

Belize Sustainable Agriculture, Ltd.
Joint Venture Farming Report – June 2, 2014

General Overview

Weather conditions continued to be less than favorable for many farming activities during the course of the last two weeks, with a fair bit of rain over the region. The general consensus is that the rainy season has arrived and any farm activities will need to be done during the short intervals between rains. Weather forecasts show more favorable conditions starting Wednesday June 4th and continuing for 10-14 days. Indications are that those with early crops in the ground are at risk of losing a substantial portion due to drowning, which would in turn lead to much of that intended corn crop being diverted to soybeans. Recent weather patterns have also resulted in delays in land work being completed in time for what is generally considered to be a very early rainy season. Humidity continues to be very high and vigilance is required due to increased fungal pressures. 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>

We have been working on improving our access to soil and plant testing data, and are pleased to report that we have found a new local soils laboratory. Their analyses are done quite differently from conventional and cheaper labs: using their approach elements are tested in their actual soluble state and values are given which reflect the plant's ability to uptake each individual element. This same lab is also capable of doing leaf tissue analysis which we will submit as early as possible and apply corrective or additional nutrients as needed, which is very helpful. This locally available lab is indeed a very positive development as we can now get analyses done in 3 days compared to 3-4 weeks when shipped abroad. We submitted samples to them from the Thiessens' fields and promptly received encouraging results, which tend to confirm our earlier analyses. Small adjustments need to be made with the P&K portions of the fertilizer with slightly less phosphorous and slightly more potassium being applied; plans are being made to correct for this in future plantings. For this crop, all planting has been done with an extra 50lb application of 14-36-12 at planting and we will use leaf tissue analysis to track any deficient fertilizer categories, which we hope to mitigate using liquid/foliar applications.

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

The Thiessens took maximum advantage of any dry moments and managed to plant approximately 200 acres of corn before rains stopped their progress. They have received approximately 3.5 inches within the last week with the majority of it coming over this past weekend. Barring any more rain and assuming (hopefully!) some sunshine, they should be able to return to planting as scheduled. In weather situations such as this, we see one of the advantages of farming "red soil"; water moves through the soil very quickly. The Thiessens are pleased with the equipment they have acquired and have been able to make good use of it. Two additional tractors in the 80hp range have helped them complete in a more timely manner the ground work necessary to prepare for planting. The Thiessens were also able to purchase two refurbished John Deere planters, which have been used for this season's crop. Both of these units are equipped with granular fertilizer application units for inserting directly below the seed. This has been the most common method of placing fertilizer into the soil and continues to be the preferred method for most farmers countrywide due to its ready availability. Our plan calls to migrate from this approach to liquid starter fertilizer as the preferred method. Fortunately, all of the Thiessens' equipment can be readily switched over to a liquid system, with a modest additional investment, as we demonstrate the benefits of this approach to them.

From a crop viewpoint, we are pleased to report that the Thiessens have suffered no drowning, that the corn they planted on May 28/29 is emerging and that rows are now clearly evident.

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This crop we have initiated some trials on the Thiessen fields, with Marlon Dyck being responsible for all aspects of these trials, including which equipment will be used, so that we can have a high degree of confidence that the trials will be rigorously and diligently carried out.

The trials, covering some 226 acres in total, involve seeding two different plant populations using two completely different fertilizer programs with two varieties of seed, on irrigated and non-irrigated ground. Land preparation will be the same as will access to irrigated/non-irrigated ground. As a result of these trials, we hope to improve our knowledge of the following points:

- What plant densities produce the highest yield in red soils?
- Which type of fertilization works best on these soils: liquid or granular?
- We also hope to get an early idea of what incremental yields can be obtained by increasing fertilization levels, although it should be noted that the first step is to better understand what type of fertilizer works best, then to fine tune the yield pick-up from incrementally higher amounts of fertilization.

In reference to the fertilizer, it has been established that for many crops, and especially corn, the first 21 days are very critical in the plant's development. The primary element responsible for the rapid growth in this early developmental stage is phosphorous. Therefore it is imperative that this nutrient is there in sufficient soluble form to adequately supply the plant. In soils such as ours that currently do not have a long history of applying sufficient fertilizers to build up an abundance of available nutrients, the most certain way to provide the necessary amounts of readily available nutrients is to use liquid fertilizer of sufficient quality and quantity to supply the plant's immediate needs.

While we do not necessarily believe that this is always the best or most cost effective solution for long term soil development, it is certainly the preferred method on "young" soils. We therefore expect that the use of liquid fertilizer will become the norm for our soil types, especially when considering their relatively low salt content compared to granular.

However, this approach certainly does not preclude any granular fertilizer being used as it will continue to be the primary source for nitrogen and potash for long term soil fertility building purposes.

