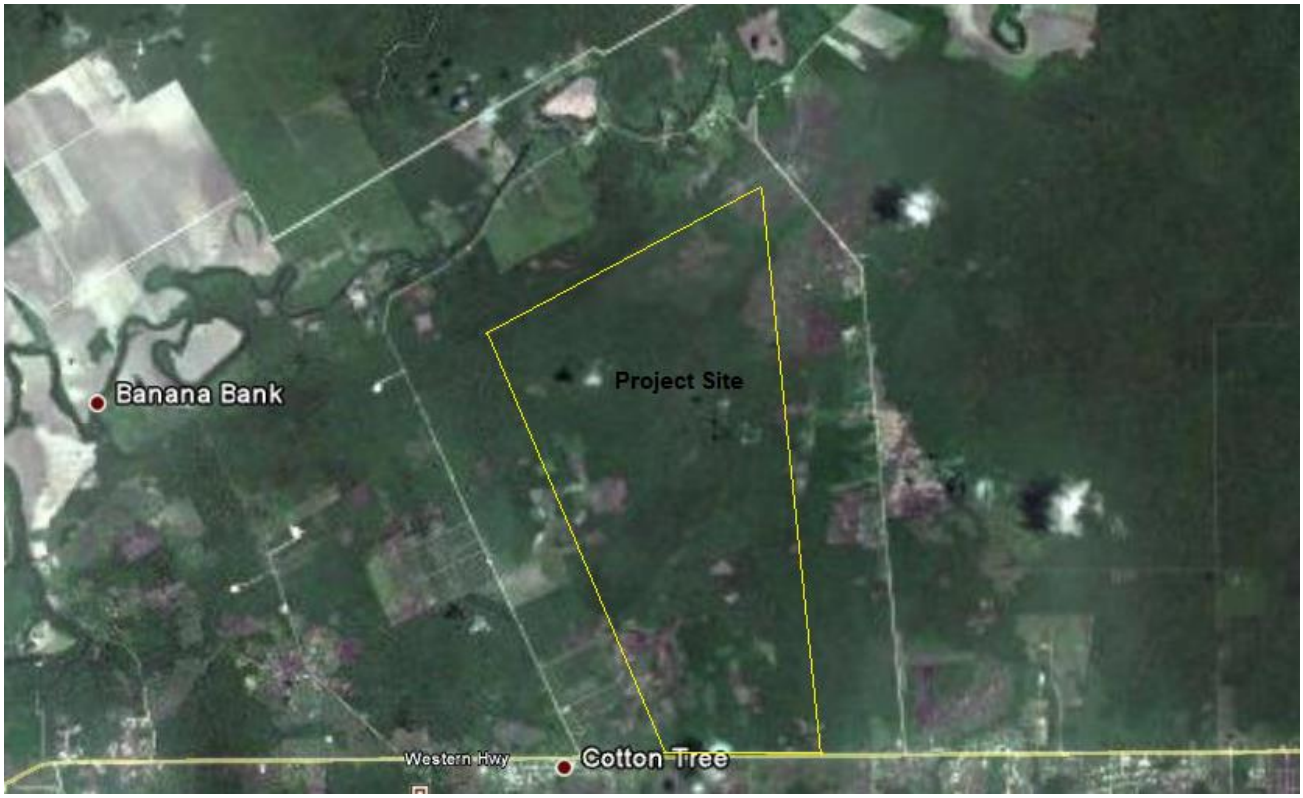
Belize Sustainable Agriculture, Ltd.
Farming Report – August 11, 2015

General Comments & Weather

This is the sixth 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 exceptionally heavy rainfall was followed by a drier period during the first week of July, with about 1" of rain. July then had heavy rains followed by a dry spell until the first week of August. This allowed significant drying of fields, to the point where there is now a need for rain! Indeed, the northern part of Belize has dried to the point where crops farmed on non-irrigated fast drying "red" soil are being lost. Fortunately, the Cayo District received some light rains during the last few days which have helped bring fields moisture back within acceptable (albeit not ideal) 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) – August Data through August 7, 2015												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
2015	**195**	**0.1**	**56**	**18**	**57**	**491**	**265**	**36**				
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 is continuing to do well in the dryer conditions of the last two week period. Visually the corn has improved immensely with 100% of the corn that can produce a cob being in full tassel at the R2 stage. There are many more plants producing cobs, albeit small, than we expected two-three weeks ago. Although these cobs will be smaller than those that tasseled early, their addition to the total kernel count is of course welcome. It is obvious from the small stature of the plant that these cobs will produce small kernels but every kernel counts!

