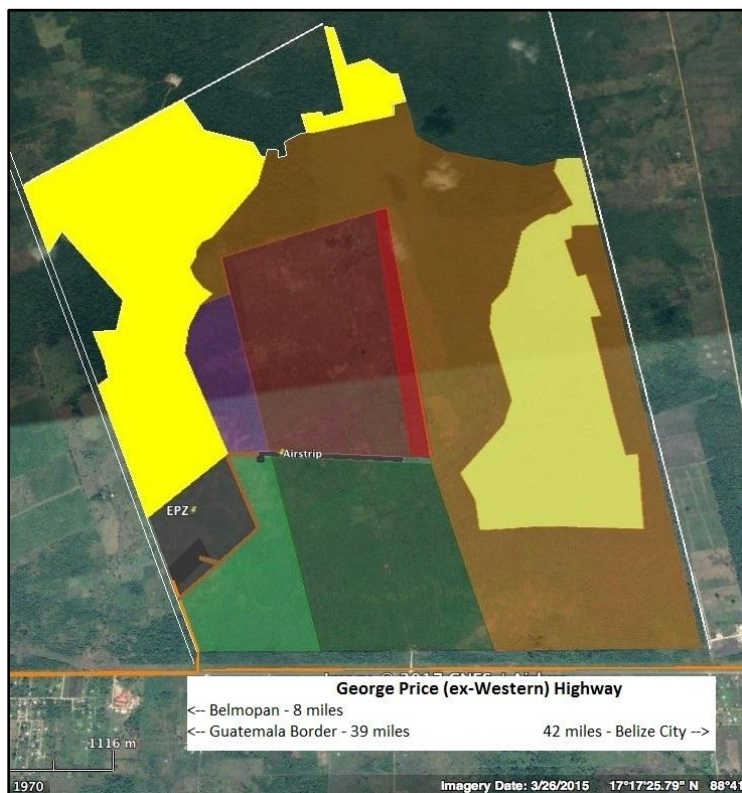


Belize Sustainable Agriculture, Ltd. Farming Report – August 14th, 2017

This is the **Fifth** 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: Belize's Cayo District continued to experience fairly "normal" rainfall during the first half of August, and continues to track quite close to its long term average. Franklin, the first Hurricane of the season, came somewhat close to Belize, as then Tropical Storm Franklin made landfall on Mexico's Yucatan Peninsula, about 100 km north of the Belize border.

Cayo One - Belmopan Precipitation Data (mm per month) – 2017 Season YTD Data through August 15 th .													
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
2016/17	295	345	96	55	74	126	10	263	237	120			
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/>
<https://www.wunderground.com/q/zmw:00000.1.WMGMM>

Belize Sustainable Agriculture, Ltd. Farming Report – August 14th, 2017

Cayo One: ~ 201 Hectares (100% non-irrigated)

The exact acreage to be planted during the Summer 2017 season has now been determined. The persistent rainfall in the first half of August made it impossible to finish preparing Field 1N, and we reached the cut-off date for any additional planting on August 15th. So, we regrettably decided not to attempt to plant 1N in the Summer 2017 season.

Weather Analysis

Rainfall patterns on the Cayo One property in the first half of August were (surprisingly!) consistent. 120mm of rain at the mid-month is entirely in line with long term averages. Given the fairly wet conditions in late July, the Cayo One property is now on the wet side of ideal. Assuming that in the weeks ahead that weather patterns follow long term historical trends and we see some dry patches, we will continue with near ideal weather conditions.

Hurricane Franklin, which began as Tropical Storm Franklin, formed in the western Caribbean in the early days of August and for a brief moment looked as if it might threaten northern Belize. The storm headed WNW and made landfall 100km north of Belize on Mexico's Yucatan peninsula. After crossing the Yucatan, it gathered strength and made landfall on Mexico's eastern shores as a Category One Hurricane. There is more regular tropical wave activity but nothing which is currently a major threat to Belize (that could, of course, change in the days ahead).

