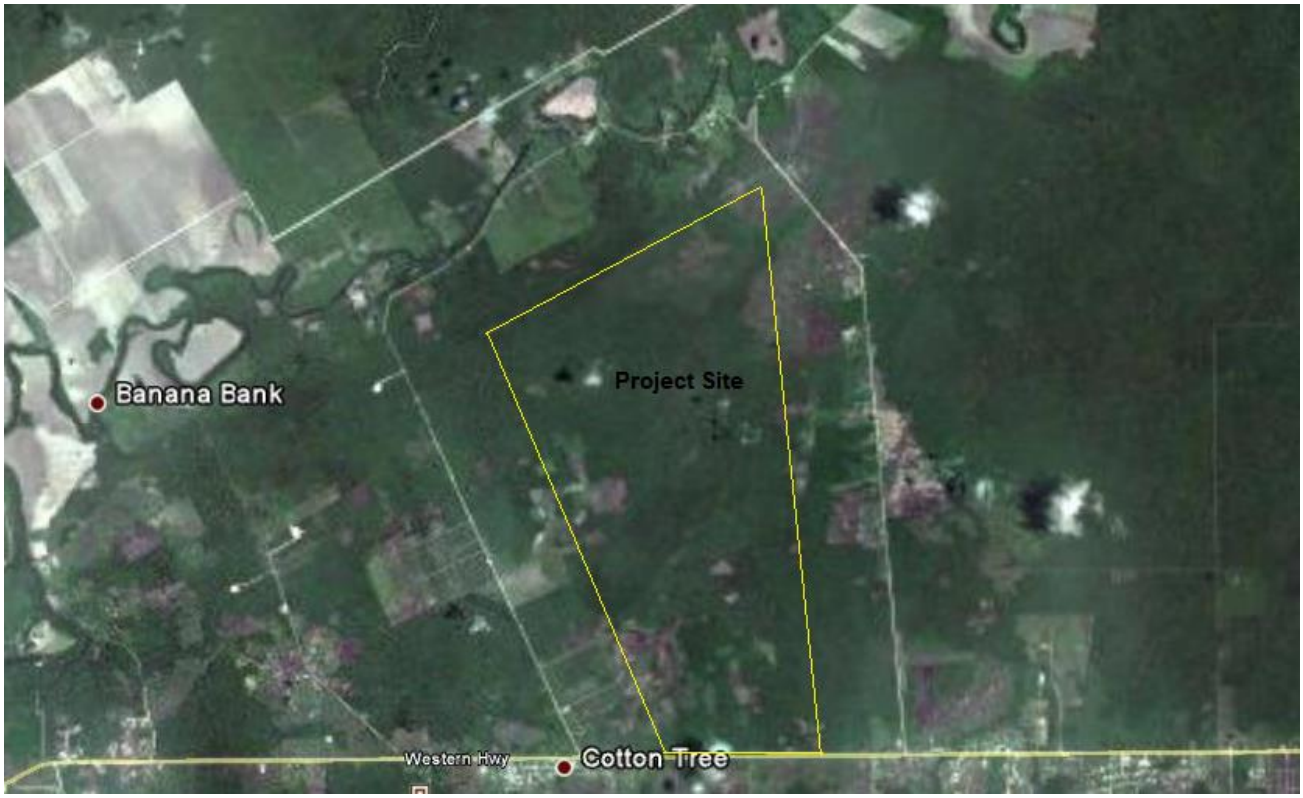
Belize Sustainable Agriculture, Ltd.
Farming Report – August 25, 2015

General Comments & Weather

This is the 7th 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.



June's heavy rainfall was followed by a drier period during the 1st week of July, with about 1" of rain. July then had heavy rains followed by an increasingly dry spell that has continued into the latter part of August! After recording 200% of normal rainfall in June, then normal rainfall in July (but not evenly spaced!), August is on track to record less than 50% of normal rainfall. And while that would provide a near ideal average 750mm of rain during the summer crops' key growing periods, the rain has not fallen in any type of an "average" fashion. Hence we are receiving increasing reports of crops being badly damaged by the recent lack of rain. Also, the first serious storms of the season, Danny and Erika, are active in the Caribbean. These storms do not appear to threaten Belize, but they are a reminder that we are entering the active part of the hurricane season. Data are shown both for the current year and an average for the past 15 years.

Belmopan Precipitation Data (mm per month) – August Data through August 22, 2015												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	**195**	**0.1**	**56**	**18**	**57**	**491**	**265**	**72**				
2000-2014	137	55	49	31	132	245	261	238	216	252	165	129

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); see below for our updated forecast.

