

Belize Sustainable Agriculture, Ltd. Farming Report – September 22, 2015

General Comments & Weather

This is the 9th of BSA’s fortnightly Farming Reports for the 2015 Summer (Wet) Season, whose 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.



September has finally seen the return of more normal rainfall, with 153mm of rain in the first 3 weeks of September. While this rain is too late to affect Summer 2015 crops, it will begin to return Belize’s unusually dry conditions to normal. After June’s heavy rainfall, July then had heavy early rains followed by an increasingly dry spell that continued into early/mid-September! After recording 200% of normal rainfall in June, then normal rainfall in July (but very irregular!), August fell to 39% of normal rainfall. So the very irregular Summer 2015 Wet season made for quite challenging farming; local crops were badly affected with many crops being severely impacted or even lost. On a happier note, the Hurricane season has been mild so far, and no system has threatened the western Caribbean, which we hope will continue over the next 2-3 weeks prior to our harvest. Data are shown both for the current year and an average for the past 15 years.

Belmopan Precipitation Data (mm per month) – September Data through September 21, 2015												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	195	0.1	56	18	57	491	265	93	153			
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>

We continue to use the US NOAA Hurricane Center weather radar network which monitors the Caribbean basin, and would also suggest Weather Underground as an additional resource:

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

<http://www.wunderground.com/q/zmw:00000.2.WMGMM>

Cayo One (Corn) – 358 acres (100% non-irrigated)

BSA planted 358 acres of corn on 3 fields at Cayo One (described in the data table below) between May 28th and 30th. All of Cayo One's fields are virgin ground, with soil tests for the newly created farmland showing a consistently rich black soil with some clay, 3-4% organic matter, pH levels in a range of 6.0 – 6.9.

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. 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); based on our most recent data we are hopeful that yields will be closer to 100 bushels/acre (6.3 mt/Ha) than 80 bushels.

There are limited new developments for the corn crop. The rain which fell during the past week is allowing some of the less developed corn kernels to fill a little more, which is a positive. On the other hand, excessive rain would make harvest conditions more expensive and slower. Indeed, truly serious rain and windy conditions could promote lodging (i.e. corn stalks falling over) which would clearly be detrimental. In light of the recent rain, which is slowing down the rate at which our corn is drying, we expect to push our harvest start date from the week of September 28th to the week of October 5th. We are of course watching weather conditions, and if we saw any serious Hurricane risk develop (there is nothing on the horizon), we would begin harvesting immediately.

Our fertilization was completed four weeks ago and we are past the stage where there is any material risk to our crops from insect pressure; fungus and bacteria also do not do well in dry conditions. The heavy work, except for the remaining harvest, is done.

In conclusion, while our Summer 2015 corn crop will have been challenged by the newness of the ground and highly unseasonal weather patterns, we can still expect to harvest a reasonable crop within our financial budget. The major risks to the crop remain hurricane activity and excessive rains during the late September / early October Harvest period.

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Cayo One (Rice) – 125 acres (100% non-irrigated)

BSA planted 125 acres of rice on the field which has been designated as field #4 and runs east to west across the northernmost section of the prepared farmland. Field #4 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.

The rice got off to a good start, as rice doesn't mind the heavy rains, and then continued to develop normally, although with plants staying smaller than ideal due to low rainfall. The shortage was acute enough that areas where plant density is high the plants began to slow their growth and weaker plants began to succumb to drought.

As we wrote in the last report, the past fortnight's weather would be key for our rice crop. Despite numerous small rain showers the rice was not able to recover from its drought stricken position and the decision to abandon the rice crop was taken on September 4th.

The residual benefit to be gained from the rice crop is to disc it under and incorporate it for "green manure". Although rice is a poor source of plant nutrient (compared to legumes) its value as organic matter is still undoubtable. Additional factors in this decision included poor weed control due to improper application of Tordon, grass in areas where rice had a low population and, given the need for further ground levelling and drainage work, would provide us with more time for this.

BSA's 4760 John Deere tractor and disc combination completed the first pass on Saturday September 12th and the quality of work done was exceptional. The amount of loose soil created by this first pass was almost unbelievable. Overnight September 13, 2015 enough rain fell in the first heavy rainfall since early July to prevent a second pass with this piece of equipment; however by September 16th this work was also completed. Several more passes of this discing equipment are needed to reduce the coarseness of the rice plant in order to allow any leveling process. This will take place as soon as weather permits.

In conclusion, we repeat again that drainage and irrigation are the keys to being able to master what are very controllable challenges, especially when it comes to lack of water. We very much look forward to the installation of CSA's first irrigation pivots in the winter/spring of 2016!

