Situation and Outlook Report

On The Cassava Industry

For the period 2010-2014

Prepared by: Ministry of Agriculture & Fisheries

Agricultural Services Unit

Hope Gardens, Kingston 6

Tel: (876)927-1731/Fax: (876)927-1792

Email: marketing@moa.gov.jm

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Crop Information

Cassava *(Manihot esculenta)* also known as yucca, tapioca, manioc and manihot is a shrubby root which is widely grown in Jamaica but is native to South America. The plant sometimes reaches 15 feet, with leaves varying in shapes and sizes. The root is dark brown in color and grows up to 2 feet long. Jamaican cassava originated in Brazil and Paraguay. The edible parts are the tuberous roots and leaves, the most commonly eaten part of the plant is its large starchy roots. The roots can be grounded into flour for bread and dumplings, boiled and fried like potatoes or fermented to make an alcoholic beverage.

Climate and Classification

Cassava can withstand droughts and grows in land which is unsuitable for most crops. The period of dormancy can last up to three months, after which growth is resumed following rain fall. The plant produces its highest quality when rainfall is fairly abundant, but can be grown where annual rainfall is as low as 500mm or as high as 5,000mm. There are two main types of cassava Manihot Palmata and Manihot Aipi (Bitter and Sweet cassava), signifying the presence or absence of toxic levels of cyanogenic glucosides. The sweet variety can be boiled and used as any other staple while bitter cassava has more of the poisonous compounds which can be converted to cyanide.

Planting

Cassava is propagated mainly from cuttings; these cuttings should be obtained from stems of plants at least ten months old and 2.5 to 3.5cm thick. Cassava is either planted as a single crop (pure stand) or intercropped with vegetables, legumes or other plants. Intercropping reduces the likelihood of loss, caused by unfavourable weather and pests, by spreading the risk over plants with different susceptibilities. This method is usually practiced by small farmers who are not producing commercially. Farmers who do produce commercially are more inclined to use the pure stand method. Spacing between rows is 80 to 100cm, and the plants are spaced along the rows according to local conditions. The number of plants per hectare varies between 10,000 and 15,000. Cassava is usually planted at the beginning of the rainy season (May or June).

Harvesting

Typically, harvesting can begin as soon as eight months after planting. In the tropics, Jamaican cassava plants can remain unharvested for more than one growing season, allowing the storage roots to enlarge further. However, as the Jamaican cassava roots age, the central portion becomes woody and inedible.

Health Issues of Cassava

Cassava contains cyanogenic glycosides that break down to produce hydrogen cyanide, which can cause both acute and chronic toxicity in humans. The symptoms of acute cyanide intoxication include rapid respiration, drop in blood pressure, rapid pulse, dizziness, headache, stomach pains, vomiting, diarrhea, mental confusion, twitching and convulsions. In extreme cases, death due to cyanide poisoning may occur. The chronic effects of cyanide intoxication are linked to regular long-term consumption in individuals with poor nutrition.

Major Disease and Pest of Cassava

The major pests of cassava are the green mite, the mealybug and the variegated grasshopper. The main diseases affecting cassava are mosaic disease and bacterial blight. Research conducted showed two insects, Epidinicarsis lopezi (Wasp) and Typhlodromalus aripo (Mite) that were able to effectively control the cassava mealy bug and the cassava green mite respectively.

The Green Mite is green in colour at a young age turning yellowish as adult. Adult females attain a size of 0.8mm. Heavily attacked leaves are stunted and become deformed. Severe attacks cause the terminal leaves to die and drop. Green mites are major pests in dry season. Severe mite attack results in 20-80 % loss in yield.

The Mealybug strongly prefers cassava. Mealybug attack results in leaf loss and poor quality planting material (stem cuttings). Cassava root losses have been estimated up to 80%. After the pest cripples plant growth, weed and erosion sometimes lead to total destruction of the crops. Mealybug damage is more severe in the dry than in the wet season.

