.

This strategic vision is expressed in the strategic framework for the Agriculture Sector for Vision 2030 Jamaica presented below.

## 4.2 Strategic Planning Framework

### 4.2.1 Strategic Approach

The strategic planning for Jamaica's agriculture sector is based on the premise that agriculture is a fundamental component of the Jamaican economy, representing an enduring source of employment, income and export earnings. Domestic agricultural producers make an important contribution to the nation's food supply, while agricultural communities play central roles in rural development and natural resource management. However, the Jamaican agricultural sector has underperformed for decades, and has lost ground in global competitiveness. Under Vision 2030 Jamaica, the Agriculture Sector Plan lays out a clear roadmap to address the main factors that have limited the progress of this important sector, and to increase its contribution to economic and social development and environmental sustainability.

The Agriculture Sector Plan starts with measures to increase the competitiveness and productivity of agricultural production, including: increasing the application of capital equipment, small tools and mechanization; developing economies of scale through clustering of activities and facilities; strengthening the use of modern farming systems and best practices; diversifying into higher value-added production; and strengthening the application of technology, innovation, research and development to agricultural production. The Sector Plan includes specific strategies targeted at the development of key agricultural sub-sectors, including traditional and non-traditional crops, fisheries and forestry.

The drive for increased productivity is complemented by measures to enhance the marketing of agricultural products locally and internationally. These include: strengthening the collection, evaluation and dissemination of marketing information; development and upgrading of marketing networks and infrastructure; enhancing market access and promotion; and strengthening the application of

intellectual property rights and nation branding to the marketing of products from Jamaican agricultural and agro-processing industries.

To ensure an adequate supply of human resources with the requisite skills at all levels the Sector Plan will: broaden and strengthen the range of educational and training institutions and programmes for agriculture and related disciplines; encourage the participation of youth in agriculture; and strengthen long-term planning for agricultural labour force. The Sector Plan also seeks systematically to improve the most important aspects of the supporting environment for agriculture in Jamaica, including: modernizing the policy, legislative and regulatory framework; developing an effective framework to reduce praedial larceny; improving access to financing for agricultural enterprises and projects; strengthening facilitating institutions including government agencies and production and marketing organizations; improving the capacity and effectiveness of the extension service; modernizing and upgrading the infrastructure for water supply, irrigation, drainage and roads; and providing for satisfactory working conditions and the health and safety of employees in the agricultural sector.

The Sector Plan seeks to enhance the contribution of agriculture to rural development and agricultural sustainability by: promoting economic enterprises and entrepreneurship in rural agricultural communities; establishing a policy and planning framework to protect and develop suitable agricultural lands; building the capacity of community organizations; strengthening compliance with environmental regulations and standards; promoting organic farming; and strengthening risk and hazard mitigation for the sector. Finally, Vision 2030 Jamaica will strengthen national food security by: ensuring consistent and dependable access to adequate food supplies; enhancing affordability and safety of food supplies; promoting appropriate technology and techniques to increase efficiency of staple food production at lower costs and prices; encouraging home food production including backyard gardening; undertaking key food security projects; and promoting the consumption of healthy foods.

### 4.2.2 Goals and Outcomes

The seven (7) main goals and associated outcomes of the Agriculture Sector Plan are presented below. These goals represent the ultimate desired state of the agriculture sector through which we realize the Sector Vision. The Sector Outcomes represent the desired results which we seek to achieve under each goal. A range of indicators and targets aligned to the Sector Outcomes provide quantitative milestones against which progress in implementing the Agriculture Sector Plan over time may be measured.

**Table 11: Agriculture Sector Goals and Outcomes**

| GOALS | OUTCOMES |
|---|---|
| **1. Efficient Competitive Diversified Value-Added Agricultural Production** | 1.1 Increased Productivity and Cost Efficiency of Agricultural Enterprises |
| | 1.2 Diversified Range of Agricultural Production including Higher Value-Added Production |
| | 1.3 Strengthened Application of Technology, Innovation, Research and Development to Agricultural Production |
| | 1.4 Development of Key Agricultural Sub-Sectors |
| **2. Strong Marketing Systems for Domestic and Export Markets** | 2.1 Strong and Effective Marketing Information System |
| | 2.2 Supportive Marketing and Distribution Infrastructure and Network |
| | 2.3 Development of Expanded and New Markets for Jamaican Agricultural Products |
| **3. Competent and Adequate Human Resources** | 3.1 Provision of Work Force with Skills, Training and Education to Meet the Dynamic Needs of Sector |
| | 3.2 Adequate Long-Term Supply of Labour Force for Sector Development |
| **4. Enabling and Facilitating Framework, Infrastructure and Support Services** | 4.1 Appropriate Policy, Legislation and Regulations for Long-Term Development of Sector |
| | 4.2 Improved Access to Financing |
| | 4.3 Strengthened Facilitating Institutions |
| | 4.4 Strengthened Extension Services |
| | 4.5 Modernized and Upgraded Infrastructure |
| | 4.6 Satisfactory Working Conditions, Health and Safety of Sector Employees |
| **5. Contributor to Long-Term Rural Development** | 5.1 Provision of Sustainable Livelihoods for Agricultural Community Residents |
| | 5.2 Comprehensive Land Use Planning and Utilization for Agricultural Development |
| | 5.3 Establishment of a Culture of Holistic Community Development |
| **6. An Environmentally Sustainable Sector** | 6.1 High Application of Environmental Standards and Good Agricultural Practices (GAPS) |
| | 6.2 Organic Farming as Major Mode of Production |
| | 6.3 Strengthened Risk and Hazard Mitigation for Sector |
| **7. National Food Security** | 7.1 Increased Access to Adequate and Safe Food Supplies for Population |
| | 7.2 Increased Domestic Food Production |
| | 7.3 Improved Nutritional Status of the Population through Consumption of Healthy Foods |

### 4.2.3 Integration with the National Development Plan

Under Vision 2030 Jamaica, each Sector Plan is integrated with the strategic framework of the National Development Plan. The Agriculture Sector Plan is aligned with the National Development Plan under the following National Goal and National Outcome:

| | |
|---|---|
| National Goal #3: | Jamaica's Economy is Prosperous |
| National Outcome #12: | Internationally Competitive Industry Structures |

Consequently the implementation of the Agriculture Sector Plan will contribute primarily to the achievement of National Goal #3 and National Outcome #12 of the National Development Plan.

## 4.3 Sector Indicators and Targets

The proposed indicators and targets for the Agriculture Sector Plan over the period 2009 -2030 are presented in Table 12 below.

**Table 12: Agriculture Sector Plan – Proposed Indicators and Targets**

| Agriculture Sector Plan | | | | | |
|---|---|---|---|---|---|
| **PROPOSED OUTCOME INDICATORS** | **BASELINE** | **PROPOSED TARGETS** | | | **COMMENTS** |
| | **2007 or Most current** | **2012** | **2015** | **2030** | |
| **Agricultural production index (2003=100)** | 95.9 | 105.9 | 112.4 | ≥150 | The FAO projects that global demand for and growth in agriculture products will average 2% annually for the next 30 years. Targets for Jamaica are set using this projection |
| **% change in exports of non-traditional agricultural products (%)** | | **>5%** | **11%** | **19%** | |
| **Irrigated land as % of total cropland (%)** | **8.8%** | | | | |

# 5. Implementation, Monitoring & Evaluation Framework for the Agriculture Sector

## 5.1 Implementation Framework

The implementation of the Agriculture Sector Plan is an essential component of the implementation, monitoring and evaluation framework for the Vision 2030 Jamaica – National Development Plan. The Plan is implemented at the sectoral level by ministries, departments and agencies (MDAs) of Government as well as non-state stakeholders including the private sector, NGOs and CBOs. The involvement of stakeholders is fundamental to the successful implementation of the National Development Plan and the Agriculture Sector Plan.

### Components of Vision 2030 Jamaica

The Vision 2030 Jamaica - National Development Plan has three (3) components:

1. **Integrated National Development Plan:**
   The integrated National Development Plan presents the overall plan for Vision 2030 Jamaica, integrating all 31 sector plans into a single comprehensive plan for long-term national development. The integrated National Development Plan presents the National Vision, the four National Goals and fifteen National Outcomes, and the National Strategies required to achieve the national goals and outcomes.
2. **Medium Term Socio-Economic Policy Framework (MTF):**
   The Medium Term Socio-Economic Policy Framework (MTF) is a 3-yearly plan which summarizes the national priorities and targets for the country and identifies the key actions to achieve those targets over each 3-year period from FY2009/2010 to FY2029/2030.
3. **Thirty-one (31) Sector Plans:**
   At the sectoral level Vision 2030 Jamaica will be implemented through the strategic frameworks and action plans for each sector as contained in the respective sector plans. Vision 2030 Jamaica includes a total of thirty-one (31) sector plans covering the main economic, social, environmental and governance sectors relevant to national development.

### 5.1.1 Accountability for Implementation and Coordination

The Cabinet, as the principal body with responsibility for policy and the direction of the Government, has ultimate responsibility for implementation of the National Development Plan. Each ministry and agency will be accountable for implementing the National Development Plan (NDP) through various policies, programmes and interventions that are aligned with the strategies and actions of the NDP and the sector plans. A robust results-based monitoring and evaluation system will be

established to ensure that goals and outcomes of the Plan are achieved. This system will build on existing national and sectoral monitoring and evaluation frameworks and will be highly participatory.

### 5.1.2 Resource Allocation for Implementation

Vision 2030 Jamaica places great emphasis on ensuring that resource allocation mechanisms are successfully aligned and integrated with the implementation phase of the National Development Plan and sector plans. The requirements to ensure resource allocation for implementation will include alignment of organizational plans in the public sector, private sector and civil society with the National Development Plan, MTF and sector plans; coherence between the various agency plans with the National Budget; rationalization of the prioritization process for public sector expenditure; and increased coordination between corporate planners, project managers and financial officers across ministries and agencies.

## 5.2 Monitoring and Evaluation Framework

### 5.2.1 Institutional Arrangements

A number of institutions and agencies, including the following, will be involved in the monitoring and evaluation framework for the National Development Plan and the Agriculture Sector Plan:

1. **Parliament**: The Vision 2030 Jamaica Annual Progress Report will be presented to the Parliament for deliberations and discussion.

2. The **Economic Development Committee (EDC)** is a committee of Cabinet chaired by the Prime Minister. The EDC will review progress and emerging policy implications on the implementation of Vision 2030 Jamaica and the relevant sector plans.

3. The **Vision 2030 Jamaica Technical Monitoring Committee (TMC)**, or Steering Committee, is to be chaired by the Office of the Prime Minister and will provide oversight for the technical coordination and monitoring of the Plan and reporting on the progress of implementation.

4. The **Vision 2030 Jamaica Technical Secretariat** to be institutionalized within the PIOJ will play a leading role in coordinating implementation, analyzing social and economic data and information, consolidating sectoral information into comprehensive reports on Vision 2030 Jamaica's achievements and results, maintaining liaisons with sectoral focal points in MDAs, and supporting the establishment and operation of Thematic Working Groups.

5. **Ministries, Departments and Agencies (MDAs)** represent very important bodies within the implementation, monitoring and evaluation system. They are the Sectoral Focal Points that will provide data/information on a timely basis on the selected sector indicators and action plans, and be responsible for the timely preparation of sector reports that will feed into the Vision 2030 Jamaica Annual Progress Report. For the Agriculture Sector Plan, the main MDAs comprising the relevant Sectoral Focal Point will include the Ministry of Agriculture and Fisheries, and the Rural Agricultural Development Authority.

6. **Thematic Working Groups (TWGs)** are consultative bodies aimed at providing multi-stakeholder participation in improving the coordination, planning, implementation and monitoring of programmes and projects relevant to the NDP and sector plans, including the Agriculture Sector Plan. TWGs will be chaired by Permanent Secretaries or senior Government officials and shall comprise technical representatives of MDAs, National Focal Points, the private sector, Civil Society Organizations and International Development Partners. TWGs will meet a minimum of twice annually.

### 5.2.2 Indicator Framework and Data Sources

Appropriate indicators are the basic building blocks of monitoring and evaluation systems. A series of results-based monitoring policy matrices will be used to monitor and track progress towards achieving the targets for the NDP and sector plans, including the Agriculture Sector Plan. The performance monitoring and evaluation framework will be heavily dependent on line/sector ministries for quality and timely sectoral data and monitoring progress.