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Easterly View of Fields 1,2,3: September 11, 2015

Fields 1, 2, & 3 are at various stages of R5 and R6. The extended dry period since early July has left everything somewhat parched and indicating a very early harvest.



Easterly view of Fields 1,2,3: Sept. 21, 2015

A fortnight later some 130mm of rain have fallen and water can be seen from the air on the partially cleared portions of Cayo 1. A reminder of how quickly and unpredictably Mother Nature can change things!



Field 4 being disced September 11, 2015

The rice crop is abandoned, but we are looking to salvage some organic material and nutrients as we prepare for the next crop.



Field 4 Second Pass: September 17, 2015

A week later, just before the rains, the rice straw has dried out and we are getting ready for another disc. The next day 50mm of rain fell, so we'll have to wait for drier conditions!

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Market Conditions and Conclusion

There are no recent developments in terms of local Market conditions, which continue to reflect both Belizean shortages as well as shortfalls throughout Central America for the Summer 2015 crops.

Corn

Belize's domestic corn market remains firm. Local prices for spot delivery remain at the BZD 29.00-31.00/cwt level (~\$8.40/bushel - \$331/mt), with no recent transactions reported.

As we reported last week, Spanish Lookout corn (main Cayo producing area) has been seriously affected by the drought. Indications with growers in that area are that their yield expectations are down as much as 50%, with most growers suffering an expected yield loss of at least 30%.

CSA has committed its Summer 2015 corn to the Central American subsidiary of a US Fortune 100 Food Consumer Products group, and we are making preparations to dry and ship this corn in October.

Soybeans

There is little news to report in the local Soybean market, other than farmers (including CSA) have had real difficulty in securing good quality soybean seed that has acceptable germination rates and vigor. Plantings in the Winter 2015/16 season will be accordingly reduced. Domestic prices remain high at around BZD 56-60/cwt (~\$ 16.80-18.00/Bu – \$ 617-661/mt).

Edible Beans

We have had limited reports on edible beans, except that there is continued solid demand from Central American buyers. We do not expect to plant any Edible Beans in the Winter 2015/16 season.

Rice

Belize's domestic Rice market remains well underpinned due to modest domestic harvests. Local wholesale prices for rough rice ("Paddy rice") continue to be reported at USD 22.50/cwt or USD 496 /mt. We have informed the local Co-Operative mill that we have abandoned our rice crop; they remain ready to work with us in the future.

The Summer 2015 weather conditions have been quite challenging, but we remain very encouraged by our crops' relatively good performance. We continue to gather data on our Cayo 1 fields, and our confidence in Cayo 1's potential continues to grow!

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 <i>(For full details of applications, refer to Lot Records)</i>	Comments
BSA	Cayo One	1A	36	N	Black	Corn	DK 7088 27,000/acre	05/28	06/03	<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) Jun 12 Foliar Jun 18 46-0-0 110 lbs (2 nd) Jun 27 Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3 rd) Jul 18	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 240m of rain days 15-28! V7 at Day 31 V12 at Day 44 VT at Day 52 R2 at Day 67 R3-4 at Day 81 R5-6 at Day 95 R5-6 at day 109
BSA	Cayo One	1B	89	N	Black	Corn	DK 7088 27,000/acre	05/28	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) Jun 12 Foliar Jun 18 46-0-0 110 lbs (2 nd) Jun 27 Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3 rd) Jul 18	235mm of rain days 4-15 V4+ at Day 17 240m of rain days 15-28! V7 at Day 31 V12 at Day 44 VT at Day 52 R2 at Day 67 R3-4 at Day 81 R5-6 at Day 95 R5-6 at day 109
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 <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) Jun 12 Foliar Jun 18	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 3-15 V4+ at Day 17 240m of rain days 15-28! V7 at Day 30 V12 at Day 43 VT at Day 52

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										46-0-0 110 lbs (2 nd) Jun 27 Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3 rd) Jul 18	R2 at Day 67 R3-4 at Day 81 R5 at Day 95 R5-6 at day 109
BSA	Cayo One	3	133	N	Black	Corn	DK 7088 27,000/acre	05/30	06/03	<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) Jun 12 Foliar Jun 18 46-0-0 110 lbs (2 nd) Jun 27 Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3 rd) Jul 18	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 240m of rain days 15-28! V7 at Day 31 V7 at Day 29 V12 at Day 42 VT at Day 52 R2 at Day 67 R3-4 at Day 81 R5 at Day 95 R5-6 at day 109

