AN ANALYSIS OF

THE JAMAICA CITRUS SUB-SECTOR

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EXECUTIVE SUMMARY

The citrus industry which is worth approximately JA $4 billion, has been severely affected by HUANGLONBING (HLB) or citrus greening disease. The local citrus sector, which was once prosperous and enjoyed lucrative returns, has in recent years declined as the huanglongbing (HLB) or greening disease negatively impacts the subsector. The problem of limited accessibility to clean planting material which is needed to sustain the industry, is compounded by the ability to keep these plants healthy.

Huanglongbing (HLB) or greening disease has no cure and efforts to control this disease has posed many challenges for the subsector. The lime citrus sub group has suffered the most from the (HLB) or greening disease, particularly, the variety commonly called Mexican lime, West Indian lime or common lime.

The Citrus Greening Management Project has implemented several control measures in order to mitigate the effects of the greening disease by the use of registered nurseries to distribute clean planting material to farms.

In October 2010, a two year project (TCP/JAM/3302) valued at US$480, 000.00 was approved by the Food and Agriculture Organisation (FAO) to assist in the execution of the citrus greening management programme. Since November 2010 the Citrus Greening Management Project has been implemented by the Research and Development Division, Ministry of Agriculture and Fisheries with assistance from selected stakeholders.

Over the period November 2010 to October 2012, the goal of the project was to sustainably manage HLB, especially on small farmer's holdings, using a strategy composed of five components. Namely:

(1) Facilitating the capacity to diagnose and detect HLB

(2) The development of a system to produce certified clean planting material

(3) Providing improved infrastructure

(4) Designing a coordinated area-wide integrated management programme for HLB and

(5) Implementation of a public education programme.

According to the views of one industry expert, citrus is no longer viable to be planted on marginal lands as the need for plant nutrition plays an integral part in the survival of the infected plants.

Limitation of the Project

Field visits were limited to targeted geographical areas where large citrus orchards are located.

Delimitations of the Project

Given the diverse groups of citrus varieties, the study was confined to the four main export groups; Sweet Orange, Grapefruit, Ortanique and Ugli. The parishes selected were confined to the rural areas only, while the targeted participants were tapered to key stakeholders who were integrally involved in either citrus planting, extension services or processing of the citrus fruit.

CROP PROFILE

Citrus is a genus of flowering plants in the rue family, Rutaceae. Citrus are versatile fruits, used in several different ways, for example enhance flavours in food preparation or eaten in its fresh forms. Citrus such as oranges, Ugli, mandarin, grapefruits, and tangerines can be sweet, but generally, citrus fruits are sour. The level of acidity varies based on variety and soil type. However, all citrus fruits are rich in vitamin C.

Citrus, which originated in Southeast Asia, is characterized by fragrant flowers and edible juicy fruit. Today, the most important commercial varieties include oranges, grapefruit, limes, lemons, tangerines, and to a lesser extent, tangelos and temples. Oranges account for the greatest value of citrus produced locally, followed by grapefruit, limes, lemons and tangerines.

The major citrus producing parishes in Jamaica are: St. Catherine, St. Mary, Clarendon, St. James St. Elizabeth and Manchester. Of these six parishes, St. Catherine, Clarendon and St. James produced the majority of the citrus crop in 2013,

In the United States of America (USA); Florida is the largest producer of oranges and grapefruits. Florida produces approximately 70 percent of total U.S. production of oranges, and approximately 65 percent of grapefruit. California is the largest producer of lemons, producing more than 92 percent of production, and of tangerines, accounting for about 80 percent of production.

(NASS 2013)

BACKGROUND TO THE CITRUS SUB-SECTOR

The citrus industry is worth approximately J$4 billion and is a major contributor to the economy of Jamaica, providing employment, exports and local production for the fresh and agro processing market. It has been estimated that approximately 96% of the citrus was consumed locally and 4% exported. On-farm employment was estimated at 5,460 individuals while employment at the industry level (including on-farm operations, processing, packaging plant, wholesale and retail trades) was estimated at 19,500 persons.

The citrus subsector was once lucrative until the last five years when the subsector declined (2010) due to HUANGLONBING (HLB) or citrus greening disease. This disease is transmitted by the Asian Citrus Psyllid which once infected with the greening disease carries it for life. This results in the disease spreading rapidly as it is easily transmitted to citrus plants.

Greening is a bacterial disease that affects citrus trees. The disease was first noted by farmers in southern China in the late 1800s; this bacterial disease is incurable. The infected trees may not show symptoms for years due to the disease having a latency period of about two years. The trees die in three to five years after being infected. Once infected, the trees will have blotchy mottling and leaf yellowing. The disease can cause small, narrow leaves and short stems. Fruit infected by the disease will result in a reduction of juice quality. There are also a high percentage of losses resulting from fruits fall at various levels of maturity. Based on the experiences of other citrus producing countries, drastic management changes are necessary to protect the local industry from complete devastation.

Challenges to the protection of the industry from HLB is posed by the topography, proximity of citrus fields to watersheds, and the presence of unmanaged and abandoned groves. Chemical application of insecticides for control in the groves is undesirable due to the potential adverse impacts on the environment, beneficial organisms and human health. The Ministry of Agriculture and Fisheries (MOAF), through a pilot study, is exploring a biologically based integrated pest management programme. However, assistance is needed to design a cost-effective, area-wide management programme, as over 90% of the industry is comprised of small farmers who do not possess sufficient resources and capability to implement their own control measures for the disease.

Currently, the Jamaica Citrus Protection Agency (JCPA), which was established in 1998 to enforce certification of citrus nurseries, is the competent authority on citrus nursery protection on the island. The unit is staffed with one technical officer and one administrative assistant. The technical officer has received international training in field detection of HLB disease. This officer has trained 10 officers (officers were selected from the MOAF and its agencies) in the identification of field symptoms of the

HLB disease. The officers that were trained conducted detection and delimiting surveys for HLB across the island.

The presence of the citrus greening disease and the Asian citrus psyllid vector are relatively new to Jamaica; therefore, there is a critical need to educate growers on identifying and managing the disease. Today, the only extension service that is being offered is from JCPA.

Approximately 60% of Jamaica's citrus budwood material comes from unprotected quick multiplication block (QMB) budwood sources, therefore increasing the chance of spreading the disease over long distances through plants that were compromised by the Asian citrus psyllid vector. Jamaica has two protected budwood facilities that meet the required standards, but is owned by large commercial growers; hence small nursery operators are dependent on large producers for budwood. Also, there is a need for a geographically isolated budwood facility meeting the required standards.

Production of citrus plants are largely open, unprotected operations and are vulnerable to insect vectors, presenting a challenge in maintaining certified planting material (budwood production).

Jamaica's tangerines, ortaniques and grapefruits are three important local cultivars, which are not currently under the citrus certification programme and have been severely affected by citrus greening disease. There are currently no certified clean/disease free plants available locally to facilitate production of these cultivars. However, there is a recent thrust now being pursued by JCPA in order to incorporate these varieties into the citrus certification programme.

Currently, the University of the West Indies (UWI) provides HLB diagnostic testing at a cost per sample. The lack of a designated laboratory for plant disease diagnosis, unfortunately mean reports can take two to three weeks to be prepared.

Agro industry: Trade Winds Jamaica Limited is one of Jamaica's market leaders in the drink and juice segment of the Citrus industry and owns several premium brands, such as: Tru Juice, Freshhh, Wakefield, Tru Tea, Squeeze and Calico Jack. The logo, brand of each is shown below.

Trade Winds Jamaica Limited is not only in agro processing, but is the island's largest citrus grower; registered under the name of Trade Winds Citrus Limited (TWCL).

Trade Winds Citrus Limited has been impacted by the disease on its operation and in the year 2013 had sold 550 Acres of its citrus farm in Enfield to the Worthy Park Co. Limited who wanted to expand their farming acreage of sugar cane production. This business transaction was necessary as the Enfield farms was severely affected by the greening disease, so total removal of the trees was necessary.

Another 150 Acres are to be cleared to make available for the planting of alternative crops such as cocoa or coconut.

Limes: Shortage of limes had impacted the agro processors and the fresh fruit market. The severity of HLB or greening disease in this citrus sub-group was compounded with several other factors, such as:

1. Lack of commercial lime production groves
2. Lack of commercial lime processing facilities
3. The high susceptibility of lime plants to HLB/greening disease
4. The lack of interest by small farmers to invest in the crop
5. The relatively low level of demand for lime in comparison to other citrus varieties such as oranges. Limes are not normally eaten in its fresh form, but are generally used as an ingredient in beverages, baked items or in cooking.