The results-based performance matrices at the national and sector levels comprise:

- At the national level, 60 proposed indicators aligned to the 15 National Outcomes
- At the sector level, a range of proposed indicators aligned to the sector goals and outcomes
- Baseline values for 2007 or the most recent past year
- Targets which outline the proposed values for the national and sector indicators for the years 2012, 2015 and 2030
- Data sources which identify the MDAs or institutions that are primarily responsible for the collection of data to measure and report on national and sector indicators
- Sources of targets
- Links to existing local and international monitoring frameworks such as the MDGs

Some gaps still exist within the performance matrix and a process of review to validate the proposed indicators and targets is being undertaken. This process is

very technical and time consuming and requires significant cooperation and support from stakeholders and partners. The performance monitoring and evaluation framework will be heavily dependent on ministries for quality and timely sectoral data and monitoring progress. The system will benefit from our existing and relatively large and reliable statistical databases within the Statistical Institute of Jamaica (STATIN) and the PIOJ.

### 5.2.3 Reporting

The timely preparation and submission of progress reports and other monitoring and evaluation outputs form an integral part of the monitoring process.

The main reports/outputs of the performance monitoring system are listed below.

1. **The Vision 2030 Jamaica Annual Progress Report** will be the main output of the performance monitoring and evaluation system.

2. **The annual sectoral reports** compiled by the Sectoral Focal Points for submission to the Vision 2030 Jamaica Technical Monitoring Committee. These will be integrated into the Annual Progress Report.

3. **Other products** of the performance monitoring system include issues/sector briefs and research reports.

### 5.2.4 Capacity Development

There is recognition that building and strengthening technical and institutional capacity for the effective implementation, monitoring and evaluation of the NDP and the Agriculture Sector Plan is critical for success. This calls for substantial resources, partnership and long-term commitment to training MDA staff. Training needs will have to be identified at all levels of the system; a reorientation of work processes, instruments, procedures and systems development will have to be undertaken; and staffing and institutional arrangements will need to be put in place. Partnership with the Management Institute for National Development (MIND) and other institutions also will be required to provide training to public sector staff and others in critical areas such as results-based project management and analysis, monitoring and evaluation, and data management.

## 5.3 The Way Forward

The Agriculture Sector Plan represents the basis for implementation of the Vision 2030 Jamaica – National Development Plan in the Agriculture sector. Some key steps in the implementation process for the Agriculture Sector Plan include:

1. Undertake consultations with stakeholders in the sector to present and review the Agriculture Sector Plan for Vision 2030 Jamaica;

2. Engage with key stakeholders including relevant Ministries, Departments and Agencies (MDAs) to finalize sector-level indicators and targets for the Agriculture Sector Plan for 2012, 2015 and 2030;

3. Mainstream the Agriculture Sector Strategic Framework and Action Plan into the Corporate/Business and Operational Plans of the relevant MDAs as the mechanism for implementation in the public sector; and

4. Ensure participation by key Agriculture sector stakeholders in the establishment and ongoing operation of the implementation, monitoring and evaluation framework for Vision 2030 Jamaica, including the Sectoral Focal Point and Thematic Working Group for the Agriculture Sector Plan.

# 6. Action Plan for the Agriculture Sector

The Action Plan represents the main framework for the implementation of the Agriculture Sector Plan for Vision 2030 Jamaica. The tracking of implementation of the Agriculture Sector Plan will take place through the Action Plan as well as the framework of sector indicators and targets.

The Action Plan contains the elements listed below.

i. Sector Goals
ii. Sector Outcomes
iii. Sector Strategies
iv. Sector Actions
v. Responsible Agencies
vi. Time-Frame