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BSA	Cayo One	4	125	N	Black	Rice	Cheniere 110 lbs/acre	6/25	6/29	<u>Base</u> 250 lbs/acre 12+26+23+Micros <u>Starter</u> NPK (pH adjust) Post-Plant 46-0-0 40 lbs (1 st) 39-0-0-7S 42 lbs (2 nd) Jul 18 46-0-0 108 lbs (3 rd) Jul 31	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 240m of rain days 15-28! < 50mm of rain days 29-39 <36mm of rain days 40-53! Crop Abandoned Sept 4, 2015
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Lot Records for Fields 1, 2, 3, & 4

GROWER: <u>BSA</u>					Date Planted: <u>May 28, 2015</u>										
FARM LOCATION: <u>Cayo One Estates I</u>					SECTION #: <u>1</u>		BLOCK #: _____								
CROP: <u>Corn</u>					VARIETY: <u>DeKalb 7088</u>					# OF ACRES: <u>125</u>					
LAND PREPARATION					FERTILIZERS					PLANTING					
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other	PREPLANT		AT PLANTING			Seed-Rate		Condition			
2	2	2			See Below		Liquid	See Below			Projected 27,000		Soil dry to moist		
					Dry										
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+1.77S	330lb	Preplant		1	5/18-5/31	38 mm	27-May-15	Cruiser	seed	X		1		
27-May-15	AlgaEnzims	1 Litre	At planting		2	6/01-6/14	236 mm	29-May-15	Atrazine	1.25lb	X		2		
27-May-15	K-Focus	3.5 Litre	At planting		2	6/15-6/26	128 mm	29-May-15	Prowl	1 Litre	X		2		
9-Jun-15	Frutal (PH adjust)	13.8CC		X	3	6/27-7/11	224mm	9-Jun-15	Nomax 15 EC	125CC		X	3		
12-Jun-15	Frutal (PH adjust)	13.8CC		X	4	7/12-7/26	25mm	12-Jun-15	Cipermethrin	150CC		X	4		
12-Jun-15	46-0-0	110lb		X	5	7/27-8/6	52mm	18-Jun-15	Chlorfluba	400CC		X	6		
18-Jun-15	NPK (PH adjust)	27.6CC		X	6	8/7-8-22	36mm	29-Jun-15	Tordon	220CC		X	8		
18-Jun-15	Sagaquel Combi	500CC		X	6	8/23-9/6	44mm	29-Jun-15	Chlorfluba	400CC		X	8		
27-Jun-15	46-0-0	110lb		X	7	9/7-9/21	130mm	16-Jul-15	Certero	161CC		X	9		
8-Jul-15	NewFol Mg	150mg		X	9			29-Jul-15	Curyom	100CC		X	11		
8-Jul-15	Nachurs Micro+Folia	1L		X	9			29-Jul-15	Abamectin	72CC		X	11		
18-Jul-15	38.7N + 7.2S	42.4lb		X	10										

GROWER: <u>BSA</u>					Date Planted: <u>May 29, 2015</u>										
FARM LOCATION: <u>Cayo One Estates I</u>					SECTION #: <u>2</u>		BLOCK #: _____								
CROP: <u>Corn</u>					VARIETY: <u>DeKalb 7088</u>					# OF ACRES: <u>100</u>					
LAND PREPARATION					FERTILIZERS					PLANTING					
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other	PREPLANT		AT PLANTING			Seed-Rate		Condition			
2	2	2			See Below		Liquid	See Below			Projected 27,000		Soil dry to moist		
					Dry										
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+1.77S	330lb	Preplant		1	5/18-5/31	38 mm	28-May-15	Cruiser	seed	X		1		
28-May-15	AlgaEnzims	1 Litre	At planting		2	6/01-6/14	236 mm	30-May-15	Atrazine	1.25lb	X		2		
28-May-15	K-Focus	3.5 Litre	At planting		2	6/15-6/26	128 mm	30-May-15	Prowl	1 Litre	X		2		
9-Jun-15	Frutal (PH adjust)	13.8CC		X	3	6/27-7/11	224mm	9-Jun-15	Nomax 15 EC	125CC		X	3		
12-Jun-15	Frutal (PH adjust)	13.8CC		X	4	7/12-7/26	25mm	12-Jun-15	Cipermethrin	150CC		X	4		
12-Jun-15	46-0-0	110lb		X	5	7/27-8/6	52mm	18-Jun-15	Chlorfluba	400CC		X	6		
18-Jun-15	NPK (PH adjust)	27.6CC		X	6	8/7-8-22	36mm	29-Jun-15	Tordon	220CC		X	8		
18-Jun-15	Sagaquel Combi	500CC		X	6	8/23-9/6	44mm	29-Jun-15	Chlorfluba	400CC		X	8		
27-Jun-15	46-0-0	110lb		X	7	9/7-9/21	130mm	16-Jun-15	Certero	161CC		X	9		
8-Jul-15	NewFol Mg	150mg		X	9			29-Jul-15	Curyom	100CC		X	11		
8-Jul-15	Nachurs Micro+Folia	1L		X	9			29-Jul-15	Abamectin	72CC		X	11		
18-Jul-15	38.7N + 7.2S	42.4lb		X	10										