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 August 14th, 2017 the status of BSA's fields is:

Field 1 (79 Ha): was planted July 17th – 18th

Field 2 (122 Ha): was planted July 15th – 17th

Field 1 N (33 Ha): Not planted – almost ready; will require only a few days of work to prepare for next season.

We hope to 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 was not subsoiled.

Seed Selection, Planting, and Crop Development

Seed Selection

Acreages planted so far are:

- Syngenta Impacto – 197 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

Belize Sustainable Agriculture, Ltd. Farming Report – August 14th, 2017

Both plant varieties have performed very well in terms of germination and early vigor, although we have begun to notice less regularity in the growth of the Pioneer seed, and a slightly paler color. Beyond these two points, it is still early in the cycle for additional observations.

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

Planting Analytics

Planting Analytics were generally very encouraging, and the data obtained from our Seed Sense FieldView™ software has been very edifying. Singulation, spacing, and ride were all at >99%, and compaction very slight, averaging <2%. The information gleaned will help us further improve our planting next season.

A detailed report on Planting Analytics, with excerpts of computer printouts from our Seed Sense planting software, was provided in the July 17th Farming Report which is available upon request.

Crop Development

We now in the V6 to V8 stages, which typically begin three to four weeks after the plant emerges.

At V-6 to V-7, the root system is well-distributed in the soil and extends about 18 inches in depth and 24 inches in radius. The third root whorl is elongating. The plant is absorbing greater amounts of nutrients, so fertilizer applications in amounts adequate to replace soil needs are beneficial at this time. The growing point is above the soil surface and rapid stem elongation begins. Some tillers (suckers) may have initiated.

At V-7 to V-8 Macronutrient and micronutrient deficiencies can appear at this time. Foliar applications may correct some soil deficiencies, especially if applied before the symptoms. Nutrient deficiencies at this stage seriously restrict leaf growth (not an issue at Cayo One!) Flooding at this or any earlier stage when the growing point is below ground can kill the corn plants in a few days, especially if temperatures are high. Flooding at later stages, with the growing point above the soil surface, is not as detrimental (this can be a real problem in poorly drained Belize farmland!)

Fertilizer Program

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

However, CSA is fertilizing 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).

As discussed in the July 31st Farming Report, we are leveraging our access to low cost aerial applications to increase the number of aerial fertilizer applications. On August 10th we applied ~ 80 kg / Ha (~70lb / acre) of Urea (40-0-0-5.6S), to which our corn reacted very favorably.

We are working on fine tuning our technique in this area, but we already have a 500-acre fertilizer application down to less than three hours' time and costing just under \$5.00/acre.

We firmly believe that more frequent fertilizer applications, which can be flexibly programed to allow for weather conditions, will allow (dearly purchased) nutrients to be made available more effectively to our crops.

Belize Sustainable Agriculture, Ltd. Farming Report – August 14th, 2017

The 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
<i>150 Bushels/Acre Maintenance (lbs./acre):</i>	<i>188</i>	<i>66</i>	<i>42</i>
<i>Fertilizer Build / Draw (lbs./acre):</i>	<i>19</i>	<i>51</i>	<i>39</i>
<i>110% Fertilization requirement surplus:</i>	<i>0</i>	<i>44</i>	<i>34</i>

The June 19th, 2017 Farming Report has a detailed discussion of our fertilizer program; it is available upon request.

Insects

As we reported on July 31st, we have seen clear evidence of significant worm activity this year. The reports we had received from other farmers who had planted much earlier, have been unquestionably confirmed.

Our initial prophylactic step, which involved treating our corn seed with Syngenta's Fortenza®, proved highly efficacious going into the first week of August. We then applied DuPont Coragen® as a subsequent insecticide. We would describe the results as "good/very good", but perhaps not the "overwhelming" for which we had (somewhat unreasonably?) geared ourselves. There is only minor episodic evidence of worm damage to our corn, and many worms we found looked like they had died in the course of eating.

However, we will continue to monitor this situation closely, and if necessary we will re-apply Coragen® in the coming in mid-September if we see evidence of worm damage.

