Belize Sustainable Agriculture, Ltd.
Joint Venture Farming Report – July 14, 2014

General Overview

Weather conditions have been, most unusually, very dry for most of this reporting period. Scattered showers over the majority of the country on Sunday July 13 gave relief to some very dry ground. Many areas have seen crops wither and die. This reinforces our belief that we must have irrigation and drainage for our crops. Of course for our rice harvest this has been perfect allowing long days of harvest. Most days have been dry with some wind and very bright sunshine. Farm activities continued unabated around the clock and much land preparation has taken place during this time. The light rains in the Hillbank/San Carlos region will allow more land work to be completed and planting to begin. Daytime highs have been in the high 20ºC 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)

The irrigated corn fields at the Thiessen Family Farms are looking very good and we are very pleased with the general health of the plants within the irrigation circles. The rows are beginning to close and leaf size is good. There is some damage from worms early in the life cycle of the plant, evidence of which is visible in the attached pictures. However, this does not pose any particular problem with the plant as there is enough leaf surface for photosynthesis to take place. The irrigation units have been running around the clock. The plants' water requirements are quite high during this growth stage. It will only increase as pollination begins to take place and seeds begin to form.

The approximately 200 acres of corn not covered by irrigation are suffering terribly due to drought. We do not have any areas where corn has completely died but yield will certainly be affected. There are large areas where corn has begun to cannibalize, as evidenced by the leaves senescing and hanging down. It is very informative to see the drought tolerance of the different varieties of corn, which we are duly recording to help us determine which varieties we should grow in future years.

Fortunately, after fearing that we would have to disc all of our non-irrigated corn (to protect the healthy irrigated corn), we have had sufficient rain over the course of the last three days to allow us to defer this decision; indeed a touch of optimism is returning to our JV partners and us on prospects for the non-irrigated corn. Two inches of rain over this time period is very much welcome and will hopefully not be too late. There are others in the surrounding area that have already "bush-hogged" their fields and are hoping to put in some soybeans with the next rains. We no longer think our non-irrigated corn will require this treatment, although we are not yet completely out of the woods.

We will also now undertake the foliar feed program earlier recommended to bring some of the micro nutrients into balance. The layout of our fields does not lend itself well to partial applications, so we are implementing this program on all of our corn. As fields become fully irrigated, such programs will be much more cost effective and beneficial, but we feel it is essential to see their impact on our irrigated corn this season. It is important to remember that we are still very much in a "learning" mode on the path to significantly higher yields on vastly greater acreages.

One particular concern over the last few weeks has been spider mites. These pests usually come later in the season or when things get very dry, which has been the case recently. The Thiessens have been monitoring for this and as populations increased we were able to spray using aircraft to get this under control. We were quite disappointed by the availability of appropriate insecticides for getting good control of these pesky critters. We confirmed with local suppliers that these products were in stock (locally held) in sufficient quantities but, once again, what we were told by local

dealers did not prove to be true! This is an area where our JV partners rely on us and we clearly need to adopt a "buy and hold" strategy for these key insecticides. While we addressed the problem, once again it was necessary to scramble!

The Thiessens are monitoring for worms throughout the growing season. This next major pest usually comes at "silk stage", which is right after tasseling when pollination begins to take place. The worms enters through the silk into the cob and can do considerable damage to the developing kernels. Monitoring for these is difficult as there is little evidence of their presence so vigilance is key. We have now assured ouselves that sufficient pesticides for this are in stock!

We are beginning to see differences in our trials section of the field. The most obvious being where black castings were used. This corn has proven to be considerably more drought resistant. Three weeks earlier when leaf tissue samples were done there was no identifiable differences in our tests. However, as seen in the picture the difference in color at 5 week stage is stark. It will continue to be a point of interest now that we have received some rain. The other trials, besides population, are not nearly as noticeable or maybe even imperceptible. We will continue to look for differences and advantages as the crop progresses.