All of the earlier saturated areas have dried out and the corn plant continues to show good color and stand strength. However, many of these plants are fairly small in diameter due to their inability to absorb nutrients during critical growth stages when younger. There are also isolated areas of pythium stem rot which will slowly suffocate the plant. Fortunately this is minimally affecting plants and should not materially change our yield projections.

On the pest front, worms have mostly lost the battle in the corn crop. During a major field survey (excerpted below) less than two percent of cobs had live worms with relatively little damage having been done in the ear itself. Spider mites have been a small issue requiring an application of abamectin. At the same time Curyom was used to catch any last active corn earworms. Curyom is an extremely effective worm treatment but has a negative side effect during dry spells; kills some beneficial insects as well.

We are now in the last key 3-4 weeks of the Corn crop before it begins to dry. The key risk factors are:

1. Adequate water for grain fill
2. Adequate sunshine (usually not an issue)
3. Adequate heat (no issue here)

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On August 7th, 48 sample areas were evaluated, comprised of 16 different samples each covering 1/1000th of an acre in each of the three corn fields, and with 180 individual ears selected and examined, with the following results:

Field Survey Summary – 20150807					
	Ears /acre (Estimate)	Kernels / Ear (Estimate)	Gross Yield (1) (Bushels/Acre)	Net Yield (1) (2) (Bushels/Acre)	Field Size (Acres)
Field 1	22,667	493	111.8	100.6	125
Field 2	21,733	573	124.6	112.1	100
Field 3	26,400	561	148.0	133.2	133
Average (Weighted)	**23,793**	**541**	**128.0**	**115.2**	**358**

(1) Assumes a Kernel Size of 100,000/bushel, which is small for the US and average for Belize for the DeKalb 7088
(2) A 10% loss has been deducted for zero yield acreage due to deep water spots, worm/mite damage, harvest loss

The above data are both highly informative and encouraging, with the following key takeaways:

1) Despite the heavy rains in June/early July, we now believe that our harvest should come in a range of 100 to 115 bushels/acre. For a first year of crop on newly cleared ground, these would be excellent results, well above our financial model forecast of 81 bushels/acre and at our optimum outcome, despite the challenging early weather.

2) Field 3, which has the best natural drainage conditions and shows the least damage due to "ponding", is indicating potential overall results that would exceed our 5 year goal of 125 bushels/acre for non-irrigated corn and be within reach of our 5 year goal for irrigated corn of 180 bushels/acre.

3) Field 3 is confirming that a target of 27,000 ears per acre is achievable, which with a 15% kernel count improvement to 650/ear and a slightly larger kernel size of 95,000/bushel would raise yields to our 180 bushel yield. Good drainage and pivot irrigation should make these wholly achievable goals.

The above Yield Estimates are still dependent on the above Risk Factors, notably adequate rain in the next few weeks!

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. It is continuing to develop normally, although with plants staying smaller than ideal due to low rainfall. This shortage is acute enough that areas where plant density is high the plants are beginning to slow their growth and weaker plants are succumbing to drought. This will certainly have a negative impact on yields. While the recent rain was helpful, it is well short of the ideal conditions for rice.

