

Belize Sustainable Agriculture, Ltd.
Joint Venture Farming Report – Aug 11, 2014

This JV Farming Report exceptionally covers the four week period July 15 through August 11, 2014 as no JV Farming Report was produced on July 28 as the key participants were on a research mission in the US Midwest in the late July and early August. Normal fortnightly reporting will resume on August 25, 2014.

General Overview

Weather conditions have been, and continue to be very dry for most of this reporting period. Scattered showers over the part of the country where our JV's are situated gave little relief to some very dry ground. For ground that saw enough rain during the previous reporting period this has been adequate to sustain but inadequate for proper grain fill. This reinforces our belief that we must have irrigation and drainage for our crops. The rice harvest has finished and weather was near perfect for this aspect of our farming operation. Most days have been dry with some wind and very bright sunshine. Farm field activities have continued in preparation for planting. The light rains in the Hillbank/San Carlos region will allow more land work to be completed but have been insufficient for planting to begin as reported earlier. Dry soil depths of 7 inches are not hard to find. Daytime highs have been in the high 20°C with cool nights. As a reminder, for those so inclined, you can follow Belize's weather on:

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

Thiessen Family Farms – 512 acres (283 Irrigated / 229 Dry – 100% Corn)

Stop press: On Sunday August 10th the Hillbank area finally received about 1" of rain after several weeks of hot, dry weather. Whether this will be enough and in time is still unknown, but it is a great relief after an exceptionally unseasonal dry spell.

The irrigated corn fields at the Thiessen Family Farms continue to look very good and we are very pleased with the general health of the plants within the irrigation circles. The rows are completely closed and leaf size is good with very good color. The irrigation units continue to run around the clock as the plants' water requirements remain high and evidence of their higher water requirement is obvious. We note with interest that an area that received considerably more water due to a malfunction in the system that allows the unit to turn around its pivot is a minimum of six inches taller and more verdant than the rest of the already very acceptable portion of the field. We will specifically monitor the yields on this small section compared with the overall field.

The corn under irrigation has pollinated successfully, and in the areas of the field where kernel counts were done there are initially encouraging yield data. We have trialed two seed rates of 30,000 and 35,000 plants/acre and expect to see 90%+ germination rates, leading to ear counts that should average 28,000 to 29,000 per acre. Equally encouraging is that we are seeing many cobs with 16 or 18 rows with 34-38 kernels per row. Assuming 95,000 kernels/bushel, a size comparable to the 2013 harvest (even though we have increased plant nutrition), the theoretical yield/acre range (in 56 lb bushels) would be (ears/acre x rows x kernel count) / kernel size (95,000/Bu). This would give us a yield range, before any losses to pests or harvest equipment, of 160 bushels to 210 bushels per acre (an average of 185). Allowing 10% loss to pests/harvest, would leave a yield of 166.5 bushels/acre (9,324 lbs /acre or 10.4 mt/Ha). Our goal for this crop was to exceed 150 bushels/acre on irrigated ground, which would be a 35% improvement on the 2013 crop. So even allowing for pest and harvest loss, our goal appears to be achievable target.

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Anecdotally, the Thiessens report not ever seeing corn with such overall vigor and stand before in their farming history. They remain excited and committed to further expansion of their irrigation project. Surprisingly, some of the larger, more conservative farmers in the area have chosen to deny the obvious and still believe the apparent difference in growth or crop security is not worth the effort of irrigation. It remains to be seen but we believe the yields on these irrigated portions will break records for this area of the country while the non irrigated portions will yield little to nothing. In fact many acres of corn in the area have already been cut down and baled for animal feed. The loss of a single season of 160 bushel corn would pay for most of the cost of an irrigation pivot.

Some rain now would clearly benefit our irrigated crops and relieve the pressure to irrigate. More importantly, for the non irrigated portions there are some areas where rain would be beneficial but it must come very soon or it will be too late. For the majority of the non irrigated areas it is too late. Plants are senescing at an alarming rate and nothing will bring them back when this process is this far along. The specified inputs have been invested in all crops, irrigated and non-irrigated, so the outcome will be radically different. We hope that today's 1" of rain will protect some non-irrigated crops, but a partial recovery of some lower yielding field is the best that can be hoped for. Such are the vagaries of farming and of Mother Nature, and we consider this year's unusual climate as a compelling argument for farming only on irrigated ground.