Funguses and Bacteria

There is no planned change to our fungus/bacteria management program, which will use Syngenta's Amistar® in an initial prophylactic application, with a second application based on subsequent climatic conditions and crop development. Our first Amistar® application is a function of weather, local conditions, and plant development. Our current estimate continues to be that it will occur during the first half of September.

Weeds

We sprayed our fields with glyphosate on July 1st, which, along with land cultivation and harrowing, had left our fields in a substantially clean condition for planting. We then aerially applied Syngenta's Calaris® on July 31st when most of our corn was at the V-3 stage and spraying conditions were near ideal. So far we are very pleased with weed control this year, but will continue to closely monitor weed development.

Harvest

We continue to tentatively schedule 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.

Belize Sustainable Agriculture, Ltd.
Farming Report – August 14th, 2017



Cayo One Field 2 Day 23 Corn at V-6 to V-7 – Aug 9, 2017
Vigorous Healthy Corn growing well on subsoiled ground



Cayo One Field 1 Day 21 Corn at V-5 – Aug 9, 2017
Growing well but less vigorously than Field 2: Drainage matters!



Cayo One Field 2 Day 29: Vigorous Growth – Aug 16, 2017
Look to right – what a difference 12 days + Urea make!



Cayo One Field 2 Day 17 – Aug 4, 2017
Look left: This corn is raring to go with sunshine and fertilizer!



Cayo One Field 1 Day 27: Making progress too – Aug 16, 2017
Steady Growth and progress in 12 days – look to right!



Cayo One Field 1 Day 15 – Aug 4, 2017
Look left: This corn just wants sunshine and fertilizer too!

Belize Sustainable Agriculture, Ltd.
Farming Report – August 14th, 2017



Cayo One Field 2 Day 23: – Aug 9, 2017
Healthy plants with little or no weeds



Cayo One Field 2 Day 23: Worm! – Aug 9, 2017
Daily field monitoring – so far worms are under control



Cayo One Field 2 Day 27: Aug 14, 2017
Very wet – thank goodness for subsoiling!



Cayo One Field 1 Day 25 – Aug 14, 2017
Very wet – non-susboiled ground has less absorptive capacity!



Field 1N Day 27: Very Wet – Aug 14, 2017
Unable to get Field 1N Ready by Aug 15 planting cutoff date



Field 1 Day 19: Franklin rain – Aug 8, 2017
Thankfully the storm went north and only left 20mm of rain

Belize Sustainable Agriculture, Ltd.
Farming Report – August 14th, 2017



Fertilizer Aerial Application: Truck Loading – Aug 10, 2017
1.05 mt (2,300 lb) per load: 23 heavy bags to load into hopper



Fertilizer Aerial Application: Loading Air Tractor – Aug 10, '17
Goal is to transfer fertilizer as quickly as possible!



Fertilizer Aerial Application: Loading Air Tractor – Aug 10, '17
Time is of the essence: each minute costs \$15.00!



Fertilizer Aerial Application: Air Tractor ready! – Aug 10, '17
Each cycle fertilizes about 12 Ha (30 Acres) in 7.5 minutes



Fertilizer Aerial Application: Air Tractor at work – Aug 10, '17
Note Altitude compared with Spraying Insecticide at right



Insecticide Aerial Application – Aug 4, 2017
Note lower altitude required: thankfully no trees or poles around

**Belize Sustainable Agriculture, Ltd.
Farming Report – August 14th, 2017**

Market Conditions and Conclusion

Corn

Global prices have continued to trade sideways, with Gulf Ports prices averaging ~\$152/mt for US #2 Feed Grade corn. This equates to ~\$192/mt FOB Puerto Quetzal (Guatemala) and \$255/mt CIF Melchor (Belize-Guatemala border crossing). The breakeven duty paid CIF price delivered in Belize would be ~\$371/mt, or BZD 33.65/cwt

Domestic Belize prices continue to remain steady at lower levels, with prices still trading in the \$265-\$285/mt range (BZD 24-26.00/cwt).