Lastly, the recent rain will allow us to proceed with granular fertilizer applications, now necesssary on all our fields. This was delayed as the ground was parched and the plants would have received no benefit from such an application.

Irrigated Corn: Strong and healthy – (July 12,2014)

Non Irrigated Corn (Pioneer): Suffering! (July 12,2014)

Non Irrigated vs Irrigated in back (July 12, 2014)

Late planted corn: Worm casting on right (July 12, 2014)

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

Rice

Jacob was able to harvest the majority of his rice on time. There is a small 27 acre field (#220) that remains to be harvested (since completed). This is the piece that he replanted due to poor seed vigor, which therefore has a later growth cycle . It is ready to harvest and will be completed as soon as he is able to get into the fields because of rain showers off and on. Jacob was able to learn quickly how he could best harvest using his equipment without plugging it and have the painstaking task of cleaning it out!

Jacob began his rice harvest as scheduled on June 23rd and finished July 4th. His rice moisture ranged from 21-23%, with a bushel weight that is considerably underweight at 40-41lbs. Well finished rice should weigh 44lbs per bushel so this is an almost 7% shortfall. This low grain weight can be attributed to several factors;

- trash in sample used for test weight
- kernels not filling adequately due to lack of nutrients during grain fill resulting in small kernels (likely cause)
- excessive hull thickness due to the above lack of nutrients

This is obviously somewhat of a disappointment. It has been our observation that foliar applications during and after panicle emergence help to mitigate considerably these low test weights. Jacob's reluctance to use these products likely contributed to these below target results. The greatest elemental plant requirement at this stage of growth is potassium. This nutrient helps the other nutrients to move within the plant helping to fill the grain. There are also a fair number of empty kernels which are removed as part of the threshing process. This seems to be a fairly common occurrence throughout the region this year but surprisingly absent from Marlon's fields. Marlon is the only farmer in the area who has embraced foliar feeding wholeheartedly. Also contributing to the above challenges is the relative lateness of the crop. Rice planted early in the season does not suffer from as much heat during pollination and develops fuller kernels.

In light of the above, it is not surprising that Jacobs yields are likely to be disappointing. As Jacob did not weigh his loads after harvesting and before dumping into silos for drying and storage, we can currently only use his best estimate for weight from his 209 acres already harvested, which is 615 tons. This is an average of just over 6,000 lbs per acre, and we had hoped for a yield close to 7,000lbs. A small amount of this rice is destined for milling this week. This is when it will become clearly evident what the quality of the rice really is.

Marlon Dyck – 420 acres (Rice 100 % irrigated)

Marlon began his rice harvest on July 7th. By this time a significant portion of his fields 211-213 had lodged. The rice really seemed somewhat green and the moisture was still a bit high at 23%. Despite these drawbacks we made the decision to go ahead and begin harvest. The lodged crop had laid down quite badly due to a few quick showers as well as duck trampling (next year we will be much more aggressive in dealing with these pesky critters). The rationale being that waiting longer was only going to cost even more in losses from not being able to pick up the fallen rice. As it turns out

this decision was certainly the correct one and should probably have been made a few days earlier. The amount of rice that was unrecoverable in parts of the field was quite staggering.

These fields suffered from the beginning with poor plant population, less than ideal vigor, large areas with extremely high water levels due to poor leveling resulting in algae growth and later with lodging and ducks. Unfortunately the loss due to lodging is likely the greatest. The weight of the panicles was simply too much and of course this caused it to lay even flatter.