Corn, after recovering well in July and early August from June's heavy rains, is beginning to suffer materially from the increasingly dry conditions. Leaves are beginning to dog-ear and signs of plant senescence are obvious as the plants begin to use up their own nitrogen and other nutrients to fill kernels in order to produce viable seed. The likelihood of small kernels is virtually guaranteed with the ongoing drought conditions. This is quite unfortunate as test weights will be reduced considerably as well as kernels per bushel will increase materially. As an example, in our previous report we used a kernel size of 100,000/bushel, which while quite small for the US Midwest, is about average in Belize for the DeKalb 7088 corn variety. In fact, our hope was that, thanks to our nutrition program and the improved condition of the corn crop, it should have been possible to achieve a kernel size closer to 95,000/bushel. However, in light of the recent unseasonal and very dry conditions, we are now adjusting our kernel size expectation to 110,000/bushel, which means a 10% downward revision in yield estimates compared with our last Farming Report.

The 2015 Summer experience, following on CSA's experience in Orange Walk in the Summer of 2014, firmly reinforces our commitment to the core project goal of investing in both drainage and irrigation to counter weather abnormality and the risk of weather extremes, as well as to adjust the timing of when crops are planted.

On a more positive note, insect pressure has dropped to near nil as the plants are not nearly as succulent as during rapid growth stages and ample rainfall. There are small incidences of mites but they are no longer a concern with the rapid slowdown in growth. Instead, we are seeing plenty of beneficial insects to keep the few detrimental ones in check. Fungus and bacteria also do not do well in such dry conditions so they have not been a concern during the last 30 days.

Our fertilization was completed some weeks ago and there now does not appear to be any likely need for additional pesticide applications, although we will remain very vigilant. So 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. A modest amount of rain will still benefit the corn in order to fill the grain to its best potential, and this is particularly true in the less mature plants that produced an ear somewhat later. Indeed, getting these "later ears" to produce is important to maintaining a yield that comes close to our recent projections. The remaining major risks to the crop are hurricane activity and excessive rains during the late September / early October Harvest period.

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

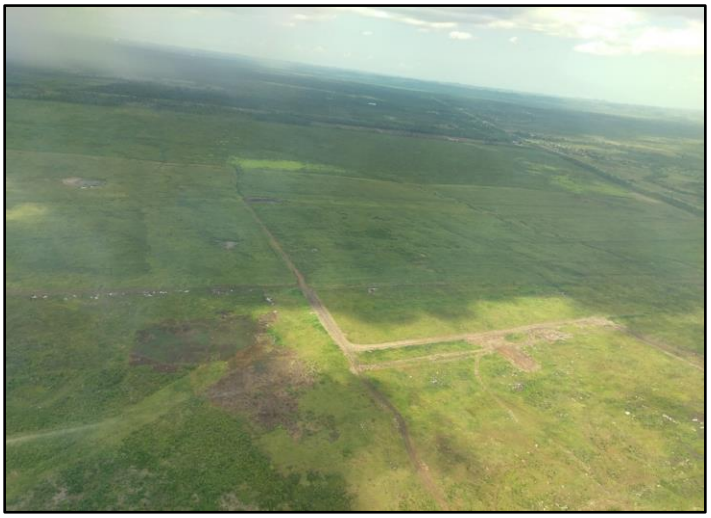
BSA planted 125 acres of rice on the field which has been designated as field #4 and runs east to west across the northernmost section of the prepared farmland. Field #4 received one disking, two passes with a harrow and one leveling during preparation. It has essentially the same soil composition and 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 are succumbing to drought. The lack of rain in the region is definitely having an increasingly negative affect on our rice crop's potential. Plant development has been arrested due to drought stress. Plants are at a very critical stage in their development-panicle initiation and the lack of rain is especially ill-timed. Without rain in the next week or less, this crop will be severely affected. Another few inches of rain would allow us to make some quick applications of nitrogen, and get the crop progressing more healthily.

The application of Tordon as a weed killer was a failure. We are unsure why this is but strongly suspect the type of nozzles that were used on the crop dusting aircraft. We are trying to understand the mentality of the aerial application people in their use of these nozzles but are unable to totally grasp their rationale. Our dismay has been expressed in no uncertain terms and a repeat of the type of application done here will not be repeated. Nonetheless, the weed problem remains manageable…

The coming days will be key for our rice crop; the forecast is for a continuation of the unseasonably dry weather into the latter part of this week, followed by the potential for several days of thundershowers. Fingers crossed!

