

Belize Sustainable Agriculture, Ltd.
Joint Venture Farming Report – September 24, 2013

General Overview

Finally weather conditions began to improve during the week ended September 21, 2013, and have subsequently been mostly sunny, warm and breezy. Soil moisture remains wet but is drying nicely in both Blue Creek and in San Carlos. With having had almost daily rain for the last 4 weeks, sunshine sure is a welcome sight. The continuous rains exceeded levels for a “25 year event” for September rains.

No serious crop damage has occurred, however we are seeing a little bit of damage where the continuous rains have caused some of the kernels on the tip of the ear to start growing. We hope that the impact on yields will not be more than a few bushels per acre.

As a reminder, for those so inclined, you can follow Belize’s weather on:

<http://www.hydromet.gov.bz/250-km-radar-loop>

Also, the methodologies we are using to estimate corn and soybean yields are described in the research papers from leading US university agronomy departments linked below:

<http://www.agry.purdue.edu/ext/corn/news/timeless/yldestmethod.html>

<http://www.ag.ndsu.edu/procrop/sds/estsyb08.htm>

Our first harvest at the Thiessen Farm began on Saturday September 28th; we will be delaying our next weekly report until Friday October 4th so we can include more data on the harvest. Needless to say we are all quite anxious to see the results!

Thiessen Family Farms – 286 acres (143 Irrigated / 143 Dry – 100% Corn)

Corn was planted May 28, 2013. Harvesting began on Saturday September 28th and in theory it would be finished by Wednesday October 2nd. However, we expect to run into a bottleneck in terms of the Thiessens’ drying capacity, which is likely to delay completion of our harvest until the week of October 7th. This season the Thiessens have planted more corn than ever, and their yields are higher than in past years. Last week the Thiessens’ have been harvesting some non-irrigated fields that are not part of the JV, where they have had outstanding yields in the 100/105 bushels/acre range. It appears that they may have been mimicking to some degree what we were doing on the JV fields! These plentiful harvests have put a major strain on the Thiessens’ drying capacity, which is comprised of batch dryers with an aggregate capacity of about 5 tons/hour. Another example of areas for improvement in Belize’s agricultural practices!

We will be doing detailed “post-mortems” on this summer season with the Thiessens so that we can begin to plan for an even more successful winter 2013/2014 season. There are many lessons to be learned from this summer’s experience in a wide range of areas, including seed selection, planting densities, fertilization programs, proactive pest/disease control, improved input procurement, improved budgeting and record keeping, and a number of others. Notwithstanding the many areas where we believe improvements can be made, we consider that working with the Thiessens this season has been a very positive experience as they consistently demonstrated integrity, commitment, drive, and enthusiasm.

Accordingly, we are pleased that the Thiessens have reconfirmed their interest in continuing, and possibly expanding, their JV activities with us and we will be discussing entering into a longer term agreement with them.

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Thiessen Corn Field - Dekalb 7088 (Sept. 23, 2013)



TF4 corn left/Thiessen Corn right– Sept. 23, 2013

Preliminary Yield Data for Thiessen fields

No additional crop Survey was performed in the Thiessen fields since August 26th. We expect to be able to give you definite yields on Friday October 4th.

We continue to maintain our weighted average yield forecast from the Thiessen fields, and have narrowed the range to 125 to 135 bushels per acre. This compares with our initial blended (irrigated and non-irrigated) target of 100 bushels per acre, and historical blended yields of 85 bushels per acre.

TF Plantations – 342 acres (259 Irrigated / 83 Dry – 100% Corn)



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The above picture is taken from Fields TF1, TF2T and TF3, also known as “the small pivot field”, which was planted on June 10-12, 2013 with seed varieties DeKalb 7088, Syngenta and Pioneer 30F35. TF2T is a trial plot which has strips of all 3 varieties, about double the fertilizer, and is almost 100% irrigated. There was lots of sunshine at the TF farm this past week and the soil has good moisture levels. Since the soil is a well drained soil, drowning of the crop is not a problem.