There are two types of lime, seeded lime also known as Mexican lime, West Indian lime or common lime, this type is very susceptible to HLB/greening. The impact of the susceptibility can be seen in a lack of limes on the local market for most of the year.

The second type is Persian lime or Bears lime which is a seedless lime and a larger fruit. This variety shows a higher degree of tolerance to HLB than the Mexican lime.

Recently, Trade Winds Company Limited created a more diversified product line; as lime juice is not only viewed as a raw material, but as a final product to be distributed commercially based on its scarcity that adversely affects the fresh and the agro processing markets. The local conglomerate; Trade Wind Company Limited has launched one of its new products “real lime juice” branded and packed for the Jamaican market. The local raw material supplies is being drastically reduced, which hinders the growth of the industry.

PRODUCTION

The huanglongbing (HLB) or greening disease can reduce citrus production by as much as 20%. Shown below is a citrus orchard with approximately 80% of fruit fall before being mature.

Source: Trade Wind Farms

Citrus huanglongbing (HLB) or greening disease is known worldwide to cause devastation of citrus groves and has the potential to destroy an entire citrus industry. Since its discovery in Jamaica, October 2009, a concerted effort was made by stakeholders of the industry, including growers, government and processors to stop the spread of the disease. The lack of government capacity in human and financial resources necessitated external assistance to develop and implement a comprehensive management programme for this disease. Therefore, assistance was sought from the Food and Agricultural Organization of the United Nations (FAO) by the Ministry of Agriculture and Fisheries in 2010 to develop a citrus greening management Programme.

HLB disease is present in all major citrus producing parishes of Jamaica and threatens to destroy the citrus industry, which is already being impacted by other challenges such as:

- Funding for the sub-sector
- Adverse weather conditions (hurricanes and drought)
- Praedial larceny
- Poor agricultural practices
- Limited scientific research on the sub-sector

Citrus Market - Processors Price and Farm Gate Prices

Table 1

Sweet Oranges and Ortaniques Delivered At The Factory (Processing) JA$ For The Year 2013

Factory Price	Pound	Per Box
Processors JA$	$95.00	$545.00

Sweet Oranges and Ortanique delivered at Factory Gate for processing - $95/pound solids (or approximately $545 per box).

Table 2

Sweet Oranges and Ortaniques At The Farm Gate JA$ (Fresh) JA$ For The Year 2013

Price Point	In Season per Box	Out Season per box
Farmgate Price	$1200.00	$2800.00

The fresh fruit prices for sweet oranges and ortaniques sold at the farm gate varied between $1,200.00 and $2,800.00 per field box depending on in season or out of season sales respectively.

Table 3

Grapefruits At The Farm Gate JA$ (Fresh) For The Year 2013

Price Point	Per Box
Farmgate Price	380.00

Grapefruit delivered for processing - $380/box

N.B. Ugly is not normally sold on the local market.

MANAGEMENT PROGRAMME OF THE HLB

The programme of management for HLB is complex and dynamic and involves three critical areas:

1. Vector control of the Asian Citrus Psyllid (ACP) using chemical and Biological means.
2. The use of clean planting material from a certified nursery.
3. Reduction of infection within the groves -; this has proven very difficult with the high level of infection, ranging between 70- 100% of all plants in the groves.

Table 1

NATIONAL CITRUS PRODUCTION 2004 to 2013 (in Field Boxes)										
Crop Year	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Sweet Orange	2,850,000	2,775,136	2,659,427	2,803,285	2,805,002	2,947,840	2,697,358	2,491,220	2,281,244	1,935,419
Grapefruit	54,460	31,808	51,128	44,996	19,628	33,600	39,788	22,404	16,000	16,887
Ortanique	213,994	188,757	209,116	213,994	106,484	164,590	144,828	116,000	98,558	83,745
Ugli	214,293	217,687	102,225	58,240	82,574	67,471	61,905	50,165`	60,000	19,802
TOTAL	**3,332,747**	**3,213,388**	**3,021,896**	**3,120,515**	**3,013,688**	**3,213,501**	**2,943,879**	**2,629,624**	**2,455,802**	**2,055,853**

Source: Supplied by the Citrus Growers Association

N.B Highlighted figures were received, computed and rounded - off by the commodity board and sent in kilogram to The Planning Institute of Jamaica (PIOJ). The collected production data were received only from citrus farms that are members of The Citrus Growers Association (CGA).

Table 2

NATIONAL CITRUS PRODUCTION 2004 to 2013 (converted to Kilogram)										
Crop Year	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Sweet Orange	116,593,500	113,530,814	108,797,159	114,682,389	114,752,632	120,596,134	110,348,916	101,915,810	93,325,692	79,178,000
Grapefruit	1,980,166	1,156,539	1,859,014	1,636,055	713,674	1,221,696	1,446,692	814,609	581,760	614,000
Ortanique	8,754,495	7,722,049	8,554,936	8,754,495	4,356,260	6,733,377	5,924,913	4,745,560	4,032,008	3,426,000
Ugli	5,843,770	5,936,324	2,787,676	1,588,205	2,251,793	1,839,934	1,688,149	1,368,000	1,636,200	540,000
TOTAL	**133,171,931**	**128,345,726**	**121,998,785**	**126,661,144**	**122,074,359**	**130,391,141**	**119,408,670**	**108,843,979**	**99,575,660**	**83,758,000**

Table 1 represents the amount of field boxes received from the production of the respective citrus fruits for each year whilst table 2 represents the conversion table in kilogram for each respective fruit box.