But there is also some very good news; the rice from fields 211-213 is milling very nicely! The merchant that purchased this grain from the fields began drying it immediately. On Friday July 11th he began to mill this rice, which had been harvested just a few days prior; this is virtually unheard of. The drying time frequently takes 3-4 weeks to bring down the internal moisture of the kernel out so it can be polished to appear crystalline instead of smearing as it is processed and polished. The quality of this rice is far superior to what our buyer is used to, and the other observation he made is that he has never had such clean rice come into his facility. We, of course, are very pleased to be able to deliver rice that is both high quality and clean. Clean means free of weed seed, grass, straw and any other foreign materials. The usual process before drying is to pass the rice through a pre cleaner to remove these foreign materials and light kernels. With this rice he does not need to do this simply because there is no foreign material! That is not to say that the fields do not have weeds or unwanted grasses but rather that our rice specific combine was properly adjusted and thus able to optimally sort the grain from the chaff. Way to go Marlon!

Harvest on the remaining fields began as soon as the 210's were complete; as predicted the 230's were ready slightly before the 220 series and were the first to be harvested. The yields from these series of fields are another story compared with the 210 series, as we are seeing results exceeding 8000lbs/acre on many areas. We are expecting these yields to continue over much of the next 210 acres yet left to be harvested. Indeed, we need these higher yields to bring our average to the expected 7000lbs/acre. We harvested until 10PM Saturday July 12th before overnight rains stopped our progress. We look forward to begin harvest again on Wednesday afternoon or Thursday morning (July 17th). The remainder of his crop is ready for harvest.

Rogueing of the fields continues and it is hoped we can stay ahead of the combines with this process. This is an important step that seeks to reduce/eliminate "red" or "wild" rice that is so harmful to our crop. Next season we may consider alternative (and very expensive) seed to mitigate this problem, but more on that in the future.

Marlon is ratooning 100 acres of this crop, specifically fields 235,236 and 237. This is an experiment with very little cost input, that involves cutting the rice stalks in such a way that a second crop will grow from them. A large majority of local farmers practice this and frequently achieve yields at least half as large as the original. Costs generally range in the BZD 300-500/acre range, so if we can generate 3,500 lbs of paddy rice at BZD 0.37/lb, this would generate an extra BZD 800/acre in returns, which more than doubles the profitability from our rice fields! The crop cycle is typically about half of the original crop's, which in this case is likely to be 55 to 60 days, leading to an early September harvest.

The worm casting trial is showing signs of being short on nitrogen. We have not observed this earlier but is clearly evident now at the end of its life. Where trimming has taken place, the plants are showing much less senescing and vigor. We are likely to combine this field last so we can take the time to monitor our yields in the area of the field with the castings. We anticipate reporting these results in our next JV Report.

An important part of these JV farming activities, especially as we grow our acreage, is to improve and develop our management strategy. As we prepare to farm acreages that are an order of magnitude or two greater than we have traditionally farmed, our organization needs to change. Some of the things we really enjoy doing must be given up because our job requires that we prioritize and do the things which are most important. Those things that can be done by others must be relinquished and newer, bigger priorities must be set. This can be difficult but is essential if our business is to grow successfully. Unarguably one of the most exciting pastimes on the farm is harvesting. There are few things that bring as much pleasure as driving through a mature crop and seeing it being loaded onto trailers, realizing that the risk of growing the crop has ended. It was with this excitement that Marlon was able to hand over the reins of the combine to a well trusted and experienced employee, knowing that he has never been at the helm of such an important operation on the farm; indeed the newly minted operator was himself surprised at the opportunity. This takes a level of maturity to recognize and even a greater level of surrender but that is what is necessary for growth to take place! Kudos to Marlon!

Combines ready to Harvest (July 3, 2014)

Field 234 Just Before Harvest: Beautiful! (July 12, 2014)

Other JV Farming Prospects

We have completed land preparation on about half of the 650 acres of rented land at Hillbank/San Carlos area. With the recent rainfall we can expect to plant in the near future, and believe that soybeans will germinate well. We will continue to work on preparing the remaining Hillbank/San Carlos land, subject to rainfall.

We are also working hard to prepare the 280 acres of sandy black soil in the Blue Creek area, where we also hope to plant at least some of that ground this season.

