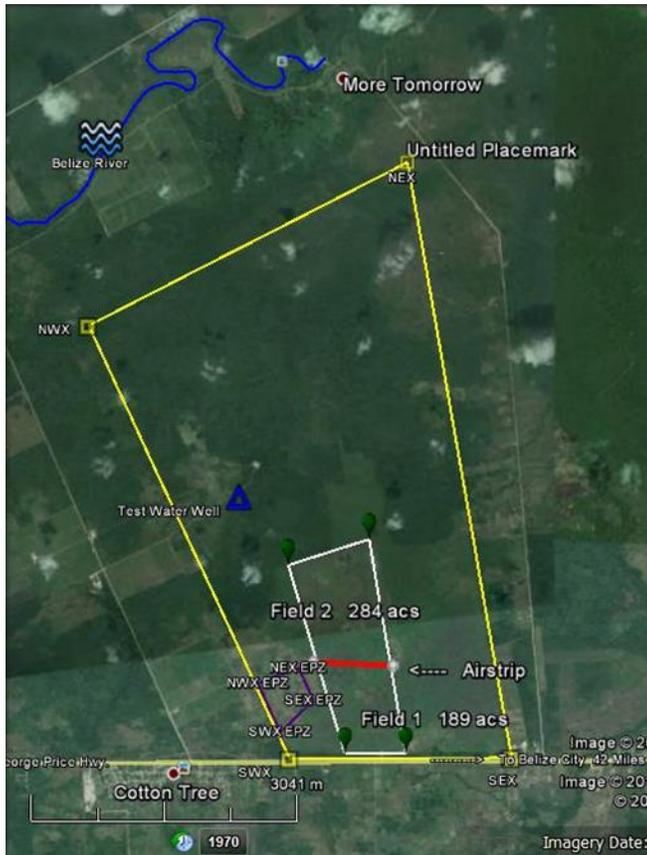


Belize Sustainable Agriculture, Ltd. Farming Report – May 17, 2016

General Comments & Weather



This is the second fortnightly Farming Report for BSA’s 2016 Summer (Wet) Season, whose main objectives are:

- Inform readers as to BSA’s farming activities by season, farm, and crop;
- Provide relevant data on climatic conditions and agricultural pests affecting BSA’s crops;
- Inform readers on domestic/regional market conditions for BSA’s crops.

BSA is only farming at the Cayo One Estate in the Summer 2016 season; it is 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 some 38 miles east of the Belize-Guatemala border at Melchor.

May 2016 saw the seasonal dry period finally return! 2016 began with a dry January, which gave early hopes that the ground at Cayo One could begin to recover from the desperately wet 2015, then significant rains returned in February. So it wasn’t until late March 2016 that the ground was dry enough to commence land preparation for the summer 2016 farming season. And it was only in late April that the ground at Cayo One became dry enough to resume land clearing operations. We are hoping for more “normal” weather patterns this season, so that Cayo One has the opportunity to demonstrate its true potential. May 2016 experienced only two days of showers and has otherwise been sunny and hot.

Belmopan Precipitation Data (mm per month) - May Data through May 15 th												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	105	282	30	66	71							
2000-2015	141	51	50	30	127	261	261	228	230	269	232	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>

Belize Sustainable Agriculture, Ltd.
Farming Report – May 17, 2016

Cayo One ~ 473 acres (100% non-irrigated)

Farm Operations

Land Preparations

Preparations for the 2016 farming season continue in earnest at Cayo One. We are entering the final stretch of land preparations, with Fields 1 (189 acres) and 2 (284 acres) having undergone the following (the fields are delineated in the map above):

1. Ploughing: Late March/mid-April
2. Disking: Late April/early May
3. Raking: Early/Mid-May, using a harrow and a mechanical root rake
4. Planing/Levelling: Mid-May, using a locally manufactured apparatus
5. Disking (Extra): Mid-May – only planned for Field 1 where there was heavy rutting

The following is planned for the next fortnight:

6. Fertilizer Spreading: Mid-May (See details below)
7. Disking (2): Mid/Late May
8. Harrowing: Late May

The Raking requirement was due to heavy weed build-up during the Winter 2015/2016 as there was no crop planted during that season owing to extremely heavy rains in late 2015. In future years, more aggressive weed management (via aerial spraying) will be required if no crop is planted due to extreme weather.

The Extra Disking requirement was due to the heavy rutting in parts of Field 1 due to the excessive rains in the last days of the 2015 Harvest. The only way to mitigate this would be to harvest in late August (a historically drier period) which will only be possible once irrigation has been installed.

The Land/Planing/Levelling work should begin to improve surface drainage at Cayo One, and some of the excess topsoil from the new land strip was available to fill some irregular areas (although not the large hole in the eastern section of Field 2). Additional work of this nature will be carried out prior to each crop over the next several years.

