

Belize Sustainable Agriculture, Ltd. Farming Report – Jun 15, 2015

General Comments & Weather

This is the second of BSA’s regular fortnightly Farming Reports for the 2015 Summer (Wet) Season. This report’s main objectives are to:

- Inform readers as to BSA’s farming activities by season, farm, and crop
- Provide relevant data on climatic conditions and agricultural pests potentially affecting our crops.
- Inform readers on domestic and regional market conditions for BSA’s crops.

BSA is only farming in the Summer 2015 season at the Cayo One Estate, situated approximately between miles 40 and 42 of the George Price Highway in Belize, near the village of Cotton Tree in Cayo District. Cayo One is some 41 miles west of Belize City, some 9 miles east of Belmopan and 38 miles east of the Belize-Guatemala border at Melchor.



Cayo One had a very rainy start to the farming season. After experiencing only 38 mm of rainfall during the May 17-31 fortnight, rainfall increased to 236 mm during the June 1-14 fortnight! This level of rainfall, in such a short time period, is approaching an amount which could be detrimental to CSA’s crops. It also put a halt to any further land clearing operations, and even the improvement works to the EPZ and the new access road have had to be temporarily halted.

The table below shows rainfall at Belmopan, which is about 9 miles from Cayo One. Data are shown both for the current year and an average for the past 15 years.

Belmopan Precipitation Data (mm per month)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	195	0.1	56	18	57							
2000-2014	137	55	49	31	132	245	261	238	216	252	165	129

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You can (normally) follow Belize's weather on:

<http://www.hydromet.gov.bz/250-km-radar-loop>

Unfortunately, the Belize Meteorology Department weather radar is currently out of commission, and we understand that, owing to Government budget difficulties, the necessary spare parts and technical service to reinstate the weather radar have only recently been ordered and it may not be operational until the end of June. Our fall back weather radar is the US NOAA Hurricane Center weather radar network which monitors the Caribbean basin:

<http://www.nhc.noaa.gov/>

Cayo One (Corn) – 358 acres (100% Dry)

Cayo One's goal was set in March 2015 to plant at least 500 acres of corn and rice; 358 acres of corn have been planted on 3 fields, which are described in the data table below. All of Cayo One's fields are virgin ground, having been converted from raw bush in the 12 month period since May 2014. Soil tests for the newly created farmland showed a consistently rich black soil with some clay, 3-4% organic matter, pH levels in a range of 6.0 – 6.9. The fields are all unirrigated and are substantially similar except for field 1A, which was subjected to a double pass with a deep ripper. Planting took place over 3 days between May 28th and May 30th.

It is important to note that BSA has budgeted fertilizers for its corn fields based on a 150 bushel / acre (9.4 mt/Ha) yield goal. We do not expect to achieve that yield in this first year of operation, but we are fertilizing to that level in order to begin enhancing our soil quality. Our optimum outcome for this first season would be 110 bushels / acre (6.9 mt/Ha) and our financial budgets assume a yield of 81 bushels / acre (5.1 mt/Ha). It is an inherent part of the CSA's long term business model to assume that for the first five years when virgin ground is converted to farmland yields will be below model and input costs will be above model.

Pre-planting operations involved a disking, a leveling, and a harrowing of the fields, after which a granular base fertilizer was applied. Our 2015 Summer Crop is relying principally on granular based fertilizers, with a modest amount of supplemental liquid fertilizers. Specifics of the fertilizers and their applications are in the data table and lot records below, and are briefly summarized hereunder:

Base Fertilizer: 330 lbs. per acre / 13.31-30.3-13.2+1.77S +0.12B+0.04Cu+0.22Mn+1Zn+0.22Fe
Starter Fertilizer: 1 liter per acre / AlgaEnzims (soil conditioner that enhances fertilizer uptake)
3.5 liters per acre / Nachurs "K-Focus", a liquid fertilizer which provides immediately available potassium.
Post-Plant Fertilizer: 275 lbs. per acre / Urea (46-0-0)

Broadly speaking, we will be applying the following primary fertilizer quantities:

N: 170 lbs. /acre (94 lbs applied as of June 14, 2015)

P: 100 lbs. /acre (100% applied as of June 14, 2015)

K: 43 lbs. /acre of granular + additional potassium via Nachurs "K-Focus (100% applied as of June 14, 2015)

There is also an extensive micro-nutrient program as well as a plan for additional ad hoc applications of foliar fertilizers based on plant development.

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Four separate germination tests of the DeKalb 7088 corn seed showed rapid germination rates of 97%-98%, which is nearly at the 99% rates typically seen in North America. Seeds were coated with an initial insecticide to protect against ants and ground beetles.