On the subject of pests, the Thiessens have been monitoring for worms throughout the growing season. The dreaded pest, which usually comes at "silk stage", has again reared its ugly head. The irrigated portions have been sprayed with a heavy dose of insecticide to stop their advance, which we hope (and believe) will be effective. We have also trialed a systemic product which appears to have had a positive result. Ear worm's presence often deep within the cob makes them especially difficult to kill and as they enter through the silk and can do considerable amount of damage by chewing away at the kernels meanwhile undetected under the husk of the cob. One of the primary methods used in their detection (besides opening a cob) is listening. Under quiet conditions and a good ear (no pun intended) these herbivores can be heard munching away. This is one area where North American farmers clearly have an advantage as this worm is controlled quite effectively with some of the more genetically advanced corn varieties, to which we do not have access in Belize due to government regulations.

We also continue to see differences in our various trial sections where we have used different seed counts and nutrition methods. One of the most obvious differences has been where black worm castings were used in lieu of conventional fertilizers; there the most impressive quality has been drought tolerance. We will be recording yield outcomes on the various trials as harvest time approaches.

In summary, despite the climatic challenges this year, we continue to be encouraged that this Summer's corn season will further validate our long term goal of being able to produce 200 bushels per acre of high quality corn in Belize. We expect to take control of the harvesting and drying of a substantial portion of this summer's production to be able to submit it to a major Guatemala based (subsidiary of US multi-national) buyer of food grade corn. If we can meet their qualitative objectives, there would be an opportunity to secure a long term contract at a very substantial premium (\$2.50+/Bu FOB Farm) to the CBOT corn price.

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Thiessen Corn – Irrigated Impacto Trial – Very Healthy!



Non Irrigated Pioneer Trial – Curling leaves, fading!



Thiessen Corn – Irrigated Impacto Trial – Large Ears



Thiessen Corn – Non Irrigated Pioneer –Cannibalization!



Thiessen Corn – Irrigated Impacto Trial – Strong Roots!

All pictures on this page were taken on August 7, 2014
at the 512 Acre Thiessen JV in Orange Walk

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Neufeld Family Farms – 336 acres total (100 acres black eyed beans - 0 % Irrigated / 236 acres Rice – 100 % irrigated)

Rice

There is little to report for Neufeld Family Farms as Jacob completed his rice harvest right at the beginning of this reporting period. He was only able to assist in harvesting a small portion Marlon's crop which had remained too wet to harvest with his combine as Jacob had switched back to tires.

Unfortunately, the total yield for JSN's crop will not be known for a while yet as Jacob put his rice directly into drying/storage before weighing. This approach creates several issues, of which the most urgent is not knowing his yields. This continues to be a pattern of small farmer thinking which we have been trying to assist him in changing. It is these types of issues that continue to haunt him and has seriously affected our willingness to continue JV farming with JSN. We have been very patient in trying to help him through these types of decisions but do not see how we can continue without him taking some very concrete steps to withdraw from these "old habits" and embracing modern farming techniques and practices. As an example, we consider that JSN's reluctance to embrace foliar feeding his crops at a critical juncture cost him (and us!) dearly in kernel weight and yield. This despite having some of the premier rice growers of this country giving him such advice.

We realize that our decision may be a shock to Jacob but it should not be; his history with BSA has been less than stellar as all three crops we have planted with him with have been in some ways a disappointment. Even this last rice crop, which will definitely be profitable, will be well below what should have been generated. And although some of the other disappointments are attributable to circumstances beyond his control, more urgency in management would have diminished his losses.

Black Eyed Beans

The Black Eyed Beans (BEB) that Jacob grew have been sold. We still do not know what the final price will be, and the amount was quite small (<600 cwts), however we believe these beans were sold below fair market price. By the next reporting period we should have a final price with a total reconciliation of this portion of the JV.

Marlon Dyck – 420 acres (Rice 100 % irrigated)

Marlon completed harvest on July 23 in dry conditions, and the final field to be harvested was the black worm castings trial. A portion of this field was held back from sale to the local vendor to use the rice as a benchmark for milling yields. The intention is to compare the milling yield of this field with the milling yield of other fields. We will also take a portion of this field to another mill to compare milling quality and milling yield with the mill that received the majority of our product. Since this crop was grown almost organically, we also want to keep some of this rice for our own consumption.

