General Comments & Weather



This is the tenth 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.

August 2016 ended on a relatively wet note, with rainfall materially above the historic average for late August, which typically has benefited from a dry spell from mid-month through early September. Seasonal and Year-to-Date rainfall are moderately above their historic averages, although, as with 2015, this masks significant month to month extremes. As we often repeat: "You can't farm the averages". We are now entering the peak season for hurricane activity, although so far there appear to be no immediate threats to Belize and no early stage cyclone formations that models indicate might head towards the western Caribbean. However, as with Earl, it's important to remember that cyclone activity can be unexpected and unpredictable!

	Belr	nopan Pre	cipitation	n Data (mı	m per mo	nth) – <mark>Sep</mark>	tember D	ata throu	gh Septer	nber 5 th		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	105	282	30	66	71	414	175	263	3			
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

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

Farm Operations

Land Preparations

These were timely completed, and a full description is provided in the Lot Records at the end of this document.

Weather Analysis

The weather during the last fortnight became far wetter than we would have liked. Although rainfall was not excessive, there was enough to arrest much of the recovery our crop was experiencing. Moreover, the rain has typically come in the form of brief but intense thundershowers whose strength can cause material damage to weakened plants, even during their relatively brief activity. Afternoon breezes have been comparatively light, which has further slowed down plants' drying process.

The weather outlook for the coming week appears to be for more of the same weather, and we will have to hope that thunderstorm activity, which is typically quite erratic, will err on the side of missing the Cayo Farm as it did in late July.

Temperatures have averaged a higher than seasonal 95°F (35°C).

Seed Selection, Planting, and Crop Development

Planting began on Saturday May 28th and finished on June 1st. Final acreages planted were:

- DeKalb 7088 425 acres (Part of Field 1 and all of Field 2) @ 27,656 seeds/acre
- Dow 3383 24 acres (Part of Field 1) @ 27,656 seeds/acre
- American Seed & Genetics R9000 24 acres (Part of Field 1) @ 27,656 seeds/acre

General Plant Development

The corn is senescing at a rapid rate. The amount of damaged leaf area and plant stalk has seemingly sent some plants into a frenzy to finish filling their cobs. Some kernels that pollinated but did not fill are now beginning to sprout. These, however, are not likely to be an issue as the cob continues to dry down the kernel will soon run out of moisture and will die. This should not negatively impact harvesting.

The greatest present concern is the variability of this summer's crop; there are areas that will be ready for harvest by the week of September 19th and some that will not be ready until the week of October 10th. So harvesting will be a challenging task this year! What exacerbates this further is the relative unevenness of germination reported earlier. There are some plants side by side that have the same above described issue; one plant will be ready in a few weeks and among them there may be one that will only be dry in 5-6 weeks. So we will shortly be completing a detailed field inspection to map out our harvest plan. Also, given the state of a significant percentage of our field, where plants suffered damage due to Earl and ears are currently drooping more than normal, we are likely to begin harvesting when our plants reach a 26%-28% humidity level rather than the more typical 20%-24% range. We would be at too much risk to significant ear losses (i.e. they fall off the plant and are permanently lost) to wait for optimum humidity. This will requires some additional drying expense, but it is better to spend more drying ears that have been recovered than to not have those ears to dry at all.

Insects

Generally speaking, we are outside of the "risk zone" when significant crop damage can occur due to insect activity. Moreover, one of the (few?) benefits of regular rains at this stage of the plant development cycle is the lack of tiny sucking insects such as thrips, aphids and mites. These have been also partially controlled by corn earwigs. Besides also biting humans, corn earwigs are a very beneficial insect and their presence is most welcome. We have not seen a tremendous amount of them but we have seen enough to know that they are making a difference. Too many earwigs indicates that there is too much for them to feed on (e.g. too many bugs) so a small earwig presence is deemed "just right". We have noted a few other beneficial insects; most of them feeding on weeds and grasses in the corn and not on the corn itself.