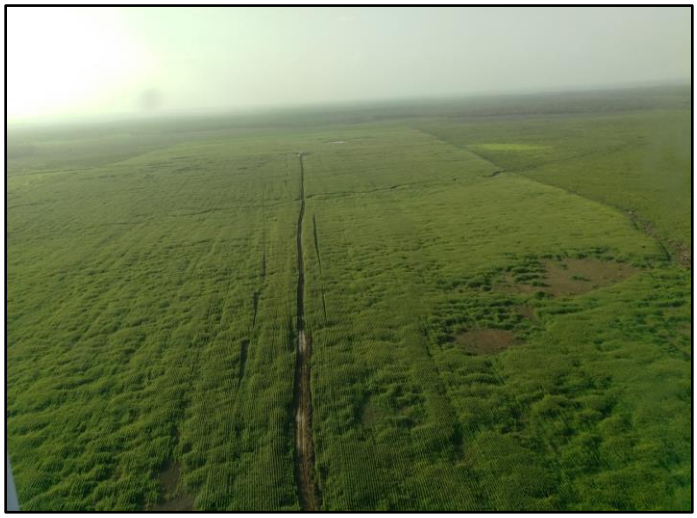
Insect pressure has been negligible and no insecticides have been applied during this period. One application of herbicide was applied for weeds and no other applications should be necessary. Grasses have not been an issue and unless this changes dramatically, no herbicides will be used for this purpose.

There are additional needs for nitrogen on the crop and these will be applied after reasonable amounts of rain have been received. Without sufficient rainfall, applying at this time would not be beneficial to the crop.

Aerial View of 500 acres: August 7, 2015

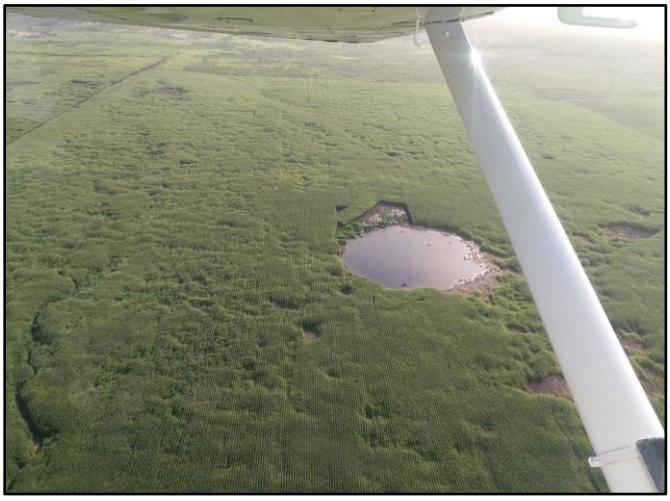
Crop developing well!

What an improvement from late June!



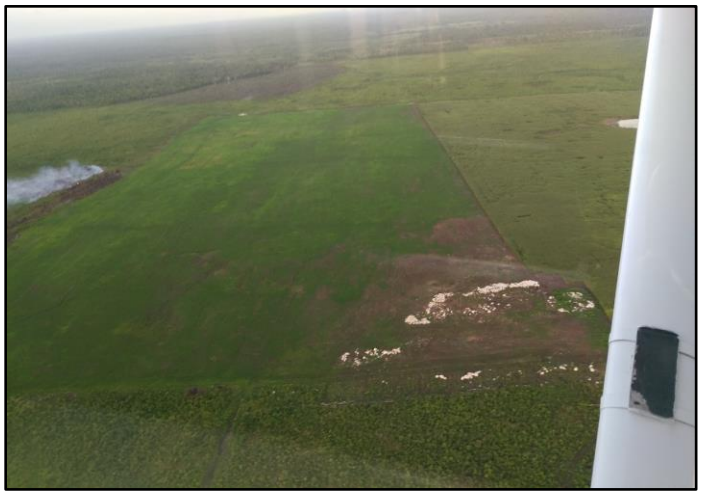
Aerial view of Fields 1 & 2: August 7, 2015

Field 2 had the heaviest ponding effects; Field 1 has a strip by the road shows benefits of ripping



View of Field 3 with its pond still full: August 7, 2015

Crop is mostly excellent - A large crocodile was reportedly seen in the pond by watchmen – No Joke!

