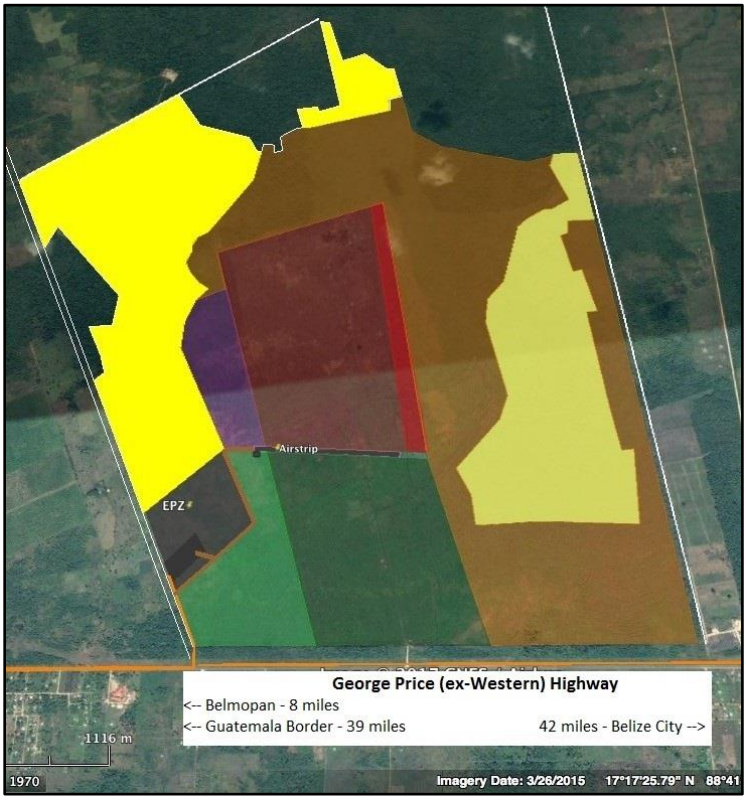
Belize Sustainable Agriculture, Ltd.
Farming Report – July 17th, 2017

This is the **Third** Farming Report for BSA's 2017 Summer (Wet) season. Its main objectives are to inform readers about BSA's farming activities by season and crop; to provide data on climactic conditions, agricultural pests, and market conditions; as well as detailed data on BSA's farming methodologies.



Field 2: Subsoiled & Leveled	106 Ha	Mix Plow / Subsoil in progress	270 Ha
Field 2: Leveled / No Subsoil	13 Ha	Windrow / Work in Progress	173 Ha
Field 2N: Plowed / Some subsoil	23 Ha	Chained – No further work	109 Ha
Field 1: Leveled / No Subsoil	79 Ha	EPZ – Total Area	24 Ha
Field 1N: Plowed & Subsoiled	36 Ha	EPZ – Finished	2 Ha

BSA is only farming at the Cayo One Estate in the Summer 2017 season; it is situated some 8 miles east of Belmopan near the village of Cotton Tree in the Cayo District, and is ~39 miles east of the Belize-Guatemala border at Melchor de Mencos.

Weather Summary: Heavy rains fell on Belize between mid-June and early July. Parts of the Cayo District received some 380 mm of rain between June 14th and July 7th. After these rains, a period of dry, breezy weather followed, which was uncharacteristic for the season. As the Inter Tropical Convergence Zone has still not formed its traditional pattern of continuous rainstorms in the 5° N - 10° N latitudes, we do not consider that it will be a useful indicator this year.

Cayo One - Belmopan Precipitation Data (mm per month) – 2017 Season YTD Data through July 17th.													
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
2016/17	295	345	96	55	74	126	10	263	164				
2000-2016	232	129	139	65	49	32	124	271	256	236	230	260	2039

You can follow Belize's weather on: http://www.hydromet.gov.bz/observations/radar/radar-images

We also use the US NOAA Hurricane Center weather radar network which monitors the Caribbean basin, and recommend:
http://www.nhc.noaa.gov/ http://www.wunderground.com/q/zmw:00000.2.WMGMM

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Cayo One: ~ 200+ Hectares (100% non-irrigated)

The exact acreage to be planted during the Summer 2017 season has still not been determined; as of July 18th, we have planted fields 1 and 2. We have another 5-7 days of work to make Field 1N ready for planting, so if the weather holds we will try and add an additional ~30 Ha to our planted area.