Funguses and Bacteria

The relative maturity of the crop, the ground and air humidity, and the less than ideal leaf surfaces have created prime breeding grounds for fungus and bacteria to propagate. There is a large incidence of eyespot that has been systematically burning holes in the leaves. Due to the advanced state of the plant the decision was made to forgo another application of fungicide. It is unlikely to result in any material change in yield and would primarily serve as an aesthetic gesture; the eyespot indeed looks horrible!

Weeds

A combination of poor results from our early herbicide spraying, including the quasi total failure of our initial application of the Bayer Prowl product, and the loss of leaf material on our corn plants due to Earl, has led to weed activity that is significantly higher than we would expect at this stage of the plant cycle. We are likely to spray a desiccant prior to harvest to reduce weeds so that our combine can harvest more readily. We informed the Bayer distributor that we will not honor their Prowl invoice and will seek reimbursement for its application cost. Interestingly, during our discussions with the distributor, when they claimed their product didn't work because there was "not enough rain" then "too much rain", our meticulous Lot Records and extensive photograph records have been very helpful in these discussions. As with the DK-7088 importer, the supplier's traditional approach of blaming grower ineptitude is much harder to argue when faced with complete and detailed field/crop data and photographs...

As a reminder, our detailed field survey from August is available upon request.

As far as our three corn varieties are concerned, there continue to be some stark differences between the various trial areas.

DeKalb DK-7088 Comments

We continue to be quite impressed with well the DK-7088 has survived a combination of challenging early season weather and Hurricane Earl. There are a number of the DK-7088's genetic qualities which make it a superior choice for our growing region, and we hope that Monsanto will be able to overcome its seed quality control problems. We continue our discussions with them to secure suitable compensation for the losses we are suffering from this season's seed quality issues and we again hope that Monsanto makes the wise long term choice to encourage us to replant this variety in the future.

Dow DAS-3383 Comments

The Dow DAS3383 has continued to markedly disappoint. Ear development and fill for the DAS 3383 is not living up to the variety's early growth promise. Again, we will wait until after harvest to determine if the DAS-3383 will perform sufficiently well to be selected, but the likelihood of it being in next year's line-up is not high.

ASG RY-9000 Comments

The ASG RY9000 has continued to underperform and it will mature close to a full month behind the DK-7088! While we will wait for our final yield results before making a decision on growing this variety again, it is unlikely that we will plant this variety again. Especially as the distributor has failed to visit our farm a single time since we planted this trial crop!

Fertilizer Program

The BSA fertilizer program has been completed and there are no further applications planned for nutrients; details of fertilizer applications can be found in the Lot Records at the end of this document. However, we feel it is worth repeating BSA's fertilizer strategy for Cayo One, which 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 section for even higher Nitrogen Applications
- 4. Initiate long term trial of organic worm based soil enrichment

For a detailed discussion of BSA's fertilizer strategy, see the May 31st report and the field matrices later in this report.

Harvest Forecast and Projected Yield Update

We are currently expecting to begin Harvest operations as early as the week of September 19th, subject to the field mapping we will perform next week. Our recently acquired John Deere corn header will not arrive from Canada (where it was purchased on very favorable terms due to the depreciation of the Canadian dollar) until the week of the 26th; however our friends at the Hillbank Agricultural Company (Dyck family) have agreed to make their JD corn header available which will allow us to get harvest operations underway as and when we deem most timely. We have also made arrangements with local farmers from the Indian Creek community to provide field drying services for our corn.

In light of the negative impact of episodic heavy rains on our damaged corn plants, we are increasing and widening our potential crop loss range due to Earl and poor DK-7088 seed quality to the 15% to 35% range. Accordingly, we expect yields to range between 90 and 70 bushels/acre.

While yields at this level are clearly disappointing, Cayo One is still in a much better position than the rest of the Cayo District, where we expect losses to be between 50% and 100% of normal yields (see Market Comment section).