**VISION 2030 JAMAICA**
**AGRICULTURE SECTOR PLAN**
**DRAFT STRATEGIC FRAMEWORK AND ACTION PLAN**

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | | | |
| **Goal #1: Efficient Competitive Diversified Value-Added Agricultural Production** | | | | |
| 1.1 Increased Productivity and Cost Efficiency of Agricultural Enterprises | 1.1.1 Encourage greater use of modern and appropriate equipment, tools and techniques among farmers | 1.1.1.1 Develop and implement farm mechanization programme | MOAF, RADA | Years 1-6 |
| | | 1.1.1.2 Increase small farmers production and productivity by the utilization of appropriate farm machinery, small tools and implements through acceleration of the small farm mechanization programme | MOAF, RADA | Years 1-6 |
| | | 1.1.1.3 Implement Tractor Programme island-wide | MOAF, RADA | Years 1-6 |
| | | | | |
| | 1.1.2 Promote increased labour productivity | 1.1.2.1 Promote use of performance-based incentive systems to encourage increased productivity among medium and large farmers | Private Sector, JAS, MOAF, RADA | Years 1-6 Ongoing |
| | | 1.1.2.2 Promote best practice in worker motivation and labour relations in agricultural enterprises | Private Sector, JAS, MOAF, RADA | Years 1-6 Ongoing |
| | | 1.1.2.3 Build technical capabilities and capacities of farmers | MOAF, RADA | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | 1.1.3 Identify production systems that are appropriate to production zones and size of enterprise | 1.1.3.1 Apply comprehensive soil profile for agricultural lands to guide crop selection and care in respective production zones | MOAF, RADA | Years 1-6 Ongoing |
| | | 1.1.3.2 Establish system of crop zoning based on suitability of soil types and growing conditions, with regards to optimizing crop yields, production and productivity | MOAF, RADA | Years 1-6 |
| | | 1.1.3.3 Promote use of dry farming systems that are appropriate to relevant production zones | MOAF, RADA | Years 1-6 Ongoing |
| | | | | |
| | 1.1.4 Develop modern, efficient farming systems through research and application of local and international best practices | 1.1.4.1 Provide training for agricultural enterprises and farmers in more efficient management systems and record keeping, modern business practices, quality standards, project proposal development, pricing and marketing products | MOAF, RADA, JAS | Years 1-6 Ongoing |
| | | 1.1.4.2 Promote the use of protected cultivation for specific crops (including greenhouse technology) | MOAF, RADA, JAS, Private Sector | Years 1-6 Ongoing |
| | | 1.1.4.3 Encourage clustering of farm activities to take advantage of shared knowledge, technology on production methods, and marketing of crops or livestock | MOAF, RADA, JAS, Private Sector | Years 1-6 Ongoing |
| | | 1.1.4.4 Develop model farms and demonstration plots at strategic points island-wide | MOAF, Private Sector | Years 1-6 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 1.1.4.5 Strengthen Crop Care Programmes in Pest and Pesticide Surveillance, Technology Transfer, and Training in order to meet needs of local agriculture sector and international trade | MOAF, RADA | Years 1-6 |
| | | 1.1.4.6 Continue to strengthen Integrated Pest Management (IPM) approaches | MOAF, RADA, JAS, Private Sector | Years 1-6 Ongoing |
| | | 1.1.4.7 Encourage collaboration and collective buying of inputs to obtain lower unit cost of supplies and cheaper agricultural inputs | MOAF, RADA, JAS, Private Sector | Years 1-6 Ongoing |
| | | 1.1.4.8 Expand Farmers' Registration Programme | RADA | Years 1-6 Ongoing |
| | | 1.1.4.9 Recommend and promote Quality Standards/ Guidelines for existing products and establish standards for new products | BSJ | Years 1-6 Ongoing |
| | | 1.1.4.10 Develop National Industry Standards Manuals for agricultural sub-sectors, including technical, environmental, health and safety standards | MOAF, RADA, PMOs, JOAM, NEPA | Years 1-6 Ongoing |
| | | 1.1.4.11 Strengthen training of farmers in application of Good Agricultural Practices (GAPS) | RADA | Years 1-6 Ongoing |
| | | 1.1.4.12 Ensure compliance with standards for local and international markets including labeling, packaging and food safety and the use of acceptable processes such as HACCP | MOAF, BSJ, MIIC, SRC, JIPO, AAAJ, RADA, Packaging Companies | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 1.1.4.13 Redevelop uniform seed quality standards (including seed health) for locally produced and imported seed | MOAF | Years 1-3 |
| | | 1.1.4.14 Improve on-farm post-harvest practices | RADA, Processors, SRC, R&D Institutions | Years 1-6 Ongoing |
| 1.2 Diversified Range of Agricultural Production including Higher Value-Added Production | 1.2.1 Utilize value chain approach | 1.2.1.1 Analyze the value chain for agriculture including local and international links and identify strengths of Jamaican producers | MOAF, RADA, JAS, Private Sector | Years 1-6 Ongoing |
| | | 1.2.1.2 Implement ITC sub-sector strategies for roots & tubers, fruits & vegetables, herbs & spices | MOAF, ITC | Years 1-3 |
| | | 1.2.1.3 Apply participatory methodology to develop and implement sub-sector strategies for other commodities using the value chain approach | MOAF, ITC | Years 4-9 |
| | | 1.2.1.4 Undertake Value Chain Analysis of Jamaican dairy and beef cattle industry | MOAF, JLA, FAO | Years 1-3 |
| | | 1.2.1.5 Identify possible SME clusters by certain criteria such as survey of the area (geographical) and commodities, size etc. | Farmers groups, PMOs, MOAF | Years 1-3 |
| | | 1.2.1.6 Develop clusters to integrate rural agricultural producers and micro, small and medium enterprises into the production and marketing/trade chains | Farmers groups, PMOs, MOAF | Years 1-6 Ongoing |
| | 1.2.2 Promote cropping models | 1.2.2.1 Support development of business plans for farmers based on production levels and | MOAF, RADA | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | which increase the number of crops and other enterprises being carried out simultaneously or in efficient sequence | efficient cropping systems | | |
| | | 1.2.2.2 Prepare Opportunity Profiles for various crops and livestock options | MOAF, RADA | Years 1-6 Ongoing |
| | | 1.2.2.3 Prepare farm models for various crops and livestock options | MOAF, RADA | Years 1-6 Ongoing |
| | | | | |
| 1.3 Strengthened Application of Technology, Innovation, Research and Development to Agricultural Production | 1.3.1 Increase application of information and communication technology (ICT) to agricultural production | 1.3.1.1 Implement electronic Extension Activity Reporting System (EARS ) | MOAF, RADA | Years 1-3 |
| | | 1.3.1.2 Develop land use geo-spatial database | MOAF (Rural Physical Planning) | Years 1-6 |
| | | 1.3.1.3 Expand application of e-government to the agricultural sector, including approval of veterinary import permits | MOAF, OPM | Years 1-6 Ongoing |
| | 1.3.2 Develop and strengthen partnerships between the private sector and research and development institutions | 1.3.2.1 Initiate public and private-sector partnerships for funding of adaptive market-driven research | MOAF, SRC, Tertiary Institutions, Private Sector | Years 1-6 Ongoing |
| | | | | |
| | 1.3.3 Strengthen | 1.3.3.1 Rehabilitate and modernize government agricultural research stations | MOAF | Years 1-9 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | agricultural research institutions and programmes | 1.3.3.2 Establish a Centre of Excellence for advanced technology (CEATA) to drive research and technological dissemination in agriculture | MOAF | Years 1-3 |
| | | 1.3.3.3 Strengthen capacity of CEATA to coordinate the research agenda and the development of agricultural education | MOAF, CARDI | Years 1-6 Ongoing |
| | | 1.3.3.4 Increase the number of internationally accredited laboratories | MOAF (Rural Physical Planning) | Years 1-6 Ongoing |
| | | 1.3.3.5 Promote conservation of select root crop, vegetable and fruit tree germplasm | MOAF, CARDI, SRC | Years 1-6 |
| | | 1.3.3.6 Promote and strengthen conservation, research and export of genetic material including livestock and endemic species | MOAF, CARDI, SRC, Tertiary Institutions, Private Sector | Years 1-6 Ongoing |
| | 1.3.4 Improve the delivery of research results to producers | 1.3.4.1 Encourage greater use of demonstration plots and farmer farm field schools including Hounslow Demonstration Centre | MOAF, RADA, CARDI | Years 1-3 Ongoing |
| | | 1.3.4.2 Improve dissemination and use of annual report of research papers and findings | MOAF, RADA, CARDI, SRC | Years 1-6 Ongoing |
| | | 1.3.4.3 Improve availability of improved planting material including from tissue culture labs and nurseries for seedlings | R&D CARDI Farmers' Associations Agricultural Training Institutions | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | 1.3.5 Carry out research on new and high- value niche crops which may be added to the mix of crops being cultivated | 1.3.5.1 Undertake market-driven research and development on crops and livestock | MOAF, RADA, CARDI, SRC, Tertiary Institutions, Private Sector | Years 1-6 Ongoing |
| | | 1.3.5.2 Undertake research in support of development of organic farming and food | MOAF, RADA, CARDI, SRC, JOAM, Tertiary Institutions, Private Sector | Years 1-6 Ongoing |
| | | 1.3.5.3 Continue introduction of new technologies from other countries that have similar conditions as Jamaica | MOAF, RADA, CARDI, SRC | Years 1-6 Ongoing |
| | | 1.3.5.4 Implement integrated spice industry development programme | MOAF, RADA, Export Division, Private Sector | Years 1-6 |
| | 1.3.6 Develop a comprehensive agricultural information system | 1.3.6.1 Promote the Agricultural Business Information System (ABIS) as the premiere agricultural information system covering production, marketing and extension | MOAF, RADA | Years 1-3 Ongoing |
| | | 1.3.6.2 Expand use of agribusiness information systems | MOAF, RADA, JAS, PMOs, Private Sector | Years 1-3 Ongoing |
| | | 1.3.6.3 Undertake integration of production and market information into ABIS to facilitate improved decision making | MOAF, RADA | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 1.3.6.4 Develop current registry of farmers and integrate into ABIS database | MOAF, RADA | Years 1-3 Ongoing |
| | | 1.3.6.5 Apply GIS and GPS systems to the Agricultural Business Information System (ABIS) | MOAF, RADA, OPM | Years 1-6 Ongoing |
| 1.4 Development of Key Agricultural Sub-Sectors | 1.4.1 Develop and implement strategic plans and programmes for key agricultural sub-sectors | 1.4.1.1 Implement European Union Banana Support Programme | MOAF | Years 1-6 |
| | | 1.4.1.2 Implement the Country Adaptation Strategy for the Sugar Industry | MOAF, AICFA | Years 1-6 |
| | | 1.4.1.3 Implement Dairy Sector Revitalization Programme | MOAF, JLA | Years 1-6 |
| | | 1.4.1.4 Implement Production and Productivity Programme for strategic crops | MOAF, PMOs, RADA | Years 1-6 |
| | | 1.4.1.5 Develop a sustainable fruit tree crop industry by establishment of commercial orchards and agro processing | MOAF, PMOs, RADA | Years 1-12 |
| | | 1.4.1.6 Implement the Improving Jamaica's Agricultural Productivity (IJAP) project to develop the greenhouse industry along the supply chain from production through post-harvest, value-added and marketing | MOAF, PMOs, RADA | Years 1-6 |
| | | 1.4.1.7 Promote conservation of and sustainable utilization of Jamaica's cattle breeds | MOAF, JLA, RADA | Years 1-6 |
| | | 1.4.1.8 Develop a sustainable beekeeping sub-sector | MOAF, All-Island Bee Farmers | Years 1-6 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | | Association | |
| | | 1.4.1.9 Develop appropriate small ruminant and pig breeding and production systems and dissemination of improved genetic stock | MOAF, PMOs, RADA | Years 1-6 |
| | | | | |
| | 1.4.2 Develop and implement strategic plans and programmes for fisheries | 1.4.2.1 Implement Fisheries Development Programme | MOAF | Years 1-6 |
| | | 1.4.2.2 Implement Fishing Beach Infrastructure Development Programme | MOAF | Years 1-6 |
| | | 1.4.2.3 Expand Fishers' Registration Programme | MOAF | Years 1-3 Ongoing |
| | | 1.4.2.4 Develop and implement Fishery Management Plans for Fisheries Management Areas covering all capture fisheries | MOAF | Years 1-3 Ongoing |
| | | 1.4.2.5 Strengthen the National Fisheries Advisory Council | MOAF | Years 1-3 Ongoing |
| | | 1.4.2.6 Establish a communication system for fishers at sea | MOAF, OPM | Years 1-3 |
| | | 1.4.2.7 Develop and apply GPS system for fishing vessels | MOAF, NLA, OPM | Years 1-3 |
| | | 1.4.2.8 Establish a research station at Pedro Cays, as well as sanitary conveniences for fisheries on the north east and middle Cays | MOAF | Years 1-3 |
| | | 1.4.2.9 Rehabilitate infrastructure on fishing beaches | MOAF | Years 1-3 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 1.4.2.10 Implement National Export Strategy Action Plan for aquaculture | MOAF, JTI, PMO/Aquaculture Cluster, BSJ | Years 1-6 |
| | | 1.4.2.11 Strengthen and support aquaculture industry | MOAF, PMOs, RADA | Years 1-3 Ongoing |
| | 1.4.3 Develop and implement strategic plans and programmes for forestry | 1.4.3.1 Implement new Strategic Forest Management Plan 2009-2013 | Forestry Department/Agency | Years 1-6 |
| | | 1.4.3.2 Build the Forestry Department as an efficient and effective service delivery organization | Forestry Department/Agency, MOAF | Years 1-6 |
| | | 1.4.3.3 Increase participation of the private sector and non-government organizations in conservation of forest areas and the realization of economic benefits from forest products | Forestry Department/Agency, MOAF, RADA, Private Sector, NGOs, ENGOs | Years 1-6 Ongoing |
| | | 1.4.3.4 Increase community participation in and public awareness of and support for forest conservation | Forestry Department/Agency, MOAF, RADA, CBOs | Years 1-6 Ongoing |
| | | 1.4.3.5 Develop and implement forest management plans including the conservation of natural forests and the development of forest plantations | Forestry Department/Agency, MOAF, RADA, Private Sector, NGOs, ENGOs,CBOs | Years 1-6 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 1.4.3.6 Maintain and restore forest cover to protect watersheds and conserve biodiversity | Forestry Department/Agency | Years 1-6 Ongoing |
| | | 1.4.3.7 Promote private sector investment in reforestation | Forestry Department/Agency, MOAF, RADA, SDC, JSIF | Years 1-6 Ongoing |
| | | | | |
| **Goal #2: Strong Marketing Systems for Domestic and Export Markets** | | | | |
| 2.1 Strong and Effective Marketing Information System | 2.1.1 Establish comprehensive marketing database that is accessible, user friendly and constantly updated | 2.1.1.1 Compile and update local secondary data of market prices, production costs, input prices, market demand for specific commodities, etc. in accessible format for marketing and planning information | MOAF, RADA, STATIN, JAS, JEA | Years 1-3 Ongoing |
| | | 2.1.1.2 Develop and implement the Jamaica Agricultural Marketing Information System (JAMIS) to automate and integrate the collection, storage and dissemination of marketing information | MOAF, RADA | Years 1-3 |
| | | 2.1.1.3 Generate local primary data for marketing information as needed | MOAF, RADA | Years 1-3 Ongoing |
| | | 2.1.1.4 Establish comprehensive database using internet sources, trade journals, foreign public and private databases to include global commodity prices, market demand information by diaspora, regional and | MOAF, RADA, STATIN | Years 1-6 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | international markets | | |
| | | 2.1.1.5 Undertake market research for the tourism and agro-processing sectors | MOAF, MIIC, JAPA, JTB, TPDCo, SRC, Universities | Years 1-6 Ongoing |
| | | 2.1.1.6 Undertake market research into local and ethnic markets abroad | MOAF, RADA, STATIN, JEA, JTI | Years 1-3 Ongoing |
| | | 2.1.1.7 Carry out surveys and studies to determine market trends, consumption patterns and tastes and consumer preferences for a range of local and export market segments | MOAF, RADA, STATIN, JEA, JTI | Years 1-3 Ongoing |
| | | 2.1.1.8 Use research findings to inform modifications in agricultural varieties and packaging | MOAF, RADA, SRC, JEA, JTI | Years 1-6 Ongoing |
| | | 2.1.1.9 Build capacity of MOAF and RADA staff to undertake market research, marketing information gathering and planning, market development and promotion | MOAF, RADA, Universities, Trade Associations, CASE, MOE, HEART/NTA | Years 1-6 Ongoing |
| | | 2.1.1.10 Improve Aquaculture Data Collection System | MOAF | Years 1-3 |
| | | | | |