Approximately 40.91 kg equivalent to one field box of Sweet orange and Ortanique

Grapefruit approximately 36.36 kg is equivalent for one field box

Ugli approximately 27.27 kg is equivalent to one field box

Figure 1

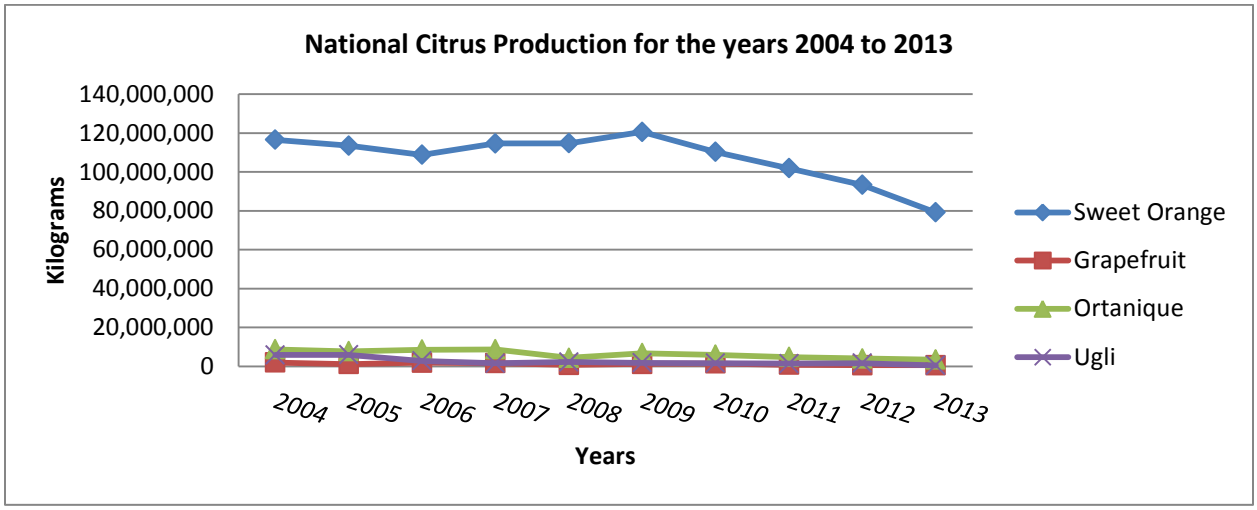


Figure 2

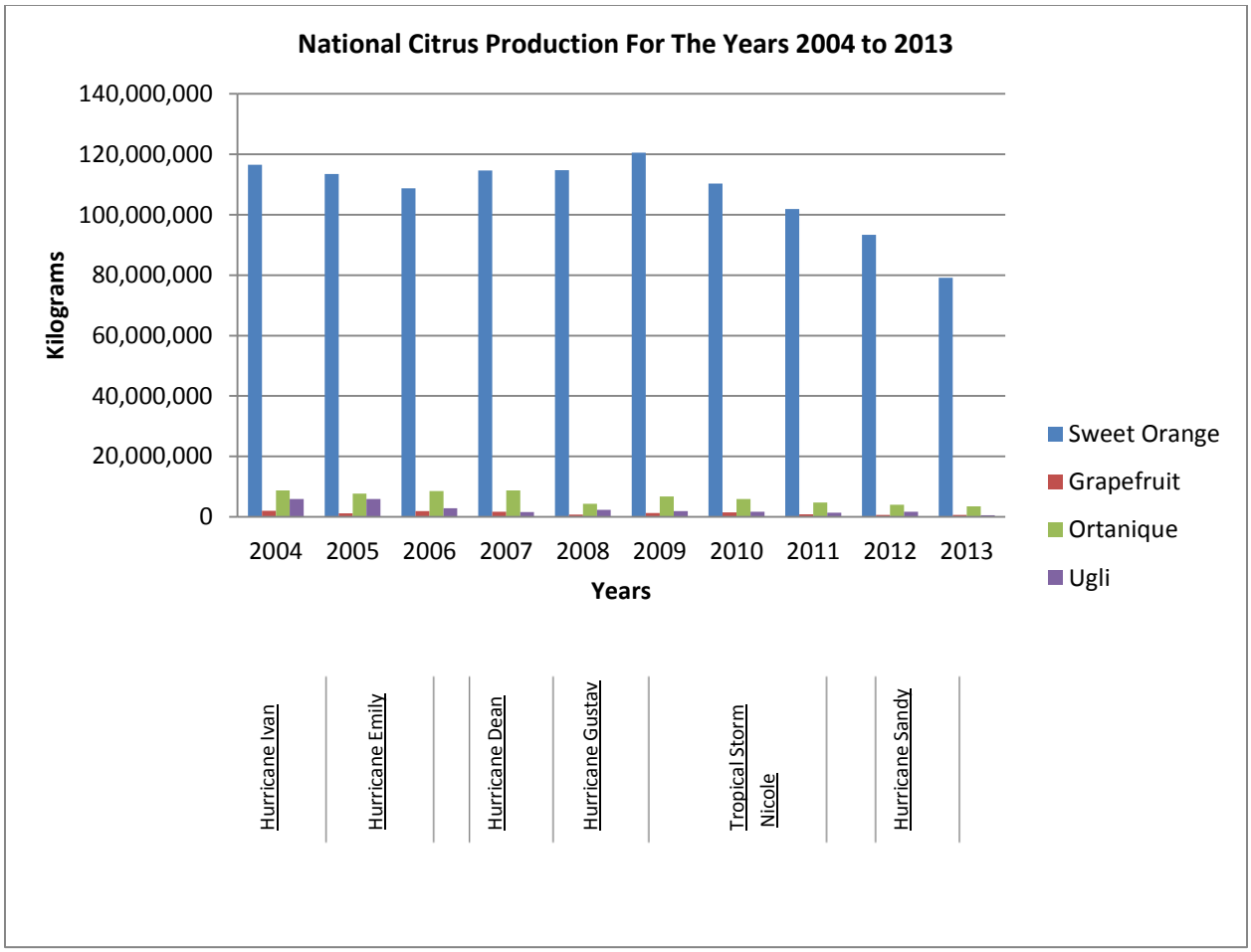


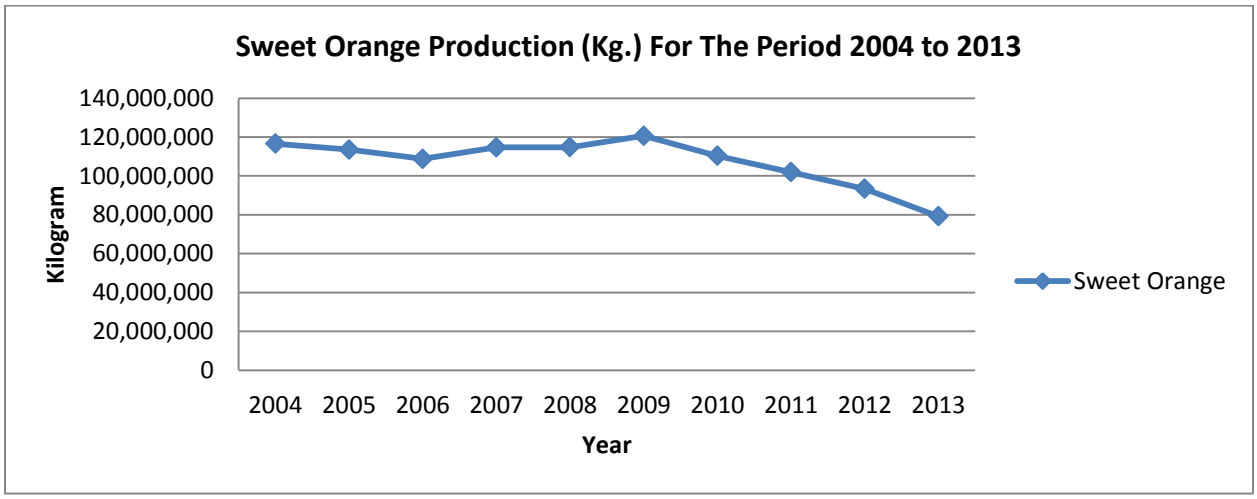
Table 1 and 2 along with Figure 1 and 2 depicts the National Production of four citrus crops: Sweet Orange, Grapefruit, Ortanique and Ugli. During the review period inconsistencies of production levels were observed throughout all four citrus groups. Sweet Orange dominated the production levels over the ten year review period from 2004 to 2013. From 2010 there has been steady declines in production outputs, these declines were as a result of Tropical Storm Nicole which accelerated the spread of greening disease.

Table 4

NATIONAL CITRUS PRODUCTION 2004 to 2013 (converted to Kilogram)										
Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sweet Orange	116,593,500	113,530,814	108,797,159	114,682,389	114,752,632	120,596,134	110,348,916	101,915,810	93,325,692	79,178,000

Source: Statistical Institute of Jamaica

Figure 3



Over the ten year review period 2004 to 2013 there has been fluctuations of production of sweet orange production outputs. The highest production output of sweet oranges, was observed in the year 2009. In that year (2009), the sweet orange production level increased by 5.09% over the previous year (2008). However, in 2010 the greening disease compounded with the volatility in the weather that the island had experienced caused a downward trajectory in production levels from the years 2010 to 2013.

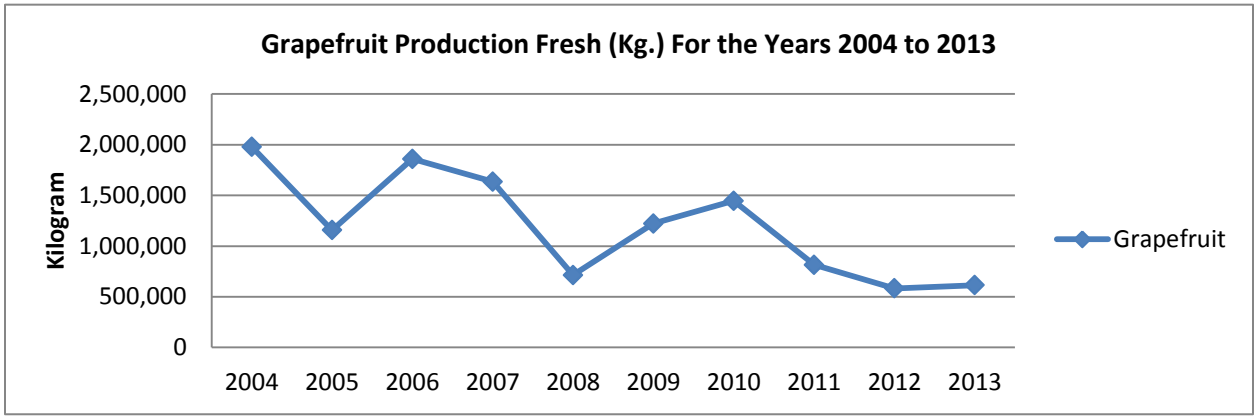
The percentage difference between the production in 2009 and 2013 was 34.34%.

Table 5

NATIONAL CITRUS PRODUCTION 2004 to 2013 (converted to Kilogram)										
Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Grapefruit	1,980,166	1,156,539	1,859,014	1,636,055	713,674	1,221,696	1,446,692	814,609	581,760	614,000

Source: Statistical Institute of Jamaica

Figure 4



In 2004 production of grapefruit was at its highest at 1,980,166 kilograms. However, in 2005 production declined by 41.59% below the previous year 2004.

Production increased by 60.73% in 2006, which was followed by declines for the years 2007 and 2008; for those years, production declined by 11.99% and 56.38% respectively.

