

**USDA CSREES Higher Education Challenge Grant HEC 2007-2010
Trip Report**

*New Paradigm for Application of Discovery-Based Learning:
Implementing Bottom-up Development by Listening to Farmer's Needs and
Using Participatory Processes and Holistic Thinking*

Site visited: Mali, West Africa

Trip Report: July 16-29, 2008

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2.0. Executive Summary

The main purpose of the trip was to continue efforts towards shea butter quality improvements and possible exportation to Western markets from the Zantieboucou cooperative as well as to ask assessment questions regarding previous and future work of the Agri-Business Entrepreneurial Incubator Network (“the Network”)(in 2009 the name was changed to Mali AgriBusiness Center [Mali ABC]). The assessment questions ranged from malaria issues in Sanambele to sustainability questions for the Network. Engaging a holistic approach, I attempted to build momentum to advance the Network’s goals. I also served as a strategic communicator between American efforts and Malian realities, as unmet expectations and unstated assumptions have hindered several participants’ past productivity.

I worked closely with Belco Tamboura, the primary Network coordinator, in a new model for the grant. This trip was the first by an unaccompanied student extern, thus placing much of the responsibility on the host mentor. Most major objectives were accomplished. Thus, having host mentors ask for externs and plan their respective agendas is a model I’d highly encourage for the future.

In the village of Zantieboucou, I demonstrated and taught the women of the Corprakazan Cooperative, the shea butter cooperative based in the village of Zantieboucou, how to use a chemical kit developed by Chris Sedlack that tests for Free Fatty Acid (FFA) and Oxidization Peroxide (OP) levels in shea butter. The kit was brought to cooperative as a tangible deliverable at the local level, thus mitigating a major previous complaint about the Network’s efforts to follow through at the village level. The chemical kit that test quality in the field was of great interest to many organizations working with shea and is probably a viable way for the Network to generate revenue.

The women of the cooperative, Belco, and I also discussed other quality, exportation, and diversification issues. We spent several hours on the report from the American Shea Institute that yielded very positive results for the physical and microbial characteristics of Zantieboucou shea butter but indicated quite low to poor chemical properties. The exportation and sale of the shea butter is now being handled by a Bamako-based marketing branch of the Cooperative (Bamako is the capital of Mali). The meeting with that team provided much new information about recent developments with Corprakazan shea butter as well as cause for concern about introducing middle men. The women are interested in diversifying their products into hand creams, soaps, and other shea products as well as possibly tapping into honey and beeswax markets. However, in both cases more information and training is necessary.

Network efforts are progressing and some issues were hashed out in a team meeting. There is a major problem with respect to the internet connection and invoicing/sending money from the US to Mali. This needs to be figured out soon. The team agreed to focus on shea butter efforts temporarily, while continuing other research. Communication must increase dramatically between the Americans and Malians as well as written and agreed upon roles and expectations of the Network team and funding grant intuitions and professors. Currently, holistic practices are not being used as prevalently as hoped. It is of crucial importance that the team starts to act more independently and towards sustainability.

3.0 Objectives of Visit

- Determine whether a holistic process is being used
- Stimulate a Network meeting
- Secure proposals for a sound network connection
- Advance Zantiebouyou shea efforts
 - Discuss *quality* determination, managing and monitoring
 - Share information on establishing *export markets*
 - Brainstorm *diversification* options
- Follow up on holistic efforts in Sanambele
- Check the functioning of the CTI grinder in Sanambele

4.0 Accomplishments of Objectives (By objectives what was accomplished)

All major objectives were accomplished to one degree of another.