Weather Analysis

Total rainfall on the Cayo One property between June 14th and July 7th exceeded 380mm, some of this in heavy downpours (June 17th – 20th: 175mm; July 6th – 7th: 60mm). These patterns of rainfall appear to have been consistent throughout the Cayo District. Further north in the Orange Walk District, usually a drier part of the country, rainfall during the same period exceed 515mm! Climate patterns certainly appear to be volatile at the moment, with limited ability to rely on historical patterns…

The challenge with intensive rainfall on ground which has not been subsoiled and where drainage pipe has not been installed is that it can lead to significant erosion. We have seen this throughout Belize, and were even impacted at Cayo One, although to a lesser degree, especially where sub-soiling took place.

As aerial photographs below will show, many farmers who planted early suffered significant crop damage from the heavy June/July rains, and we are hearing that in more than a few cases farmers are choosing to replant their corn crops, assuming that they can readily access their fields.

Fortunately, after rains ended on July 7th, the Cayo District enjoyed 8 days of dry, warm and breezy weather, which allowed farmland to begin drying out. At Cayo One this opened a remarkable window of opportunity which we were able to seize.

Land Preparation

There are two components to CSA's Land Preparation activities in 2017: Land Development and Farmland Preparation.

Land Development

A detailed discussion of CSA's Land Development activities is available in the June 19th, 2017 Farming Report, which is available upon request.

As of July 18th, 2017 the status of BSA's fields is:

Field 1 (79 Ha): is planted! (July 17th – 18th)
Field 2 (120 Ha): is planted! (July 15th – 17th), and the first corn is already emerging!
Field 1 N (33 Ha): needs 5-7 more days of work, and should be ready to plant by July 28th if the current mostly dry and warm weather holds.

Our target is to do everything possible to plant Field 1N now that Fields 1 & 2 are planted. We expect to finish the major "stick picking" by July 21st, and are doing as much land refinement as possible behind our "stick picking crews". We will need an additional week of "dryish" weather to finish land refinement.

We will have an interesting ability to compare the impact of subsoiling, as a small section of Field 2 (13 Ha) was not subsoiled, and Field 1 will not be subsoiled whereas Field 1N has been subsoiled.

Seed Selection, Planting, and Crop Development

Acreages planted so far are:

- Syngenta Impacto – 195 Ha / 482 acres (Field 2 and most of Field 1) @ ~70,000 seeds/Ha or ~28,340 seeds/acre
- Pioneer 4226 – 4 Ha / 10 acres (a small part of Field 1) @ ~70,000 seeds/Ha or ~28,340 seeds/acre

A detailed discussion of these two non-GMO hybrids is in the June 19th, 2017 Farming Report, which is available upon request.

CSA's Chairman & CEO writes: Napoleon Bonaparte is reputed to have said "I don't want Good Generals, I want Lucky Generals!" CSA appears to have managers who have both of those qualities. In our Second Farming Report we explained how after the extensive land preparation work carried out at Cayo One in April through June 2017, including considerable subsoiling and levelling, Abram Dyck and John Peters felt that we should hold off planting in early/mid-June until soil conditions were more propitious. Then followed the heavy rains of June 17th through July 7th, which led us to explain in the Second Farming Report that we would need 10-15 days of dry weather to be able to consider planting. Starting in the afternoon of July 7th the sun came out and warm breezy conditions prevailed for the next eight days; by July 13th Field 2, which has been sub-soiled, was ready for re-harrowing and planting began during the afternoon of July 15th, finishing by the afternoon of July 17th (with considerable late-night work as seen on the pictures below). Re-harrowing of Field 1, which has not yet been subsoiled and was consequently wetter, began on July 16th along with additional cultivation on July 18th. By the end of July 18th Field 1 was planted. As seen below, Field 2 seeds were emerging by July 19th and indicate promising vigor.

We are at the very beginning of the corn crop cycle, but it is already clear that the land preparation work done at Cayo One, combined with Abram's and John's judicious timing (and good luck!) have given us the best starting point for this crop that we could have hoped for, especially in a growing season that is already so challenging for many Belize farmers.