The yields on this portion of the crop appear to be nearly identical to the remainder of the nearby fields planted at the same time, so whether there is a cost of production advantage for using black worm castings remains to be seen. Once all the input costs have been tabulated we will report these results. The relatively high costs of the actual castings (provided this year at no cost to us) are offset by fewer applications and no costs attributed to fungicides and insecticides. A possible, albeit likely small, advantage we noticed was that this field actually matured a few days earlier than the rest of this equally planted lot of fields. This could be a consideration if inclement weather was pressuring us to get crops harvested. There was no such pressure this year and the choice was made to harvest last. Additionally, these fields were

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observed to have the greatest progression of senescence but ratooned better than all other fields. This thirty acre piece has since had a modest amount of nitrogen applied and water pumped on in order to trial a ratoon crop.

The hundred acre area that we had set for a ratoon trial has been abandoned. There is not nearly enough growth to warrant any further fertilization or husbanding. We believe there are several possible reasons for this:

- The fields had begun senescing before harvest took place; this is mostly attributable to removing water a little prematurely thinking we would get a little more rain.
- Several days elapsed before we could hire people to mow or “bush hog” the harvested fields
- The fields were “bush hogged” vs. “flail-mowed”: the latter being very much preferred for ratooning
- Application of urea was late due to fields being too dry for effectiveness

It is important to bear in mind this is a trial and inputs used to date will be quite minimal. There is very little of this type of ratooning practiced in Belize and it is a first for us. However, much of the rest of the rice growing regions in our part of Central America use this technique and we cannot see why it should not work here. We will visit a farm in southern Mexico that has perfected ratooning and where the principals are quite willing to share their technique with us; the prospective returns seem well worth the effort!

The merchant who purchased our rice continues to be very pleased with the quality of the grain we delivered to him. He is keenly interested in pursuing opportunities to partner on more crops with us, and has indicated that is prepared to make similar agreements as the one we made for this rice crop cycle. He is also prepared to take any grain we have available from our ratoon crop. In fact, we have others who have also become interested in buying our rice crop and setting up a mill specifically for that purpose. It seems as if a little competition for our crops may be on the horizon, and competition for a good product usually leads to a better price!

Other Farming Prospects

We have completed the majority of the land preparation on the 650 acres of rented land at Hillbank/San Carlos area. We had expected to plant at least some of our soybeans with the rains earlier in July, but we were unable to get this accomplished because the amount of rain was simply inadequate to allow root formation after germination. Disappointing as this was, Marlon’s decision to withhold planting has proven to be the correct one given the lack of rain until today. We have now been able to rent an additional tractor to help with ground preparation and our crew is working as many hours as they can to get the final acreage ready for planting. There has been a considerable effort required to clean the fields of residual papaya tree mounds and rocks, with many tons of rocks collected over the last few weeks. This makes the fields look much cleaner and will certainly make planting much more enjoyable. There are still significant large rocks subsurface and continued vigilance in all land working operations are important to preserve our equipment.

As all of our equipment has now been taken to Hillbank/San Carlos area to assist in land preparation, this leaves the preparation of the 280 acre piece of sandy black soil in Blue Creek somewhat in limbo. It is still our hope that this can be prepared for either a very late planting of milo this season or a very early planting of milo next season. Efforts are being made to utilize this piece of land and these efforts will continue.

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Perhaps the biggest challenge for the current soybean crop after lack of rainfall has been seeds. We have finally been able to procure enough soybean seed of a local grown variety known as “3296” for approximately 500 acres. The seed has a germination rate of between 85% and 90%, which we would generally not consider to be sufficiently good for our standards; however there is such a shortage of soybean seed in the region that this year we shall have to make do. We have also found another variety well known to us, which while having an unacceptably low germination rate for commercial production, is usable for a small seed growing plot (likely less than 30 acres). Efforts will continue to get seed from a reputable source and with adequate germination for our next growing season. It is also worth noting that The Huasteca variety procured earlier from a Mexican source proved to be of unacceptable quality (we had not paid for it yet) and will not be planted.

Summary and Conclusion

Our farming operations have generally been quite encouraging, as we continue to accumulate evidence that several key crops can be farmed quite successfully in Belize, notably Edible Beans, Rice and Corn. While “absolute dollar” profits have so far been modest, some of our “profit per acre” results have been very impressive. Moreover, the experience gained through our three seasons of JV farming has been extremely valuable, and will clearly assist us as we scale up operations on our own land.

The other area where we have been working to gain experience and contacts has been in the marketing and sales side of our operations. It has always been clear to us that in order to successfully scale our operations we need to establish reliable connections with end user customers who have an appetite for substantial quantities of product and the financial capability and willingness to reliably pay the right price for our output. Now that we can begin to produce credible amounts of high quality product, or intermediate some product from other local Belizean producers, we have been reaching out to buyers in several markets to begin building connections.