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GROWER: <u>BSA</u>					Date Planted: <u>May 30, 2015</u>	
FARM LOCATION: <u>Cayo One Estates I</u>					SECTION #: <u>3</u>	
CROP: <u>Corn</u>					BLOCK #: _____	
VARIETY: <u>DeKalb 7088</u>					SOIL TYPE: <u>Black Loam</u>	
# OF ACRES: <u>133</u>						

LAND PREPARATION					FERTILIZERS			PLANTING	
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other	PREPLANT	AT PLANTING		Seed-Rate	Condition
2	2	2			See Below	Liquid	See Below	Projected 27,000	Soil dry to moist
						Dry			

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+1.77S	330lb	Preplant		1	5/18-5/31	38 mm	30-May-15	Cruiser	seed	X		1
30-May-15	AlgaEnzims	1 Litre	At planting		2	6/01-6/14	236 mm	30-May-15	Atrazine	1.25lb	X		2
30-May-15	K-Focus	3.5 Litre	At planting		2	6/15-6/26	128 mm	30-May-15	Prowl	1 Litre	X		2
9-Jun-15	Frutal (PH adjust)	13.8CC		X	3	6/27-7/11	224mm	9-Jun-15	Nomax 15 EC	125cc		X	3
12-Jun-15	Frutal (PH adjust)	13.8CC		X	4	7/12-7/26	25mm	12-Jun-15	Cipermethrin	150cc		X	4
12-Jun-15	46-0-0	110lb		X	5	7/27-8/6	52mm	18-Jun-15	Chlorfluba	400CC		X	6
18-Jun-15	NPK (PH adjust)	27.6CC		X	6	8/7-8-22	36mm	29-Jun-15	Tordon	220CC		X	8
18-Jun-15	Sagaquel Combi	500CC		X	6	8/23-9/6	44mm	29-Jun-15	Chlorfluba	400CC		X	8
27-Jun-15	46-0-0	110lb		X	7	9/7-9/21	130mm	16-Jun-15	Certero	161CC		X	9
8-Jul-15	NewFol Mg	150mg		X	9			29-Jul-15	Curyom	100CC		X	11
8-Jul-15	Nachurs Micro+Folia	1L		X	9			29-Jul-15	Abamectin	72CC		X	11
18-Jul-15	38.7N + 7.2S	42.4lb		X	10								

GROWER: <u>BSA</u>					Date Planted: <u>June 25, 2015</u>	
FARM LOCATION: <u>Cayo One Estates I</u>					SECTION #: <u>4</u>	
CROP: <u>Rice</u>					BLOCK #: _____	
VARIETY: <u>Cheniére</u>					SOIL TYPE: <u>Black Loam</u>	
# OF ACRES: <u>125</u>						

LAND PREPARATION					FERTILIZERS			PLANTING	
Discing	Harrowing	Leveling or Land Plane	Cultivating	Other	PREPLANT	AT PLANTING		Seed-Rate	Condition
1	2	1			See Below	Liquid		110lbs	Wet
						Dry			

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+1.77S	124.4lb	Pre-plant	X	1	5/18-5/31	38 mm	18-Jun-15	Touchdown	600CC		X	3
12-Jun-15	11-22-13.33+5S+0.18	124.4lb	Pre-plant	X	2	6/01-6/14	236 mm	11-Jul-15	Karate	100CC		X	4
18-Jun-15	NPK (PH adjust)	27.6CC	Pre-plant	X	3	6/15-6/26	128 mm	5-Aug-15	Tordon	164CC		X	8
11-Jul-15	46-0-0	40lb		X	5	6/27-7/11	224mm						
18-Jul-15	38.7N + 7.2S	42.4lb		X	6	7/12-7/26	25mm						
31-Jul-15	46-0-0	108		X	7	7/27-8/6	52mm						
						8/7-8/22	36mm						
						8/23-9/6	44mm						
						9/7-9/21	130mm						