Planting at Cayo One took place between May 28th and May 30th, just after 33 mm of rain fell on May 23rd, which provided an ideally moist seedbed. The excessive rain of the subsequent fortnight, however, has been less than ideal.

We witnessed rapid and vigorous emergence within 72-96 hours of planting, and our 5 day old seedlings looked very healthy. Since our first report, and despite adverse conditions due to excessive rainfall and little to no direct sunlight, the corn continues to show signs of good vigor; the majority of the crop was in the V4 to V5 stage at day 16. However, the excessive rains have definitely stressed the plants and many of them have begun to turn mauve or purple as a result. This is an expected outcome during times of stress (usually cold or excessive water) and some hybrids are more prone than others. It can also be as a result of phosphorous deficiency, which is highly unlikely with the amount of phosphorous available to the plant. The coloring will usually begin to fade and disappear after V6-V8 stage. Importantly, this condition is not believed to affect plant growth or yield.

Nitrogen in the form of Urea (46% N) has been applied at a rate of 110lb per acre. The particular type of urea contains agrotain, a urease inhibitor that slows down the release of nitrogen, thereby making it less prone to volatilization and extending its release to the plant. The response to this should be almost immediate and should also assist the plant in overcoming water logging stresses.

We have so far seen an unusually strong worm presence this season, and we are addressing this issue with three treatments: a seed coating, an application of Nomax 15EC, and Cipermethrin. Field surveys made on the 13th and 15th of June seem to indicate that the teflubenzuron in the Nomax 15 EC is beginning to work. This delayed response is likely due to the high amounts of water and the reluctance of the worm to climb to the topside of the leaf. Field scouting shows a preponderance of insects around the edges but also pockets of infestations throughout the field. Closer inspection of progress with our worm treatments on the afternoon of June 15th will clarify a game-plan for next application steps. We believe that next year we will need to obtain a minor use permit for Coragen (not currently approved for use in Belize) in order to get satisfactory results. In addition, use of a hooded sprayer, if weather permits, would materially reduce our chemical needs.)

Cayo One (Rice) – 122 acres (100% non-irrigated)

A total of 122 net acres are scheduled to be planted in Rice, bringing the overall total acreage planted at Cayo One to 480 acres, slightly below the total 500 acre goal. The rice field has been designated as field #4 and runs east to west across the northernmost section of the prepared farmland. Field four received one disking, two passes with a harrow and one leveling during preparation. It has essentially the same soil composition and chemistry as the corn fields.

Base Fertilizer was applied aerially on June 12th, using ~250lbs/acre of a granular formula with 12-26-23 primary characteristics as well as micro-nutrients. Accordingly, the following nutrients have already been applied:

- N: 30 lbs. /acre - An additional 115 lbs to 160 lbs per acre of N will be applied, subject to weather, in the form of Urea (46-0-0)
- P: 65 lbs. /acre
- K: 58 lbs. /acre

The Rice crop is expected to be seeded with Cheniere variety at a rate of 90lbs/acre during the week of June 15th.

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Northerly view of Field One – Day 17 June 15th, 2015



Strong Root System – Day 17 June 17th, 2015



Stalk Diameter at Day 17 – June 15th, 2015



Soggy Tracks! – June 15th, 2015



Southerly view of fields – June 15th, 2015



Northerly view of new access road/EPZ – June 15th 2015

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Summary and Conclusion

There were no notable changes in market conditions in Belize, so we are repeating last week's comments for general information purposes:

Corn

Corn continues to be in short supply locally in Belize, where Belizean buyers are currently paying BZD 0.25-0.27 / lb for local delivery, which equates to USD 7.00 – 7.56 per bushel and USD 276 – 299 per metric ton. Prices in Guatemala are reported to be modestly lower for feed grade corn (net of freight costs to Guatemala) but marginally higher for food grade corn.

Rice

Rice also enjoys a strong market in Belize, although for limited quantities. Local wholesale prices for rough rice ("Paddy rice") at the mill equate to approximately USD 20.00/cwt or USD 441 /mt. Milled premium rice wholesales for USD 40.00 / cwt, although Belize's annual consumption of milled rice is not likely to exceed 10,000 mt. We have had informal discussions with potential importers of rice from Guatemala, with prospective prices expected to be close to those achieved in Belize, but we can not yet verify the reliability of these prospective markets.

Soybeans

Soybeans continue to be in short supply in Belize, and what limited production came from the winter season was apparently sold for BZD 0.56-0.60 / lb, which equates to USD 16.80-18.00 / bushel and USD 617 – 660 / mt. We continue to believe that there is local Belizean demand for an additional 10,000-20,000 acres of soybeans to meet domestic livestock feed requirements.