In Guatemala, we continue to communicate with Julio Ruiz regarding Corn sales; he fully understands our issue with security of payment and is working with prospective Guatemalan buyers regarding this requirement. We have made it clear that not only are we reluctant to grant credit, but we are equally reluctant to accept large quantities of physical cash as payment. This rather more orthodox approach to business has slowed down our initial sales somewhat. However, we had some lab tests run on our grain in storage at Indian Creek Grain Co-op and the tests were very favorable for protein and starch, with aflotoxins also at quite acceptable levels. These positive results have made a sizable difference in demand for our product and we expect that we will soon have a resolution regarding payment terms so that corn will begin to cross the border (officially!) into Guatemala. The prospective buyer is asking all the right questions and it certainly appears that he is moving forward with a sizeable order. This transaction is being handled by the Co-op, with our technical support as required.

Looking forward at corn in general, within Belize and especially in the north, we expect the market to tighten significantly. Northern production has been deeply affected by recent weather patterns, and it is likely that this winter corn will be in tight supply in Orange Walk. However, further to the south in the Cayo District farmers will be harvesting rain fed crops that should show much higher yields those from non-irrigated OW fields due to Cayo’s adequate rainfall during the last three months. This will likely increase the flow of grain from the south to the north, placing a cap on upward price pressure. It costs about BZD 0.02/lb. to truck corn from Spanish Lookout to Orange Walk, so it is unlikely that local prices will exceed BZD 0.22-0.23/lb. (USD 6.16-USD6.44/Bu). While for local farmers this is a low price which reduces most farms to marginal profitability, by world standards it is still a very attractive price considering the Chicago contract closed around USD 3.60/bushel on August 8.

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On the Edible Bean sales front, there continues to be interest in LRK's and BEB's from the Central American region, and we have begun to make regular quotes to several regional brokers. While we only have a nominal quantity of beans left, Indian Creek and Little Belize (two traditional Mennonite communities) have several million pounds of beans left that we are trying to assist them in selling. However, at the moment demand is out of Panama and Colombia rather than Jamaica, and Argentina is undercutting recent regional market prices by a substantial margin (>30%). Producers in IC and LB, having seen higher "Jamaica" prices this spring, are reluctant to accept the lower "Global" prices. This is further evidence of the special position Belize enjoys when selling to CARICOM member states: the 45% Common External Tariff applied on food imports from non CARICOM countries allows Belizean producer to enjoy a substantially higher price than the world markets currently afford.

We have just commissioned a surprisingly affordable market survey from the London based Caribbean Council, which should provide us with not only detailed data on various agronomic products imported throughout the Caribbean region, but also a rich list of direct contacts with end user buyers in this region.

Rice continues to be a very attractive market in Belize. We expect to be able to confirm the final yield results of the Marlon Dyck JV next report, but almost the entire output was pre-sold as "paddy" or "rough" rice straight off the field at USD 0.185/lb. We only kept enough to do some milling quality trials; with milled rice currently wholesaling for BZD 0.80/lb, which assuming decent milling yields equates to USD 0.22/lb for paddy rice net of milling and related costs, this will be even more profitable. These prices compare with an August 8 CBOT contract price for "rough rice" of USD 0.127/lb.

Soybeans continue to be in strong local demand, as Belizean poultry producers are starting up sobean extrusion and pressing facilities to expand their internal production of chicken feed components. Local soybean prices remain around BZD 0.60/lb (USD 18.00/bushel), which is a very large premium to the Aug 8 CBOT contract price of \$10.84/bushel. We have been in negotiations with a local poultry producer for a contract covering the first 600,000lbs of our production (200 acres @ 50Bu/acre), which would be the first time this company has ever entered into a forward purchase contract. We are close to concluding the contract and expect to confirm the status at the next fortnightly report.

While we are only at the first steps of building CSA's direct marketing and sales organization, and building the necessary relationships to reliably market our growing future production, we are comforted by the attractive domestic and regional markets for our products, with solid price premiums achievable, even in the current climate of significantly lower global prices. This should ensure that as our production grows substantially thanks to (many) more farmed acres at (much) higher yields, we will consistently achieve farming results that are truly superior

Thanks!