As for corn seed, we will be using Syngenta Impacto and Dekalb 7088 seed for the trial plots. These plots will consist of two population densities: a 30,000 and a 35,000 population. They will be planted on a staggered basis across the field so that there will be an even amount of each variety for a given density. Germination tests were undertaken and records are being kept for future use. Germination test results will be compared to actual planting results in the field.

We will be planting the trial plots under one of the Thiessen irrigation pivots, so that we can collect data from irrigated and non-irrigated corn; given that the rows are considerably longer than the area covered by the pivots we will obtain results from both soil types. Additionally, both methods of planting fertilizer application (liquid and granular) will be employed.

Accordingly, we should obtain very valuable data focused on two different seed varieties and two different fertilization methods, given that all other field preparations and nutrient programs will remain the same. The acres allotted to these trials are such that the margin of error should be quite low.

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We remain committed to our working relationship with the Thiessens and believe their commitment is being reciprocated. They have indicated their desire to work together with us in their other farming endeavors and discussions are continuing how this may develop for mutual benefit.

Please note that a mistake was made on the last JV Report, wherein we indicated the starter granular fertilizer being applied was 12-26-14 when indeed it was 14-36-12.



Thiessen's Planting Corn (May 29, 2014)

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

Black Eyed Beans

These beans have been graded and are destined for market. They rated well above average with excellent color and a count of 500-520 beans per 100grams. While demand for BEB's apparently remains high, we are puzzled by the low local price. This has prompted us to take a closer look at export opportunities, even though we only have a little more than one container load. We anticipate by the next JV Report that we will be able to confirm the BEBs have been sold for export. Local markets being what they are, we would probably need to have an agreement in place with an export buyer before considering planting any meaningful quantities of BEBS. Once the BEBs have been sold, we will also report back on the economics of this crop, which this year will have been quite disappointing

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Rice

With the exception of approximately 25 acres Jacob's rice is fully headed. Most of his rice is in early dough stage indicating it is filling the grain and beginning to harden. As indicated in the photo some kernels are beginning to change color to a light tan and showing quite a bit of maturity. The grain size is excellent and panicle size average to slightly above average. The earlier planted rice is "hanging its head" quite early which is good. This indicates good weight in the seed. The remainder of his crop is in late milk stage and maturing as expected. By the next report it too should have moved to the dough stage. This is an important milestone in the life of a rice plant. The majority of pest management is complete at this stage with the exception of grasshopper or locust infestation. Fortunately the dreaded spinki mite has not reared its ugly head and by far the majority of Jacob's crop has surpassed the level of maturity at which the mites harm the crop. Stink bugs are still a consideration but have not been an issue with Jacob's crop. As mentioned in earlier reports, chemicals are in stock to battle either of these possibilities. Indications are they will not be needed as surrounding farmers have not needed to exercise their use. Some other good news is some of the later fields surprised us with more consistent panicle emergence!

Unfortunately all the rice fields received at least 6 inches of rainfall over the last 24 hour period. I say at least because the gauge only measures 6 inches and it was full! How much more we received is anyone's guess. This has created a unique situation where water needs to be drained from the fields potentially taking some nutrients with it. This is indeed unfortunate but necessary as leaving too much water on the field will result in much more harmful conditions than the potential loss of nutrients.

Another concern for irrigated rice is long periods of extremely bright sunshine and hot conditions. It is believed that the water either gets too hot or that a fungus develops causing mortality. No fungicide has been found to combat this condition. The only known cure is dropping the water level very low or maintaining only moisture on the fields. As can be easily understood, with rains such as last night's maintaining low water levels is difficult. Jacob has been looking after this very well and is being encouraged to be vigilant in this area. This condition is much more present where plant population is low and sunlight can directly heat the water. An even and dense plant stand also prevents this condition from occurring.

The last area of concern in Jacob's fields is the amount of lodging beginning to take place. Jacob has one field that has particularly bad infestation of "red" or "wild" rice. This particular plant adapts itself very well to its surroundings. It will always grow at least 8-12 inches higher than the remainder of the crop. The plant itself is inherently weak and tends to lodge much easier than the intended cultivar. The damaging aspect of this is that also takes the preferred rice with it to the ground. As mentioned before, selection of varieties is imperative in order to get control of this plague. Unfortunately for Jacob there is nothing that can be done at this stage. Inclusion of these types of varieties in rotation must be considered for the next crop or this field will simply remain fallow.

As we reported in the last edition, Jacob was in need of upgrading some of his equipment and he has added a fairly new New Holland tractor to his equipment pool. We will provide pictures in a future report.