Cayo One fields looking remarkably good-Aug 30, 2016



DK 7088 wind damaged plants: difficult to harvest! 8/30/16



Field 1 & 2 looking West: starting to dry - Sep 9, 2016



Damaged plants ready to harvest in 2 weeks - Sep 9, 2016



Field 2 looking Northeast: starting to dry - Sep 9, 2016



Santander Sugar fields wtill very wet! Aug 30, 2016



DK-7088 ear with 600+ kernels: all must be like this! 8/30



18 rows by 35 height with great kernels! August 30, 2016



DK 7088 partially filled: almost ready to harvest Sep 9, 2016



DK 7088 ear close to dropping: harvest soon! Sep 9, 2016



DK-7088 showing sprouting: too much water! Sep 9, 2016



DK 7088 w/ Eyespot fungus: ugly but no crop danger 9/9/16

Market Conditions and Conclusion

Corn

We continue to hear talk of a bumper crop from the Spanish Lookout community, who are the dominant corn producers in Belize. This talk does not correspond in any way to the aerial and ground observations we have made of the Spanish Lookout fields or of their plant development. We believe that these "market rumors" are being circulated to depress corn prices in the short term and thereby discourage other Belize farmers from planting a winter season corn crop. We understand that the Spanish Lookout community intends to plant a back-to-back "no till" winter 2016-2017 corn crop in an attempt to recover losses from the summer 2016 fiasco.

Belize's northern corn growing communities, which represent about 25% of the country's production capacity, expect to achieve a better than usual yield as their fields were less impacted by Earl than Belize's main grain producing Cayo District. This is one advantage the northern areas had this year; they planted later in 2016 due to insufficient early season rains and these later planted fields endured the winds much better and recovered quicker than the more advanced crop in the central parts of Belize. Given the challenges these communities faced in the last two years, an above average crop will be very welcome indeed.

As a result of the above rumors and developments, the market for corn in Belize has softened slightly; prices have dropped from the \$28-30/cwt range (\$8.12/Bu - \$320/mt) to \$26-28/cwt (\$7.56/Bu - \$298/mt). However, we expect this dip to be short lived as harvests begin in a few weeks' time and the reality of country's major corn crop losses in the key Cayo District become impossible to hide.

Lastly, we also consider it likely that much of the Cayo District's corn will be negatively affected by aflatoxin; accordingly, none of it will be of "food grade" quality. However, it should be noted that this will not negatively affect the corn's marketability or price as most of Belize's corn is used animal feed which is not impacted by aflatoxin (except horses).

CSA was unable to satisfactorily complete discussions on a prospective multi-year corn supply agreement with a US Fortune 100 company in time to include the 2016 Summer corn crop. Accordingly we have now committed our crop to a local co-operative where it should achieve an excellent price. However, we will continue our discussions hoping to completing a multi-year supply agreement.

Soybeans

Soybeans continue to be very quiet with limited reported trades. #1 Grade Soybeans continue to be bid at 50.00/cwt (USD 550/mt), and lower grade #2 soybeans remain steeply discounted below \$40.00/cwt. (USD 440/mt).

Edible Beans

Edible beans continue to be inactive as they are sold out in Belize. There has been no recent price talk but we continue to believe beans would trade in the USD 40-\$50/cwt.

As we wrote in our last report, 2016 will go down as a year that has challenged many a farmer's soul in Belize. But we remain just as upbeat as we will still harvest a reasonable crop, Mother Nature permitting, compared to other Cayo District farmers. We are working hard on preparing our field expansions and our first drainage system installation both scheduled for the coming Dry Season!