In the years 2009 and 2010 production level rose by 71.18% and 18.42% respectively. The peaks and trough pattern of production levels, saw a record low of 581,760 kilograms in 2012, which followed by a slight increase of 5.54% (32,240 kilograms) in the year 2013.

Table 6

ORTANIQUE PRODUCTION 2004 TO 2013 (KG)

NATIONAL CITRUS PRODUCTION 2004 to 2013 (converted to Kilogram)										
Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Ortanique	8,754,495	7,722,049	8,554,936	8,754,495	4,356,260	6,733,377	5,924,913	4,745,560	4,032,008	3,426,000

Source: Statistical Institute of Jamaica

Figure 5

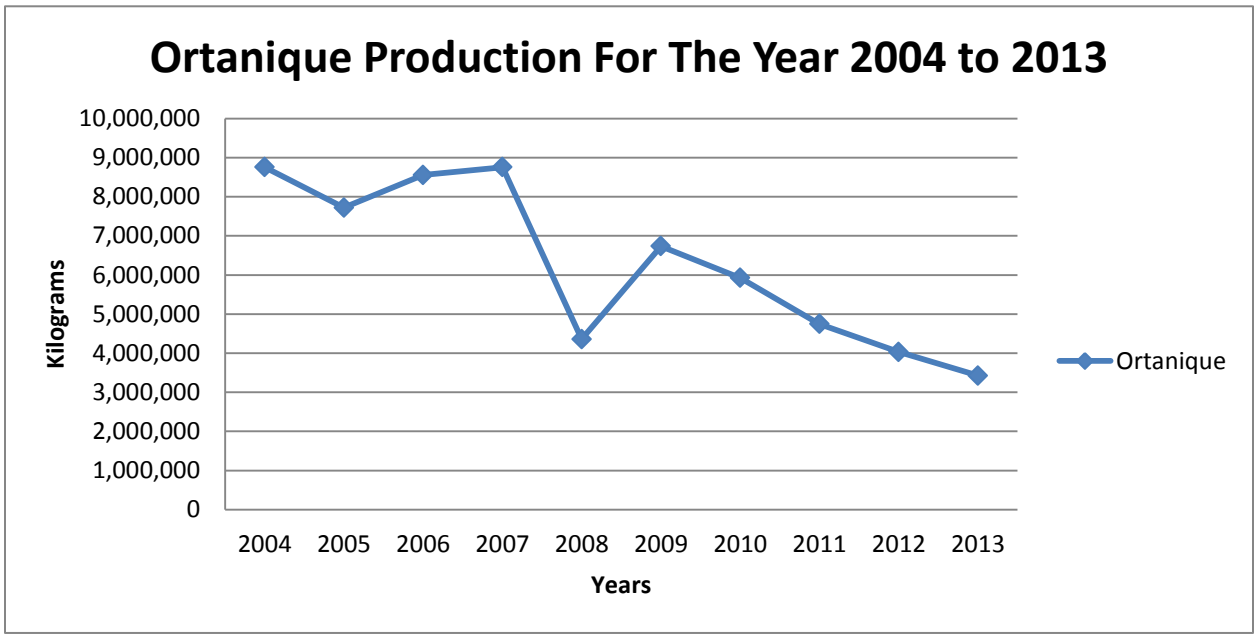


Table 6 and figure 5 reveals that throughout the ten year review period there has been a fluctuation in ortanique production outputs. The highest production levels were in the years 2004 and 2007, for those two years production levels were 8,754,495 kilograms.

In 2008 ortanique production declined by 50.24% or 4,398,235 kg below the previous year 2007.

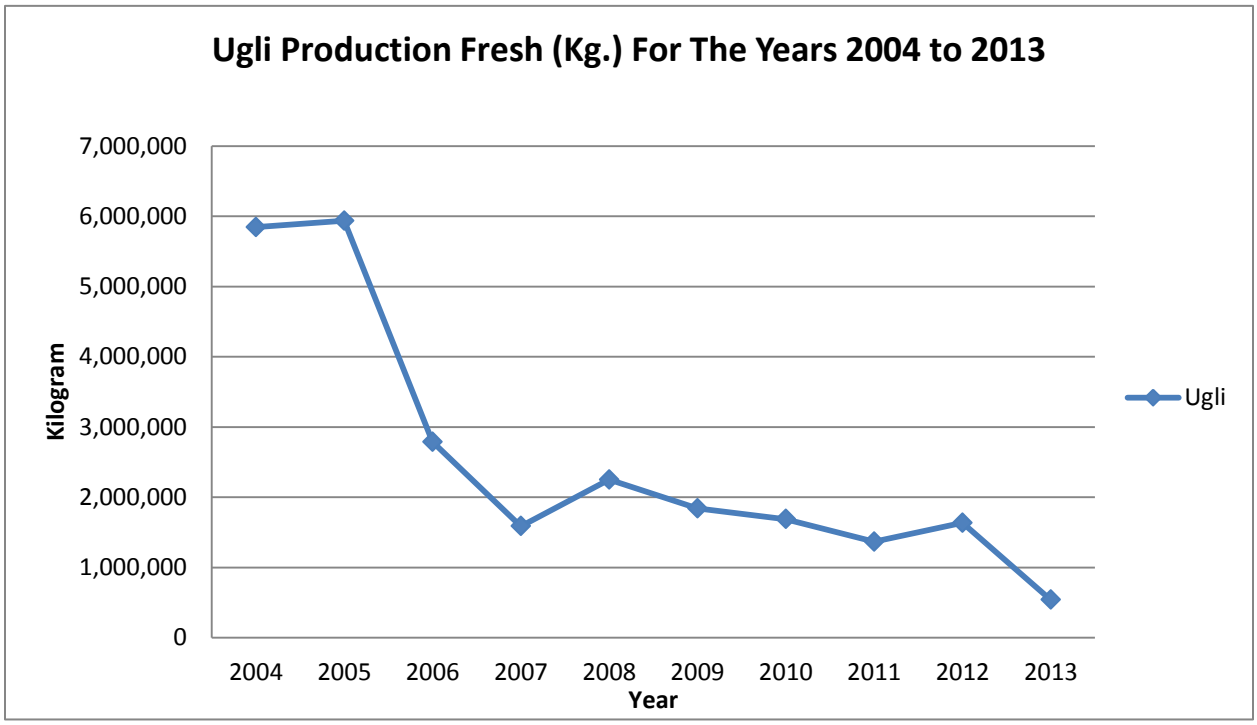
In 2009 there was a an upsurge in ortanique production level of 54.57%, followed by declines from 2010 to 2013. In 2013 production level was tapered to a record low of 3,426,000 kilograms.

Table 7

NATIONAL CITRUS PRODUCTION 2004 to 2013 (converted to Kilogram)										
Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Ugli	5,843,770	5,936,324	2,787,676	1,588,205	2,251,793	1,839,934	1,688,149		1,636,200	540,000

Source: Statistical Institute of Jamaica

Figure 6



Production level in the Ugli citrus group was at its highest in the year 2005; in that year, the Ugli production level was 5,936,324 kilograms.

In the year 2006 and 2007 production declined by 53.04% and 43.03%, respectively, followed by an upturn in production in 2008 with an increase of 41.78%.

A downward trend was observed in the years 2009 to 2011 followed by an upturn of 19.61%, which tapered off in 2013 at a record low of 540,000 kilograms.

Citrus Exportation

Table 8

Export Quantity and Value of Jamaican (Fresh) Citrus for the years 2004 to 2013								
Year	Quantity Exported (kg)	% Change	Value (J$)	% Change	Annual Average Unit Export Price JA/Kg	Annual Average Unit Export Price US$/Kg	Value (US$)	% Change
2004	3,874,283		127,949,534.06		33.03	0.55	2,121,071.10	
2005	2,400,737	-38%	91,936,823.83	-28%	38.30	0.62	1,496,522.99	-29%
2006	2,126,550	-11%	65,250,080.37	-29%	30.70	0.47	994,869.19	-34%
2007	3,840,624	81%	129,016,997.52	98%	33.59	0.49	1,878,375.43	89%
2008	2,917,017	-24%	131,461,600.00	2%	45.07	0.63	1,823,396.29	-3%
2009	5,398,933	85%	149,236,929.20	14%	27.64	0.32	1,711,729.74	-6%
2010	7,443,970	38%	161,733,081.50	8%	21.73	0.25	1,831,173.06	7%
2011	6,709,224	-10%	179,722,011.31	11%	26.79	0.31	2,096,592.11	14%
2012	4,391,176	-35%	165,431,184.90	-8%	37.67	0.43	1,882,638.94	-10%
2013	4,709,667	7%	325,755,502.37	97%	69.17	0.71	3,322,488.80	76%
Grand Total	**43,812,182**		**1,527,493,744.06**				**19,158,857.65**	

Source: External Trade; STATIN

Table 8 depicts the total citrus exported over the ten year review period 2004 to 2013 , along with percentage changes that have occurred year over year.