| | 2.1.2 Establish effective dissemination of information on marketing | 2.1.2.1 Disseminate information through publication of comprehensive marketing database through mailing list, e-mail list, MOAF website, marketing organizations, marketing journals and newspapers | MOAF, RADA | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | database, including stakeholder, institution and association and success stories | 2.1.2.2 Broaden and streamline use of various media and modalities for regular dissemination of information on farm gate, wholesale, retail, supermarket and municipal and parish market prices | MOAF, RADA | Years 1-3 Ongoing |
| | | 2.1.2.3 Institute information hotline access for data users to access market information on constant basis | MOAF, Communication providers | Years 1-3 |
| | | 2.1.2.4 Explore options for setting up a network to provide distributed information via SMS and browser (existing cell phone operators or wi-fi distributors or autonomous cell phone operators) | JBOS /ABIS MOAF | Years 1-3 |
| | | 2.1.2.5 Publicize success stories and market opportunities through various media | Marketing Division, MOAF, RADA, JAS, Media Houses, JIS | Years 1-6 Ongoing |
| | | 2.1.2.6 Strengthen numbers and capacity of Marketing Officers | MOAF | Years 1-6 Ongoing |
| | 2.1.3 Establish linkages with other local and international databases | 2.1.3.1 Develop stronger linkages with local and international organizations that provide market information | MOAF, JEA, JTI, STATIN | Years 1-6 Ongoing |
| | | | | |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| 2.2 Supportive Marketing and Distribution Infrastructure and Network | 2.2.1 Develop reliable marketing distribution and communications network and infrastructure | 2.2.1.1 Expand and strengthen production and marketing organizations (PMOs) to supply centralized post-harvesting and distribution facilities | MOAF, RADA, JAS, JHTA, MTW, Parish Councils, JEA, Retailers' Association, MIIC, JAPA, Wholesalers, Supermarkets | Years 1-6 Ongoing |
| | | 2.2.1.2 Undertake repair and upgrading of existing market infrastructure in major distribution centres including provision of modernized communication systems | MOAF, RADA, OPM, MFPS, JAS, KSAC, Parish Councils | Years 1-3 Ongoing |
| | | 2.2.1.3 Strengthen communications network among agencies, organizations and associations involved in agricultural marketing | MOAF, RADA, JAS, KSAC, Parish Councils, JEA, MIIC, JAPA, Wholesalers, Supermarkets, Communications Companies | Years 1-3 Ongoing |
| | | 2.2.1.4 Establish wholesale market facilities for handling and selling produce and livestock, with cold storage, water, shelter, toilets, scales and display areas for commercial activities | MOAF, RADA, OPM, MFPS, JAS, KSAC, Parish Councils | Years 1-6 |
| | 2.2.2 Develop stakeholder | 2.2.2.1 Organize consultations among agencies, organizations and associations and other | MOAF, RADA, JEA, AAAJ, JHTA, | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | networks | stakeholders involved in agricultural marketing to air views and share information | Wholesalers, Consumer groups | |
| | | 2.2.2.2 Produce newsletter and organize mailing list to provide information to key stakeholder contacts on a regular basis | MOAF, RADA, JEA, JAPA, JHTA, Wholesalers, Consumer groups, Media, JIS | Years 1-3 Ongoing |
| | | | | |
| | 2.2.3 Strengthen capacity of current practitioners in the informal distribution system | 2.2.3.1 Facilitate upgrading of level of equipment and vehicles for higglers, truckers and purveyors | DBJ, Credit Institutions, JAS | Years 1-6 Ongoing |
| | | 2.2.3.2 Provide special training in sorting, grading, packaging, presentation technologies and transporting of produce | MOAF, MIIC, RADA, JAS | Years 1-6 Ongoing |
| | | 2.2.3.3 Encourage adoption of best practices and innovations by higglers, truckers, purveyors and marketers including through media recognition of top achievers | MOAF, JCC, JMA, JEA, JTI, JHTA, MIIC, RADA, JAS, Jamaica 4H, Parish Councils, KSAC, Communications Companies, JIS, Media Houses | Years 1-3 Ongoing |
| | 2.2.4 Strengthen post harvest facilitating | 2.2.4.1 Establish public private sector partnerships in the establishment and operation of post-harvest facilities with packing houses for | MOAF, MFPS, MIIC, Refrigeration Companies, JAS, | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | infrastructure | collection, grading, sorting, cold and ambient temperature storage, and distribution of produce | RADA, JEA, JAPA | |
| | | 2.2.4.2 Upgrade cold storage and export complexes | MOAF, MFPS, MIIC, Refrigeration Companies, JAS, RADA, JEA, JAPA | Years 1-3 Ongoing |
| | | 2.2.4.3 Establish ripening houses for bananas and plantain | MOAF, RADA, EUBSP | Years 1-3 Ongoing |
| | | | | |
| 2.3 Development of Expanded and New Markets for Jamaican Agricultural Products | 2.3.1 Strengthen linkages with other economic sectors including manufacturing and tourism | 2.3.1.1 Strengthen linkages between agriculture and other sectors, to increase the use of locally produced agricultural commodities and create new opportunities, markets and arrangements | MOAF, RADA, JAS, Jamaica 4H, JMA, JEA, JTI, JHTA, MOT, MIIC | Years 1-6 Ongoing |
| | | 2.3.1.2 Strengthen communications with key linkage sectors including through newsletters, publications and regular fora and meetings | MOAF, RADA, JAS, Jamaica 4H, Parish Councils, JMA, JEA, JTI, AAAJ, JHTA, Min. of Tourism, MIIC, JIS, Media Houses | Years 1-3 Ongoing |
| | | 2.3.1.3 Increase collaboration with the distributive trade in marketing of locally produced agricultural commodities | MOAF, RADA, JAS, MIIC, JCC | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 2.3.1.4 Promote community-based Agro Tourism | MOAF IICA, SDC, JSIF, TPDCo | Years 1-3 |
| | | 2.3.1.5 Strengthen role and capacity of Agri- Business Co-ordination Unit to strengthen linkages between farmers and end users of agricultural produce | MOAF | Years 1-6 |
| | | 2.3.1.6 Develop an industry purchasing planning platform to facilitate arranged purchasing between buyers and growers and enhance coordination of planting and reaping schedules with buyer requirements | MOAF, RADA, JMA, JEA, JAS, JAPA, JTI | Years 1-3 Ongoing |
| | 2.3.2 Undertake local and global promotion of Jamaican agricultural products | 2.3.2.1 Increase promotion of local agricultural products through participation in international trade shows, advertising in foreign magazines, and on foreign websites | MOAF, Media and advertising companies, JEA, JTI, RADA, JAS, CFNI, MOHE, JAPA, JHTA | Years 1-6 Ongoing |
| | | 2.3.2.2 Coordinate promotion of local agricultural products with major tourism promotions being carried out in the tourism industry for international and regional markets | MOAF, MOT, JTB, TPDCo, JEA, AAAJ, RADA, JAS, JTI, JHTA, MIIC | Years 1-6 Ongoing |
| | | 2.3.2.3 Identify and assess value-added markets for agricultural products for local agro-processors, agro-tourism, nutraceuticals and export markets | MOAF, JAPA, Ministry of Tourism, SRC, Universities, CASE | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 2.3.2.4 Implement the "Eat What We Grow, Grow What We Eat" Campaign | MOAF, RADA, JIS, Private Sector | Years 1-3 |
| | | 2.3.2.5 Implement the Banana Consumption Campaign | MOAF, RADA, JIS, EUBSP, Private Sector | Years 1-6 |
| | | 2.3.2.6 Mount an awareness initiative to recruit and provide training to brokers traders, stock inspectors, receipt issuers, shipping agents | JBOS /ABIS MOAF, MFPS, MIIC, JEA, Customs | Years 1-3 Ongoing |
| | | 2.3.2.7 Strengthen collaboration among agencies to promote local agricultural products in export markets | MOAF, RADA, JOAM, JTI, JTB, MFAFT, Jamaican Embassies, JEA, JAS | Years 1-6 Ongoing |
| | 2.3.3 Analyze local and international markets on an ongoing basis, including new, emerging and alternative markets | 2.3.3.1 Build capacity of Marketing Division to review current international markets, and identify new markets for traditional and non-traditional Jamaican agricultural commodities, such as fair trade, organic agriculture, diaspora, Caribbean and emerging country markets | MOAF, RADA, JOAM, JTI, MFAFT, Jamaican Embassies, JEA, JAS | Years 1-6 |
| | 2.3.4 Develop new and emerging markets | 2.3.4.1 Develop agricultural products based on new production and processing methods for promotion in local and export markets | MOAF, RADA, JOAM, JTI, JAS, MFAFT, JEA, Jamaican Embassies | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 2.3.4.2 Liaise with end users to identify and develop new market segments for local agricultural products | MOAF, RADA, Private Sector, SRC | Years 1-6 Ongoing |
| | | 2.3.4.3 Encourage import substitution for agricultural products with potential for local production on competitive basis | MOAF, RADA, Private Sector, SRC | Years 1-6 Ongoing |
| | | 2.3.4.4 Support research in pursuit of "fair trade" crops | MOAF, RADA, SRC, MFAFT, EUBSP | Years 1-6 Ongoing |
| | | 2.3.4.5 Implement sub-sector marketing strategies for roots & tubers, fruits & vegetables, herbs & spices | MOAF | Years 1-6 |
| | 2.3.5 Develop favourable external trade relations for marketing of Jamaican agricultural products | 2.3.5.1 Develop market opportunities for Jamaican agricultural products to EU markets under the EU/CARIFORUM Economic Partnership Agreement (EPA) | MOAF, MFAFT, RADA, JEA, JTI, MIIC, MFPS, JAS, Private Sector | Years 1-3 Ongoing |
| | | 2.3.5.2 Develop market opportunities for Jamaican agricultural products to regional markets under the CSME | MOAF, MFAFT, RADA, JEA, JTI, MIIC, MFPS, JAS, Private Sector | Years 1-3 Ongoing |
| | | 2.3.5.3 Ensure that the access of Jamaican agricultural products to domestic, regional and international markets are adequately defended in trade negotiations and agreements | MOAF, MFAFT, JTAT, Private Sector | Years 1-3 Ongoing |
| | | | | |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | 2.3.6 Strengthen intellectual property rights of nation brand for agricultural products | 2.3.6.1 Expand use of copyright, trademarks, certification marks, logos, and geographical indications for Jamaican agricultural products | MOAF, MFAFT, JIPO, Commodity associations and boards, JAS, RADA, BSJ, JTI, JEA | Years 1-6 Ongoing |
| | | 2.3.6.2 Develop an integrated branding strategy for Jamaican agricultural products based on superior quality and the exotic image of Jamaica as a brand | MOAF, JTI, JEA, MFAFT, Jamaican Embassies, JIPO, Attorney General, Commodity associations and boards, JAS, RADA, BSJ | Years 1-6 |
| | | 2.3.6.3 Develop and implement "Jamaica made" trade mark for agro processors | MOAF, JTI, BSJ, JIPO, JAPA | Years 1-3 |
| | | | | |
| **Goal #3: Competent and Adequate Human Resources** | | | | |
| 3.1 Provision of Work Force with Skills, Training and Education to Meet the Dynamic Needs of Sector | 3.1.1 Broaden range and access for agricultural education and training at all levels | 3.1.1.1 Facilitate student financing for courses in agricultural extension and research | MOAF, Universities and training colleges, SLB, Credit institutions | Years 1-6 Ongoing |
| | | 3.1.1.2 Design short courses and training modules appropriate for farmers, farm supervisors and workers | RADA, Universities and training colleges, HEART/NTA | Years 1-6 Ongoing |
| | | 3.1.1.3 Introduce post-graduate degree programmes in agribusiness and other agricultural-related | MOAF, Universities and training colleges, | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | disciplines | UCJ | |
| | | 3.1.1.4 Expand the range of locally-based tertiary institutions offering agricultural degree programmes | MOAF, Universities and training colleges, UCJ | Years 1-6 Ongoing |
| | 3.1.2 Strengthen capacity of existing agricultural educational and training institutions | 3.1.2.1 Transfer responsibility of administration of agricultural high schools from the MOE to the MOAF | MOAF, MOE | Years 1-3 |
| | | 3.1.2.2 Improve curricula of agricultural high schools | MOAF, MOE | Years 1-6 Ongoing |
| | | 3.1.2.3 Strengthen programmes offered by Ebony Park for training of agricultural workers and technicians | HEART/NTA, MOAF | Years 1-3 |
| | | 3.1.2.4 Develop and strengthen programmes which lead to certification for agricultural occupations, professionals and operatives | MOAF, UWI, CASE, UTECH, 4H, HEART/NTA | Years 1-6 Ongoing |
| | 3.1.3 Promote infusion of agriculture in primary and secondary education | 3.1.3.1 Expand National School Garden Programme in public schools island-wide | 4H, MOAF, MOE | Years 1-3 Ongoing |
| | | 3.1.3.2 Liaise with the MOE for the inclusion of Agricultural Science in school curricula | MOAF, MOE | Years 1-6 Ongoing |
| | | | | |
| 3.2 Adequate Long-Term Supply of Labour Force for Sector Development | 3.2.1 Encourage participation of youth in agriculture | 3.2.1.1 Develop and implement programmes to facilitate access to government-owned land to young farmers on lease basis | MOAF, OPM, NLA, MCYS, 4H | Years 1-3 Ongoing |
| | | 3.2.1.2 Facilitate access to agricultural inputs to young farmers | MOAF, OPM, NLA, MCYS, 4H, Credit | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | | Institutions | |
| | | 3.2.1.3 Encourage involvement and participation of youth in agricultural organizations (e.g. 4H Clubs) | MOAF, OPM, MCYS, 4H, HEART/NTA | Years 1-3 Ongoing |
| | | 3.2.1.4 Implement reward system for youth involved in mentoring programmes | MOAF, OPM, MCYS, 4H, HEART/NTA | Years 1-3 Ongoing |
| | | 3.2.1.5 Expand Youth in Agriculture Programme | 4H, MOAF | Years 1-3 Ongoing |
| | | 3.2.1.6 Expand Apprenticeship Programme in selected sub-sectors | 4H, MOAF | Years 1-3 Ongoing |
| | 3.2.2 Strengthen long-term planning for agricultural labour force | 3.2.2.1 Carry out regular workforce audits to determine gaps in skills set within the agricultural sector | MOAF, MLSS, Private Sector | Years 1-6 Ongoing |
| | | 3.2.2.2 Conduct audits of agricultural educational and training institutions to match programmes with long-term human resource needs of sector | MOAF, MLSS, Universities and Agricultural training institutions, Private Sector | Years 1-6 Ongoing |
| | | 3.2.2.3 Develop an Agricultural Skills Bank to quantify the level and types of skills present in the public and private sector and to determine the need for training and acquisition of scarce skills | MOAF, MLSS, Universities and Agricultural training institutions, Private Sector | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 3.2.2.4 Provide timely labour market demand and supply information to inform decision making for all stakeholders within the agricultural sector | MOAF, MLSS, Universities and Agricultural training institutions, Private Sector | Years 1-6 Ongoing |
| | | | | |
| | | | | |
| **Goal #4: Enabling and Facilitating Framework, Infrastructure and Support Services** | | | | |
| 4.1 Appropriate Policy, Legislation and Regulations for Long-Term Development of Sector | 4.1.1 Develop and maintain appropriate modernized policy, legislation and regulatory framework for the agricultural sector | 4.1.1.1 Finalize and promulgate new policies for the agricultural sector, including:<br>• Draft Plant Health Policy<br>• Draft Animal Health Policy<br>• National Fisheries Policy<br>• Banana Industry Policy<br>• National Food Safety Policy<br>• Organic Policy<br>• Seed Policy<br>• Marketing Policy<br>• Weather Risk Management Policy | MOAF, CO | Years 1-6 |
| | | 4.1.1.2 Integrate environmental sustainability issues in sector policies | MOAF, NEPA, OPM, CO | Years 1-3 Ongoing |
| | | 4.1.1.3 Integrate gender equity issues in sector policies | MOAF, MYCS, MLSS, OPM, CO | Years 1-3 Ongoing |
| | | 4.1.1.4 Provide the regulatory framework and enforcement mechanisms relevant to the | MOAF, Department of Plant Quarantine, | Years 1-3 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | production, importation and exportation of seed/planting material | R&D and Training Institutions, Input Industries, Farmers' Associations | |
| | | 4.1.1.5 Repeal ACB Act and transfer function of ACB to Registrar of Cooperatives | MOAF | Years 1-3 |
| | | 4.1.1.6 Enact New Fisheries Act | MOAF | Years 1-3 |
| | | 4.1.1.7 Undertake review, updating and harmonization of legislation relevant to agriculture sector | MOAF | Years 1-3 Ongoing |
| | | 4.1.1.8 Ensure effective participation in international trade negotiations on agriculture, including the WTO Doha Development Round | MFAFT, MOAF | Years 1-3 Ongoing |
| | | 4.1.1.9 Strengthen regional and hemispheric interaction among and between agricultural ministries and international organizations | MOAF, MFAFT | Years 1-3 Ongoing |
| | | 4.1.1.10 Coordinate sector development with the hemispheric AGRO 2003-2015 Plan[11] | MOAF, MFAFT | Years 1-6 |
| | | 4.1.1.11 Conclude bilateral fishing agreements to protect fishery resources within Jamaica's Exclusive Economic Zone (EEZ) | MFAFT, MOAF | Years 1-6 |
| | | 4.1.1.12 Develop policies to ensure increased social inclusion in agriculture sector | MOAF, MYCS, MLSS, OPM, CO | Years 1-6 Ongoing |