Nothing has changed with these fields, which continue to look really good. All scheduled treatments are now finished and no further work is expected until harvest, which should begin during the week of October 7th. Corn stands at about 7.5 – 8.5 feet tall. This field got an application of Tordon several weeks ago for vine control and the vines are also dying off nicely. There is also some grass that is showing itself in TF1, TF2 and TF3, indicating that the grass control was not ideal but should not materially affect yields. The ears are drying very nicely. No further worm damage is evident. The ears are drying off nicely while the stalk remains green, although the seriously wet weather has slowed down the drying process. The very wet conditions have also caused some of the kernels at the tip of the Dekalb ears to germinate as can be seen below.



Nonetheless, we do not anticipate there to be any material loss in yield.

As with the Thiessens, we have begun discussions with TF Plantations to determine whether we will continue the JV program with them next season; we expect to be able to report back next week.

Preliminary Yield Data for TF Plantations Fields TF1 - TF2T - TF3

No additional crop Survey was performed in the TF Plantation fields since September 2nd. We expect to do one final survey on September 30th before harvest to assess kernel size. A couple of ears were looked at on Monday and the kernels are ripening very nicely.

We continue to maintain our weighted average yield from the TF Plantations fields TF 1-2-3, but have narrowed the range to 130 to 140 bushels per acre. TF4 remains in a wider and somewhat lower range of 120 to 140 bushels per acre due to the time remaining to harvest and some incomplete ear formation. This compares with our initial blended (irrigated and non-irrigated) target of 107 bushels per acre, and historical blended yields of 90 bushels per acre. The TF Plantations yields (historic and target) are higher than the Thiessen yields principally due to higher percentages of irrigated land.

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TF Plantation Field TF4 (Sept. 9, 2013)



TF Plantation Field TF4 (Sept. 23, 2013)

The above pictures are from Field TF4, also known as “the Large Pivot field”; it was planted 27-28 June, 2013. Seed varieties planted are Pioneer 30F35 - 75 acres, DeKalb - 7088 - 23 acres and Syngenta - 105 acres. All corn ears that were checked did not show any further signs of worms being present, although it seems that TF4 might be the hardest hit by worms.

The projected yields look not too bad, but as can be seen in pictures in last weeks report, nutrition is still an issue! There are considerable improvements to be made! If you look at what percentage of the ear is not filled, that is significant. With the sun having come out again it all looks very promising.

D&H Farms – 224 acres (0 Irrigated / 224 Dry – 125 acres Corn / 99 acres Soybeans)

Soybeans

The soybeans were planted June 27-28 and they are currently about 28 - 30 inches tall, pretty much as tall as they will get. Rain has given us a break this week on this field and soil conditions are now wet but drying category. This field still has a bit of a grass problem; it does not seem to be affecting the plants too much. Plants are looking good: they continue to improve in color. Typical plant height for this variety is around 30-34”; these plants currently are 28-30”. They are as tall as they will grow this time around. This variety (Huasteca 400) is more resistant to disease and high moisture, but can also take drier conditions than other varieties. We are reducing our “concern level” on fungus risk thanks to the recent return of dry, sunny weather. However, we will be actively monitoring for this and both pre-emptive and remedial sprays are planned.

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Another survey of the D&H Soybean field was not carried out this week. The access road to this field was flooded and I did not want to drown my truck. Next week we hope to be able to give a better idea on how many pods are filling. Therefore we cannot accurately assess the true pod count, which is a critical data point. What we can say is that plant count remains low (~52k/acre) but with a high pod count (~80). The critical factor to assess yield will be what percentage of the pods which have formed will fill out. However, as we won't have a good feel for this for another week, we will defer any yield estimates until then



D&H Soybean Field (September 16, 2013)

Corn

The small field of some 24 acres planted on June 11, the corn is above 7 - 8 feet high. It is scheduled for harvesting either the week of October 7th or October 14th. It remains very healthy looking corn and the corn silk is drying off nicely. No further worm damage is evident.

No additional crop Survey was performed in the DHC1 Corn field since August 26th. We expect to do one final Survey shortly before harvest to assess kernel size.

We are maintaining our forecasted weighted average yield from this small D&H field of 100 to 120 bushels per acre. This compares with our initial target of 71 bushels per acre (!), and historical blended yields of 70 bushels per acre.