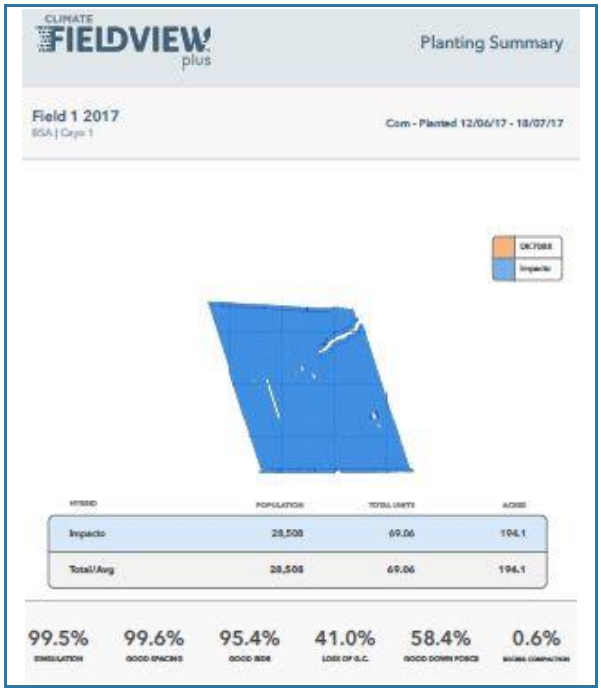
Planting Analytics

We use a 16 row (40' / 12m) John Deere Planter, supported by Seed Sense FieldView™ software. The latter gives us the important ability to measure analytic data from our seeding. This in turn can help us to make any immediate adjustments to our planter to optimize seeding as well as better understand where we will need to focus particular attention during land preparation activities ahead of the next crop. While the latter is part of a long-term effort to improve our fields, these are necessary steps if we wish to achieve our long term yield objectives. Some of the Key observed metrics:

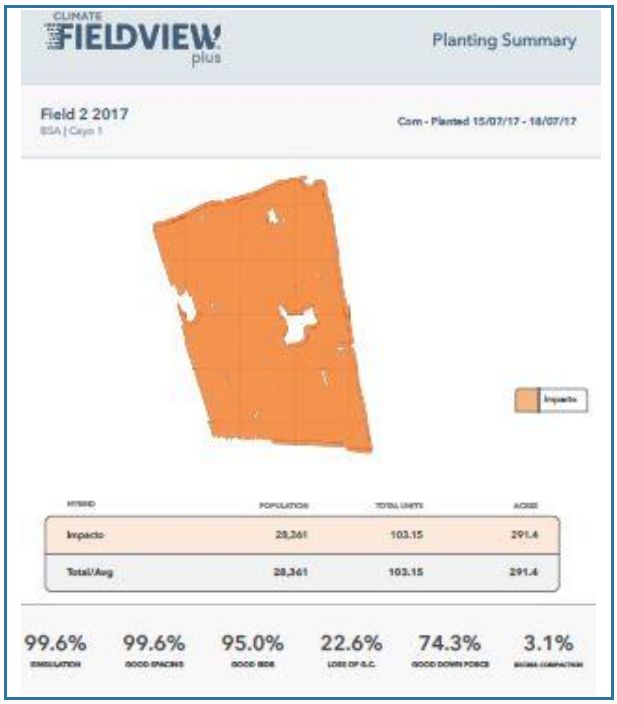
	Field 1	Field 2	Comment
Singulation	99.5%	99.6 %	Virtually every seed went through the planter properly
Good Spacing	99.6%	99.6%	Seeds are evenly spaced throughout the rows
Good Ride	95.4%	99.5%	Planter remained in contact with soil at all times (almost!)
Good Down Force	58.4%	74.3%	Some issues with force sensor were detected on planter; no spares available in Belize! Extensive manual checks confirmed planting depths were consistently good!!
Excess Compaction	0.6%	3.1%	Seed was planted into ideally loose soil

In theory, if we have 99.5% singulation and, say, 98% germination, assuming a planting rate of 70,000 seeds per Ha, we should have ~68,000 corn plants per Ha. These are the first important steps towards generating targeted yields. After that come the vital steps that determine "how may ears of corn do we get and how much corn does each ear generate". The next 60-90 days will see these key issues progress and be (mostly) fixed.

FIELD 1



FIELD 2



Note: White areas are where the planter did not plant, typically due to rocks, water holes, or other obstructions

Fertilizer Program

BSA has set a business goal of a weighted average yield of 7 mt/Ha (112 bushels/acre) for its Summer 2017 corn crop.

However, CSA has planned to fertilize for a 9.4 mt/Ha (150 bushel/acre) yield, assuming a minimum fertilization rate of 110% of maintenance levels (the level at which the crop neither adds nor depletes to the soil's fertility).

A detailed discussion of our fertilizer program is in the June 19th, 2017 Farming Report, which is available upon request. A summary table below provides an overview of this program.