[11] The AGRO 2003-2015 Plan is the shared long-term agenda for promoting the sustainable development of agriculture and the rural milieu in the Americas which was adopted at the Second Hemispheric Ministerial Meeting (Panama 2003).

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 4.1.1.13 Conduct public consultations as a means of broadening participation and engendering inclusiveness in policy development | MOAF | Years 1-6 Ongoing |
| | 4.1.2 Develop effective framework to reduce praedial larceny | 4.1.2.1 Strengthen National Advisory Committee on Praedial Larceny and implement recommendations over time | MOAF, JAS, MNS, Farmers Associations, PMOs, JCF, ISCF, Coast Guard, MOJ, MOHE | Years 1-3 Ongoing |
| | | 4.1.2.2 Develop and implement Praedial Larceny Action Plan | MOAF, JAS, MNS, Farmers Associations, PMOs, JCF, ISCF, Coast Guard, MOJ, MOHE | Years 1-6 |
| | | 4.1.2.3 Review and modernize existing legislation and develop new legislation and regulations relevant to praedial larceny | MOAF, MNS, OPM, CO | Years 1-3 Ongoing |
| | | 4.1.2.4 Establish and expand National Animal Identification System to undertake traceability of meats island-wide | MOAF | Years 1-3 |
| | | | | |
| 4.2 Improved Access to Financing | 4.2.1 Encourage diversification of financial support for agricultural projects | 4.2.1.1 Formulate and implement innovative modalities for credit for small farmers | MOAF, DBJ, MFPS, PMOs, Private Financial Institutions | Years 1-3 Ongoing |
| | | 4.2.1.2 Arrange financing for agricultural projects and large scale agricultural programmes | MOAF, DBJ, MFPS, Agro-Invest | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | including venture capital and equity financing | | Corporation, PC Banks, Ex-Im Bank, Private Financial Institutions | |
| | | 4.2.1.3 Promote collaboration between DBJ and PC Banks as well as Credit Unions in the provision of low cost financing for farmers | MOAF, DBJ, MFPS, Private Financial Institutions | Years 1-3 Ongoing |
| | | 4.2.1.4 Promote micro-financing through Production and Marketing Organizations | MOAF, DBJ, MFPS, PMOs, Private Financial Institutions | Years 1-3 Ongoing |
| | | 4.2.1.5 Expand role of Production and Marketing Organizations in loan provision and management, e.g. cattle industry | MOAF, PMOs, DBJ, Dairy Board, Private Financial Institutions, MFPS | Years 1-3 Ongoing |
| | | 4.2.1.6 Review and restructure the PC banks | MOAF, MFPS | Years 1-6 |
| | | 4.2.1.7 Increase access for loans and grant funding to farmers for upgrading of farms inclusive of small-scale irrigation systems | MOAF, DBJ, MFPS, Agro-Invest Corp., PC Banks, Ex-Im Bank, Private Financial Institutions | Years 1-3 Ongoing |
| | | 4.2.1.8 Explore the feasibility of a venture capital fund including potential support from the diaspora for investment in local value added development products | MOAF, MFPS, DBJ, MFAFT | Years 1-6 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| 4.3 Strengthened Facilitating Institutions | 4.3.1 Strengthen the capacity of Government to play a supporting role in development of the agricultural sector | 4.3.1.1 Reorganize and restructure the Ministry of Agriculture and Fisheries and its entities and Divisions:<br>• Research and Development<br>• RADA<br>• Marketing and Credit Division<br>• Databank and Evaluation Division<br>• Agricultural Credit Board<br>• Agri-Business Council | MOAF, CO, MFPS | Years 1-3 |
| | | 4.3.1.2 Transform Fisheries Division and Forestry Department into Executive Agencies and modernize their operations | MOAF, CO, MFPS | Years 1-3 |
| | | 4.3.1.3 Administer and implement a reorganized, effective and efficient Plant Quarantine and Veterinary Services Division, including Pest Risk Analysis Unit | MOAF, CO, MFPS | Years 1-3 Ongoing |
| | | 4.3.1.4 Restructure Export Division to lead and regulate the development of the spice/herbs industry | MOAF, CO, MFPS | Years 1-3 |
| | | 4.3.1.5 Establish Agriculture Development Fund (ADF) to finance specific development activities in agricultural sector | MOAF, CO, MFPS | Years 1-3 |
| | | 4.3.1.6 Establish the Agro-Invest Corporation to package and promote agricultural investment opportunities | MOAF | Years 1-3 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 4.3.1.7 Undertake periodic census of agriculture, forestry and fishing sector, and specific sub-sectors | STATIN, MOAF | Every 5-10 years |
| | | 4.3.1.8 Strengthen investment promotion for agricultural projects | JTI, MOAF, PMOs | Years 1-3 Ongoing |
| | 4.3.2 Strengthen Production and Marketing Organizations (PMOs) and farmer organizations to effectively promote agriculture and encourage agricultural investment | 4.3.2.1 Encourage formalization and strengthening of community-based farmers' groups and PMOs through registration with relevant agencies, including through the Registrar of Cooperatives | MOAF, RADA, PMOs | Years 1-3 Ongoing |
| | | 4.3.2.2 Undertake restructuring of JAS to promote organizational effectiveness as an independent farmers' organization with coordinated marketing network | MOAF, JAS | Years 1-13 |
| | | 4.3.2.3 Change legal structure of JAS to allow it to attract non-governmental capital | MOAF, JAS | Years 1-3 |
| | | 4.3.2.4 Ensure PMO participation in sectoral decision-making processes at local, regional and international levels | MOAF, RADA, PMOs, MFAFT | Years 1-3 Ongoing |
| | | 4.3.2.5 Review and rationalize all Commodity Boards, with a view to separate their regulatory functions from their commercial functions | MOAF, PMOs, CO, Private Sector | Years 1-6 |
| | | 4.3.2.6 Divest Government of commercial interests in Commodity Boards | MOAF, MFPS, CO, Private Sector | Years 1-6 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| 4.4 Strengthened Extension Services | 4.4.1 Improve the capacity and effectiveness of the extension service | 4.4.1.1 Increase the number of extension officers | MOAF, RADA | Years 1-3 Ongoing |
| | | 4.4.1.2 Increase training and retraining of extension officers including emphasis on productivity and efficiency | MOAF, RADA | Years 1-3 Ongoing |
| | | 4.4.1.3 Re-train extension officers in the use of computer-based office productivity tools | MOAF, RADA | Years 1-3 Ongoing |
| | | 4.4.1.4 Provide specialist officers (e.g. animal health officers) | MOAF, RADA | Years 1-3 Ongoing |
| | | 4.4.1.5 Provide reward system for good performance by extension officers who maintain effective extension delivery | MOAF, RADA | Years 1-9 Ongoing |
| | | 4.4.1.6 Strengthen linkages between research and development and the extension services based on needs assessment of the sector | MOAF, RADA | Years 1-3 Ongoing |
| | | 4.4.1.7 Update the extension delivery model | MOAF, RADA | Years 1-3 Ongoing |
| | | 4.4.1.8 Coordinate delivery of extension services with private sector and other agricultural stakeholders | MOAF, RADA, JAS | Years 1-3 Ongoing |
| | | 4.4.1.9 Require annual re-certification of extension officers including mandatory training | MOAF, RADA | Years 1-3 Ongoing |
| | | | | |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| 4.5 Modernized and Upgraded Infrastructure | 4.5.1 Provide adequate water supply, irrigation and drainage to meet needs of sector | 4.5.1.1 Undertake expansion of irrigation services in major agricultural production areas | MOAF, NIC | Years 1-3 Ongoing |
| | | 4.5.1.2 Promote acquisition and installation of on-farm irrigation systems | MOAF, NIC, RADA, Financial Institutions | Years 1-3 Ongoing |
| | 4.5.2 Improve and rationalize road infrastructure including farm roads network | 4.5.2.1 Undertake inventory of farm roads island-wide | MOAF, NWA, Local Authorities | Years 1-6 |
| | | 4.5.2.2 Expand farm road rehabilitation programme | MOAF, NWA, Local Authorities | Years 1-3 Ongoing |
| | | | | |
| 4.6 Satisfactory Working Conditions, Health and Safety of Sector Employees | 4.6.1 Implement and enforce health and safety standards on farms and in agro-processing establishments | 4.6.1.1 Educate employers and workforce on local and international health and safety standards and requirements | MOAF, MOHE, MLSS, NEPA, BSJ, Private Sector | Years 1-3 Ongoing |
| | | 4.6.1.2 Promote and expand competitions and give recognition to agricultural producers and agro-processors who comply with safety standards and carry out environmentally friendly practices | Private Sector, BSJ, MOAF, MLSS | Years 1-6 Ongoing |
| | | | | |
| | 4.6.2 Ensure collaboration and participation of relevant agencies and stakeholders in | 4.6.2.1 Establish joint interagency committee to develop and promote occupational health and safety standards in agriculture | MOAF, MOHE, MLSS | Years 1-3 |
| | | 4.6.2.2 Develop programme of public consultations involving sector and stakeholder interests in review, development and updating of safety | MOAF, MOHE, MLSS | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | review, development, updating and enforcement of safety and health legislation, regulations and standards | and health legislation, regulations and standards | | |
| | 4.6.3 Enhance labour relations in the agricultural sector | 4.6.3.1 Promote best practices in labour relations and adoption of the Labour Relations Code among employers and employees | MOAF, MLSS, Private Sector, Trade Unions | Years 1-3 Ongoing |
| | | 4.6.3.2 Promote ILO core labour standards and worker rights and obligations among all employers and employees in the sector | MOAF, MLSS, Private Sector, Trade Unions | Years 1-3 Ongoing |
| | | | | |
| | | | | |
| **Goal #5: Contributor to Long-Term Rural Development** | | | | |
| 5.1 Provision of Sustainable Livelihoods for Agricultural Community Residents | 5.1.1 Promote economic enterprises and entrepreneurship in rural agricultural communities | 5.1.1.1 Provide training in entrepreneurship and business development for communities | RADA, SDC, JBDC | Years 1-3 Ongoing |
| | | 5.1.1.2 Infuse promotion of the culture of entrepreneurship in the education system from primary to tertiary level | RADA, SDC, JBDC, MOE | Years 1-3 Ongoing |
| | | 5.1.1.3 Encourage community participation in economic ventures through group action, cooperatives, joint ventures etc. | RADA, SDC, JBDC | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 5.1.1.4 Support communities to apply geographical indications to register their lands and products as a basis for marketing of specific commodities with geographic branding advantages | MOAF, JIPO, RADA | Years 1-3 Ongoing |
| | | 5.1.1.5 Undertake area development planning and project implementation | RADA | Years 1-3 Ongoing |
| | | 5.1.1.6 Implement EUBSP Rural Diversification Programme | RADA, EUBSP | Years 1-6 |
| | | 5.1.1.7 Implement Sugar Area Dependent Programme | MOAF, RADA, Sugar Transformation Unit | Years 1-9 |
| | | 5.1.1.8 Implement Rural Enterprise Development Initiative | RADA, JSIF | Years 1-6 |
| | | 5.1.1.9 Promote the integration of rural producers and micro, small- and medium-scale agricultural enterprises into production and marketing/trade chains contributing to a sustainable income | MOAF, RADA | Years 1-6 Ongoing |
| 5.2 Comprehensive Land Use Planning and Utilization for Agricultural Development | 5.2.1 Establish policy and planning framework to protect and develop suitable agricultural | 5.2.1.1 Develop a comprehensive land inventory, showing all parcels of land owned by the State, the zoning for different purposes and the capability profile, based on soil analysis | MOAF, RPPD, NLA | Years 1-6 |
| | | 5.2.1.2 Ensure zoning of prime agricultural lands | MOAF, OPM, NEPA, Local | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | lands | | Authorities | |
| | | 5.2.1.3 Coordinate land use planning of agricultural lands with other competing land uses, including mining, quarrying, housing and commercial development | OPM, MOAF, NEPA, Local Authorities | Years 1-6 Ongoing |
| | | 5.2.1.4 Integrate rehabilitation of mined-out lands and resettlement of agricultural communities in planning for agricultural sector | OPM, MOAF, MEM, NEPA, Local Authorities, JBI, MQAJ, MQD | Years 1-6 Ongoing |
| | | 5.2.1.5 Ensure that where resettlement of agricultural communities is required, farmers are given adequate compensation and resettled on good agricultural lands | OPM, MOAF, JBI, NEPA, JAS | Years 1-6 Ongoing |
| | | 5.2.1.6 Encourage farmers' organizations to lobby Government to ensure that land use policy is enforced to protect agricultural livelihoods and agricultural communities | MOAF, JAS, PMOs | Years 1-6 Ongoing |
| | | 5.2.1.7 Support identification and protection of agricultural heritage sites and historical agricultural equipment for posterity | MOAF, JNHT | Years 1-6 Ongoing |
| | | 5.2.1.8 Support the current efforts of the Land Administration and Management Programme (LAMP) across all parishes in Jamaica in order to address land tenure and registration issues with a view to issuing land titles | NLA, MOAF | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 5.2.1.9 Encourage agricultural development on idle lands and abandoned farms | JTI, NLA, MOAF | Years 1-6 Ongoing |
| 5.3 Establishment of a Culture of Holistic Community Development | 5.3.1 Strengthen partnerships between public, private and community stakeholders | 5.3.1.1 Strengthen inter-agency collaboration to create greater involvement in community development | MOAF, RADA, SDC, JSIF, PDCs, CBOs | Years 1-6 Ongoing |
| | | 5.3.1.2 Promote joint venture programmes involving private sector and farming communities | MOAF, RADA, SDC, JSIF, PDCs, CBOs, JAS, Private Sector | Years 1-6 Ongoing |
| | | 5.3.1.3 Encourage participation and partnership of public and private sector sector in community development | MOAF, RADA, SDC, JSIF, PDCs, CBOs, JAS, Private Sector | Years 1-6 Ongoing |
| | | 5.3.1.4 Identify and train "patrons" in communities to facilitate and mentor participation of residents in community and economic ventures | MOAF, RADA, SDC, JSIF, PDCs, CBOs, JAS, Private Sector | Years 1-6 Ongoing |
| | | 5.3.1.5 Improve rural connectivity and access to information through the creation of information network systems within communities | MOAF, RADA, SDC, JSIF, PDCs, CBOs, OPM | Years 1-6 Ongoing |
| | 5.3.2 Build capacity of community organizations | 5.3.2.1 Undertake capacity building of relevant organizations at the community level to enhance community development | MOAF, RADA, SDC, JSIF, PDCs, CBOs | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 5.3.2.2 Develop capacity of community organizations to lobby for improvements in community infrastructure and services | MOAF, RADA, MCYS, SDC, JSIF, PDCs, CBOs, MLSS, LAs, JAS | Years 1-6 Ongoing |
| | | | | |
| | 5.3.3 Promote social equity in rural development | 5.3.3.1 Promote appropriate social protection measures for economically vulnerable rural families | MOAF, MLSS, RADA, SDC, JSIF, PDCs, CBOs | Years 1-6 Ongoing |
| | | 5.3.3.2 Promote gender equity in rural development programmes | MOAF, MLSS, MCYS, RADA, SDC, JSIF, PDCs, CBOs | Years 1-6 Ongoing |
| | 5.3.4 Support and encourage participatory methodologies in development of rural agricultural communities | 5.3.4.1 Participate in and support local government and governance structures, including CBOs, CDCs, DACs and PDCs | MOAF, OPM, SDC, RADA, JSIF, LAs, JAS, CBOs, CDCs, DACs, PDCs | Years 1-6 Ongoing |
| | | 5.3.4.2 Participate in community priority setting and action planning | MOAF, OPM, SDC, RADA, JSIF, LAs, JAS, CBOs, CDCs, DACs, PDCs | Years 1-6 Ongoing |
| | | 5.3.4.3 Participate in regular community stakeholder consultations including town hall meetings with appropriate stakeholders to focus on developmental issues | MOAF, OPM, SDC, RADA, JSIF, LAs, JAS, CBOs, CDCs, DACs, PDCs | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 5.3.4.4 Support and participate in community action planning processes | MOAF, OPM, SDC, RADA, JSIF, LAs, JAS, CBOs, CDCs, DACs, PDCs | Years 1-6 Ongoing |
| | | | | |
| | | | | |
| **Goal #6: An Environmentally Sustainable Sector** | | | | |