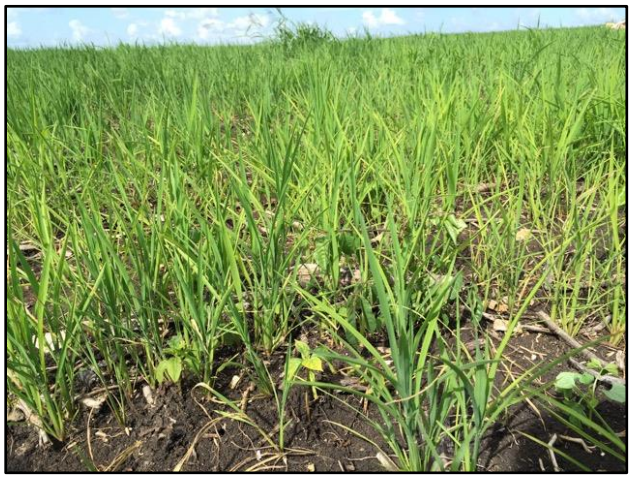


View of Fields 4 & 3: August 7, 2015

Rice developing nicely!

Well developing cobs – Day 67– August 7, 2015

Rare double cob (2% of total) – Day 67– August 7, 2015



Rice showing water stress – Field 4 Day 39– August 7, 2015

Healthy Rice - Day 39 – August 7, 2015

Market Conditions and Conclusion

There are a few changes to market conditions in the past fortnight, notably in corn, as reported below.

Corn

Belize's domestic corn market continues to be firm, with supply remaining tight. Recent transactions have been reported as high as BZD 30.00-31.00/cwt from the local co-operatives ($8.54/bushel - $336/mt), who continue to be reported as having insufficient stocks to meet local demand prior to the forthcoming harvests. It is expected that early fresh corn will fetch prices close to these levels in possibly large volumes until inventories have been rebuilt.

Two of the large corn growing areas in the northern part of Belize have been effectively wiped out due to local shortages of rain. This further portends well for corn prices as the crop failures will further exacerbate supply/demand imbalances.

Importantly, we had a successful field visit from the purchasing team of the Guatemalan subsidiary of a leading US snack/beverage company, who have expressed an interest in a multi-year supply agreement for food grade corn, and which would include a substantial portion of our current crop. We look forward to reporting on progress.

Soybeans

Soybean plantings in northern Belize are reported to have increased substantially since last year, although we have no firm data to support this. What crops we have been able to inspect aerially appear in good condition. Domestic demand remains firm with supply still well short of the domestic crush requirement, so we expect the market to remain well bid for the rest of the year. Recent prices remain steady at BZD 57.00-58.00/cwt ($17.25/bushel - $634/mt). Demand is stable and increasing with more mills coming on stream with their own crushing capability.

Edible Beans

We have had limited reports on edible beans, except that there is continued solid demand from Central American buyers.

Rice

Belize's domestic Rice market remains well underpinned as recent crop harvests have reportedly been below earlier hopes. Local wholesale prices for rough rice ("Paddy rice") at the mill 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 had preliminary discussions with a leading local Co-Operative mill that is interested in acquiring our entire crop. We would likely obtain a final price of USD 22.50-24.00/cwt, although payment would be spread over the six months or so required to mill and sell the rice. While payment terms are slow, the mill has a sterling reputation and the price is substantially higher than the CME price 0f ~ USD 11.50/cwt.

Recent improvements in weather are certainly encouraging, and 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 grows from week to week!

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
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

										Starter 2 3.5 ltr/acre K - Focus Post-Plant 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
BSA	Cayo One	2	100	N	Black	**Corn**	DK 7088 27,000/acre	05/29	06/03	Base 330 lbs/acre 13+30+13+Micros Starter 1 1 ltr/acre Algaenzyme Starter 2 3.5 ltr/acre K - Focus Post-Plant 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

										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
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

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						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			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-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: 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						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			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								

Belize Sustainable Agriculture, Ltd. Farming Report – August 11, 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			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						