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JSN Rice Maturing (June 2, 2014)



JSN Rice "Lodging" (June 2, 2014)

Marlon Dyck – 420 acres (Rice 100 % irrigated)

Marlon's earliest rice (planted March 12 2014) is beginning to go into head. In a week or so the entire 90 acres will be fully in head. From early observations the panicles are well developed and of good size. Size matters in determining yield potential. It is Marlon's turn to be vigilant with spinki mite detection and other insects that can harm the freshly emerged panicles. Rigorous daily scouting has been programmed, and the necessary insecticides are in stock in case of an outbreak. As the fields go into head the color changes to a lighter color green and the sweet aroma intensifies.

Fields 221-226 & 231-237 (Replanted March 29-31) are continuing to tiller and grow plant mass in anticipation of sending out panicles. This should start in about two weeks. At that time tillering will slow down or stop. Indications are these panicles should be larger and longer than those we have seen up to this time. The diameters of individual plants are quite large with some measuring a full 3/8". There is a direct correlation between girth and panicle so it will be exciting to see what these panicles will be like.

Marlon too experienced significant rainfall amounts exceeding 6" over a 48 hour period. Draining the fields of excess water is important due to potential fungus and the earlier mentioned lethal condition due to high water temperatures. He is scheduled to apply more nitrogen this week to give the plants a boost as panicles begin to emerge. This product is locally available and will be applied as soon as water levels are stabilized.

Marlon has made good headway in preparing his equipment for harvest; accordingly we do not expect to need to plan on repairing equipment when it should be in the field harvesting. Due to the amount of rain we have been having and the season in which harvest will take place Marlon is also ensuring that the tracks are ready for his combine. These are used in place of the front tires which do not provide enough flotation and grip under the extremely muddy conditions that rice is grown in. In a dry season crop the water is lowered from the field at the correct time to allow the crop to use up the remaining moisture for grain fill and with normal evaporation taking place the rice is harvested by driving on dry

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ground. Also, much of this specialized equipment (the type of combine and header is rather specific for rice) has been standing idle for three years and needs a thorough overhaul to ensure a trouble free harvest. Our previously reported pre-sale of the entire crop to a local merchant has eased equipment maintenance pressure somewhat as drying and cleaning equipment do not need to be readied as that is part of the responsibility of the buyer.

Other JV Farming Prospects

We have now focused our negotiations with HAC for the remaining land we are interested in farming for the Summer 2014 Season, and we expect to be able to report on definitive agreements by the next report.

- **HAC** – rent ~650 acres of non-irrigated red soil in the San Carlos/Hillbank area. This ground would not be part of a JV program, but rather would be farmed by BSA personnel (MD, JP, and helpers.). We have been able to come to a satisfactory agreement, and expect to begin land preparation as soon as weather conditions allow. The crop allotments are as follows; 120 acres corn and 530 acres soybeans.
- **HAC** – rent ~280 acres of non-irrigated sandy black soil in the Blue Creek area, almost adjacent to our current rice crops. Here too, we continue to make progress towards a satisfactory agreement. It is quite possible this will become 80 acres only. Work will begin on this ground as soon as weather permits.

Summary and Conclusion

Weather conditions are currently somewhat challenging, with, in some parts of the country, an early and occasionally powerful start to the rainy season. However, unless we are subjected to repeated heavy downpours in the Blue Creek area, we do not consider our rice crop to be severely at risk. Moreover, the lack of marketing/sales exposure for this crop means that we can consider ourselves to be in the final leg of this important effort. We remain hopeful that yields will be quite rewarding!

We believe that this Summer's corn crop, again subject to Mother Nature's vagaries, has the potential both to set new record yields for the Thiessen's (and us!) and to provide important information on the road to the long term goal of "200 Bushels or Bust!" corn yields in Belize.

Assuming we proceed with the Hillbank land rental, we expect to plant ~710 acres of corn, ~530 acres of soybeans, and ~200 acres of sorghum milo. We are reluctant to plant too much corn until we secure our own export channels, as domestic plantings are rumored to increase by 50%+, and we doubt the domestic market's capacity to absorb much additional supply. More reassuringly, there continues to be a significant shortage of soybeans in Belize's domestic market (primarily used for animal feed), and we believe that we can secure good prices for these soybeans while helping the country meet its domestic foodstuff requirements. The milo would again provide an opportunity to test another commodity to see what crop economics would be like assuming one can generate something closer to North American yields (historic yields in Belize have been very low, but local farmers have invested next to nothing in their crops). Moreover, continued heavy Chinese buying has absorbed most of the world's excess milo, continuing to secure a (historically unusual) premium price (versus corn) for this key feed grain.