The Variegated Grasshoppers attack a wide range of crops mainly in the seedling stage. They feed on cassava plants, chewing leaves and stems. This is particularly severe in fields next to the bush when the dry season is prolonged. Use neem extracts to protect cassava from grasshopper damage. It acts as antifeedant (grasshoppers stop feeding when they are exposed to neem products) and affects development of the grasshoppers.

Cassava Mosaic Disease is one of the most serious and widespread diseases throughout cassava growing areas, causing yield reductions of up to 90%. Symptoms vary from leaf to leaf, shoot to shoot and plant to plant, even of the same variety and virus strain in the same locality. Stem cuttings from the branches are more likely to sprout into disease-free plants than stem cuttings from the main stems

Bacterial blight favours wet conditions, this disease is primarily spread by infected cuttings. It can also be mechanically transmitted by raindrops, use of contaminated farm tools (e.g. knives), chewing insects (e.g. grasshoppers) and movement of man and animals through plantations, especially during or after rain. Yield loss due to the disease may range from 20 to 100% depending on variety, bacterial strain and environmental conditions. Use clean planting material. This can reduce disease incidence in areas where cassava bacterial blight is already widespread.

The Primary Industry of Cassava

Cassava in its natural state

The crop, in its fresh produce state is mainly consumed locally and is exported on a small scale. In 2013, approximately 17,369,600kg of cassava root was produced locally. During the same period, less than 1% was exported. Both varieties of cassava are grown in all parishes of Jamaica with the principal growing areas being St. Elizabeth, Manchester, St. Ann and St. Catherine. Bitter varieties are especially suited for industrial and animal feed purposes, because of its higher starch content, while sweet varieties are generally preferred if the root is for human consumption

Cassava Production

In 2008, Jamaicans were urged to eat more cassava. This was one of the government's responses to rising food prices which resulted in an increased production and for the period 2008-2011 the production of sweet cassava jumped from 8,250 tonnes to 13,011 tonnes, while bitter cassava grew from 6,741 tonnes to 7,522 tonnes.

However, in 2012, cassava production declined compared to the previous year, this was predominantly attributed to the low prices farmers received for the tuber and the initiative seemed to have died. In 2013, there was a further reduction of 3.61% of cassava production and by 2014 cassava production stood at 16,559 tonnes.

While other root crops, sweet potato and yams in particular, exports ranged between 2-8% of annual production for the period 2010-2013, cassava export figures did not exceed 1% of annual production

All-Island Estimates of Production by Quarter

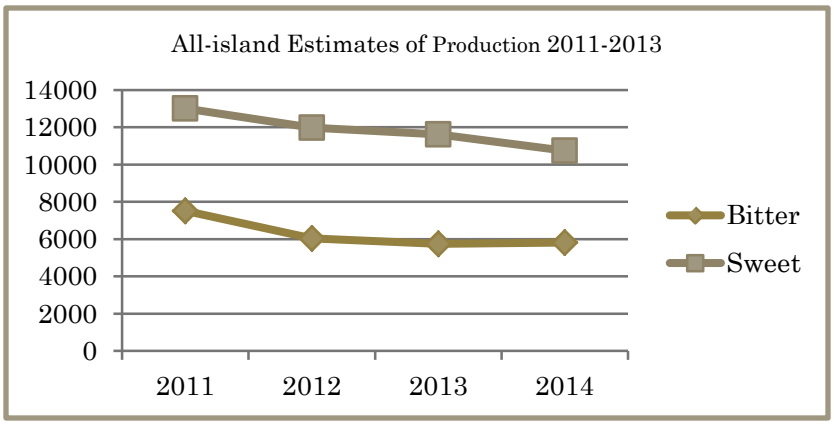
2011-2014

Table 1:

Quarters	Quantity kg(000)								
	2011		2012		2013		2014		Total by quarters
	Bitter	Sweet	Bitter	Sweet	Bitter	Sweet	Bitter	Sweet	
1st Quart.	1,888.2	3,193.5	1,798.0	3,289.0	1,399.2	2,832.2	1,752.7	3,155.7	19,308.50
2nd Quart.	1,824.2	3,248.3	1,499.0	3,114.0	1,659.8	3,146.7	1,522.6	2,649.1	18,663.70
3rd Quart.	2,053.2	3,234.0	1,274.0	2,817.0	1,277.4	2,764.7	1,161.0	2,230.1	16,811.40
4th Quart.	1,756.7	3,334.8	1,465.0	2,764.0	1,413.1	2,877.1	1,383.2	2,704.1	17,698.00
Sub Total	7,522.30	13,010.60	6,036.00	11,984.00	5,749.50	11,620.70	5,819.50	10,739.00	
Total	20,532.90		18,020.00		17,370.20		16,558.50		