Our ability to complete the remaining land preparations is, of course, subject to weather. Currently tropical activity in the Caribbean basin does not yet indicate the arrival of seasonal rains, so we hope to have a clear fortnight to complete land preparations and be ready to plant at the end of May.

Work has also begun on the airstrip at Cayo One. This is planned on eventually being a 3,000 foot tarmacked strip (Runways 10/28), 40 feet wide, with an additional 40 feet safety zone on either side of the strip. For 2016 the width will be limited to 20 feet of all-weather surface, and the strip will only be usable for crop-dusting activities. There is a considerable amount of administrative and security work required to register an airstrip for civil aviation use, which is understandable given regional concerns about narco-trafficking. However, this on farm crop-dusting strip should

Belize Sustainable Agriculture, Ltd. Farming Report – May 17, 2016

substantially pay for itself in 2016 through savings in ferrying crop dusters back and forth from the local airfield (compared with our 2015 costs). We estimate that aerial crop dusting costs will drop to ~ USD 3.95/acre for fertilizer (-45%) and ~ USD 3.20/acre for pesticides (-25%). See the map above and the photographs below for reference.

Seed Selection

BSA has chosen to plant most of its acreage in one seed variety, with the balance allocated to three trials:

- **407 acres (Part of Field 1 and all of Field 2): DeKalb 7088 @ 27,000 seeds/acre**

This is an excellent wet season selection due to its closed ear and tendency to droop upon drying down. This is important if too much rain arrives after senescence the water gets into the cob and germination of the corn at the tip begins. This variety has a highly crystalline grain structure and is sought after by the snack food industry. It also makes an above average candidate for processing into grits and other cereal products.

- **22 acres (Part of Field 1): Pioneer P4226 @ 27,000 seeds/acre**

This is a high yielding open ear variety which has long been a major Pioneer variety for Central America and the Caribbean; it performs better than most corn varieties in many weather conditions. It is also sought after by the lucrative snack food market. Unfortunately, its least likable attribute is its open ear, which is vulnerable to post senescence heavy rains, which can happen frequently in Belize during the late summer/early autumn .

- **22 acres (Part of Field 1): Dow 3383 @ 27,000 seeds/acre**

This is a crystalline variety that is both reasonably fungus resistant as well as drought tolerant. It has rather small kernels compared to the ASG R9000 and is considered a closed variety meaning the husks onto cob will extend past the end of the cob and not allow entry of water. The cob will also droop as it begins its senescence. This variety should compete very well with the Pioneer P4226 variety and has many similar attributes with the exception of being closed (which is good in the wet/summer season!) It has a very deep yellow color.

- **22 acres (Part of Field 1): American Seed & Genetics R9000 @ 27,000 seeds/acre**

This is a newcomer to Belize and has only been trialed twice in the country; once with excellent results and once with terrible results. This seed was developed in Chiapas, Mexico where it has done very well. This variety grows very tall, has a slender but strong stalk, and a large grain. Ideally this corn should be grown under irrigation as it is not very drought tolerant, hence the trial taking place during Belize's wet season. BSA is interested in growing this variety as yield potential is considerably higher than other more established varieties.

The approximately 22 acre trial sizes are designed to allow 7 passes with BSA's 40 foot planter over the 3300 foot distance between the southern boundary of Field 1 and its northern Boundary at the airstrip. We will be fertilizing the three trial plots in exactly the same fashion for trial control purposes.

In light of increased consumer interest in non-GMO foods, it is worth noting that all of our corn is non-transgenic, as will be all of our soybeans and edible beans. This may well provide future opportunities for making feeds for the animal, fish, and shrimp markets that can be sold at premium prices.

**Belize Sustainable Agriculture, Ltd.
Farming Report – May 17, 2016**

Fertilizer Program

BSA's fertilizer program for Cayo One is based on multiple goals:

1. Test the impact of higher fertilization rates on yields
2. Ensure that fertilization is at least 110% of theoretical "maintenance rates"
3. Test one plot for higher Nitrogen Applications
4. Initiate long term trial of organic worm based soil enrichment

Target Yields and Fertilization Rates

BSA has set a business goal of a weighted average yield of 107 bushels/acre for its Summer 2016 corn crop, which is 6,000lbs./acre or 6.7 mt/Ha. This represents an increase of some 15% over the yields achieved on Field 3 in 2015.

However, CSA has planned to fertilize for a 150 bushel/acre yield (8,400lbs./acre or 9.4 mt/Ha), assuming a minimum fertilization rate of 110% of maintenance levels (the level at which the crop neither adds or depletes to the soil's fertility). The table below provides an overview of the relevant data:

Fertilizer Application (lbs./acre)	N	P	K
Base	44	100	44
Liquid (fast uptake)	11	7	3
Urea	152	0	0
Foliar	0	0	0
Total	207	107	46
<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>41</i>	<i>4</i>
<i>110% Fertilization requirement surplus:</i>	<i>0</i>	<i>34</i>	<i>0</i>

The high Phosphorous build is to adjust for a soil deficiency, which is not uncharacteristic of recently cleared land, identified in soil tests performed at Cayo One.