| 6.1 High Application of Environmental Standards and Good Agricultural Practices (GAPS) | 6.1.1 Facilitate access to and application of new and emerging information on environmental best practices and standards in the sector | 6.1.1.1 Develop networks to disseminate information on available environmental best practices and standards | MOAF, RADA, CAPE, JAS | Years 1-3 Ongoing |
| | | 6.1.1.2 Strengthen partnerships between public and private sector and academic and research institutions in relevant research and foresighting on emerging environmental trends for agricultural sector | MOAF, CASE, JAS, SRC, tertiary institutions | Years 1-3 Ongoing |
| | | 6.1.1.3 Develop renewable energy from bio-fuel resources in sector | MEM, MOAF, Private Sector | Years 1-3 Ongoing |
| | | | | |
| | 6.1.2 Strengthen compliance with environmental regulations, standards, conventions and agreements | 6.1.2.1 Support the strengthening of capacity of environmental regulatory agencies and authorities | MOAF, JAS, NEPA, Local Authorities | Years 1-3 Ongoing |
| | | 6.1.2.2 Promote improved self-regulation of environmental compliance by agricultural sector enterprises | MOAF, JAS, PMOs | Years 1-3 Ongoing |
| | | 6.1.2.3 Develop and expand role of agricultural sector in system of carbon trading | MOAF, MEM, MFAFT, OPM, | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | | NEPA, Met Office, Forestry Department/Agency | |
| | | 6.1.2.4 Establish and enforce rules and regulations for sustainable fishing practices | MOAF, NEPA, MNS, JCF, Coast Guard, ENGOs | Years 1-6 Ongoing |
| | | 6.1.2.5 Encourage agricultural enterprises to achieve environmental standards and certification including ISO14001 | MOAF, RADA, JAS, NEPA, PMOs, Private Sector | Years 1-6 Ongoing |
| | 6.1.3 Increase utilization of conservation practices throughout the sector | 6.1.3.1 Integrate soil management, clean energy technology and watershed management with agricultural production | MOAF, JAS, NEPA, RADA | Years 1-3 Ongoing |
| | | 6.1.3.2 Expand training programmes on conservation practices for sector professionals and stakeholders | MOAF, RADA, JAS | Years 1-3 Ongoing |
| | | | | |
| | 6.1.4 Increase recycling of organic residue and waste | 6.1.4.1 Strengthen supply chain from aquaculture to farms | Private enterprises, MOAF, RADA | Years 1-3 Ongoing |
| | | 6.1.4.2 Develop recycling of organic residue and waste from solid waste collection and sanitation sites to agricultural producers | NSWMA, MOAF, RADA, JAS, Private enterprises | Years 1-3 Ongoing |
| | | | | |
| 6.2 Organic Farming as Major Mode of Production | 6.2.1 Expand training of agricultural | 6.2.1.1 Expand training programmes on organic technology for sector professionals and stakeholders | MOAF, RADA, JAS, JOAM, Research and Tertiary Institutions | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | communities in organic farming practices | 6.2.1.2 Introduce exposure of organic farming in schools and agricultural learning institutions | MOAF, MOE, RADA, JAS, JOAM | Years 1-3 Ongoing |
| | 6.2.2 Develop supporting environment and conditions for organic agriculture | 6.2.2.1 Collaborate with national agencies and associations to de-contaminate lands to prepare for increase organic production | MOAF, NLA, NEPA, JOAM, PCA, Private Enterprises | Years 1-3 Ongoing |
| | | 6.2.2.2 Establish national standards for organic food production | MOAF, BSJ, JOAM, Private Enterprises | Years 1-3 Ongoing |
| | | 6.2.2.3 Establish appropriate legislation and regulations for the production, oversight, quality certification and trade of organic products | MOAF, RADA, CO, BSJ, JOAM, MFAFT | Years 1-3 Ongoing |
| | | 6.2.2.4 Develop and implement national organic research programme | MOAF, RADA, JAS, JOAM, Research and Tertiary Institutions, Private Enterprises | Years 1-3 Ongoing |
| | | 6.2.2.5 Strengthen and expand public education and awareness of the benefits of organic food and production systems | MOAF, RADA, JAS, JOAM, Research and Tertiary Institutions, JIS, Private Enterprises | Years 1-3 Ongoing |
| 6.3 Strengthened Risk and Hazard Mitigation for Sector | 6.3.1 Develop comprehensive agricultural insurance system | 6.3.1.1 Assess the feasibility for the Government to provide financial support to local insurance companies, for them to insure against catastrophic risks in the agricultural sector | MOAF, MFPS, Insurance Companies, ODPEM | Years 1-3 |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 6.3.1.2 Strengthen Banana Insurance Fund and Catastrophe Fund, including designing a parametric insurance model for the banana sector | MOAF, MFPS, Insurance Companies, ODPEM, EUBSP | Years 1-6 |
| | | 6.3.1.3 Develop a risk profile of Jamaica in order to identify the magnitude of losses that can occur based on the profile design risk management tools to manage the different risk layers (national, meso and micro level) | MOAF, MFPS, Insurance Companies, ODPEM | Years 1-3 |
| | | 6.3.1.4 Identify the main sources of risks for specific crops and areas | MOAF, RADA, NLA, MFPS, ODPEM, Insurance Companies | Years 1-3 |
| | | 6.3.1.5 Institute and strengthen formal risk analysis mechanisms | MOAF, RADA, NLA, MFPS, ODPEM, NEPA, Insurance Companies | Years 1-3 |
| | | 6.3.1.6 Develop provisions for agricultural sector under the Caribbean Catastrophe Risk Insurance Facility | MOAF, RADA, MFPS, MFAFT, ODPEM, NEPA, PIOJ, Insurance Companies | Years 1-3 |
| | 6.3.2 Strengthen on-farm hazard mitigation measures | 6.3.2.1 Encourage the design and construction of hurricane resistant structures for on-farm buildings and infrastructure | MOAF, RADA, ODPEM, PMOs, Individual Agricultural | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | | Enterprises | |
| | | 6.3.2.2 Zone agricultural enterprises placing them in sheltered areas, including avoiding flood prone areas | OPM, NEPA, MOHE, LAs, MOAF, ODPEM | Years 1-3 Ongoing |
| | | 6.3.2.3 Promote installation and provision of wind barriers to protect crops | MOAF, RADA, ODPEM, PMOs, individual agricultural enterprises | Years 1-3 Ongoing |
| | | 6.3.2.4 Encourage and promote on-farm mitigation measures including:<br>• Harvest and storage of crops before onset of hurricane season<br>• Tree pruning<br>• Production of reserve supplies of seedlings and planting material<br>• Safe storage of pesticides | MOAF, RADA, ODPEM, PMOs, individual agricultural enterprises | Years 1-3 Ongoing |
| | | 6.3.2.5 Strengthen research into appropriate hazard mitigation measures for Jamaican agricultural enterprises | MOAF, RADA, ODPEM, Research and Tertiary Institutions, JAS, Private Enterprises | Years 1-3 Ongoing |
| | | | | |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | 6.3.3 Develop comprehensive hazard preparedness activities for the agricultural sector | 6.3.3.1 Provide hurricane tips and other information for farmers before the onset of the hurricane season | MOAF, RADA, ODPEM, JIS | Years 1-3 Ongoing |
| | | 6.3.3.2 Disseminate hazard mitigation information to the agricultural sector on a timely basis | ODPEM, PMOs, RADA, JAS, JIS, commodity organizations, MOAF | Years 1-3 Ongoing |
| | | 6.3.3.3 Implement Parish Disaster Management Plans | RADA, ODPEM, LAs, PMOs, commodity organizations, MOAF, Private Sector, CBOs | Years 1-3 Ongoing |
| | | 6.3.3.4 Strengthen early warning systems for natural disasters | MOAF, RADA, ODPEM, CBOs, LAs | Years 1-3 Ongoing |
| | | 6.3.3.5 Encourage the establishment of a hemispheric network specialized in early warning and agro-meteorological monitoring for the mitigation of natural disasters through the joint efforts of public and private institutions in the hemisphere | MOAF, MFAFT, ODPEM | Years 1-3 Ongoing |
| | 6.3.4 Strengthen disaster response | 6.3.4.1 Accelerate post-disaster resuscitation of roads and other agriculture infrastructure | MOAF, MTW, NWA, LAs, RADA, ODPEM | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | and recovery mechanisms for the agricultural sector | 6.3.4.2 Implement National Agricultural Disaster Risk Management Programme | MOAF, MFPS, ODPEM, CBOs, LAs, PMOs, Private Enterprises | Years 1-3 Ongoing |
| | | 6.3.4.3 Establish stockpiles of tools, equipment and other materials for emergency use | ODPEM, CBOs, LAs, PMOs, Private Enterprises, Commodity Organizations | Years 1-3 Ongoing |
| | | 6.3.4.4 Develop mechanisms for communication with farmers after a disaster including through cell phone communication and mass-text messages to registered farmers | MOAF, RADA, ODPEM, Private Sector, Telecommunications Companies | Years 1-3 Ongoing |
| | | 6.3.4.5 Encourage planting to reap within the non-hurricane peak season to ensure food security for hurricane season | MOAF, RADA | Years 1-3 Ongoing |
| | | 6.3.4.6 Develop and implement Fisheries Disaster Response Strategy | MOAF, Fisheries Division | Years 1-3 |
| | | 6.3.4.7 Strengthen linkages between umbrella organizations and national disaster preparedness and emergency management system, including throughout the prevention, preparation, response and recovery phases | MOAF, OPM, PSOs, ODPEM, LAs, JAS, CBOs, Private Enterprises | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 6.3.4.8 Encourage collaboration between agricultural enterprises and community-level disaster committees | OPM, PSOs, JAS, Private Enterprises, ODPEM, MOAF, LAs, CBOs | Years 1-3 Ongoing |
| | | 6.3.4.9 Research and improve hazard damage assessment methods for the agricultural sector | ODPEM, STATIN, PIOJ, MOAF, Research and Tertiary Institutions | Years 1-3 Ongoing |
| | | 6.3.4.10 Conduct agricultural livelihood assessments in pre-hurricane and post hurricane seasons | MOAF, RADA | Years 1-3 Ongoing |
| | | | | |
| **Goal #7: National Food Security** | | | | |
| 7.1 Increased Access to Adequate and Safe Food Supplies for Population | 7.1.1 Ensure consistent and dependable access to adequate food supplies | 7.1.1.1 Strengthen distribution, storage and marketing system for consistent food supplies | MOAF, MIIC, RADA, Private Sector | Years 1-3 Ongoing |
| | | 7.1.1.2 Mitigate against food shortages resulting from natural and man-made hazards, including establishment of emergency stockpiles | MOAF, MIIC, MOHE, ODPEM, Private Sector | Years 1-3 Ongoing |
| | | | | |
| | 7.1.2 Enhance affordability of food supplies | 7.1.2.1 Implement Price Support Programme to subsidize basic food items to mitigate against external price shocks and disasters | MIIC, MLSS, MOAF, MOHE, MFPS | Years 1-3 Ongoing |
| | | 7.1.2.2 Strengthen the targeting and delivery of social assistance to vulnerable groups and welfare beneficiaries | MLSS, MOAF, MOHE | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 7.1.2.3 Expand School Feeding Programme | MOE | Years 1-3 Ongoing |
| | | 7.1.2.4 Source cheaper inputs for local agricultural production | MOAF, MIIC, Private Sector | Years 1-3 Ongoing |
| | 7.1.3 Ensure safety of food supplies | 7.1.3.1 Establish Single Food Safety Agency | MOAF, MOHE, MIIC, BSJ, CO, OPM | Years 1-3 |
| | | 7.1.3.2 Rationalize agencies and activities into single integrated national system for food safety | MOAF, MOHE, MIIC, CO | Years 1-3 |
| | | 7.1.3.3 Strengthen coordination of agencies involved in food safety | MOAF, MOHE, MIIC, CO | Years 1-3 |
| | | 7.1.3.4 Modernize legislation relating to food safety and create umbrella legislation | MOAF, MOHE, MIIC, CO, OPC | Years 1-3 Ongoing |
| | | 7.1.3.5 Finalize and implement food safety policy | MOAF, MOHE, MIIC, CO, OPM | |
| | | 7.1.3.6 Strengthen the system of inspection, monitoring and testing of imported foods | MOAF, MOHE, MIIC, BSJ, Customs | Years 1-3 Ongoing |
| | | 7.1.3.7 Encourage implementation of on-farm food safety programmes and good agricultural/ manufacturing practices | MOAF, RADA, MOHE, MIIC, JAS, BSJ, Private Sector | Years 1-3 Ongoing |
| | | 7.1.3.8 Strengthen the system for surveillance of food-borne disease and create a comprehensive database for food-borne-related illnesses | MOHE, MOAF | Years 1-6 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | 7.1.3.9 Establish effective traceability system for key agricultural crops and livestock "from farm to fork" | MOAF, RADA, MOHE, MIIC, JAS, BSJ, Private Sector | Years 1-6 |
| 7.2 Increased Domestic Food Production | 7.2.1 Promote appropriate technology and techniques to increase efficiency of staple food production at lower costs and prices | 7.2.1.1 Promote best practice and GAPS by domestic food producers including mechanization of on-farm operations, small-scale irrigation systems, soil testing to inform crop selection and fertilizer application, post-harvest techniques | MOAF, RADA, JAS, Private Sector | Years 1-6 Ongoing |
| | 7.2.2 Provide incentives to local producers for food security purposes | 7.2.2.1 Review existing trade rules to identify incentives for domestic food production | MOAF, MFAFT, MIIC, MFPS | Years 1-6 Ongoing |
| | | 7.2.2.2 Provide temporary, targeted incentives to encourage growth of critical sub-sectors | MOAF, MFAFT, MIIC, MFPS | Years 1-6 Ongoing |
| | 7.2.3 Ensure sustainable management of food-based resources (land and sea/aquatic) | 7.2.3.1 Establish fishing sanctuaries to protect breeding grounds | MOAF, NEPA, MNS, JCF, Coast Guard, ENGOs | Years 1-6 Ongoing |
| | | 7.2.3.2 Encourage crop zoning for lands suitable for their production | MOAF, NLA, NEPA, LAs | Years 1-6 Ongoing |
| | 7.2.4 Encourage home | 7.2.4.1 Promote use of backyard garden systems in urban and peri-urban households | MOAF, RADA, SDC | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | food production including backyard gardening | 7.2.4.2 Implement residential fruit tree planting programme | MOAF, RADA, SDC | Years 1-3 Ongoing |
| | 7.2.5 Undertake key food security projects | 7.2.5.1 Implement key food security projects including:<br>➢ Production and Productivity Programme for selected crops<br>➢ Improving Jamaica's Agricultural Productivity (IJAP) (Greenhouse Clusters and Fisheries Development)<br>➢ Cassava Expansion Project<br>➢ Dairy Revitalization Programme<br>➢ Small Ruminant Expansion Programme<br>➢ Urban Backyard and School Garden Programmes<br>➢ EC Food Facility | MOAF, RADA, PMOs, Private Sector | Years 1-6 |
| | | | | |
| 7.3 Improved Nutritional Status of the Population through Consumption of Healthy Foods | 7.3.1 Promote the consumption of healthy foods | 7.3.1.1 Promote increased consumption of healthy foods and diet, including increased consumption of fruits, vegetables, legumes and ground provisions, and decreased consumption of fat, sugar and salt, within the Healthy Lifestyles framework | MOHE, MOAF, MIIC, BSJ, JIS, JAS, Private Sector, CBOs, CFNI, MOE | Years 1-3 Ongoing |
| | | 7.3.1.2 Align food import and local production policies with recommended nutrition and | MOHE, MOAF, MIIC, MFAFT | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | dietary goals | | |
| | | 7.3.1.3 Develop and implement public education and awareness programme on healthy food choices | MOHE, MOAF, MIIC, JIS, JAS, Private Sector, CBOs, CFNI | Years 1-3 Ongoing |
| | | 7.3.1.4 Reinforce and implement policy on breast-feeding and "Baby Friendly" hospitals | MOHE | Years 1-3 Ongoing |
| | | 7.3.1.5 Highlight the negative characteristics of some foods such as GMOs, and foods containing increased additives, hormones and other chemicals, and saturated fats | MOHE, MOAF, MIIC, BSJ, JIS, JAS, Private Sector, CBOs | Years 1-3 Ongoing |
| | 7.3.2 Create supportive environment for healthy foods | 7.3.2.1 Incorporate healthy food choices in hospitality industry, restaurants, schools, retail outlets, canteens, and other food outlets | MOAF, MIIC, MOHE, MOE, Private Sector | Years 1-3 Ongoing |
| | | 7.3.2.2 Establish and enforce nutrition and food safety standards for the food industry, based on food-based dietary guidelines | MOHE, MOAF, MIIC, BSJ, Private Sector | Years 1-3 Ongoing |
| | | 7.3.2.3 Ensure proper labeling of food products in relation to their nutritional content | MOHE, MOAF, MIIC, BSJ, Private Sector | Years 1-3 Ongoing |
| | | 7.3.2.4 Establish partnership with the food and beverage industry to promote the production and marketing of healthy foods | MOHE, MOAF, MIIC, BSJ, Private Sector | Years 1-3 Ongoing |
| | | 7.3.2.5 Support and strengthen relevant research on food and nutrition | MOHE, MOAF, MIIC, BSJ, SRC, | Years 1-3 Ongoing |