Source: MOAF, Agricultural Marketing Information Division (AMID)

Figure 1



Cassava production recorded a decline of 19.36% over the four (4) year period from 2011 to 2014. Over the same period, the first quarters (Jan.-Mar.) recorded the highest total production of 19,308,500kg while the third quarters (Jul.-Sept.) recorded the lowest which was 16,811,400kg.

The total production over the four year period 2011-2014 stood at 72, 481,600kg of which, sweet cassava accounted for 65.33%, or 47,354,300kg.

Significantly, the summated quarters over years 2011-2014 recorded a production variability of 14.85% between the highest quarter (1st) and lowest (3rd). One could therefore conclude that the growing conditions in Jamaica would suit cassava production on an annual basis.

All-Island Estimates of Crop Area Reaped by Quarter

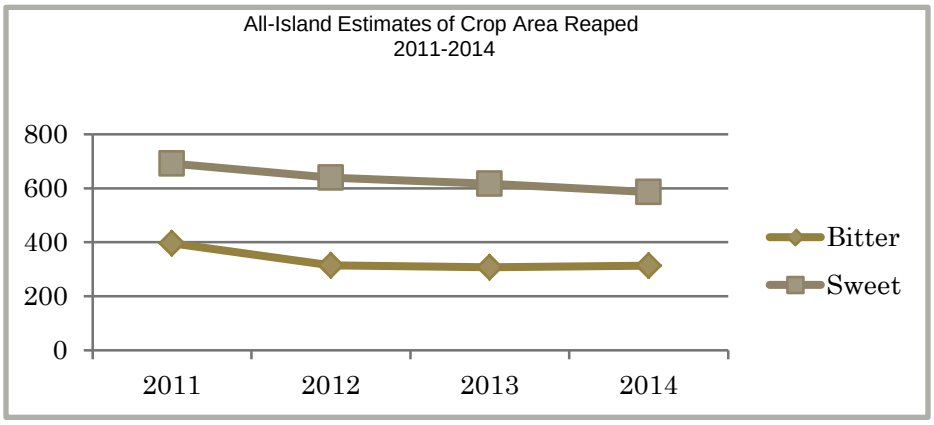
2011-2014

Table 2:

Quarters	Hectare								Total by quarters
	2011		2012		2013		2014		
	Bitter	Sweet	Bitter	Sweet	Bitter	Sweet	Bitter	Sweet	
1St Quarter	103	174	92	167	76	155	94	173	1,034
2nd Quarter	97	169	78	169	88	164	82	138	985
3rd Quarter	104	170	68	149	69	145	64	125	894
4th Quarter	92	178	77	154	75	153	74	150	953
Sub Total	396	691	315	639	308	617	314	586	
Total	1,087		954		925		900		

Source: MOAF, AMID

Figure 2



The total crop area reaped for the period 2011-2014 was 3,866 hectares.

Crop area reaped recorded a percentage decrease of 17.20% in 2014 when compared to 2011.

Throughout the period 2011 to 2014, July to September or the third quarter accounted for the lowest crop area reaped. The trend observed for cassava over the period 2011-2014 is that crop area reaped declined in 2012, 2013 and 2014.