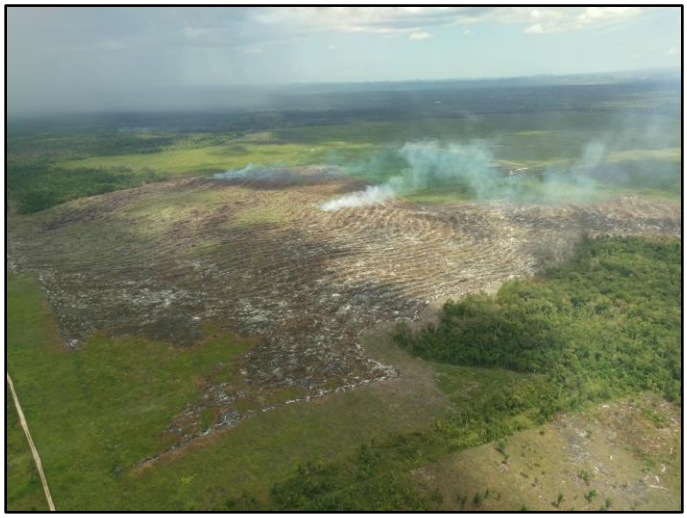
In conclusion, as with the corn crop, drainage and irrigation are the keys to being able to master what are very controllable challenges, especially when it comes to lack of water. We very much look forward to the installation of CSA's first irrigation pivots in the winter/spring of 2016!



Aerial View of Cayo One 500 acres: August 24, 2015

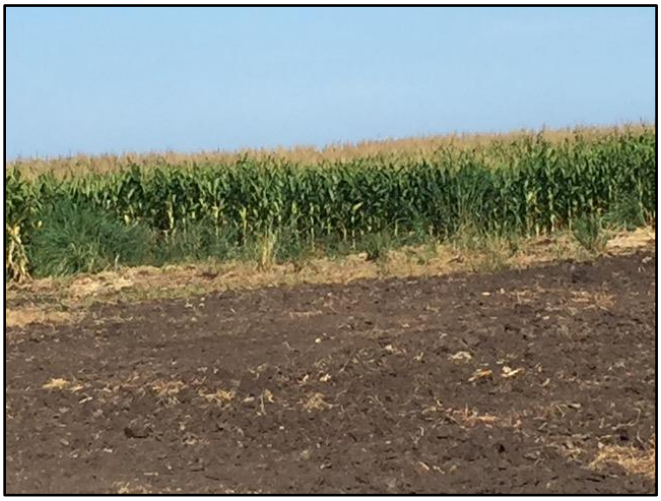
Crop still looking good, albeit too dry…

Irrigation will make such a difference!



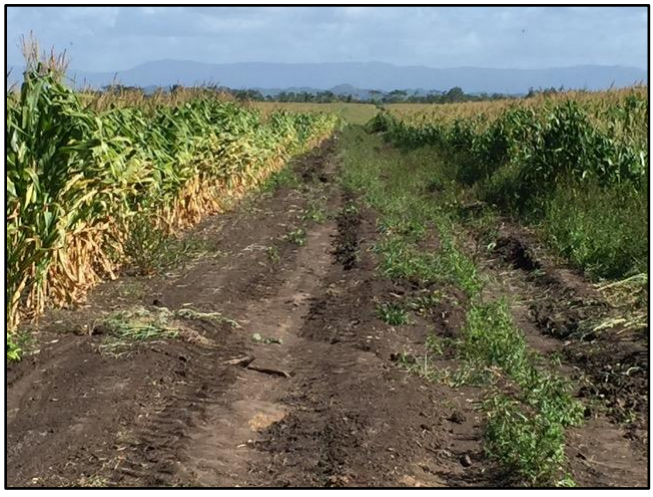
Aerial view of Chained area NW of Fields: Aug 24, 2015

Taking advantage of unseasonably dry weather to burn recently chained land; notice the rainstorm coming! It reached us 30 minutes later with ~ ¼ inch of rain ☺