Figure 7

Table 8 and figure 7 revealed that the highest citrus exports was observed in the year 2010, followed by a downward trend for the years 2011 and 2012 which represented declines of 9.87% and 34.55% respectively. In 2013 a slight increase was observed representing 7.25% or 318,491 kilograms more than the previous year.

Table 9

Sweet Orange Fresh Quantity (Kg) Exported by Destination For The period 2004 to 2013												
Sweet Oranges	Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Total	2,404,491	1,200,331	1,133,837	2,232,212	1,565,375	3,562,933	6,653,777	5,492,902	3,274,423	3,419,927	30,940,208

Source: Statistical Institute of Jamaica

Table 9A

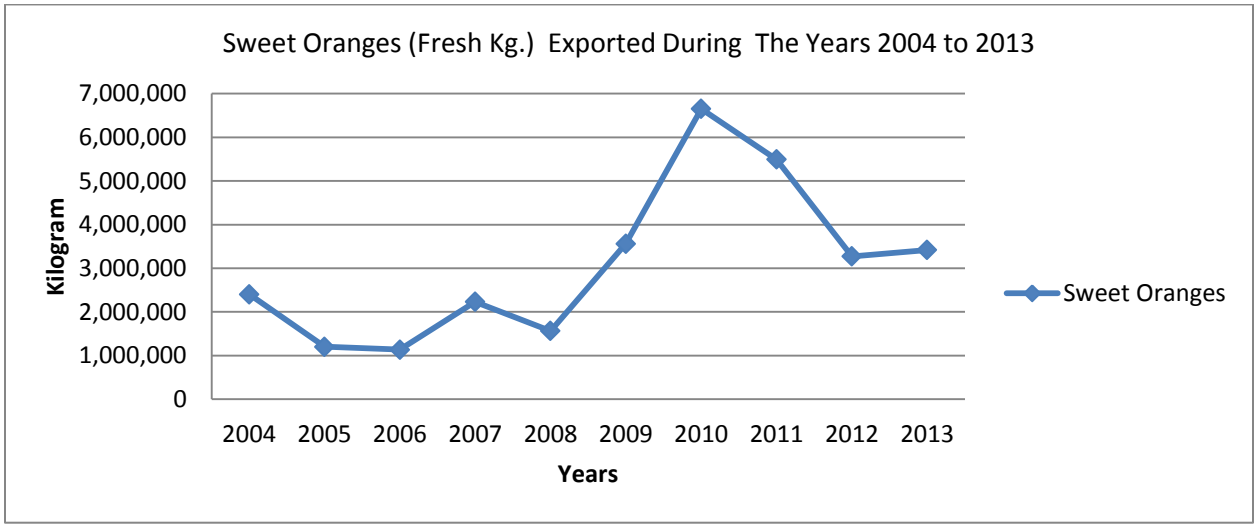
Sweet Orange Fresh Quantity (Kg) Exported by Destination For The period 2004 to 2013												
Sweet Oranges	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Aruba	524,545	300,265	305,318	240,435	340,811	363,632	363,632	227,270	229,543	269,547	3,164,998
	Cayman	338		207			2,723	343			182	3,793
	Guyana	23				25,812						25,835
	Barbados	970,452	549,358	432,509	810,826	660,241	492,236	590,505	361,375	537,544	378,399	5,783,445
	United States	2132	19,810	21,818	20,556	598	20	57,983	71,884	65,288	5,937	266,026
	Canada	3528	1,137	1,937	5,531	2,538	1,876	2,670	1,176	2,501	2,015	24,909
	United Kingdom	903,473	250,058	234,048	653,132	469,855	2,702,446	5,638,644	4,811,295	2,439,547	2,748,317	20,850,815
	Guadeloupe		25,500	76,500	159,256						14	261,270
	Netherlands		25,400	36,000	23,200	22,200			19,810		15,500	142,110
	Netherlands Antilles		28,803									28,803
	Martinique			25,500	298,544	42,840						366,884
	Puerto Rico				20,179							20,179
	Antigua and Barbuda				553							553
	British Virgin island								92			92
	Croatia										16	16
	ST. Lucia					480						480
	Total	2,404,491	1,200,331	1,133,837	2,232,212	1,565,375	3,562,933	6,653,777	5,492,902	3,274,423	3,419,927	30,940,208

Source: Statistical Institute of Jamaica

Over the review period from 2004 to 2013, the main export destinations of sweet orange were the United Kingdom, Barbados and Aruba respectively.

The revenue gained from the exports of sweet oranges, was JA$771, 350,143 or US$9,575,233 (see appendix 8 & 9)

Figure 8



Sweet orange has been the largest subgroup of citrus exported over the ten year review period 2004 to 2013.

Table 9 and figure 8 showed that the highest quantity of exported sweet orange was in the year 2010 . A downward trend of exports for the years 2011 and 2012 was observed, which represented declines of 17.45% and 40.39% respectively.

In 2013 a slight increase of exports was observed representing 4.44% or 3,419,927 kilograms

Table 10

Ortaniques Fresh Quantity (Kg) Exported by Destination For The period 2004 to 2013												
Ortaniques	Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Total	**391,787**	**234,226**	**196,815**	**281,438**	**155,860**	**237,604**	**62,352**	**41,200**	**33,445**	**75,472**	**1,710,199**

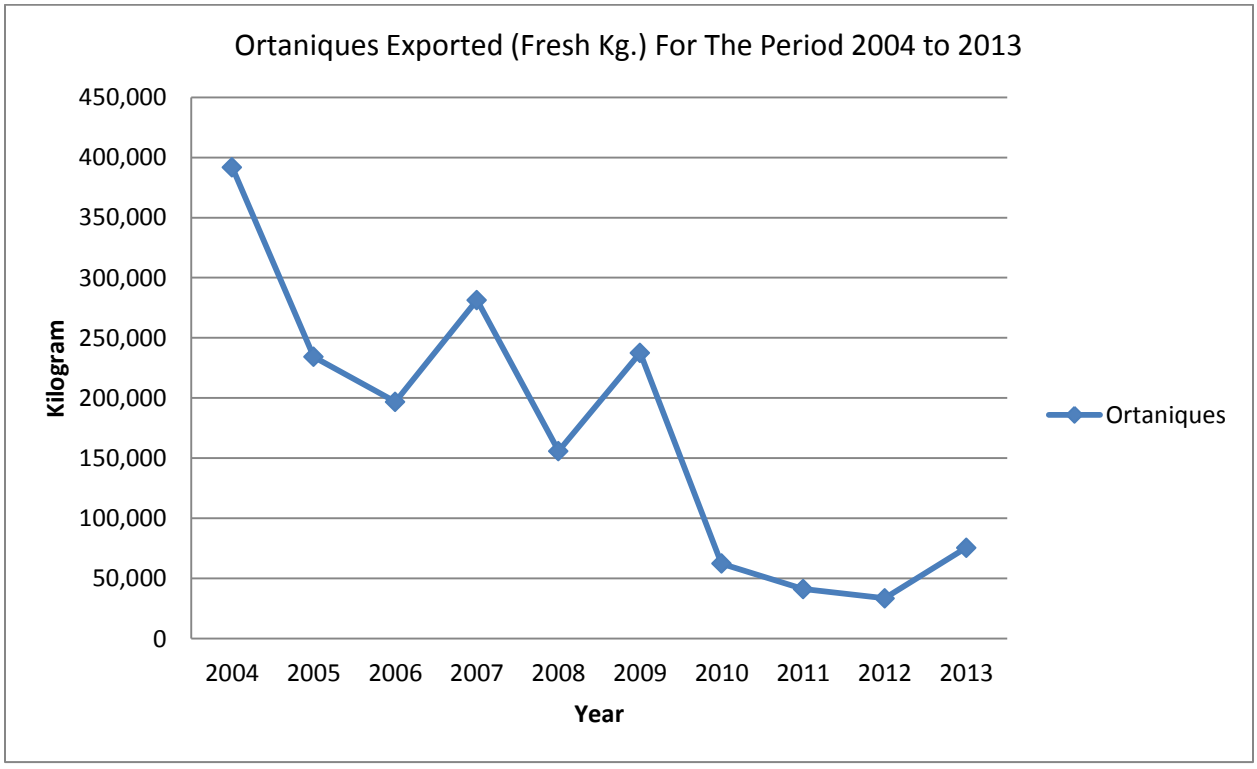
Table 10A

Ortaniques Fresh Quantity (Kg) Exported by Destination For The period 2004 to 2013												
Ortaniques	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Cayman	41										41
	Guyana			11,000								11,000
	Barbados	19,324	14,276	18,106	28,000	20,751	7,704	3,087		15,218	5,166	131,632
	United States	112,247	40,555					18,555				171,357
	Canada	657	44,420	1,279	54	10	112	210		227	18,764	65,733
	United Kingdom	259,518	134,975	166,430	253,384	135,099	229,788	40,500	41,200	18,000	51,542	1,330,436
	Total	**391,787**	**234,226**	**196,815**	**281,438**	**155,860**	**237,604**	**62,352**	**41,200**	**33,445**	**75,472**	**1,710,199**