Farmgate Prices

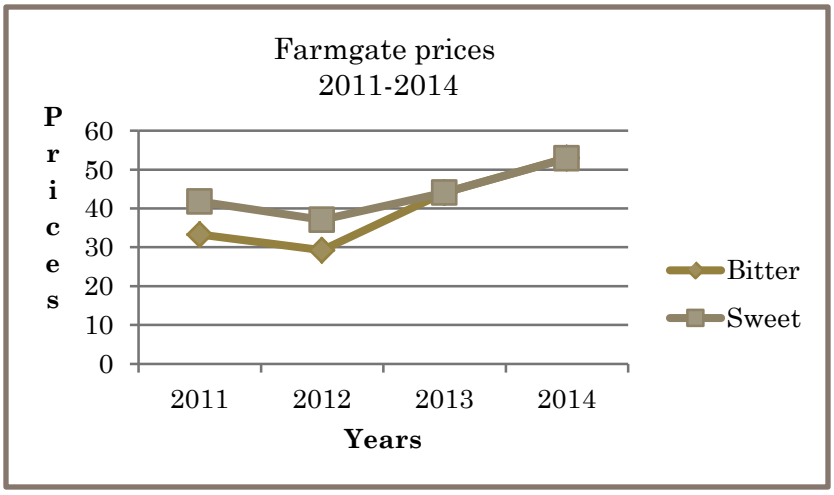
2011-2014

Table 3:

Prices($/Kg)										
Quarters	2011		2012		2013		2014		Average by quarters	
	Bitter	Sweet	Bitter	Sweet	Bitter	Sweet	Bitter	Sweet	Bitter	Sweet
1st Quarter	27.5	45.82	32.54	34.3	36.31	41.46	56.52	51.09	38.22	43.17
2nd Quarter	35.89	39.68	25.12	33.45	39.77	43.45	46.23	48.09	36.75	41.17
3rd Quarter	34.29	40.87	26.09	45.88	47.15	44.99	51.28	52.4	39.70	46.04
4th Quarter	35.77	40.86	33.3	34.65	53.02	46.55	57.85	60.08	44.99	45.54
Average by Variety	33.32	41.81	29.26	37.07	44.06	44.11	52.97	52.91		
Annual Average	37.57		33.17		44.09		52.94			

Source: MOAF, Data Bank & Evaluation Division

Figure 3



The annual average farmgate prices for cassava during the period 2011-2014 increased by 40.91%.

Prices for both varieties of cassava experienced a decline in 2012 but increased in 2013 and 2014. Sweet cassava price increased from $41.81/kg in 2011 to $52.91/kg in 2014 while bitter cassava saw upward movement in its prices as well, moving from $33.32/kg in 2011 to $52.97 in 2014.

During the four year period 2011-2014, the average farmgate prices for both varieties of cassava tend to be the least expensive in the second quarters (Apr.-Jun.) as observed in Table 3.

A Global Overview of Cassava

Production

Cassava is a major food crop and is widely grown globally. It is primarily produced for human consumption with 267,721, 584 tonnes produced in 2013, a 2.82% increase from the previous year. The major producing countries were Nigeria, Thailand, Indonesia, Brazil and the Democratic Republic of Congo in 2013.

Area Harvested

In 2013, the global area harvested (global crop area reaped) was 20,321,193 hectares, of this amount, Jamaica accounted for 925 hectares. Also, in 2013, the Caribbean global area harvested totaled 171,593 hectares.

Exports

Table 4

Fresh or Naturally Dried Cassava Exports 2009-2013			
Year	**Destinations**	**Kilograms**	**Export % of Annual Production**
2009	*Canada*	*273*	**0.0037**
	Cayman Islands	*159*	
	United Kingdom	*90*	
2010	*Cayman Islands*	122	**0.0032**
	United Kingdom	180	
	United States of America	286	
2011	*Canada*	1	**0.01**
	United Kingdom	2,100	
2012	*United States of America*	300	**0.017**
2013	*United Kingdom*	55	**0.003**

Source: Statin

The largest quantities of cassava being exported during the period 2009-2013 occurred in 2011; this coincides with the highest production figures record for the same period and is attributed to the efforts made to increase cassava usage by the Ministry of Agriculture and Fisheries.

The Secondary Industry of Cassava

Cassava in its Value-Added form

When contacted, local agro processors stated that their primary manufactured cassava products are Bammy, Pancake Mix, Cassava Chips and Bammy Sticks. Most agro processors only target the domestic market, however, those who produce for both the domestic and international markets, target markets in Canada, United Kingdom and United States of America mainly on an inconsistent basis, with United States of America being the main destination.