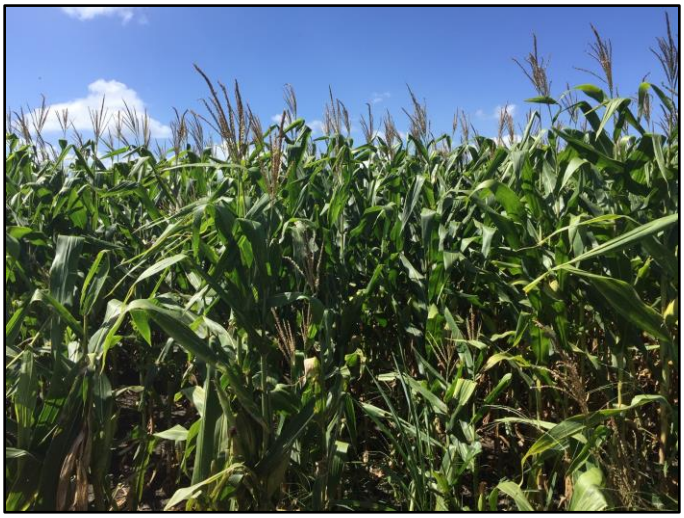
Field 3 looking good: August 24, 2015

Crop is looking healthy and not excessively dry. With just a little rainfall in the next 5-10 days we will approach late September harvest in good condition

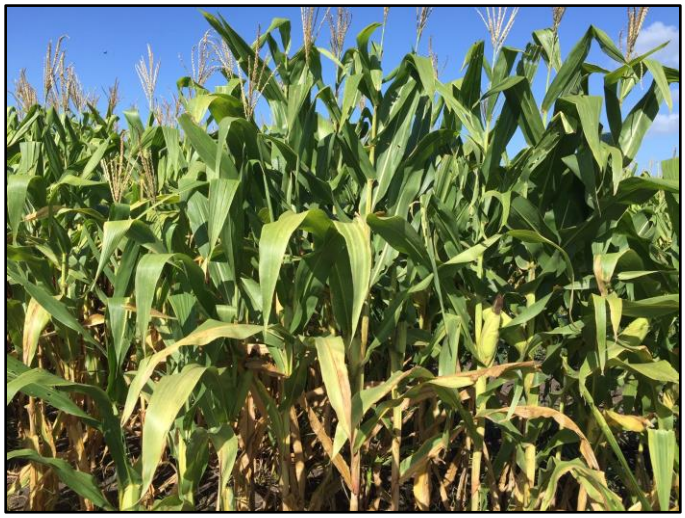


View of Fields 2 & 1: August 24, 2015

Eastern strip of Field 1 on right benefitted from "deep ripping". Corn was less vulnerable to ponding and is holding moisture better. A must for all Cayo One!



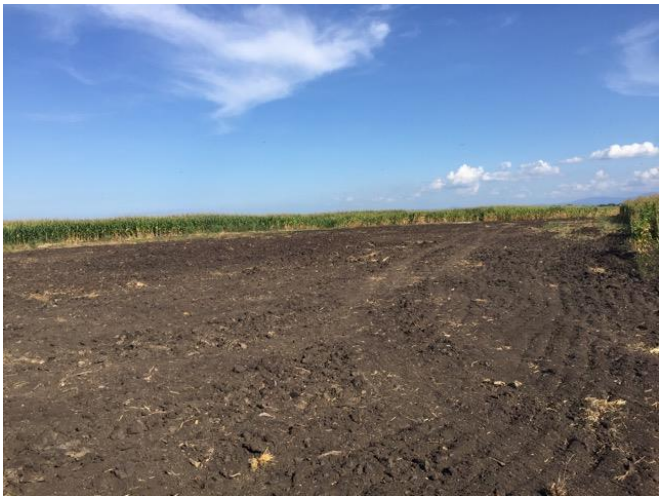
Field 3 looking healthy: Day 80 – August 20, 2015



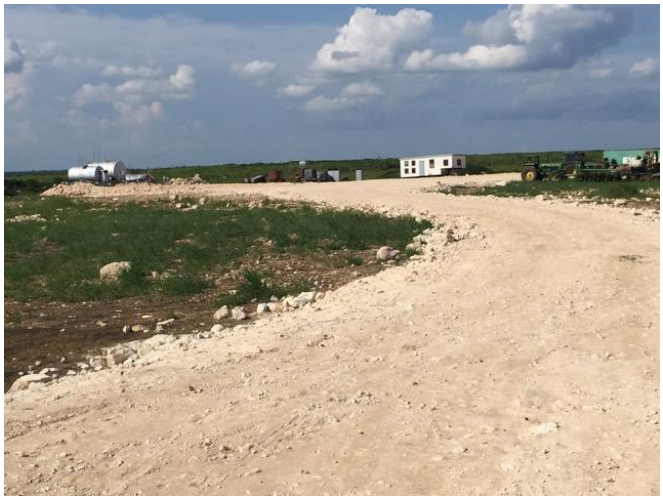
Field 2 showing water stress: Day 80 – August 20, 2015

Field 4 small but healthy Rice – 52– August 20, 2015

Field 4 with drought stressed rice: Day 56 – Aug 24, 2015



Old construction camp now farmland– August 24, 2015



New EPZ area being prepared for Harvest August 24, 2015

Market Conditions and Conclusion

Market conditions continue to reflect the current regional shortages, and are also beginning to reflect expected shortfalls in the forthcoming Summer 2015 Central American crops.