Fertilizer Application (lbs./acre)	N	P	K
Base	44	110	78
Liquid (fast uptake)	11	7	3
Urea	152	0	0
Foliar	0	0	0
Total	**207**	**117**	**81**
150 Bushels/Acre Maintenance (lbs./acre):	*188*	*66*	*42*
Fertilizer Build / Draw (lbs./acre):	19	51	39
110% Fertilization requirement surplus:	0	44	34

We expect make our first aerial application of Urea (and any other necessary nutritional elements) on or about August 4th.

It is noteworthy that, based on our recent aerial application of Glyphosate (aka Roundup) using the crop-duster that is now based at Cayo One (see pictures below), our agri-chemical aerial spraying costs are slightly less than USD 2.00/acre. This remarkably affordable cost is achieved because the crop duster loses no time ferrying from a home base to a local airstrip from which it flies in product. We look forward to also achieving highly competitive aerial application costs for our fertilizer applications.

Insects

We will remain extremely vigilant for insect activity throughout this season, and we will perform daily crop inspections to monitor for all forms of insects. As we reported in our previous report, Belizean farmers who planted early indicate strong worm activity this year, as well as resistance to the better-known insecticides. We are addressing this risk in a two-fold manner:

- Seed Treatment using Syngenta's Fortenza®, which has proven to be the most effective seed treatment for worm control used in the region (see picture below)

- Field Spraying with Coragen®. We are delighted to report that, thanks to the strong support of Belize's Minister of Agriculture, Belize's Pesticide Control Board issued us a Minor Use Permit to import Coragen®, which is the only insecticide that is reported to be effective in the region this year against various species of *Noctuidae* (worms). We will begin spraying our corn crop during the first week of August.

Once again, the presence of an on-site crop duster should give us a strong capability to rapidly address any detected insect issues.

Funguses and Bacteria

We have developed a fungus/bacteria management program which uses Syngenta's Amistar® in an initial prophylactic application, with a second application based on applied on climatic conditions and crop development.

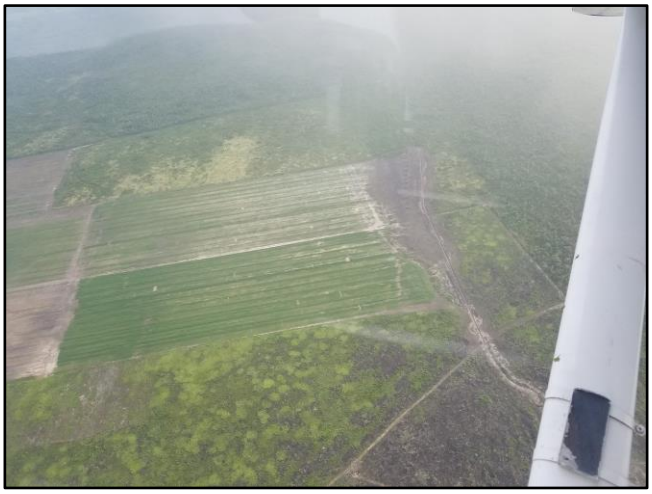
Weeds

We sprayed our fields with glyphosate on July 1st, which, along with land cultivation and harrowing, left our fields in a substantially clean condition for planting. We expect to aerially apply Syngenta's Calaris® in the closing days of July depending on crop and weed development.

Harvest

We are tentatively scheduling our harvest to begin during the week of November 27th, although this target date is likely to change during the course of the crop cycle as we see how our corn matures.

Stop Press: As this Report is about to be dispatched on the morning of July 20th, we can add that a nearly ideal 20 mm / 0.75" of rain fell on Cayo One during the night of July 19th / 20th bringing just the right amount of additional moisture onto our newly planted fields. The 10 day forecast is for partly sunny, warm weather with periodic scattered thundershowers. Let's hope that Lady Luck continues to smile at us…



Western Cayo District fields July 12, 2017
Poor stands or failed fields due to heavy June/July rains

Spanish Lookout west of Cayo One – July 12, 2017
Poor stands or failed fields due to heavy June/July rains

Pioneer 4226 In Terra Test – July 15, 2017
Strong vigor at Day 12 – very encouraging!

Coating Seeds – July 15, 2017
Key treatment being applied just hours before planter is loaded!

Cayo One Field2 – July 15, 2017
Field 2: Finishing harrowing East side as we plant West side

Field 2 West Side: Planter preparing to start – July 15, 2017
Field 2 is ready earlier than expected, but we're all set to go!

Cayo One Field 2: Planter at work – July 16, 2017
Outriders keeping watch for rocks, sticks, and clogging

Cayo One Field 2: Planter at work – July 16, 2017
Tempo is picking up as ground continues to dry

Cayo One Field 2 – Jul 16, 2017
Working into the night as long as ground is dry enough!