We have had preliminary discussions with D&H regarding the next season, and it is likely that we will continue the JV program with them next season, with a likelihood of expanded acreage.

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D & H Field 2 (Sept 24, 2013)



D & H Field 2 (Sept 16, 2013)

The above pictures are of field DHC2 (field 2), the last of the JV crops to be planted this season, which was planted on Friday the 26th of July. This field received a glyphosate burn down application hours before planting. The field is cleaning up nicely from the burn down. Corn varies in size, from 4.5 feet to 6 feet tall on the east side (left picture) of the field and 5 - 7 feet on the west side (right picture) of the field. This difference in height in a certain area is mainly due to water logging at certain points of the field especially after constant heavy rains like last week. The difference in height between the east side and the west side is fertilizer. The west 30 acres got an additional 2.5 gallons liquid fertilizer at planting. This field is in full tassel and no further nitrogen will be applied. The corn is looking greener this week than last week, a step in the right direction. An application of 46-0-0 was applied on Saturday. We had hoped to do a little more experimenting with differing N rates, but the field is starting to tassel, which means no more N. This field has really suffered from excessive water! Last week I reported that I would be happy if we recovered our expenses from this field. This week I was thoroughly surprised at how it had recovered, we just might make some money off of this field. ☺

The late planting means that this crop will probably be harvested around December 1st, but our view was very much “better late than never”. Again drainage is so very important.

Neufeld Family Farms – 117 acres (0 Irrigated / 117 – 100% Soybeans)

Jacob Neufeld finished planting on June 28, 2013, and despite what looked at first like a low stand on his field, the crop is now looking very good. These fields have received very little rain in the last week. The fields are finished with flowering and pods are filling very nicely. A pod count was done this week.

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Field #JN4- Planted June 28, 2013: 20 acres



Field #JN3- Planted June 27, 2013: 17 acres

Mike and Jacob looking at leaf cutter ant damage on JN3 (minimal damage)



All the rain has triggered a bit of an issue with some of the soybeans. A very limited number of plants were showing signs of fungus. Fungicide has been app



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A preliminary survey of the four Neufeld soybean fields was carried out on September 9th, and reconfirmed this week. As with the D&H field, it is too early to draw any reliable conclusions as the pods are forming; we also expect that they will continue to fill out in the course of the next week. Average peas in pods are 2.5.

We have confirmed the low plant count (~27k/acre), but are surprised at how many of the pods appear to be filling. Despite the recent rains, the pod count remains extraordinarily high (~150!!!). We will likely make a first prediction in the next report, as we will have a clearer picture of any potential fungus damage and we should have a better feel for how many pods are filling properly.

We have also had preliminary discussions with Jacob Neufeld regarding the next season, and it is likely that we will continue the JV program with them next season, with a likelihood of substantially expanded acreage.

Summary and Conclusion

We continue to be well pleased with how the various crops have developed, and most of them continue to look really good. We are very excited that the sun has shown up again. Once things dry out, we can start harvesting. The Thiessens started harvesting September 28th and TF will start in about 2-3 weeks

Grain prices were unchanged from last week at the lower levels. However, there have been consistent inquiries from Guatemala and Mexico for corn, with substantial demand around the BZD 0.25-0.26 level, which equates to \$7.00-\$7.25. (\$275-85/mt). However, we have reports that, due to the late arrival of new storage bins from the US, the Indian Creek co-op was desperate to find a home for some excess corn and a Mexican buyer picked up 500 tons at \$0.23. This is yet another example of the need for better planning, and we fully expect prices to firm as soon as the crop is securely in storage. Soybeans remain around the BZD 0.55/lb level (\$16.50/bushel) and most soybeans will go into the domestic Belize market where the remains a structural shortage. There has been no activity in Milo as no one has much in storage and none is expected to be harvested in this crop. However, there is growing talk that milo's discount to corn may narrow. The local co-ops have experienced delays in getting storage silos set-up due to late arrival of equipment from the US. However, we currently believe that this should not become an issue for our crops...

There have already been a few corn harvests from non JV farmers and early results are encouraging. We remain comfortable that achieving an average corn yield of around 130 bushels/acre (+/- 5 bushels) will be possible. We will have more information next week and will report back promptly.