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	14	Z	Black	Corn (Yellow)	DeKalb 7088 27,656	June 1	June 7	Base 13.3-30.3-13.2-1.8S 330lbs/acre Liquid Aporte-M 2L/Acre TRIAL Vermiplex 4L/Acre 46-0-0 100 lbs./acre 38.5-0-0-7.2S 136lbs/acre 46-0-0 110 lbs./acre	Land Preparation underway May 1, 2016; continues May 17, 2016 under good conditions; finished May 23. Planting June 1. Vigorous emergence June 5-10. Above average June 25 plant count for DK-7088 at 24,000/acre. Clear signs of water stress after very wet June; starting to dry out / July 11. Major improvement by late July; Early tasseling. Very healthy plants, mostly pollinated. moderate hurricane damage, still a promising crop / Aug 9. Encouraging field survey that shows large quantity of ears that will be smaller than average / Aug 23. Additional rain damage; crop approaching maturity / Sep 5.
BSA	Cayo One	1b	24	N	Black	Corn (Yellow)	Dow 3383 27,656	May 31	June 7	Base 13.3-30.3-13.2-1.8S 330lbs/acre Liquid Aporte-M 2L/Acre 46-0-0 100 lbs./acre	Land Preparation underway May 1, 2016; continues May 17, 2016 under good conditions; finished May 23. Planting June 1. Vigorous emergence June 5-10. Above average June 25 plant count for DK-7088 at 24,000/acre.

										38.5-0-0-7.2S <u>136lbs/acre</u> 46-0-0 <u>110 lbs./acre</u>	Clear signs of water stress after very wet June; starting to dry out / July 11. Major improvement by late July; Early tasseling. Very healthy plants, mostly pollinated. moderate hurricane damage, still a promising crop / Aug 9. Disappointing field survey shows insufficient ears that will be small / Aug 23. Additional rain damage; crop approaching maturity / Sep 5.
BSA	Cayo One	1c	24	N	Black	Corn (Yellow)	ASG R9000 27,656	May 31	June 7	Base 13.3-30.3-13.2-1.8S 330lbs/acre Liquid Aporte-M 2L/Acre 46-0-0 100 lbs./acre 38.5-0-0-7.2S 136lbs/acre 46-0-0 110 lbs./acre	Land Preparation underway May 1, 2016; continues May 17, 2016 under good conditions; finished May 23. Planting June 1. Vigorous emergence June 5-10. Above average June 25 plant count for DK-7088 at 24,000/acre. Clear signs of water stress after very wet June; starting to dry out / July 11. Major improvement by late July; Early tasseling. Very healthy plants, mostly pollinated. moderate hurricane damage, still a promising crop / Aug 9. Disappointing field survey shows insufficient ears that will be small / Aug 23. Additional rain damage; crop still ~ 6 weeks from maturity / Sep 5.

BSA	Cayo One	2	284	N	Black	Corn (Yellow)	Dekalb 7088 27,656	May 28-31	June 7	Base 13.3-30.3-13.2-1.8S 330lbs/acre Liquid Aporte-M 2L/Acre 46-0-0 100 lbs./acre 38.5-0-0-7.2S 136lbs/acre 46-0-0 110 lbs./acre	Land Preparation underway May 4, 2016; continues May 17, 2016 under good conditions; finished May 27. Planted May 28-31. Vigorous germination but irregular emergence June 5-10 followed by disappointing June 25 plant count at 22,500/acre. After June's heavy rainfalls Field 2 also showed the highest amount of ponding as of July 11. Major improvement by late July; Early tasseling, even in areas with bad seed. Mostly healthy plants, mostly pollinated / July 25. Moderate hurricane damage, still a promising crop / Aug 9. Encouraging field survey that shows large quantity of ears
											Encouraging field survey that