| OUTCOMES | STRATEGIES | ACTIONS | RESPONSIBLE AGENCIES AND STAKEHOLDERS | TIME-FRAME |
|---|---|---|---|---|
| | | | CFNI, Private Sector, Research and Tertiary Institutions | |
| | | 7.3.2.6 Design food and nutrition policy from a nutrition/health perspective and support the production of safe and nutritious foods | MOAF, MOHE, MIIC, BSJ, CO, Private Sector, CFNI, MOE | Years 1-3 Ongoing |
| | 7.3.3 Highlight the nutritional, taste and cultural and economic benefits of Jamaican foods | 7.3.3.1 Promote local foods based on their cultural and economic importance, health benefits, freshness and superior flavor | MOHE, MOAF, MIIC, JIS, JAS, Private Sector, CBOs | Years 1-3 Ongoing |
| | | 7.3.3.2 Develop media advertisements, cooking classes and contests, cookbooks and publishing of local recipes for Jamaican foods | MOHE, MOAF, MIIC, JIS, JAS, Private Sector, CBOs | Years 1-3 Ongoing |
| | | | | |

# 7. Appendices

## 7.1 Appendix 1 – List of Task Force Members

| | |
|---|---|
| Mr. Donovan Stanberry | Permanent Secretary, Ministry of Agriculture and Lands (MOAF)<br>(Task Force Chairperson) |
| Mr. Peter Myers | Policy Analyst, Cabinet Office |
| Mr. Robert Reid | Agri-Business Specialist, International Institute for Cooperation in Agriculture (IICA) |
| Ms. Shauna Brandon | Rural Development Specialist, IICA |
| Mr. Ainsworth Riley | Agri. Manager, Jamaica Exporters' Association |
| Mr. C. Leopold Nesbeth | Sales and Marketing Manager, Jamaica Cane Products Sales Ltd. |
| Mr. Paul C. Miller | Executive Chairman, Citrus Growers Association |
| Dr. Dunstan Campbell | Representative in Jamaica, Food and Agricultural Organization (FAO) |
| Dr. Keith Amiel | President, Caribbean Agribusiness Association / Caribbean Broilers Group |
| Mr. Lawrence V. Bowie | Cultivation Manager, Trade Winds Citrus Ltd. |
| Ambassador Derick Heaven | Executive Chairman, Sugar Industry Authority |
| Mr. Albert Shand | Executive Director, Rural Agricultural Development Authority (RADA) |
| Mr. Shaun Baugh | Director, Planning and Evaluation, RADA |
| Mr. Neville Lindo | Development Bank of Jamaica |
| Mr. Vitus Evans | Jamaica Agricultural Development Foundation (JADF) |
| Ms. Idelle Brown | Chief Executive Officer, Belle Tropicals Ltd. |
| Mr. Don McGlashan | Chief Technical Director, MOAF |
| Mrs. Zuliekha Budhan | Principal Director, Policy and Planning, MOAF |
| Mrs. Carol Johnston-Miller | Director, Economic Planning, MOAF |
| Dr. Osbil Watson | Director, Veterinary Services Division, MOAF |
| Mr. Karl Hyatt | International Trade Specialist, MOAF |
| Ms. Mavis Campbell | Consultant, MOAF |
| Mr. Denzville Williams | Plant Quarantine, MOAF |
| Mr. Delroy Coley | Corporate Planning, MOAF |
| Ms. Stacy Rose | Economic Planning, MOAF |
| Mr. Dwight E. Robinson | Chairman, Jamaica Organic Agricultural Movement |
| Mrs. Dionne Clarke-Harris | Caribbean Agricultural Research and Development Institute (CARDI) |
| Sen. Norman Grant | President, Jamaica Agricultural Society |
| Mr. Ronald Blake | Jamaica 4H Club |

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|---|---|
| Dr. Ballayram | Caribbean Food and Nutrition Institute |
| Mr. R. Karl James | General Manager, Jamaica Cane Products Sales Limited |
| Mr. Kevin Condappa | MOAF |
| Ms. Tracey-Ann Wright | MOAF |
| Mr. Julian Douglas | MOAF |
| Mr. Carlton Wedderburn | MOAF |
| Mrs. Camille Beckford Scott | Jamaica Exporters' Association |
| Ms. Genevieve Graham | FAO/United Nations |
| Mr. Wesley Van Riel | Senior Director, Strategic Planning and Evaluation, Ministry of Tourism |

**PIOJ STAFF:**

| | |
|---|---|
| Mrs. Angela Taylor-Spence | PIOJ |
| Mr. Barrington Hibbert | PIOJ |
| Mr. Michael Ramsay | PIOJ |
| Mr. Richard Lumsden | PIOJ |
| Ms. Tameka Walker | PIOJ |

Note: Positions of Task Force Members are given as at the time of their appointment to the Agriculture Task Force.