One area that has been particularly challenging this year has been procuring adequate supplies of high quality soybean seeds. We have searched throughout the region (including Guatemala and Mexico) and there is a clear shortage of non-GMO seed. It has taken us a considerable amount of time, effort and scrambling to secure the necessary seed (of satisfactory quality) for our land. We now have 370 acres of soybean seed available. These are not our preferred varieties but

are ones that nonetheless do reasonably well for summer crops. These are a local variety usually grown for winter crops called 3296 and another one known as Huasteca 300. This variety yields really well but is very difficult to maintain seed vitality over longer periods, even if in cold storage. The seed we are getting is fresh and has about 85% germination. It produces a big strong plant, but it very quickly breaks down after maturing. While these characteristics are not ideal, we will manage the challenge as it looks like these seeds/varieties are all that can be obtained for this season.

Changing how seeds of all kinds are procured must remain one of BSA's priorities going forward!

Where we do not have sufficient/satisfactory soybean seed, we will be planting milo. We have Marathon seed in stock with very good germination and vigor, and our remaining acres will likely be planted with this seed. While Milo is likely to generate only a modest profit, it will be important to have a crop in the ground to improve its quality ahead of this winter's key bean season, which has such good prospects for superior profitability.

Summary and Conclusion

We continue to expand the dialogue with our initial contacts in Guatemala. Among the key issues we are working on are: price, delivery terms, payment terms, and credit risk. We are looking to make an initial shipment of several truck loads (at 50,000 lbs/truck), leading to a total first order of 500 mt (~1,100,000 lbs, or 22 truckloads). A key issue is how we retain some type of security for any grain we ship to them. Traditionally, in international trade, with a new customer there would be either a Letter of Credit or the shipment would be COD. This seems to be different from how the Guatemalan buyers (other than the Frito-Lay type customer) have done business before and we are trying to our best to educate without appearing too arrogant or demeaning.

The current corn in storage has been tested for germination and it does not qualify for selling to the higher priced market of Frito-Lay in Guatemala. Given what we witnessed in terms of local drying methods, this was an expected outcome, but it is still disappointing as would like to get a first test order sold to Frito-Lay. However, we will ensure that our corn from this summer's crop is dried properly (e.g. by us) so that we can begin this promising relationship. best to ensure we have some corn that can fill this market from the current corn being grown. In the meantime we are making every effort to sell our current stock to feed industry buyers (less demanding) after ironing out the various logistical details.

We are also expanding our dialogue with several prospective bean buyers, both to help our local partners move their residual balance of beans and to establish direct contact with end user buyers going forward.

The local corn price is being dragged down by global forces, with current pricing in the BZD 0.21-0.22/lb range (~USD 6.00/bushel). We do not see any prospects for significant improvement, although the challenges faced by local Belizean farmers with this season may lead to continuing shortages next year.

Soybeans continue to be in strong local demand, and we are still seeing prices around the BZD 0.60/lb (USD 18.00/bushel), which is a nice premium to international prices.

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	?	160	N	Red	Milo	Marathon			TBA	Land Prep continues
BSA / Marlon & Team	Hillbank	?	370	N	Red	Soy Beans	Huasteca 300 120 acres 3296 250 acres			TBA	Land Prep completed. Awaiting Soy-bean planting
BSA / Marlon & Team	Hillbank	?	120	N	Red	Corn ?	N/A				Land Prep completed. Too late for corn – Considering options
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
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	Trial Plot managed by Marlon Dyck Reviewing Germination results- Thiessen; Impacto 93% Dekalb 94% Impacto 99% germ Dekalb 99% germ

										SinerPotasio 8L/ac SinerPlus 1L/ac	
Thiessen Brothers	SC	Trial 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	Waiting finalization of HAC agreement
TBA	Blue Creek	?	200	N	Sandy Loam	Soybeans Milo?	(seeds/acre)			TBA	Waiting finalization of HAC agreement
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 Pending
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	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

										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	