While both varieties of cassava can be used to create value added products, more of the sweet variety is being utilised with the primary reason being bitter cassava is more poisonous.

Table 5

Bammy Exports 2010-2013(kg & Value)								
Destination	2010 (kg)	Value (JMD$)	2011(kg)	Value (JMD$)	2012(kg)	Value (JMD$)	2013(kg)	Value (JMD$)
United Kingdom	17,153.55	500,797.81	12,540.32	3,922,669.21	23,146.00	5,469,096.18	8,381.80	2,751,680.72
Canada	11,626.81	2,760,448.59	5,621.88	1,720,434.98	13,174.00	3,937,784.85	6,554.52	2,130,934.72
U.S.A	61,198.75	21,009,513.08	65,947.24	19,293,769.38	47,213.00	14,985,155.00	50,688.43	16,920,013.04
China	247.00	94,690.53	-	-	-	-	-	-
Bermuda	30.05	34,814.52	37.09	18,924.29	33.00	12,726.00	-	-
Cayman Island	494.73	140,446.73	33.50	7,395.00	-	-	283.00	119,615.54
Dominica	-	-	-	-	-	-	57.00	24,330.32
Ghana	-	-	-	-	-	-	11.36	4,000.00
Netherland Antilles	-	-	-	-	-	-	21.00	2,400.00
Bahamas	-	-	-	-	-	-	19.00	16,351.20
Barbados	-	-	-	-	57.00	20,106.00	-	-
Trinidad & Tabago	-	-	-	-	226.00	106,589.00	510.00	221,092.98
St. Maarten	-	-	-	-	3.00	2,400.00	9.00	3,100.00
Totals	90,750.89	24,540,711.26	84,180.03	24,963,192.86	83,852.00	24,533,857.03	66,535.11	22,193,518.52
Source: Statin								

Over the four (4) year period from 2010 to 2013, bammy exports decreased by 26.68% moving from 90,750.89kg in 2010 to 66,535.11kg in 2013. A total of 325,318.03kg was exported during the period 2010-2013, this accounted for less than 1% (0.0044) of the production of its primary raw material, cassava. Also, check last sentence on page 6.

Throughout the period 2010-2013, bammy was mainly exported to the United States (225,047.42kg or 69.18%), the United Kingdom (61,221.67kg or 18.82%) and Canada (36,997.21kg or 11.37%).

Table 6

Respondents (January/2015)
List of Major Cassava Processors Island-wide
Flower Hill Producers Co-operative
Charleston Bammies
Jamaica Producers Tropical Foods
Tijule Company Ltd.
Stansam Bammies
Mello Bammies
Hanover Chips
Simone Binns
St. Bess Bammies
Twickenham Bammy
Source: MOAF, AMID

A total of eleven major agro-processors were contacted in 2012 to ascertain their monthly cassava usage (see Appendix I). Based on a survey conducted in October/2012, the monthly quantity used by the listed eleven agro processors was 322,315kg. In January/2015, the same eleven agro-processors were contacted to ascertain their monthly cassava usage, ten agro-processors responded favorably (see Table 6). Therefore, the monthly quantities used by the listed ten agro processors for January/2015 was 99,613.64kg. This reduction in quantity used is as a result of, but not limited to, the non-participation of one major cassava processor and the unavailability of quantities required by agro-processors.

Red Stripe

Red Stripe has invested $150 million in local cassava production on 403 acres of land at Bernard Lodge, to reduce much of its imported raw material utilised in its brewery. This is part of a US$10 million project that the company hopes to complete in five years, with an estimated 6,000 persons gaining employment directly and indirectly. The company has since planted an initial 36.2 acres of cassava that will soon be reaped as part of its pilot project that comes to a closure in June/2015. A successful pilot project is expected to pave the way for an increase in cassava production by Red Stripe to some 2,400 acres over a five-year period.