Source: Statistical Institute of Jamaica

The major export destination of Ortaniques over the ten year review period was United Kingdom, United States and Barbados respectively. The revenue gained from the exports of Ortaniques was JA$69, 594,096 or US$1,028,600 (see appendix 4 & 5)

Figure 9



Ortanique was ranked third in the citrus subgroup that have been exported over the ten year review period from 2004 to 2013. Exported Ortanique quantities indicated fluctuations over the ten year period. The highest exported quantity was recorded in the year 2004 when 391,787 kilograms was exported.

The following declines were observed in 2005 and 2006; when exports were reduced by 40.22% and 15.97% respectively. Thereafter, a fluctuating pattern of exports was observed throughout the years 2007 to 2010 which was then followed by steady declines of 33.92% and 18.82% respectively in the years 2011 to 2012.

Ortanique quantity exported rebounded in 2013, with an increase of 125.66% or 42,027 kilograms more than the previous year (2012) .

Table 11

Grapefruit Fresh Quantity (Kg) Exported by For The period 2004 to 2013												
GrapeFruit	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Total			24,963	12,722	3,986	87,854	25,427	853	4,304	3,184	163,293
Key :		No grapefruit was exported										

Grapefruit is not one of the fruit trees that is certified in the present registered nursery programme. Hence, there is no clean budwood material that is able to produce a disease free plant. The impact HLD on this fruit tree was severe. This is depicted in the declines in exports. The lowest exported quantity was in the year 2011; for that year exports was a mere 853 kilograms.

Table 11A

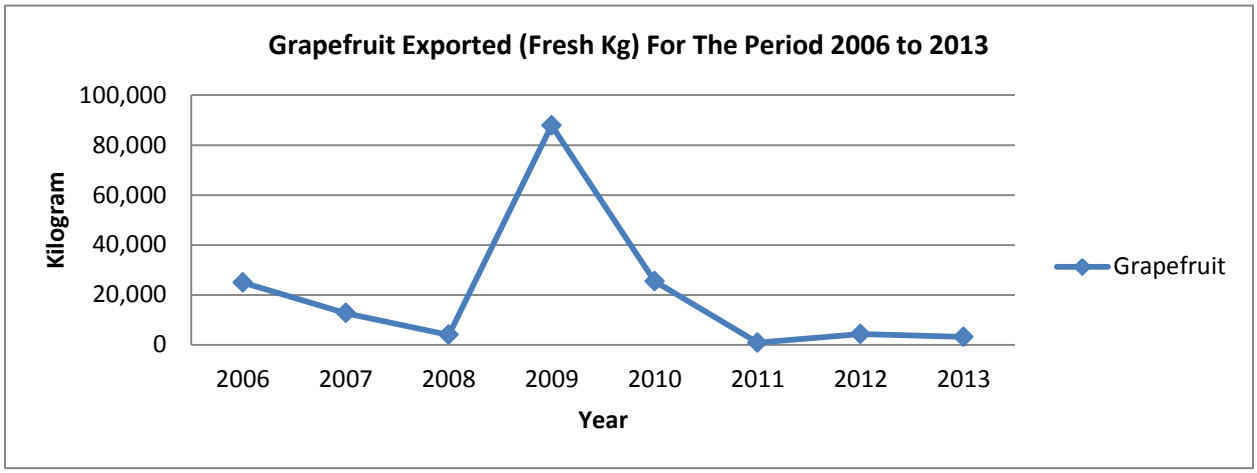
Grapefruit Fresh Quantity (Kg) Exported by Destination For The period 2004 to 2013												
GrapeFruit	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Barbados			663	5,432	3,986	10,047	3,276		3,600	2,520	29,524
	United States								81			81
	United Kingdom			24,300	7,290		77,807	22,151	751	704	664	133,667
	British Virgin island								21			21
	Total			24,963	12,722	3,986	87,854	25,427	853	4,304	3,184	163,293
Key :		No grapefruit was exported										

Source: Statistical Institute of Jamaica

The major export destination for the Grapefruit was United Kingdom and Barbados.

The revenue gained from the exports of sweet grapefruit was JA$4, 558,967 or US$57,202 (see appendix 2 &3)

Figure 10



The grapefruit citrus subgroup had exported the highest quantity in the year 2009. In that year; 87,854 kilograms were exported, this was followed by steady declines in 2010 and 2011 which represented 71.06% and 96.65% respectively .

In 2012 production recovered by an increase in exports of 404.57%, then tapered off with a decline of 26.02% or 1,120 kilograms in the year 2013.

Table 6A

Ugli Fresh Quantity (Kg) Exported by Destination For The period 2004 to 2013												
Ugli	Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Total	**918,305**	**960,323**	**706,757**	**1,272,809**	**1,069,982**	**1,301,146**	**667,544**	**1,139,593**	**1,077,473**	**1,170,653**	10,284,585

Table 6B

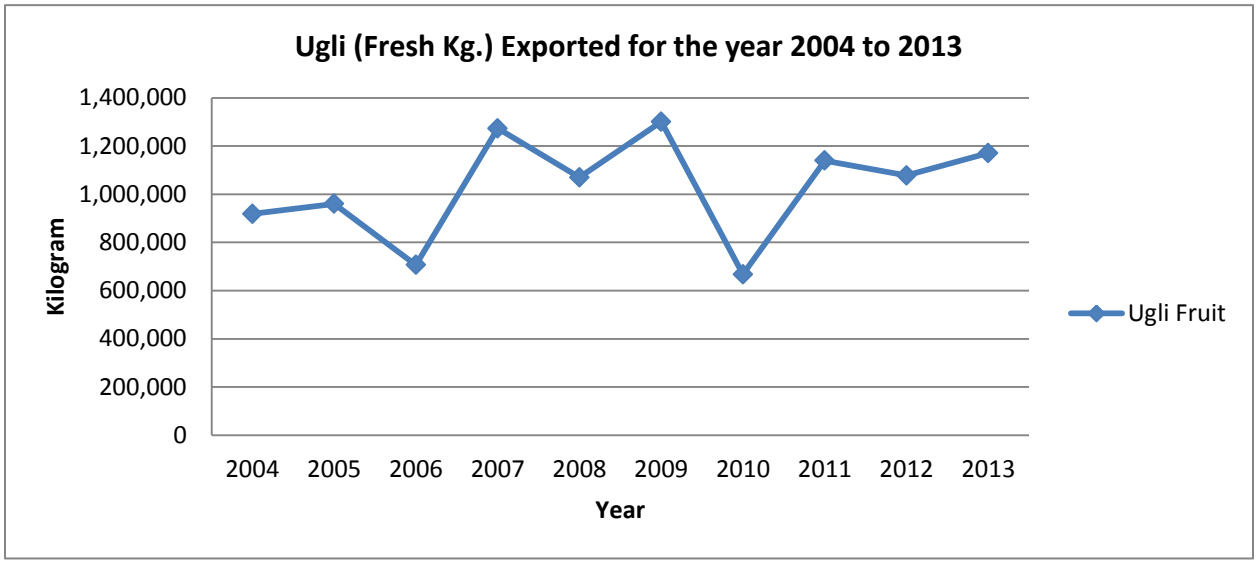
Ugli Fresh Quantity (Kg) Exported by Destination For The period 2004 to 2013												
Ugli	Crop Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	France	25,932	6,122	28,993	39,620	58,933	99,050	19,810				278,460
	Denmark					39,620						39,620
	Switzerland						19,810			14,857		34,667
	Barbados	5,694	10,080		27,200						2,772	45,746
	United States	579,496	550,994	359,637	754,909	770,820	961,736	468,868	969,211	839,308	840,493	7,095,472
	Canada	190						188			23,133	23,511
	United Kingdom	39,620	59,430	79,240	200,969	59,430	59,570	20,787	39,629	25,210	81,836	665,721
	Germany							14				14
	Netherlands	267,373	297,497	238,832	250,111	81,740	141,170	98,447	108,963	178,288	200,466	1,862,887
	Netherlands Antilles		14,200			59,439	19,810	59,430	21,790	19,810	21,953	216,432
	Canada		22,000	55								22,055
	Total	**918,305**	**960,323**	**706,757**	**1,272,809**	**1,069,982**	**1,301,146**	**667,544**	**1,139,593**	**1,077,473**	**1,170,653**	10,284,585

Source: Statistical Institute of Jamaica

The three main export destination for the Jamaican Ugli citrus fruit was the United States, the Netherlands and the United Kingdom .