John Peters

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Grower	Location	Field #	Acres	Irr?	Soil Type	Crop	Seed Variety (count/acre)	Plant Date	Stand Date	Fertilizer Program	Comments
BSA / Marlon & Team	Hillbank	?	500	N	Red	Soy Beans	3296 500 acres			TBA	Land Prep completed. Awaiting rain.
BSA / Marlon & Team	Hillbank	?	120	N	Red	Milo	Marathon			TBA	Too late for corn – Land prep continues Waiting for rain
Thiessen Brothers	SC	T1	131	80 Y 51 N	Black-red loam	Corn	Dekalb 7088 131 acres (30,000)	June 6-7	June 9-10	14-36-12 150lb 18-46-0 50lb	Reviewing germination 91% germ
Thiessen Brothers	SC	T2	139	80 Y 59 N	Black-red loam	Corn	Pioneer 4226 139 acres (30,000)	May 29	June 1	14-36-12 150lb 18-46-0 50lb	Reviewing Germination results Germination good Vigor good 93% germ
Thiessen Brothers	SC	Trial TB-1	51	36 Y 15 N	Red	Corn	Syngenta Impacto 26 acres (30,000) 25 acres (35,000)	May 28	May 31	14-36-12 150lb 18-46-0 50lb	Reviewing Germination results Germination good Vigor good 93% germ
Thiessen Brothers	SC	Trial TB-2	52	36 Y 16 N	Red	Corn	Dekalb 7088 26 acres (30,000) 26 acres (35,000)	May 28	May 31	14-36-12 150lb 18-46-0 50lb	Reviewing Germination results Germination good Vigor good 94% germ

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Thiessen Brothers / Marlon Dyck Trial	SC	Trial MD-1	131	71 Y 60 N	Red	Corn	Syngenta Impacto 30.5 acres (30,000) 30.5 acres (35,000) Dekalb 7088 35 acres (30,000) 35 acres (35,000)	June 7-8	June 10-11	14-36-12 150lb + liquid AlgaEnzims 1L/ac AlZinc .5L/ac Complex NPK 10L/ac Complex NS+P 10L/ac SinerFos 6L/ac SinerPotasio 8L/ac SinerPlus 1L/ac	Trial Plot managed by Marlon Dyck Reviewing Germination results- Thiessen; Impacto 93% Dekalb 94% Impacto 99% germ Dekalb 99% germ
Thiessen Brothers	SC	Trial Black Worm Castings	8	N	Red	Corn	Syngenta Impacto (35,000)	June 6	June 8	14-36-12 150lb + liquid AlgaEnzims 1L/ac AlZinc .5L/ac Complex NPK 10L/ac Complex NS+P 10L/ac SinerFos 6L/ac SinerPotasio 8L/ac SinerPlus 1L/ac	Black Casting Trial Plot managed by Marlon Dyck Reviewing Germination Germination Good Vigor Good 99% germination
BSA / Marlon & Team	Blue Creek	?	80	N	Sandy loam	Corn?	(seeds/acre)			TBA	HAC agreement finalized Land preparation halted for lack of equipment
TBA	Blue Creek	?	200	N	Sandy Loam	Soybeans Milo?	(seeds/acre)			TBA	HAC agreement finalized Land preparation halted for lack of equipment

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Marlon Dyck	Rio Bravo	210-212 220-226 231-237	420	Y	Heavy Black	Rice	Cheniere (local supplied)	March 12-13	Vigor issues	Base liquid fertilizers 40-0-0-6s 81lb 10-36-10-6.8s-9zn 68lb 40-0-0-6s 75lb 10-36-10-6.8s-9zn 75lb 40-0-0-6s 100lb 10-40-5-7s-7zn 30lb	210-220-230 planted Significant Issues due to bad seed 210 Series now much improved 220-230 Very Promising 210s Harvested: ~5,750 lbs./acre 220s Harvested: ~8,000 lbs./acre 230s Harvested
Jacob S Neufeld	Rio Bravo	110-114 121-123	230	Y	Heavy Black	Rice	Cheniere	March 5-7		15-15-15 65lb 12-24-12 65lb 40-0-0-6s 50lb 13-11-21-2s 30lb 40-0-0-6s 50lb 46-0-0 50lb 19-4-19+mg 30lb 40-0-0-6s 50lb 46-0-0 50lb 13-11-2 30lb 40-0-0-6s 75lb	236 acres planted Some algae in 110s, one field, 122, suffered from poor seed, replanted. 121-122 now looking very good Yield potential very good All Harvested Awaiting yields