- **Determine whether a holistic process is being used:** A holistic process is being used in some cases and not in others.
- **Stimulate a Network meeting:** The Network met on Monday, 28 July 2008. Please see the journal entry for that date in section 5.0 for the complete transcript.
- **Secure proposals for a sound network connection:** A proposal was secured and sent to respective accountants and professors on Tuesday, 29 July 2008.
- **Advance Zantiebougou shea efforts**
 - **Discuss *quality determination, managing and monitoring*:** Quality was discussed on Tuesday, 22 July 2008. The chemical kit was demonstrated as a means of quality determination and the results from the American Shea Institute stimulated suggestions for managing and monitoring.
 - **Share information on establishing *export markets*:** Many discussions revolved around establishing export markets including meetings with: the cooperative on 22-23 of July, the marketing team on 24 July, Jean Harman on 25 July and subsequent discussions with Belco.
 - **Brainstorm *diversification options*:** Belco and I discussed diversification with the Zantiebougou cooperative on 23 July.
- **Follow up on holistic efforts in Sanambele:** On 29 July, Abdoulaye and I traveled to Sanambele and met with representatives from the community about the grinder and malaria issues.
- **Check the functioning of the CTI grinder in Sanambele:** The grinder is functioning. See the journal entry for Tuesday, 29 July for more information.

5.0 Journal (a daily log of what was done, visits, meetings, cultural experiences, other things related to visit objectives or helpful information for the faculty and students who will follow you here to Mali.)

Wednesday, 16 July 2008: I bought gifts to give away in Mali- the favorites were calendars, Montana playing cards, candles, one picture/page photo albums and huckleberry taffy. I flew out of Bozeman airport at 11:15 a.m. At the time, Northwest Airlines allowed international travelers to take two 50-lbs bags. My suitcases were both over 60-lbs so I had to pay \$100. Note that bags over 70-lbs are not accepted and will not be loaded onto the plane. The connection in Minneapolis gave me a couple hours to stretch my legs and hop back on a plane to Paris at 15:20.

Thursday, 17 July 2008:

I had a nine-hour layover in Paris and would highly suggest to future travelers a trip into the city. A day pass for the RER train and all metros costs 18 euro. The train station is connected to Charles de Gaulle airport and well marked. There is a ticket counter on the first floor of the station with trains going to Paris on tracks 11 and 12 down below. It takes 40 minutes to get to Halles les Chatet- the central station of the metros in Paris. Trains leave for de Gaulle-Chatet every 15 minutes. I went to a lovely café near the Tulleiers and Musee de l'Orangie to see Monet's Les Nymfes.

Getting back through security only took 15 minutes, although the airlines suggest that passengers arrive 2.5 hours before departure. I arrived in Bamako at 20:20 and Aissata Thera and her daughter Ume picked me up. The airport employs baggage boys to help with luggage, but Aissata told me to give the man \$5 anyway. They expect white people to pay this much. I found the Bamako airport smaller than expected, the air balmy, and the chaos manageable that late at night.

We went to Aissata's home and briefly said hello to her family members, who were sitting around on the lower patio. One could immediately sense the hospitality so often cited about Malians as well as their commitment to family. I spoke a few words to Bambara to the elder people, who were delighted with my feeble attempt. I'd highly suggest memorizing the typical greetings and how to say "I'm full" in their language.

I stayed at Aissata's parent's home in a honeymoon suite, of sorts, disconnected from the house. There was a patio facing the main part of the home, two rooms, and a bathroom. The bed was short, but had a bed net. It is Malian tradition to take special care of your guest the first night- so I watched with unease as Aissata ordered her daughter to make my bed and her nephews to carry in my heavy bags.

When Aissata left, I hit the wall of a different culture, exhaustion, and excitement simultaneously. I showered in a hurry and smeared Sawyer's Controlled Release 20% Deet over myself before crawling into the bed. People were chatting outside- so I grabbed earplugs, a melatonin to kick jet leg, and thankfully remembered to take my malaria medication. I quickly fell asleep.