A key "Next Step" for our project is to develop direct distribution channels for our products. 2013 and the first half of 2014 have demonstrated how unreliable Belize's domestic market, as well as traditional "grey market export channels", can be. It is therefore essential that we make every effort to develop rapidly our own channels. We have begun a multi-pronged strategy to reach out to potential export buyers of beans, corn, rice, and potentially other agronomic crops.

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On the bean front, we began initial contacts with Grace-Kennedy, based in Toronto, Ontario, which looked like a worthwhile avenue for the sale of LRK's. From early conversations it appeared the demand for this product was strong due to shortage of supply and it looked like sales of large volumes might be imminent. This excitement has cooled off significantly and they have now indicated to us that they are interested, but only in limited monthly quantities; perhaps 2 containers (~1,000cwt) per month. They further indicated that we should not count on them for large sales and pursuing other customers would be in our best interest. The Belize embassy in Washington, DC has also been extremely helpful in getting our name out to several prospective buyers in the Central American region. Through this channel we have been able to make contact with New Coast Trading Inc. in Florida. The majority of their clientele is based in the equatorial region. Their primary interest is in BEB's, but they are receptive to pursuing LRK's in the future. Contact has also been made with Lasco, another large volume buyer of LRK's in the Caricom region. While we are in early stage discussions, interest appears to be there and we hope that by the next Report we can share further progress.

Efforts to develop end user customers in Guatemala and Mexico are in their early stages, and we will share progress in the next couple of reporting periods. While Belize's reputation for producing a high quality product seems well established, our inability to offer substantial quantities remains a challenge. Nonetheless we hope to entice prospective buyers with the opportunity to secure a new and attractive supply channel whose capacity is likely to grow rapidly in the future. We expect to invest a material amount of time, effort, and travel budgets in the next few months to calling on prospective regional partners. We also look forward to leveraging our network within the regional US Embassies, the Government of Belize's official contacts, and a number of other lead generators.

For the next fortnight or two, we seem to be stuck in a holding pattern until more favorable weather conditions present themselves. Until then, all efforts are being geared to ensuring that equipment is field ready and operators are fine tuning their skills for more efficient and smoother operations.

Thanks!

John Peters

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Grower	Location	Field #	Acres	Irr?	Soil Type	Crop	Seed Variety	Plant Date	Stand Date	Fertilizer Program	Comments
BSA/ Marlon&Team	Hillbank	?	120	N	Red	Corn	Syngenta Impacto			TBA	Waiting finalization of HAC agreement
BSA/ Marlon&Team	Hillbank	?	530	N	Red	Soy Beans	TBA			TBA	Waiting finalization of HAC agreement
Thiessen Brothers	SC	T1	131	TBA	Black-red loam	Corn	Dekalb 7088			150lb 14-36-12	Summer 2014 Crop – waiting for rains to start planting
Thiessen Brothers	SC	T2	139	TBA	Black-red loam	Corn	Pioneer 4226	May 29/14		150lb 14-36-12	Reviewing Germination results
Thiessen Brothers	SC	T3	51	TBA	Red	Corn	Syngenta Impacto	May 28/14		150lb 14-36-12	Reviewing Germination results
Thiessen Brothers	SC	Extra	52	TBA	Red	Corn	Dekalb 7088	May 28/14		150lb 14-36-12	Reviewing Germination results
Thiessen Brothers	SC	Extra	139	TBA	Red	Corn	61 ac Syngenta Impacto 79 ac Dekalb 7088	Waiting		150lb 14-36-12 + liquid	Summer 2014 Crop – waiting for rains to stop to start planting Trial Plot managed by Marlon Dyck
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	Milo?	(seeds/acre)			TBA	Waiting finalization of HAC agreement
Marlon Dyck	Rio Bravo	210-212 220-226 231-237	420	Y	Heavy Black	Rice	Cheniére local supplied	March 12/14- March 31/14	Vigor issues	Base of liquid ferts 81lb 40-0-0-6s 68lb 10-36-10-6.8s-.9zn 75lb 40-0-0-6s 75lb 10-36-10-6.8s-9zn 100lb 40-0-0-6s 30lb 10-40-5-7s-7zn	210-220-230 planted Significant Issues due to bad seed 210 Series now much improved 220-230 Very Promising

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Jacob S Neufeld	Rio Bravo	110- 114 121- 123	230	Y	Heavy Black	Rice	CHENIERE	5-6- 7/3/14		65lb 15-15-15 65lb 12-24-12 50lb 40-0-0-6s 30lb 13-11-21-2s 50lb 40-0-0-6s 50lb 46-0-0 30lb 19-4-19+mg 50lb 40-0-0-6s 50lb 46-0-0 30lb 13-11-2 75lb 40-0-0-6s	236 acres planted Some algae in 110s, one field, 122, suffered from poor seed, replanted. 121-122 now looking very good
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