Lot Records for Field 1

			(GROWER:			BS	SΑ						
						SECTION #:		1a. 1		ed: 5/31/	2016 - 6/0	1/2016		
1	FARM LOCATION:	Cay	o One Estat	es I	_	BLOCK #:				SOIL TYPE:	В	lack Loan	n	_
CROP:		Corn				VARIETY:	DK 70		ASG R9000	# (OF ACRES:	141+	24+24	
chor.		REPARATIO			i		FERTIL				PLANTI			_
Discing	Harrowing	Leveling or		Other		PREPLAN			PLANTING	Seed-Ra			ndition	
5/1/2016 5/16/2016	23-May-16	5/9/2016	4-May-16			See Below			Aporte Pre- M See	27,656	<u> </u>	Dr	/ & Hot	
5/20/2016		.,.,	,						Below	,,,,,				
		ERTILIZERS				Rain i				PESTIC				_
Date 26-May-16	Analysis 13.3-30.3-13.2-1.8S	Rate/Ac 330lb	Ground X	Air	1	Date 6/3/2016	Quar 0.		Date 3-Jun-16	Description Atrazine	Rate/Ac 1lb	Ground	Air	
	Aporté Pre-M	2L	X		2	6/5/2016	1.		3-Jun-16	Prowl	1L	x		
31-May-16	/ermiplex (111 acres	4L	Х		2	6/8/2016	0.	5	13-Jun-16	Certero (perimeter only)	161 cc		х	
22-Jun-16	46-0-0	100lb		х	6	6/9/2016	0.	8	13-Jun-16	Aporté Pre-M	250 cc		х	
8-Jul-16	38.5-0-0-7.2S	136lb		х	8	6/12/2016	0.		13-Jun-16	Damoil	250 cc		х	_
15-Jul-16 8-Aug-16	Aporté Pre-M 46-0-0	630 cc 110lb		x x	9	6/17/2016 6/18/2016	1. 1.		18-Jun-16 18-Jun-16	Primero Tordon	18 cc 150 cc		x	
5u8.10	200	11010		<u> </u>		6/19/2016	3.		18-Jun-16	Aporté Pre-M	122 cc		X	
						6/22/2016	1.		18-Jun-16	Surf-Ac	3 cc		х	
						6/23/2016	0.		26-Jun-16		161 cc		х	
						6/24/2016	0.		26-Jun-16	Surf-Ac	2 cc		х	
					<u> </u>	6/25/2016 6/26/2016	0.		26-Jun-16 15-Jul-16	Aporté Pre-M Amistar Top	80 cc 200 cc		x	_
						6/27/2016	1.		13-341-10	Allistai Top	200 cc			
						7/3/2016	0.							
						7/4/2016	0.0	07						
						7/6/2016	0.							
						7/9/2016	0.							
						7/10/2016 7/6/2016	0.2							
						7/9/2016	0.							
						7/10/2016	0.2							
						7/12/2016	0.4	46						
						7/13/2016	0.							
						7/14/2016 7/15/2016	0.0							
						7/16/2016	0.0							
						7/17/2016	0.0							
						7/18/2016	0.1	18						
						7/19/2016	0.							
						7/20/2016 7/23/2016	0.3							
						7/24/2016	1.0							
						7/27/2016	0.0							_
						7/28/2016	0.0							
						7/29/2016	0.6							_
						7/30/2016 8/1/2016	0.0							
						8/3/2016	1.5							
						8/4/2016	2.							_
		-				8/13/2016	0.0							_
						8/14/2016	1.							
						8/15/2016 8/16/2016	0.0							
					-	8/16/2016	0.0							
						8/19/2016	0.2							
						8/20/2016	0.1							
					_	8/21/2016	0.2							
						8/22/2016	2.4							
				<u> </u>	-	8/23/2016 8/24/2016	0.0							
						8/25/2016	1.0							
						8/26/2016	0.0							
						8/29/2016	0.1							
						8/31/2016	0.1							_
						9/1/2016	0.0							
				ļ		9/5/2016	0.0)/			l			