Cayo One Field 1 almost ready to Harrow – Jul 15, 2017
The field dries out just in time and is ready to plant by July 17

Field 2 Day 3 – July 18, 2017
The first corn sprouts emerge late in the afternoon of Day 3!

Field 2 Day 3 – July 18, 2017
A few hours later, a row becomes visible just before sunset

Field 2 Day 4 – July 19, 2017
Corn is emerging uniformly across the fields

Field 2 Day 4 – July 19, 2017
Note slower emergence under track path – compaction matters!

Field 1N – July 19, 2017
Planting Fields 1 & 2 is done: we move to Field 1N

Field 1N – July 19, 2017
View from Cab – Note on left how cultivation refines soil!

Cayo One Base Station – July 19, 2017
Crop Duster, Fertilizer loader, and Agri-chemical Mixing unit

Air Tractor 402 – July 19, 2017
Reliable on-site workhorse provides fast & economical service!

Market Conditions and Conclusion

Corn

Global prices have continued to trade steady to slightly firmer, with Gulf Ports prices averaging ~$160/mt for US #2 Feed Grade corn. This equates to ~$200/mt FOB Puerto Quetzal (Guatemala) and $260/mt CIF Melchor (Belize-Guatemala border crossing). The breakeven duty paid CIF price delivered in Belize would be ~$380/mt, or BZD 34.00/cwt

Domestic Belize prices continue to remain steady at recently lower levels, with prices trading in the $265-$285/mt range (BZD 24-26.00/cwt), with reported demand at the lower end of this range from Guatemalan buyers. Even Feed Grade Belizean corn appears to attract a quality premium from regional buyers!

We continue to expect that the challenging start to the 2017 Summer Season will likely mean that Belize's domestic production will fall well short of its estimated 2013 peak of 65,000 mt, and will likely not even achieve the estimated 2015 production level of 50,000 mt. We will continue to use ad-hoc aerial inspections to gauge the quantity and quality of Belize's corn plantings.

Edible Beans

Global prices for black beans continue to trade steady to slightly firmer, with black beans trading at ~$800/mt FOB US and Chinese dealers and Mexican CIF prices considerably higher at ~$1,100/mt.

Belize's small 2016/17 black bean crop sold out quickly at historically attractive prices of $1,000+/mt FOB. Belize still has a modest supply of light red kidney beans currently offered at ~$1,050/mt FOB Belize.

Soybeans

Global prices continue their recent modestly firmer trends, with Gulf Ports prices averaging ~$375/mt, which equates to ~$415/mt FOB Puerto Quetzal and $475/mt CIF Melchor border crossing. The breakeven duty paid CIF price (Belize delivery) would be ~$680/mt, or BZD 62.00/cwt

Domestic Belize prices have remained steady for an extended period of time, with Grade #1 soy bean prices being quoted in the $560-$580/mt range (BZD 50-52.00/cwt), although there is no activity.

Lady Luck gave us a brief smile and we were ready! We're excited by how quickly and well our corn seeds got into the ground. There's a lot of work ahead, but we are confident that, if we can avoid weather extremes over the next few months, the 2017 crop will set yield and quality records for CSA.

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

Grower	Location	Field #	Ha/ Acres	Irr ?	Soil Type	Crop	Seed Variety (count/Ha) (count/acre)	Plant Date	Stand Date	Fertilizer Program *(For full details of applications, refer to Lot Records)*	Comments
BSA	Cayo One	1	79/ 195	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	July 17-18	TBD	Base 12-24-12 330lbs/acre 0-46-0 85lbs/acre 0-0-60 68lbs/acre	Near ideal seedbed and planting conditions
BSA	Cayo One	1a	4/ 10	N	Black	Corn (Yellow)	Pioneer 4226 70,000 28,340	July 18	TBD	Base 11.1-28.6-20.2 385lbs/acre	Western side of Field 1. Near ideal seedbed and planting conditions
BSA	Cayo One	1N	34/ 83	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	TBD	TBD	Base 11.1-28.6-20.2 385lbs/acre	Hoping to plant towards end of July
BSA	Cayo One	2	115/ 289	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	July 15-17	TBD	Base 11.1-28.6-20.2 385lbs/acre	Near ideal seedbed and planting conditions. Uniform emergence within 60-72 hours of planting

Lot Records for Fields 1 and 2 (Zoom in to see details)

A new Lot Record is in development and will be provided in following reports