The fertilization program assumes the following applications:

Base: 330lbs/acre (370Kg/Ha) of 13.3-30.3-13.2-1.8S+Micros to be applied in Mid-May (Now!) by ground

Liquid: 2.4 litres/acre at planting by ground application

Urea: 330 lbs./acre (370Kg/Ha) of 46% N divided into 3 aerial applications at days 20, 35, and 55 after planting

Foliar: 1 litre/acre divided into 2 aerial applications at days 30 and 60 after planting

Belize Sustainable Agriculture, Ltd.
Farming Report – May 17, 2016



Cayo One Northwesterly View with airstrip- May 12, 2016



Cayo One – SW Corner after leveling – May 12, 2016



Field 1 after raking – May 12, 2016



Field 1 well raked – May 12, 2016



Field 1 Second disking after levelling – May 17, 2016



Field 1 tractor at work on 2nd disking – May 17, 2016

Belize Sustainable Agriculture, Ltd.

Farming Report – May 17, 2016

Market Conditions and Conclusion

Grain prices are unchanged in Belize over the past fortnight, and have remained mostly stable over the five months since our last Farm Report, with the only significant movement being in Soybeans.

Corn

Corn volumes in storage are adequate to meet needs until next crop cycle, but there was little or no excess grain and exports of whole grains, with the exception of edible beans, have been minimal. Belize's corn price of BZD 28.00-30.00/cwt (USD 308-330/mt) remains high compared to CBOT/World market prices, although total demand at these price levels is limited. An excess supply of five to ten thousand metric tons would sharply compress Belize's premium versus the region. Regional prices (e.g. Guatemala, Salvador, etc.) for the forthcoming crop are expected to settle in a Belize FOB equivalent of USD 260-280/mt. This is still a high price compared to the USD 165/mt level currently quoted by the USDA for corn FOB US Gulf Ports.

Early reports are that corn plantings in Belize will be lower this season as some farmers are diverting crops to sugar cane (Cayo District) and Soybeans (Orange Walk District). Local grain cooperatives are seeking commitments and expect the Summer 2016 corn crop to generate at least USD 7.84/bushel (USD 309/mt) for local farmers.

Soybeans

Soybeans in Belize are unchanged in price recently, and expectations are for an increase in plantings. They have seen a significant decrease in price from last fall and are now selling in the range of BZD 45.00-50.00/cwt (USD 500-550/mt), compared with last fall's BZD 55.00-60.00/cwt (USD 605-655/mt). There are now plenty of soybeans available in Belize, which has justified the lower local price, although it is still at a substantial premium to global markets

Rice

Rice remains a very good option for Belize farmers who have fields that are properly designed and irrigated. Prices for rough/paddy rice remain stable at BZD 45.00/cwt (USD 495/mt), which continues to be a high premium relative to global market prices (USD 275/mt).

Edible Beans

Edible beans enjoyed a better than average yield and quality in the spring 2016 harvest, with local variations due to rain. Sales of the 2016 crop have been very slow as remaining 2014 and 2015 inventories first had to be cleansed, but these are mostly sold now. Most bean varieties are creeping back to the USD 45.00-50.00/cwt level FOB Belize, which is an improvement over 2015 but materially lower than 2014 levels.

We look forward to a successful Summer 2016 season with weather conditions that we hope will be more favorable than in 2015! Regional market conditions remain quite strong, especially when compared with the current low level of agricultural commodity prices on global markets. We retain all of our optimism for Belize's remarkable farming potential, provided the right investments are made in drainage, irrigation, equipment, and especially people!

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

Belize Sustainable Agriculture, Ltd. Farming Report – May 17, 2016

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	123	N	Black	None	DeKalb 7088 27,000	May 30?	?	Base 13.3-30.3-13.2-1.8S 330lbs/acre	May 4, 2016: Land Preparation underway May 17, 2016 continues under good conditions
BSA	Cayo One	1b	22	N	Black	None	Pioneer P4226 27,000	May 30?	?	Base 13.3-30.3-13.2-1.8S 330lbs/acre	Land Preparation underway May 4, 2016; continues May 17, 2016 under good conditions
BSA	Cayo One	1c	22	N	Black	None	Dow 3383 27,000	May 30?	?	Base 13.3-30.3-13.2-1.8S 330lbs/acre	Land Preparation underway May 4, 2016; continues May 17, 2016 under good conditions
BSA	Cayo One	1d	22	N	Black	None	ASG R9000 27,000	May 30?	?	Base 13.3-30.3-13.2-1.8S 330lbs/acre	Land Preparation underway May 4, 2016; continues May 17, 2016 under good conditions
BSA	Cayo One	2	284	N	Black	None	Dekalb 7088 27,000	May 30?	?	Base 13.3-30.3-13.2-1.8S 330lbs/acre	Land Preparation underway May 4, 2016; continues May 17, 2016 under good conditions