Corn

Belize's domestic corn market has continued its recent firmness, with spot supply remaining tight. We have no reports of significant transactions, but local prices for spot delivery remain at the BZD 30.00-31.00/cwt level ($8.54/bushel - $336/mt). Belize's largest domestic grain co-operative is reported to be offering new corn from the Summer 2015 harvest at BZD 26.00/cwt ($7.28/bushel - $287/mt). While this price is materially (BZD 4.00/cwt) below current levels, it is substantially above last year's initial price quotes of BZD 21.00/cwt.

We continue to hear reports of crop failures in Belize due to the post early July drought. We are also hearing reports of other crops in jeopardy throughout northern Central America. After the catastrophic Summer 2014 harvest in Central America, another bad harvest would make the region heavily dependent on imports from North and South America.

CSA has executed an agreement to deliver substantially all of its 2015 Summer corn crop to the Central American subsidiary of a US Fortune 100 Snack/Beverage group. While the price may not be quite as high as recent domestic Belizean transactions, we consider that such relationships are a cornerstone of CSA's long term strategy.

Soybeans

We understand that the substantial soybean plantings in northern Belize are under real stress from recent drought conditions. Local mills may have difficulty in obtaining sufficient beans for their crush requirements. Accordingly, despite recent weakness in global soybean prices, the local market remains very well bid. Recent prices continue steady at BZD 57.00-58.00/cwt ($17.25/bushel - $634/mt), a very large premium to international prices.

Edible Beans

We have had limited reports on edible beans, except that there is continued solid demand from Central American buyers. We were recently approached by agents of prospective Salvadoran buyers for our winter 2015/16 bean crop, but we indicated that we did not expect to plant any material quantities of edible beans in Q4 2015.

Rice

Belize's domestic Rice market remains well underpinned. Recent crop harvests were confirmed to be below earlier hopes, which has in turn supported local wholesale prices for rough rice ("Paddy rice") at the mill. They contnue to be reported at USD 22.50/cwt or USD 496 /mt. Milled premium rice is expected to wholesale for around USD 45.00/cwt.

We have reached an agreement with a leading local Co-Operative mill to deliver our entire Summer 2015 crop (which may be quite modest), and the likely final price would be USD 22.50-25.00/cwt. While payment terms are slow, the mill has a sterling reputation and the price is substantially higher than the CME price of ~ USD 11.50/cwt.

Recent dry weather has been disappointing, but the limited insect pressure has also been helpful. We continue to gather data on our Cayo 1 fields, and our confidence about their strong potential continues to grow!

Thanks! - Abram Dyck, John Peters, and the Farming Report Editorial Team

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	06/03	<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 (1st) Jun 12 Foliar Jun 18 46-0-0 110 lbs (2nd) Jun 27 Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3rd) 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
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 <u>Starter 1</u> 1 ltr/acre Algaenzyme	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

										<u>Starter 2</u> 3.5 ltr/acre K - Focus <u>Post-Plant</u> 46-0-0 110 lbs (1st) Jun 12 Foliar Jun 18 46-0-0 110 lbs (2nd) Jun 27 Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3rd) Jul 18	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
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 (1st) Jun 12 Foliar Jun 18 46-0-0 110 lbs (2nd) Jun 27	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 R2 at Day 67 R3-4 at Day 81

										Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3rd) Jul 18	
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 (1st) Jun 12 Foliar Jun 18 46-0-0 110 lbs (2nd) Jun 27 Foliar/Micro Jul 8 39-0-0-7S 42 lbs (3rd) 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
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)	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

										Post-Plant 46-0-0 40 lbs (1st) 39-0-0-7S 42 lbs (2nd) Jul 18 46-0-0 108 lbs (3rd) Jul 31	235mm of rain 6/1-14 240m of rain days 15-28! < 50mm of rain days 29-39 <36mm of rain days 40-53!