## 7.2 Appendix 2 – List of Attendees at Agriculture Workshop

**ATTENDEES AT VISION 2030 JAMAICA**
**AGRICULTURE TASK FORCE STAKEHOLDER WORKSHOP**
**HELD ON WEDNESDAY, NOVEMBER 7, 2007**
**AT THE TERRA NOVA HOTEL, KINGSTON**

**PRESENT:**

| | | |
|---|---|---|
| 1. | Hon. Christopher Tufton, M.P. | Minister of Agriculture, Ministry of Agriculture and Lands (MOAL) |
| 2. | Mr. Donovan Stanberry | Permanent Secretary, Ministry of Agriculture and Lands |
| 3. | Mr. Don McGlashan | Chief Technical Director, Ministry of Agriculture and Lands (Workshop Chairperson) |
| 4. | Mr. Byron McDonald | Development Bank of Jamaica |
| 5. | Mr. C. Bishop | Wallenford Coffee |
| 6. | Mr. Wesley Van Riel | Senior Director, Strategic Planning and Evaluation, Ministry of Tourism |

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|---|---|---|
| 7. | Mr. Thomas Burton | Rural Agricultural Development Authority (RADA) |
| 8. | Mr. Stanley Dodd | RADA |
| 9. | Mr. Winston Simpson | RADA |
| 10. | Mr. Raymond Martin | Jamaica Organic Agricultural Movement (JOAM) |
| 11. | Mrs. Dorienne Rowan-Campbell | Jamaica Organic Agricultural Movement (JOAM) |
| 12. | Ms. Tracey Ann Logan | Jamaica Organic Agricultural Movement (JOAM) |
| 13. | Dr. Ballayram | Caribbean Food and Nutrition Institute |
| 14. | Halcyee Anderson | Agribusiness Council of Jamaica |
| 15. | Ms. Donnelle Christian | TVJ |
| 16. | Ms. Kimone Witter | RJR |
| 17. | Ms. Claudia C. Barnes | Ministry of Foreign Affairs and Foreign Trade |
| 18. | Ms. Florence Young | Jamaica Horticultural Society |
| 19. | Mr. Lawrence V. Bowie | Trade Winds Citrus Limited |
| 20. | Ms. Grace-Ann Allen | Trade Winds Citrus Limited |
| 21. | Mr. Dave Reid | Jamaica Information Service |
| 22. | Mr. Vin Evans | BECO |
| 23. | Mr. Dave Hutton | Agri Unit, UWI |
| 24. | Ms. Genevieve Graham | FAO/United Nations |
| 25. | Mr. Hesdie Grauwde | FAO – Barbados |
| 26. | Mr. Howard Batson | USAID/REACT |
| 27. | Mr. Maurice Harrison | National Irrigation Commission |
| 28. | Mr. John Allen | Newport-Fersan (Ja.) Limited |
| 29. | Mr. Richard Jones | Coconut Industry Board |
| 30. | Mr. Neville Lindo | Development Bank of Jamaica |
| 31. | Mr. Derrick Simon | All Island Coffee Growers Association |
| 32. | Ms. Gail Barrett | Jamaica Trade and Invest (JAMPRO) |
| 33. | Mrs. Zuliekha Budhan | Principal Director, Ministry of Agriculture and Lands |
| 34. | Mrs. Paulette Lyons-Dodd | Ministry of Agriculture and Lands |
| 35. | Ms. Shelia Harvey | Ministry of Agriculture and Lands |
| 36. | Mr. Karl Hyatt | Ministry of Agriculture and Lands |
| 37. | Mr. Michael Pryce | Ministry of Agriculture and Lands |
| 38. | Mrs. Trudi Stuart-Gaynor | Ministry of Agriculture and Lands – Veterinary Services |
| 39. | Ms. Hyacinth Bernard | Ministry of Agriculture and Lands, Data Bank |
| 40. | Mrs. Carol Johnston-Miller | Ministry of Agriculture and Lands |
| 41. | Ms. Jasmin Holness | Ministry of Agriculture and Lands – R&D |
| 42. | Mr. Hershell Brown | Ministry of Agriculture and Lands – ASSP |

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| 43. | Mr. Kevin Condappa | Ministry of Agriculture and Lands |
| 44. | Mr. Carlton Wedderburn | Ministry of Agriculture and Lands |
| 45. | Mr. John Townend | Ministry of Agriculture and Lands |
| 46. | Ms. Tracey-Ann Wright | Ministry of Agriculture and Lands |
| 47. | Dr. Omer Thomas | Ministry of Agriculture and Lands |
| 48. | Mr. Rohan Richards | Ministry of Agriculture and Lands |
| 49. | Mr. Marvel Gray | Ministry of Agriculture and Lands |
| 50. | Ms. Judith C. Maloney | Ministry of Agriculture and Lands |
| 51. | Dr. Mohini Kiswani | Ministry of Agriculture and Lands |
| 52. | Ms. Valerie Roberts | Ministry of Agriculture and Lands |
| 53. | Mr. Gladstone A. Barrett | Ministry of Agriculture and Lands – Export Division |
| 54. | Ms. Anginette Murray | Fisheries Division |
| 55. | Mrs. Dionne Clarke-Harris | CARDI |
| 56. | Mr. Louis Campbell | Coffee Industry Board |
| 57. | Ms. Marcia Thompson | Pesticides Control Authority |
| 58. | Mr. James Burrowes | USAID |
| 59. | Mr. Balteano Duffus | Beef and Dairy Producers Association |
| 60. | Sen. Norman Grant | Jamaica Agricultural Society |
| 61. | Mr. Francis Asiedu | CARDI |
| 62. | Dr. Dunstan Campbell | FAO |
| 63. | Ms. Shalom Hodara | JDI |
| 64. | Ms. Annbel Williams | JMA |
| 65. | Mr. Leslie Simpson | CARDI |
| 66. | Mr. Paul Miller | Citrus Growers Association |
| 67. | Mr. Percy Miller | Citrus Growers Association |
| 68. | Mr. Alvin Murray | Christiana Potato Growers Association |
| 69. | Ms. Cordia Thompson | FAO |
| 70. | Mr. Lennie Morgan | ADC |
| 71. | Mr. Egbert Bob Miller | AIBGA/JAS |
| 72. | Mr. Lenworth Blake | Jamaica Greenhouse Growers' Association |
| 73. | Mr. Hugh Dixon | STEA |
| 74. | Mr. Calvon Watson | Jamaica 4H Club |
| 75. | Mr. Paul Jennings | Jamaica Dairy Development Board |
| 76. | Ms. Helen Farquharson | |
| 77. | Ms. Idelle Brown | Belle Tropicals Limited |
| 78. | Ms. Shelly Thompson | The Gleaner Company Limited |
| 79. | Mr. Vitus Evans | JADF |
| 80. | Mr. Johnathan Lamey | College of Agriculture, Science and Education |
| 81. | Ms. Donna Lamey | College of Agriculture, Science and Education |
| 82. | Mr. Keith Amiel | CB Group/CABA |
| 83. | Mr. Robert Reid | IICA |

**PIOJ STAFF:**

1. Dr. Peter-John Gordon
2. Mr. Lasford Stone
3. Mr. Richard Lumsden
4. Mr. Barrington Hibbert
5. Mr. Michael Ramsay

## 7.3 Appendix 3 – Listing of Task Force Meetings

- September 21, 2007
- October 25, 2007
- November 7, 2007 (Workshop)
- February 3, 2009

## 7.4 Appendix 4 – List of Acronyms and Abbreviations

| | |
|---|---|
| AAAJ | Advertising Agencies Association of Jamaica |
| ABIS | Agricultural Business Information System |
| AICFA | All-Island Cane Farmers' Association |
| BOJ | Bank of Jamaica |
| BSJ | Bureau of Standards Jamaica |
| CAPE | Caribbean Advanced Proficiency Examination |
| CARDI | Caribbean Agricultural Research and Development Institute |
| CARICOM | Caribbean Community |
| CASE | College of Agriculture, Science and Education |
| CBO | Community Based Organization |
| CFNI | Caribbean Food and Nutrition Institute |
| CO | Cabinet Office |
| DAC | Development Area Committee |
| DBJ | Development Bank of Jamaica |
| ENGO | Environmental Non-Governmental Organization |
| EU | European Union |
| EUBSP | European Union Banana Support Programme |
| FAO | Food and Agriculture Organization |
| 4H | Jamaica 4H Clubs |
| GDP | Gross Domestic Product |
| GOJ | Government of Jamaica |
| GON | Government of the Netherlands |
| HEART/NTA | Heart Trust/National Training Agency |
| ISCF | Island Special Constabulary Force |
| IICA | International Institute for Cooperation in Agriculture |
| ITC | International Trade Centre |
| JAPA | Jamaica Agro Processors Association |
| JAS | Jamaica Agricultural Society |

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|---|---|
| JBDC | Jamaica Business Development Centre |
| JBI | Jamaica Bauxite Institute |
| JBOS | Jamaica Business Opportunity Service |
| JCC | Jamaica Chamber of Commerce |
| JCF | Jamaica Constabulary Force |
| JEA | Jamaica Exporters' Association |
| JHTA | Jamaica Hotel and Tourist Association |
| JIPO | Jamaica Intellectual Property Office |
| JIS | Jamaica Information Service |
| JLA | Jamaica Livestock Association |
| JMA | Jamaica Manufacturers' Association |
| JNHT | Jamaica National Heritage Trust |
| JOAM | Jamaica Organic Agriculture Movement |
| JSIF | Jamaica Social Investment Fund |
| JTB | Jamaica Tourist Board |
| JTI | Jamaica Trade and Invest |
| KSAC | Kingston and St. Andrew Corporation |
| LA | Local Authority |
| MCYS | Ministry of Culture, Youth and Sports |
| MDAs | Ministries, Departments and Agencies |
| MDGs | Millennium Development Goals |
| MEM | Ministry of Energy and Mining |
| MFAFT | Ministry of Foreign Affairs and Foreign Trade |
| MFPS | Ministry of Finance and the Public Service |
| MIIC | Ministry of Industry, Investment and Commerce |
| MLSS | Ministry of Labour and Social Security |
| MNS | Ministry of National Security |
| MOAF | Ministry of Agriculture and Fisheries |
| MOAL | Ministry of Agriculture and Lands |
| MOE | Ministry of Education |
| MOHE | Ministry of Health and Environment |
| MOT | Ministry of Tourism |
| MQAJ | Mining and Quarrying Association of Jamaica |
| MSMEs | Micro-, Small and Medium-Sized Enterprises |
| MTW | Ministry of Transport and Works |
| NEPA | National Environment and Planning Agency |
| NGO | Non-Governmental Organization |
| NIC | National Irrigation Commission |
| NLA | National Land Agency |
| NSWMA | National Solid Waste Management Authority |
| NWA | National Water Authority |
| ODPEM | Office of Disaster Preparedness and Emergency Management |
| OPM | Office of the Prime Minister |
| PA | Producers' Association |
| PDC | Parish Development Committee |
| PIOJ | Planning Institute of Jamaica |

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|---|---|
| PMO | Production and Marketing Organization |
| PSOJ | Private Sector Organization of Jamaica |
| RADA | Rural Agricultural Development Authority |
| RPPD | Rural Physical Planning Department |
| SDC | Social Development Commission |
| SLB | Student Loan Bureau |
| SRC | Scientific Research Council |
| STATIN | Statistical Institute of Jamaica |
| TNC | The Nature Conservancy |
| TPDCo | Tourism Product Development Company |
| UCJ | University Council of Jamaica |
| USAID | United States Agency for International Development |
| UTECH | University of Technology |
| UWI | University of the West Indies |
| WTO | World Trade Organization |

## 7.5 Appendix 5 – References and Selected Bibliography


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