The revenue gained from the exports of Ugli was JA$7, 943,274 or US$644,581,466 (see appendix 6 & 7)

Figure 6



Observing the Ugli citrus subgroup export trend, indicated that it fluctuated throughout the ten year review period of 2004 to 2013. The lowest level of Ugli quantities exported was recorded in the 2010; in that year, 667,544 kilograms of Ugli were exported.

In 2011 Ugli exports rebounded with an increase of 70.71%, followed by a decline of 5.45% in 2012. Export of Ugli increased in 2013 by a mere 8.65% or 93,180 kilograms .

Citrus – SWOT Analysis

On the basis of the data analysed in the current market situation, there are some major strengths, weaknesses, opportunities and threats (SWOT analysis) identified, as well as issues within the Citrus Subsector. The information presented in the SWOT analysis is intended to be used for strengthening the competitive advantage of the Citrus sub-sector.

Strengths.

Knowledgeable and competent staff – R&D, Direct labour, both skill and unskilled workers

Ideal climate condition for the growth of the crop.

Accessibility to markets.

Access to shared research and development findings on Citrus.

Weaknesses.

Lack of innovativeness in the market support

High input costs-fungicides, pesticides and other direct costs

Lack of motivation by key stakeholders to re-invest in the sub-sector.

The farming framework within this subsector consisted mostly of subsistence farming

Praedial larceny

Poor agricultural practices

Lack of sufficient funding for the sub-sector

No shared research pursued in identifying new varieties with tolerance to the (HLD) greening disease.

Opportunities.

Large CARICOM market

Threats.

External trade Regulation policy, such as: The Food Safety Modernization Act 2011

Governmental import and export regulation policies

Competition from other countries supplying citrus to external markets

Insect pests and diseases

Adverse weather conditions

Lack of interest and technical skills of the younger population

Issues Analysis: Based on the SWOT analysis, there are several issues identified that must be addressed for the improvement of this subsector. The decision on these issues will lead to the setting of objectives and further formulation of strategies.

By exploring the SWOT analysis, an assumption can be made that the citrus subsector needs to be more structured in order to be competitive in the external markets. There is a need to participate in shared scientific research, in order to ascertain whether there are hybrid varieties that are more tolerant to the (HLD) greening disease.

Future Prospects. The future prospects of the citrus subsector depend on research and development along with better control measures in order to mitigate the spread of the (HLD) greening disease.

Conclusion

The need for more public education and awareness programmes is critical for the successful implementation of an area-wide management programme. This may be achieved through the use of posters, videos and other similar media that can reach targeted farmer groups.

The management strategy is to ensure the continued economic viability and productivity for the citrus industry along with rigorous psyllid control, scouting for infected trees, removing infected trees immediately, and establishing area wide regions of such management. Good nutrition management practices will keep HLB infection rates low over large areas and maintain optimal health and productivity of uninfected trees. The current statewide inoculum levels and psyllid populations are factors that will impact the programme's success. Until a long-term solution emerges in the form of a resistant citrus variety, managing HLB successfully will remain one of the largest challenges currently facing the Jamaican citrus industry.

Citrus nursery production should be done under approved insect proof structures. In this context a geographically isolated citrus plant nursery with the required standards is needed to demonstrate and train citrus nursery operators. Early and correct diagnosis is essential to disease management. Trained personnel in Polymerase Chain Reaction (PCR), applications are needed for quick diagnosis and turnaround time, so that management measures can be put in place quickly. The above are very difficult, but can be achieved with:

1. A re-training/ training of citrus farmers in the production of citrus
2. Zoning of production areas
3. The use of area wide management programme and clustering of growers
4. Regulations and monitoring
5. Providing low or no inputs farmers with an alternate crop
6. Providing more extension service (JCPA now only has two technical staff)
7. Need for critical citrus research from R&D
8. Find better lands for growing citrus which will allow for mechanization's and irrigation
9. Control the problem of praedial larceny

Recommendation

It is recommended that a scientific approach be applied to investigate whether there are varieties of citrus (of similar groups) that are more resistant to the greening disease.

The recommended farming practices in order to mitigate the disease must be enforced in order to protect the industry, they are:

- Removal of infected plants
- Retraining/ training of citrus farmers in the production of citrus
- Zoning of production areas
- The use of area wide management programme along with clustering of growers
- Regulations and monitoring programmes
- Providing more extension services

APPENDICES

Appendix 1

Methodology

The casual research method was applied to determine trends in the Citrus sub sector and to identify possible relationships and impacts on production volumes, pricing and export values.

Both qualitative and quantitative data have been examined using desk research. A combination of information from prior research, telephone interviews and in-depth interviews was used in the data gathering process. The objective of this method was to identify differences in experiences or common features, diverse perspectives and interpretations of comments or opinions, that would enable varied scopes and dimensions of the study. This would also facilitate adequate knowledge and understanding in analyzing the results of the study.

Primary and secondary data were gathered from the industry experts at the Jamaica Citrus Protection Agency (JCPA), to provide background details on the sector and to analyze trends identified in the varied citrus sub groups; Statistical Institute of Jamaica (Statin) provided export statistics; review articles were obtained from websites gave insight to issues that were pertinent to the sub-sector.

Appendix 2

Grapefruit (Value $ JA) Exported by Destination For The period 2004 to 2013												
	Destination	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
GrapeFruit	Barbados			20,449	279,722	184,206	752,688	245,512		260,000	193,195	1,935,772
	United States								3,060			3,060
	United Kingdom			751,235	258,044		1,004,725	392,967	95,786	48,709	68,240	2,619,706
	British Virgin island								429			
	Total			**771,684**	**537,766**	**184,206**	**1,757,413**	**638,479**	**99,275**	**308,709**	**261,435**	**4,558,967**
Key :		No grapefruit was exported										

Appendix 3

Grapefruit Value $ US Exported by Destination For The period 2004 to 2013												
	Destination	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
GrapeFruit	Barbados			312	4,078	2,533	8,672	2,741		3,010	1,958	23,304
	United States								5			5
	United Kingdom			11,531	3,825		11,785	4,398	1,117	539	662	33,857
	British Virgin island								36			36
	Total			**11,843**	**7,903**	**2,533**	**20,457**	**7,139**	**1,158**	**3,549**	**2,620**	**57,202**
Key :		No grapefruit was exported										

Appendix 4

Ortaniques Fresh Value (US$) Exported by Destination For The period 2004 to 2013												
	Destination	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Ortaniques	Cayman	69										69
	Guyana			6,600								6,600
	Barbados	12,387	8,964	12,078	20874	15,766	6,560	2,587		16,030	3,933	99,179
	United States	174,656	41,299					30,241				246,196
	Canada	1,132	22,935	2,795	149	191	544	596		218	19,167	47,727
	United Kingdom	167,724	79,360	87,456	141,724	74,118	29,183	6,938	19,587	5,594	17,145	628,829
	Total	**355,968**	**152,558**	**108,929**	162747	**90,075**	**36,287**	**40,362**	**19,587**	**21,842**	**40,245**	**1,028,600**

Appendix 5

Ortaniques Fresh Value $JA Exported by Destination For The period 2004 to 2013												
	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Ugli	Cayman	4212										4,212
	Guyana			432093								432,093
	Barbados	742,938	552,203	789,505	1,411,271	1,129,888	528,880	231,448		1,391,258	369,372	7,146,763
	United States	10,552,053	2,494,899					2,709,123				15,756,075
	Canada	67,480	1,414,424	181,648	10147	960	48,409	51,405		18,860	1,899,545	3,692,878
	United Kingdom	10,185,776	4,884,534	5,698,756	9,552,541	5,288,985	2,554,307	621,329	1,676,928	483,732	1,615,187	42,562,075
	Total	**21,552,459**	**9,346,060**	**7,102,002**	**10,973,959**	**6,419,833**	**3,131,596**	**3,613,305**	**1,676,928**	**1,893,850**	**3,884,104**	**69,594,096**