Lot Records for Field 2

			(GROWER:			BSA									
						SECTION #:	Date Planted: 5/28-31/2016 2, 2a, 2b SOIL TYPE: Black Loam									
F	ARM LOCATION:	Cay	o One Estat	es I		BLOCK #:				SOIL TYPE:	B	lack Loan	n	_		
CROP:						VARIETY:				#0	OF ACRES:		5.1+15.7	.7		
I	LAND F	REPARATION Leveling or					FERTILIZ				PLANT			_		
Discing	Harrowing	Land Plane		Other		PREPLAN	NT .	AT P	LANTING	Seed-Ra	ite	Cor	ndition			
5/5/2016 5/10/2016 5/16/2016	23-May-16	5/12/2016 5/17/2016	6-May-16			See Below			Aporte Pre- M See Below	27,656	5	Dry	/ & Hot	:		
		ERTILIZERS		1		Rain I				PESTI						
Date	Analysis	Rate/Ac	Ground	Air	#	Date 6/3/2016	Quanti	ity	Date		Rate/Ac		Air	_		
20-May-16	13.3-30.3-13.2-1.85	ection 2 330lb	Х		1	6/5/2016	0.6 1.5	-	2-Jun-16 2-Jun-16	Atrazine Prowl	1lb 1Lb	x		-		
	Aporté Pre-M	2L	X		2	6/8/2016	0.5			ertero (perimeter onl			х			
22-Jun-16	46-0-0	102lb		х	6	6/9/2016	0.8		13-Jun-16	Aporté Pre-M	250 cc		х			
8-Jul-16	38.5-0-0-7.2S	142.9lb		х	8	6/12/2016	0.7		13-Jun-16	Damoil	250 cc		х			
15-Jul-16	Aporté Pre-M	630 cc		х	9	6/17/2016	1.9	_	18-Jun-16	Primero	18 cc		Х	_		
8-Aug-16	46-0-0	112.3lb		х	10	6/18/2016 6/19/2016	1.3 3.8	\dashv	18-Jun-16 18-Jun-16	Tordon Aporté Pre-M	150 cc 122 cc		X X	_		
						6/22/2016	1.0	7	18-Jun-16	Surf-Ac	3 cc		×	_		
	Sec	tion 2a,2b				6/23/2016	0.8		26-Jun-16	Certero	161 cc		х	_		
20-May-16	13.3-30.3-13.2-1.85	330lb	Х		1	6/24/2016	0.7	J	26-Jun-16	Surf-Ac	2 cc		х			
•	Aporté Pre-M	2L	Х		2	6/25/2016	0.7	4	26-Jun-16	Aporté Pre-M	80 cc		х	_		
22-Jun-16	46-0-0	157lb		X	6		0.8		15-Jul-16	Amistar Top	200 cc		Х	_		
8-Jul-16 15-Jul-16	38.5-0-0-7.2S Aporté Pre-M	150lb 630 cc		X X	9	6/27/2016 7/3/2016	1.9 0.2	-						_		
8-Aug-16	46-0-0	167lb		×	10		0.07							-		
						7/6/2016	0.2									
						7/9/2016	0.1									
						7/10/2016	0.25	_						_		
						7/12/2016	0.46							_		
						7/13/2016 7/14/2016	0.08	_						_		
						7/15/2016	0.08	-						_		
						7/16/2016	0.02									
						7/17/2016	0.08									
						7/18/2016	0.18	_						_		
						7/19/2016 7/20/2016	0.9	-						_		
						7/23/2016	0.11	-						_		
						7/24/2016	1.02							-		
						7/27/2016	0.03									
						7/28/2016	0.06	-						_		
						7/29/2016	0.68							_		
				1		7/30/2016 8/1/2016	0.07	-						_		
						8/3/2016	1.54							_		
						8/4/2016	2.4									
						8/13/2016	0.04	J						_		
						8/14/2016	1.4	4						_		
						8/15/2016 8/16/2016	0.03							_		
						8/17/2016	0.01							_		
						8/19/2016	0.22							_		
	_					8/20/2016	0.12	⇉								
						8/21/2016	0.25							_		
						8/22/2016	2.42							_		
				1		8/23/2016 8/24/2016	0.02							-		
						8/25/2016	1.02							_		
						8/26/2016	0.01							-		
						8/29/2016	0.18	J								
						8/31/2016	0.14									
						9/1/2016	0.03									
						9/5/2016	0.07									