As we wrote these last several weeks, we continue to find more and more areas on which to focus additional research in future crops. We are convinced that there will be numerous ways to enhance yields, each bringing its contribution which allows us to think that the long term objective should be to double Belize's historical yield levels.

Thanks! –

Abe Dyck

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Grower	Location	Field #	Acres	Irr?	Soil Type	Crop	Seed Variety	Plant Date	Stand - Date	Fertilizer Program	Comments
Thiessen	SC	1	143.0 142.8 <u>285.8</u>	Y	Sandy loam (Red)	Corn	DeKalb 7088 (25,000 seeds/acre)	May 28	6.5' - 7/13 7.5' - 7/19 8.5' - 7/27 8.5' - 8/3 8.5' - 8/19	170lbs/acre 18-46-0 183lbs/acre 46-0-0	Fertilizing complete. Total pure N this season = 115lbs/acre, versus historic 40-50lbs/acre. Note lack of "K" vs TF fields. Silking underway late July Silk starting to dry off on some ears` Kernels are getting hard 8/19 Ears continue ripening/browning 9/2 + 9/9 Very Healthy High Yield Forecast
TF Plantations	SC	TF1	57.99 14.00 <u>71.99</u>	Y N	Sandy loam (Red)	Corn	DeKalb 7088 (31,000 seeds/acre)	June 10	18" - 7/13 36-42"-7/19 48" - 7/27 8' - 8/3	220lbs/acre 10-26-26 110lbs/acre 0-0-60 65lbs/acre 40-0-0-6 148lbs/acre 46-0-0	Fertilizer program calls for 330lbs/acre base Fertilizer and 150 lbs/acre pure N. This is over 150% higher than historic levels and consistent with requirements for 125-150Bu/acre yields Silking underway 8/3 Silking finished, silk drying off 8/19 Ears continue ripening 9/2 + 9/9 Ears drying nicely 9/16 Healthy, with some ear worm High Yield Forecast
TF Plantations	SC	TF2T Test Plot	14.72	Y	Sandy loam (Red)	Corn	DeKalb 7088 Syngenta Pioneer 30F35 (38,000 seeds/acre)	June 11	18" - 7/13 36-42"-7/19 47" - 7/27 8' - 8/3 8' - 8/19	330 lbs/ acre 10-26-26 330 lbs/ acre 0-0-60 140lbs/acre 40-0-0-6 260lbs/acre 46-0-0	Test Plot getting major fertilizer boost (up to 100% extra) vs. TF1 and TF3 (which are already way above historic levels) Harvest will be monitored for different result vs. TF1 & TF3 Silking underway 8/3 Silking finished, silk drying off 8/19 Ears continue ripening 9/2 + 9/9 Ears drying nicely 9/16 Healthy, with some ear worm High Yield Forecast

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TF Plantations	SC	TF3	46.40 5.59 <u>51.99</u>	Y N	Sandy loam (Red)	Corn	Pioneer 30F35 (31,000 seeds/acre)	June 12	18" – 7/13 36-42" – 7/19 46" – 7/27 7' – 8/3 8' – 8/19	220lbs/acre 10-26-26 110lbs/acre 0-0-60 65lbs/acre 40-0-0-6 148lbs/acre 46-0-0	Same strategy as TF1 Little bit slower in silking 8/3 Silking finished, silk drying off 8/19 Ears continue ripening 9/2 + 9/9 Ears drying nicely 9/16 Healthy, with some ear worm High Yield Forecast
TF Plantations	SC	TF4	140.02 63.56 <u>203.58</u>	Y N	Sandy loam (Red)	Corn	Pioneer 30f35 75 acres DeKalb 7088 23 ac. Syngenta 105 ac. (27,000 seeds/ac).	June 27-28	7-8" – 7/13 12-14" – 7/19 30-36" – 7/27 42-46" – 8/3 7-8.5' - 8/19	220lbs/ac 18-46-0 110lbs/ac 0-0-60 142lbs/acre 46-0-0	Same strategy as TF1, some difference in fertilizers due to local availability issues. Tasseling and silking 8/19 Silking finished 9/9 Silk finished drying off 9/16 More worm damage than ideal 9/16 but no new worm damage Healthy, with some ear worm High Yield Forecast
D & H	BC	DHS1	99.37	N	Heavy Black	Soy	Huasteca 400 33.44 lbs/acre ~94,000 seed/acre	June 27-29	3-4" – 7/13 7-8" – 7/19 8-10" – 7/27 10-12" – 8/3 14-18" – 8/19 24-28" – 8/25	40lbs/ac 15-15-15	Summer soybean trial in heavy black Blue Creek soil. Limited Fertilizer program due to modest soybean needs and local soil conditions. Compare with JN. Crop Replanted June 27-28 after first seed had very low germination rates. Looking promising, water concern subsiding
D & H	BC	DHC1	24.43	N	Heavy Black	Corn	DeKalb 7088 (Seeds/acre 26,000)	June 11	3.5' – 7/13 5' – 7/19 6.5' – 7/27 7-8' – 8/3 8'+ - 8/19	100lbs/acre 14-36-12 65lbs/acre 46-0-0	Summer corn trial in heavy black non-irrigated Blue Creek soil. Fertilizer program calls for 150lbs/acre base Fertilizer and 75 lbs/acre pure N. (low range but 50% above historic levels) Looking healthy despite the Sept rains, and within 2-3 weeks of harvest water concerns are subsiding