Milo

The milo market in Belize is quite limited, with only a few poultry farmers using it as a staple feed. Local prices have hovered between BZD 0.18 and 0.20 / lb, which equates to 5.04 – 5.60 / bushel and \$198 - \$220 / mt. Accordingly it is one of the few grains to trade at a discount to the USDA cash price (FOB Gulf Ports) which is currently USD 246 / mt.

As we wrote a fortnight ago, Mother Nature will have a determining impact on our success this season. After an excellent start, the heavy rains of the past fortnight are somewhat challenging. However, they are not atypical for June, and we will hope that they relent for the second half of the month. Hopefully there is sufficient sunshine between rains to continue to promote nutrient uptake as the next week is critical in terms of plant, kernel and cob development. We continue to firmly believe that, with a little help from Mother Nature, the summer 2015 crop should be the start of an outstanding track record at Cayo One.

Thanks!

Abram Dyck, John Peters, and the Farming Report Editorial Team

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Grower	Location	Field #	Acres	Irr ?	Soil Type	Crop	Seed Variety (count/acre)	Plant Date	Stand Date	Fertilizer Program (For full details of applications, refer to Lot Records)	Comments
BSA	Cayo One	1A	36	N	Black	Corn	DK 7088 27,000/acre	05/28	06/02	<u>Base</u> 330 lbs/acre 13+30+13+Micros <u>Starter 1</u> 1 ltr/acre Algaenzyme <u>Starter 2</u> 3.5 ltr/acre K - Focus <u>Post-Plant</u> 46-0-0 110 lbs (1 st)	Western strip that received a "Deep Soil Rip" Full Base: 13.31-30.3-13.2+1.77S +0.12B+0.04Cu+0.22Mn+1Zn+0.22Fe Planted just in time ☺ 235mm of rain days 4-15 V4+ at Day 17
BSA	Cayo One	1B	89	N	Black	Corn	DK 7088 27,000/acre	05/28	06/02	<u>Base</u> 330 lbs/acre 13+30+13+Micros <u>Starter 1</u> 1 ltr/acre Algaenzyme <u>Starter 2</u> 3.5 ltr/acre K - Focus <u>Post-Plant</u> 46-0-0 110 lbs (1 st)	Full Base: 13.31-30.3-13.2+1.77S +0.12B+0.04Cu+0.22Mn+1Zn+0.22Fe Planted just in time ☺ 235mm of rain days 4-15 V4+ at Day 17
BSA	Cayo One	2	100	N	Black	Corn	DK 7088 27,000/acre	05/29	06/03	<u>Base</u> 330 lbs/acre 13+30+13+Micros	Full Base: 13.31-30.3-13.2+1.77S +0.12B+0.04Cu+0.22Mn+1Zn+0.22Fe Planted just in time ☺

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										<u>Starter 1</u> 1 ltr/acre Algaenzyme <u>Starter 2</u> 3.5 ltr/acre K - Focus <u>Post-Plant</u> 46-0-0 110 lbs (1 st)	235mm of rain days 3-15 V4+ at Day 17
BSA	Cayo One	3	133	N	Black	Corn	DK 7088 27,000/acre	05/30	06/04	<u>Base</u> 330 lbs/acre 13+30+13+Micros <u>Starter 1</u> 1 ltr/acre Algaenzyme <u>Starter 2</u> 3.5 ltr/acre K - Focus <u>Post-Plant</u> 46-0-0 110 lbs (1 st)	Full Base: 13.31-30.3-13.2+1.77S +0.12B+0.04Cu+0.22Mn+1Zn+0.22Fe Planted just in time ☺ 235mm of rain days 2-15 V4+ at Day 17
BSA	Cayo One	4	122	N	Black	Rice	Cheniére 90 lbs/acre	By 6/20	TBA	<u>Base</u> 250 lbs/acre 12+26+23+Micros	Full Base spread 6/13 50%: 13.31-30.3- 13.2+1.77S+0.12B+0.04Cu+0.22Mn+ 1Zn+0.22Fe 50%: 11-22-13.33+ 5S +0.1B+ 0.04Cu+0.22Mn+1Zn+0.22Fe 235mm of rain 6/1-14

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Lot Records for Fields 1, 2, 3, & 4

GROWER: BSA

Date Planted: May 28 2015

SECTION #: 1

FARM LOCATION: Cayo One Estates I

BLOCK #: _____

SOIL TYPE: Black Loam

CROP: Corn

VARIETY: DeKalb 7088

OF ACRES: 125

LAND PREPARATION				
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other
2	2	2		