Cassava Major Producing Parishes (2013)

Table 7

Cassava Major Producing Parishes for 2013			
Parishes	Production kg(000)	% of Annual Production	Cost of Production($/kg)
St. Elizabeth	5,681.20	32.71	
Manchester	3,036.20	17.48	
St. Catherine	2,203.90	12.69	31
Clarendon	1,273.60	07.32	
St. Ann	1,338.40	07.71	
Others(COP reported)	3,836.90	22.09	

Source: MOAF, Economic Planning

As stated before, cassava's principal growing areas throughout the period of 2011-2014 were St. Catherine, St. Elizabeth, Manchester and St. Ann. In 2013, those four parishes accounted for 70.59% of total production, with St. Elizabeth being the dominant parish in relation to cassava production, accounting for 32.71% of production.

In 2013, cost of production for cassava was $31.00/kg in St. Catherine, this was the only parish reported on by the Economic Planning Division of the Ministry of Agriculture and Fisheries.

An Update on Cassava Activities at Bodles Research Station

Maintenance of cassava varieties

Bodles Research Station originally maintained seven (7) cassava varieties (Blue Bud, MCol 22, CM 516, CM849, Real Sweet, Cuba Sweet and Prison Farm) until the Scientific Research Council (SRC) provided four (4) more new varieties, CM 3306-4, CM 3299-1, MCol 1505 and CM 3281-4. The addition of these new varieties brings to eleven (11) the number of varieties being held in our germplasm at the Bodles Research Station in 2009. These new varieties give sustained yields of about 50% more than the local varieties (7lbs per plant). The improved cassava varieties have been introduced throughout Jamaica.

In 2010, a shipment of eleven (11) new and improved varieties (separate from those held in the germplasm at the Bodles Research Station) was received from Clayuca-Ciat, Columbia to further enhance our germplasm and to fulfill the request for high yielding low cyanide varieties. These varieties have been hardened off and are ready for field grow-out. Therefore, Bodles Research Station now maintains twenty-two (22) cassava varieties in their germplasm.

In 2015, these twenty-two (22) cassava varieties are now being characterized. This in being done to identify varieties based on appearances and also Deoxyribonucleic acid (DNA). Upon completion of the characterization of the twenty-two (22) cassava varieties, it is expected that a detailed document containing preferred soil type, yield per hectare, starch content among other information of each variety will be prepared. The expected completion time for this exercise is unknown.

Appendix I

List of Major Cassava Processors Island-wide			
Company	**Contact Person**	**Address**	**Telephone #**
Flower Hill Producers Co-operative	Ms. Edna Edwards	Flower Hill, St. James	381-3680
Charleston Bammies	Mr. Robin Broomfield	40 Greendale Road Manchester	963-8636 or 382-6352
Central Food Packers	Mr. Paul Bravo	Spanish Town, St Catherine	907-2094
Tijule Company Ltd.	Mr. Roy Newell	Paisley Avenue May Pen, Clarendon	566-2414
Stansam Bammies	Ms. Joy Samuda	Nain, St. Elizabeth	963-6211
Mello Bammies	Mrs. Shurma Clarke	Golden Grove, St Ann	852-9527
Hanover Chips	Ms. Charmaine Hepburn	RADA Parish Office, Haughton, Hanover	956-2252
Simone Binns	Ms. Simone Binns	Manchester	871-2049
Jamaica Producers Tropical Foods	Mr. David Martin	14 Retirement Road, Kingston 5	383-4264
St. Bess Bammies	Mrs. Erica Whyte	St. Elizabeth	961-8614
Twickenham Bammy	Ms. Nordia Smith	RADA Twickenham Park, St. Catherine	984-9052
Source: MOAF, AMID			

References

- ✓ Ministry of Agriculture and Fisheries, Agricultural Marketing Information Division (A.M.I.D) Production Quantities
- ✓ Food & Agriculture Organization (FAO) Statistical Database
- ✓ Boodle Research Station, Pest/Disease, Cassava Varieties
- ✓ Cassava Development Feasibility Review, DMAP-MOA03102008.
- ✓ The Jamaica Agro-Processors Associtaion, List of Agro-Processors
- ✓ Rural Agricultural Development Authority, List of Agro-Processors
- ✓ Jamaica Statistical Institute of Jamaica (STATIN)