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 / Dry		See Below

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

FERTILIZERS					
Date	Analysis	Rate/Ac	Ground	Air	#
25-May-15	13.31-30.3-13.2+1.7S	330lb	Preplant		1
27-May-15	AlgaEnzims	1 Litre	At planting		2
27-May-15	K-Focus	3.5 Litre	At planting		2
9-Jun-15	Frutal (PH adjust)	13.8CC		X	3
12-Jun-15	Frutal (PH adjust)	13.8CC		X	4
12-Jun-15	46-0-0	110lb		X	5
18-Jun-15	NPK (PH adjust)	27.6CC		X	6
18-Jun-15	Sagaquel Combi	500CC		X	6
27-Jun-15	46-0-0	110lb		X	7
8-Jul-15	NewFol Mg	150mg		X	9
8-Jul-15	Nachurs Micro+Folia	1L		X	9
18-Jul-15	38.7N + 7.2S	42.4lb		X	10

Rain	
Date	Quantity
5/18-5/31	38 mm
6/01-6/14	236 mm
6/15-6/26	128 mm
6/27-7/11	224mm
7/12-7/26	25mm
7/27-8/6	52mm
8/7-8-22	36mm

PESTICIDES					
Date	Description	Rate/Ac	Ground	Air	#
27-May-15	Cruiser	seed	X		1
29-May-15	Atrazine	1.25lb	X		2
29-May-15	Prowl	1 Litre	X		2
9-Jun-15	Nomax 15 EC	125CC		X	3
12-Jun-15	Cipermethrin	150CC		X	4
18-Jun-15	Chlorfluba	400CC		X	6
29-Jun-15	Tordon	220CC		X	8
29-Jun-15	Chlorfluba	400CC		X	8
16-Jul-15	Certero	161CC		X	9
29-Jul-15	Curyom	100CC		X	11
29-Jul-15	Abamectin	72CC		X	11

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 / Dry		See Below

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

FERTILIZERS					
Date	Analysis	Rate/Ac	Ground	Air	#
25-May-15	13.31-30.3-13.2+1.7S	330lb	Preplant		1
28-May-15	AlgaEnzims	1 Litre	At planting		2
28-May-15	K-Focus	3.5 Litre	At planting		2
9-Jun-15	Frutal (PH adjust)	13.8CC		X	3
12-Jun-15	Frutal (PH adjust)	13.8CC		X	4
12-Jun-15	46-0-0	110lb		X	5
18-Jun-15	NPK (PH adjust)	27.6CC		X	6
18-Jun-15	Sagaquel Combi	500CC		X	6
27-Jun-15	46-0-0	110lb		X	7
8-Jul-15	NewFol Mg	150mg		X	9
8-Jul-15	Nachurs Micro+Folia	1L		X	9
18-Jul-15	38.7N + 7.2S	42.4lb		X	10

Rain	
Date	Quantity
5/18-5/31	38 mm
6/01-6/14	236 mm
6/15-6/26	128 mm
6/27-7/11	224mm
7/12-7/26	25mm
7/27-8/6	52mm
8/7-8-22	36mm

PESTICIDES					
Date	Description	Rate/Ac	Ground	Air	#
28-May-15	Cruiser	seed	X		1
30-May-15	Atrazine	1.25lb	X		2
30-May-15	Prowl	1 Litre	X		2
9-Jun-15	Nomax 15 EC	125CC		X	3
12-Jun-15	Cipermethrin	150CC		X	4
18-Jun-15	Chlorfluba	400CC		X	6
29-Jun-15	Tordon	220CC		X	8
29-Jun-15	Chlorfluba	400CC		X	8
16-Jun-15	Certero	161CC		X	9
29-Jul-15	Curyom	100CC		X	11
29-Jul-15	Abamectin	72CC		X	11

Belize Sustainable Agriculture, Ltd. Farming Report – August 25, 2015

GROWER: BSA

Date Planted: May 30, 2015

SECTION #: 3

FARM LOCATION: Cayo One Estates I

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 / Dry		See Below

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+1.77S	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			29-Jun-15	Chlorfluba	400CC		X	8
27-Jun-15	46-0-0	110lb		X	7			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: BSA

Date Planted: June 25, 2015

SECTION #: 4

FARM LOCATION: Cayo One Estates I

BLOCK #:

SOIL TYPE: Black Loam

CROP: Rice

VARIETY: Cheniere

OF ACRES: 125

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

FERTILIZERS			
PREPLANT		AT PLANTING	
See Below	Liquid / Dry		

PLANTING	
Seed-Rate	Condition
110lbs	Wet

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+0.1B	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						