FERTILIZERS		
PREPLANT	AT PLANTING	
See Below	Liquid	See Below
	Dry	

PLANTING	
Seed-Rate	Condition
Projected 27,000	Soil dry to moist

FERTILIZERS						Rain		PESTICIDES					
Date	Analysis	Rate/Ac	Ground	Air	#	Date	Quantity	Date	Description	Rate/Ac	Ground	Air	#
25-May-15	13.31-30.3-13.2+1	330lb	Preplant		1	5/18-5/31	38 mm	27-May-15	Cruiser seed		X		1
27-May-15	AlgaEnzims	1 Litre	Plant		2	6/01-6/14	236 mm	29-May-15	Atrazine	1.25lb	X		2
27-May-15	K-Focus	3.5 Litre	Plant		2			29-May-15	Prowl	1 Litre	X		2
9-Jun-15	Frutal (PH adjust)	13.8CC		X	3			9-Jun-15	Nomax 15 EC	125cc		X	3
12-Jun-15	Frutal (PH adjust)	13.8CC		X	4			12-Jun-15	Cipermethrin	150cc		X	4
12-Jun-15	46-0-0	110lb		X	5								

GROWER: BSA

Date Planted: May 29, 2015

SECTION #: 2

FARM LOCATION: Cayo One Estates I

BLOCK #: _____

SOIL TYPE: Black Loam

CROP: Corn

VARIETY: DeKalb 7088

OF ACRES: 100

LAND PREPARATION				
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other
2	2	2		

FERTILIZERS		
PREPLANT	AT PLANTING	
See Below	Liquid	See Below
	Dry	

PLANTING	
Seed-Rate	Condition
Projected 27,000	Soil dry to moist

FERTILIZERS						Rain		PESTICIDES					
Date	Analysis	Rate/Ac	Ground	Air	#	Date	Quantity	Date	Description	Rate/Ac	Ground	Air	#
25-May-15	13.31-30.3-13.2+1	330lb	Preplant		1	5/18-5/31	38 mm	28-May-15	Cruiser seed		X		1
28-May-15	AlgaEnzims	1 Litre	Plant		2	6/01-6/14	236 mm	30-May-15	Atrazine	1.25lb	X		2
28-May-15	K-Focus	3.5 Litre	Plant		2			30-May-15	Prowl	1 Litre	X		2
9-Jun-15	Frutal (PH adjust)	13.8cc		X	3			9-Jun-15	Nomax 15 EC	125cc		X	3
12-Jun-15	Frutal (PH adjust)	13.8cc		X	4			12-Jun-15	Cipermethrin	150cc		X	4
12-Jun-15	46-0-0	110lb		X	5								

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GROWER: BSA

Date Planted: May 30, 2015

FARM LOCATION: Cayo One Estates I

SECTION #: 3

BLOCK #: _____

SOIL TYPE: Black Loam

CROP: Corn

VARIETY: DeKalb 7088

OF ACRES: 133

LAND PREPARATION				
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other
2	2	2		

FERTILIZERS		
PREPLANT	AT PLANTING	
See Below	Liquid	See Below
	Dry	

PLANTING	
Seed-Rate	Condition
Projected 27,000	Soil dry to moist

FERTILIZERS						Rain		PESTICIDES					
Date	Analysis	Rate/Ac	Ground	Air	#	Date	Quantity	Date	Description	Rate/Ac	Ground	Air	#
27-May-15	13.31-30.3-13.2+1	330lb	Preplant		1	5/18-5/31	38 mm	30-May-15	Cruiser	seed	X		1
30-May-15	AlgaEnzims	1 Litre	Plant		2	6/01-6/14	236 mm	30-May-15	Atrazine	1.25lb	X		2
30-May-15	K-Focus	3.5 Litre	Plant		2			30-May-15	Prowl	1 Litre	X		2
9-Jun-15	Frutal (PH adjust)	13.8CC		X	3			9-Jun-15	Nomax 15 EC	125cc		X	3
12-Jun-15	Frutal (PH adjust)	13.8CC		X	4			12-Jun-15	Cipermethrin	150cc		X	4
12-Jun-15	46-0-0	110lb		X	5								

GROWER: BSA

Date Planted: 6/??/2015

FARM LOCATION: Cayo One Estates I

SECTION #: 4

BLOCK #: _____

SOIL TYPE: Black Loam

CROP: Rice

VARIETY: Cheniere

OF ACRES: 122

LAND PREPARATION				
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other
1	2	1		

FERTILIZERS		
PREPLANT	AT PLANTING	
See Below	Liquid	See Below
	Dry	

PLANTING	
Seed-Rate	Condition
Projected 90 lbs / acre	Soil dry to moist

FERTILIZERS						Rain		PESTICIDES					
Date	Analysis	Rate/Ac	Ground	Air	#	Date	Quantity	Date	Description	Rate/Ac	Ground	Air	#
12-Jun-15	13.31-30.3-13.2+1	124.4lb		X	1	5/18-5/31	38 mm						
12-Jun-15	11-22-13.33+5S+0	124.4lb		X	2	6/01-6/14	236 mm						