Appendix 6

Ugli Fresh Value(JA$) Exported by Destination For The period 2004 to 2013												
	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Ugli	France	644,710	20,983	844,906	1,082,660	1,770,514	3,397,114	610,575				8,371,462
	Denmark					1,270,432						1,270,432
	Switzerland						690,298			412,004		1,102,302
	Barbados	266,296	449,796		786,658						195,946	1,698,696
	United States	37,715,151	35,684,053	10,419,485	22,518,528	50,019,319	58,408,407	31,783,204	45,010,170	51,033,923	199,177,023	541,769,263
	Canada	20,556	676,899	4,444				27,234			1,354,031	2,083,164
	United Kingdom	941,200	1,403,325	1,964,966	6,601,169	1,882,121	2,039,036	756,533	1,306,803	383,163	2,885,172	20,163,488
	Germany							11,101				11,101
	Netherlands	6,596,683	8,948,333	8,704,411	7,689,516	2,724,511	5,020,873	3,606,883	3,394,327	6,048,146	7,132,044	59,865,727
	Netherlands Antilles		793,152			1,960,655	701,986	1,999,333	1,269,664	633,951	887,090	8,245,831
	Total	**46,184,596**	**47,976,541**	**21,938,212**	**38,678,531**	**59,627,552**	**70,257,714**	**38,794,863**	**50,980,964**	**58,511,187**	**211,631,306**	644,581,466

Appendix 7

Ugli Fresh Value (US$) Exported by Destination For The period 2004 to 2013												
	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Ugli	France	10,561	324	12,619	15,612	23,170	39,347	7,123				108,756
	Denmark					16,367						16,367
	Switzerland						7,724			4,530		12,254
	Barbados	4,433	7,264		11,569						2,107	25,373
	United States	636,542	590,262	159,259	328,945	699,597	671,794	359,239	524,529	580,731	2,032,105	6,583,003
	Canada	338	10,999	68				310	15,253		13,898	40,866
	United Kingdom	15,504	22,774	30,025	95,627	24,432	24,090	8,467		4,422	30,424	255,765
	Germany							129				129
	Netherlands	107,661	143,590	122,618	112,394	36,634	58,483	41,388	39,497	66,774	71,827	800,866
	Netherlands Antilles		12,960			24,583	8,161	22,975	14,655	7,328	9,233	99,895
	Total	**775,039**	**788,173**	**324,589**	**564,147**	**824,783**	**809,599**	**439,631**	**593,934**	**663,785**	**2,159,594**	7,943,274

Appendix 8

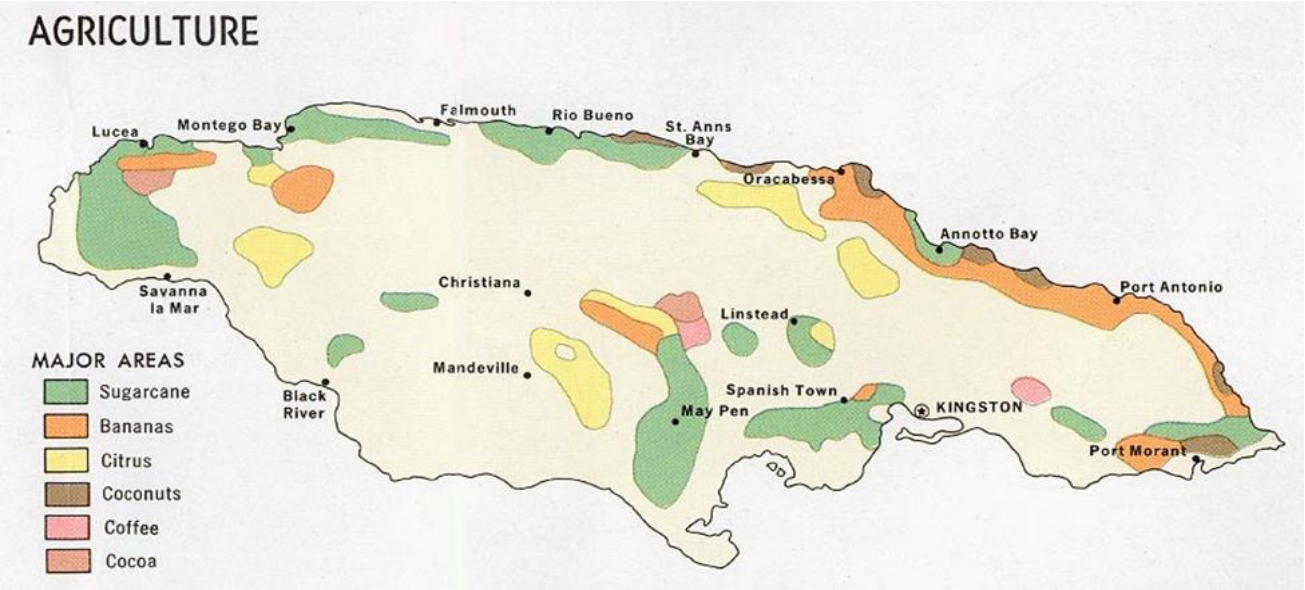
Sweet Orange Fresh Value $JA Exported by Destination For The period 2004 to 2013												
	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Aruba	7,612,930	4,651,121	5,256,830	4,796,275	7,912,313	9,766,568	10,184,213	7,682,720	9,731,618	11,647,038	79,241,626
	Cayman	16,559		8,775			772,873	7838			12,600	818,645
	Guyana	24,985				843,515		36,106,440				36,974,940
	Barbados	33,238,124	18,360,341	15,474,258	33,650,358	29,668,040	28,509,711		23,963,610	34,985,284	27,501,925	245,351,651
	United States	22078	535,676	409,032	823,522	10,618	2,119	688,059	1,848,062	2,945,850	587,751	7,872,767
	Canada	191,655	99,460	69,802	305,542	203,710	264,205	304,589	134,972	342,004	311,160	2,227,099
	United Kingdom	14,754,206	7,889,160	7,387,260	18,114,080	14,911,771	24,331,524	70,104,861	87,448,279	56,438,773	66,491,597	367,871,511
Sweet Oranges	Guadeloupe		602,258	2,221,313	4,797,499							7,621,070
	Netherlands		1,630,368	2,564,784	1,731,456	1,832,026			633,542		1,772,190	10,164,366
	Netherlands Antilles		480,989								597	481,586
	Martinique			683,340	9,449,473	1,434,384						11,567,197
	Puerto Rico				848,705							848,705
	Antigua and Barbuda				150,056							150,056
	British Virgin island								2145			2,145
	Croatia										955	955
	ST. Lucia					155,824						155,824
	Total	**55,860,537**	**34,249,373**	**34,075,394**	**74,666,966**	**56,972,201**	**63,647,000**	**117,396,000**	**121,713,330**	**104,443,529**	**108,325,813**	**771,350,143**

Appendix 9

Sweet Orange Fresh Value $US Exported by Destination For The period 2004 to 2013												
	Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
	Aruba	124,563	74,128	80,153	70,277	108,563	111,155	116,918	89,490	110,446	116,987	1,002,680
	Cayman	274		135			8,696	88			119	9,312
	Guyana	405				11,831						12,236
	Barbados	546,265	239,910	234,939	486,285	409,367	324,801	412,168	279,095	393,912	274,384	3,601,126
	United States	368	8,672	6,240	11,602	149	26	7,680	21,614	33,930	6,345	96,626
	Canada	3,170	1,614	1,067	4,468	2,857	2,998	3,420	1,574	3,889	3,237	28,294
	United Kingdom	243,424	128,432	113,599	264,799	209,326	276,786	789,031	1,021,501	648,263	683,686	4,378,847
Sweet Oranges	Guadeloupe		9,750	33,750	70,260							113,760
	Netherlands		25,920	38,880	25,920	25,920			7,323		18,331	142,294
	Netherlands Antilles		7,475								6	7,481
	Martinique			10,500	135,565	20,320						166,385
	Puerto Rico				11,870							11,870
	Antigua and Barbuda				2108							2,108
	British Virgin island								25			25
	Croatia										10	10
	ST. Lucia					2,179						2,179
	Total	**918,469**	**495,901**	**519,263**	**1,083,154**	**790,512**	**724,462**	**1,329,305**	**1,420,622**	**1,190,440**	**1,103,105**	**9,575,233**

Appendix 10

Agricultural Map of Jamaica



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