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D & H	BC	DHC2	100.56	N	Heavy Black	Corn	DeKalb 7088 Syngenta Pioneer 30f35 (seed rate 28,000)	July 26-27	4" – 8/3 16" -8/19 16-36"-8/25	192 lbs/ac 14-36-12 40 lbs/ac 46-0-0 50 lbs/ac 46-0-0 50 lbs/ac 46-0-0 115 lbs/ac 46-0-0 65 acres 45 lbs/ac 46-0-0	Same as DHC1 Looking better, but yields may be impacted by Sept rains. We'll know more in a fortnight
Neufeld	SC	JN1	60.73	N	Sandy loam (Red)	Soy	CARDI 1088 28 lbs /acre ~78,000 seed/acre	June 27	4-6" – 7/13 7-8" – 7/19 8-10" – 7/27 15-19" 8/3 27-33"-8/19 30-36"-8/26 32-38" -9/2	120lbs/acre 15-15-15	Summer soybean trial in sandy red soil. Fertilizer program calls for moderate increase in base and foliar applications Now looking good given below average germination rate 9/2 Survey shows Low plant count with very high pod count 9/9 Pod count remains good 9/17 Pod count still very high 9/24
Neufeld	SC	JN2	20.17	N	Sandy loam (Red)	Soy	CARDI 1088 28 lbs/acre ~78,000 seed/acre	June 27	4-6" – 7/13 7-8" – 7/19 8-10" – 7/27 15-18" – 8/3 27-33"-8/19 30-36"-8/26 32-38" -9/2	120lbs/acre 15-15-15	Same as JN1 Now looking good given below average germination rate 9/2 Survey shows Low plant count with very high pod count 9/9 Pod count remains good 9/17 Pod count still very high 9/24
Neufeld	SC	JN3	16.56	N	Sandy loam (Red)	Soy	Huasteca 400 28 lbs/acre ~78,000 seed/acre	June 27	4-6" – 7/13 7-8" – 7/19 8-10" – 7/27 16-19" – 8/3 27-33"-8/19 30-36"-8/26 32-38" -9/2	120lbs/acre 15-15-15	Same as JN1 Now looking good given below average germination rate 9/2 Survey shows Low plant count with very high pod count 9/9 Pod count remains good 9/17 Pod count still very high 9/24

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Neufeld	SC	JN4	19.82	N	Sandy loam (Red)	Soy	CARDI 1088 28 lbs/acre ~78,000 seed/acre	June 28	4-6" – 7/13 7-8" – 7/19 8-10" – 7/27 15-18" – 8/3 27-33" -8/19 30-36"-8/26 32-38" -9/2	120lbs/acre 15-15-15	Same as JN1 Now looking good given below average germination rate 9/2 Survey shows Low plant count with very high pod count 9/9 Pod count remains good 9/17 Pod count still very high 9/24
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