We continue to see (from the air) a wide dispersion of field quality throughout the country, with a significant percentage of fields having failed completely, and another portion of poor quality. Thanks to the substantial increase in domestic corn acreage in the last few years, it is possible that Belize will achieve its 2015 production level of 50,000 mt, although results will vary widely farmer by farmer. As a reminder, almost all Belize corn production is expected to be Feed Grade and unsuitable for use by regional food manufacturing companies.

Edible Beans

Global prices for black beans continue to trade steady at slightly firmer prices, with black beans trading at ~\$850/mt FOB US and Chinese dealers and Mexican CIF prices considerably higher at ~\$1,150/mt.

Belize still has a modest supply of light red kidney beans currently offered at ~\$1,050/mt FOB Belize.

Soybeans

Global prices traded sideways, with Gulf Ports prices inching up to ~\$369/mt, which equates to ~\$409/mt FOB Puerto Quetzal and \$469/mt CIF Melchor border crossing. The breakeven duty paid CIF price (Belize delivery) would be ~\$670/mt, or BZD 61.50/cwt

Domestic Belize prices continue to remain steady, as they have 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.

Well the Fates decided to send us a little warning, with Hurricane Franklin coming within 150 miles of Cayo One. We are now in the Hurricane Season and can expect regular “scares” as cyclone activity picks up. Statistics are on our side, but as a famous British politician was reported to have said long ago: “There are Lies! There Damn’d Lies!! and then there are Statistics!!!”

In the meanwhile, we remain encouraged by the appearance of our crop and remain extremely vigilant to rapidly and effectively address pest and weed issues. We are now at week 5 of an 18 week crop cycle so we are entering the long main stretch of plant development, ear formation, and ear filling.

In the meanwhile, we continue to do everything possible to ensure the crop’s success, and hope that Lady Luck will still occasionally smile at us...

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

Belize Sustainable Agriculture, Ltd. Farming Report – August 14th, 2017

Grower	Location	Field #	Ha/ Acres	Irr ?	Soil Type	Crop	Seed Variety (count/Ha) (count/acre)	Plant Date	Stand Date	Fertilizer Program <i>(For full details of applications, refer to Lot Records)</i>	Comments
BSA	Cayo One	1	75/ 185	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	July 17-18	July 20	Base 12-24-12 <u>330lbs/acre</u> 0-46-0 <u>85lbs/acre</u> 0-0-60 <u>68lbs/acre</u> 40-0-0-5.6 (S) <u>100lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u>	Near ideal seedbed and planting conditions. Stand emerged and established by July 20. Stand is Uniform and Vigorous at Day 11 – July 31 V-6 to V-7 and healthy although slight signs of water stress – Aug 14
BSA	Cayo One	1a	4/ 10	N	Black	Corn (Yellow)	Pioneer 4226 70,000 28,340	July 18	July 20	Base 11.1-28.6-20.2 <u>385lbs/acre</u> 40-0-0-5.6 (S) <u>100lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u>	Western side of Field 1. Near ideal seedbed and planting conditions. Stand emerged and established by July 20. Stand is Uniform and Vigorous at Day 11 – July 31 V6 to V7 and healthy although slight signs of water stress – Aug 14
BSA	Cayo One	1N	34/ 83	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	TBD	TBD	Base	Decision to Plant must be made by August 12 th . Field will not be planted. Ground too wet at cut-off date.

Belize Sustainable Agriculture, Ltd. Farming Report – August 14th, 2017

BSA	Cayo One	2	122/ 301	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	July 15-17	July 18	Base 11.1-28.6-20.2 <u>385lbs/acre</u> 40-0-0-5.6 (S) <u>100lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u>	Near ideal seedbed and planting conditions. Uniform emergence within 60-72 hours of planting Stand emerged and established by July 18. Stand is Uniform and Vigorous at Day 13 – July 31 V8 and healthy across the field with little to no signs of water stress – Aug 14
-----	----------	---	-------------	---	-------	------------------	-----------------------------------------	---------------	---------	-----------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Belize Sustainable Agriculture, Ltd. Farming Report – August 14th, 2017

[Lot Records for Fields 1 and 2 \(Zoom in to see details\)](#)

A new Lot Record is (still!) in development and will be provided in following reports