Friday, 18 July 2008:

Aissata had arranged for her nice nephew, Amadou, to take me to get CFAs (pronounced se-fah) water, and phone cards. I had a Visa ATM card and had to go to five different banks to find a place that would accept it. Many banks only take ATM cards

from Mali, if they take any at all. However, the bank called BICIM- located near the river and central bank of Mali- has 2 machines that take Visa ATM cards and is open 24 hours a day. We then went to a supermarket and bought 24 1.5 liter bottles of Tombouctou water for 14700 CFA. Upon later inspection, I think they may have charged me double for the water (i.e. they charged me for 49 bottles instead of 24). A 1.5 liter bottle of water should cost about 300 CFA. I bought a 1000 CFA Orange phone card- which wasn't nearly large enough. It takes about 2000 CFA for a five minute call to America. Entering the minutes of the phone card is quite easy: you simply scratch away the grey film covering the 14 number code, press *123* followed by the code, and the #, and then push send (or the call button).

Amadou and I then went to Café Broadway (Rue 224, face Sekou LY-Hippodrome Bamako. Tel: 223-221-2618). They sell a large variety of good food and there were many Westerners in the restaurant. The Theras are friends with the owner. My steak kebab, French fries, and coke cost 4000 CFA. Amadou and I spent the hour awkwardly staring at each other, because we didn't speak the same languages. Towards the end of we started playing tic-tac-toe which was entertaining (comparatively speaking). When I called Aissata she said she was nearby and would pick me up "soon." Cultural note: "soon" has hence meant anywhere from 5 minutes to 4.5 hours.

After 45 minutes of monotonous children's games, Aissata and her 4 extroverted sisters-in-law picked me up in the family van. We made a stop at another relative's home to drop off some money for a wedding. Inside three plump women were watching the Tour de France. Cultural note II: always say hi- in Bambara or French- to everyone. The Malians shake hands with everyone in the room they enter. I didn't do this to with the three plump women and endured stares the rest of the visit.

Aissata dropped me off at IER-Sotuba, a research station aiming to find agricultural solutions for rural development efforts. I first met Pat Hipkins, a pesticide researcher at Virginia Tech. After explaining the goal of my visit she told me about a Peace Corps volunteer named Christin Spardley who worked with women on shea issues. I called Christin right then and we arranged to talk the next day. Pat also told me that Madam Gamby is working on the fruit and vegetable division of IER and that horticultural crops that can be sold for exports but they are only transportable by air.

Then I met Madame Gamby. I quickly explained that I am working with Belco on shea butter issues. She said that the shea price is high this year- 900 CFA compared to last year when it was around 350 CFA, asserting that the increasing demand is driving up the price. The shea trees also have many nuts on them this year, so it should be good for the women. Madame Gamby went to Dakar on the 20-26 with Pat, so we planned to meet again when she returned.

Abdoulaye Camara drove me back to the house. I gave him \$65 for an order Florence Dunkel placed with the women of Sanambebe to pay for her crochet items. Abdoulaye stated that he became a civil servant last week and that he works for Madam Gamby. He hasn't done anything with the BTI for malaria prevention in Sanambebe because he hasn't received any money from the USDA project for the transportation (confirming that the cost-reimbursable delivery of funds required by the USDA was not understood). "I'd love to work for the project, but I need money to leave my job" he said. He only needs money for the gas to Sanambebe, not a wage. He can probably drive the IER car and Madam Gamby will definitely give him time off work to do the malaria work

in the villages. Sanambele is about (he, like many Malians, was hesitate to estimate) 70 km from Bamako. Dean Drenk said gas should be about 105 CFA/km.

I called Florence once we returned. We decided that she would drop \$450 off at my house to pay for two trips for Abdoulaye to make to Sanambele. I then went outside to practice Bambara with the aunt of the household. Basseko, another nephew studying English and Arabic at The University of Bamako, came and helped me with pronunciations. Later that evening I played card games with the nephews, toured Bamako on the back of Basseko's motorbike, and sat with their entertaining friends in the street until late into the evening.

Tip: Bring a French-English dictionary with you to Mali.

Saturday, 19 July 2008:

I woke up at 7 to go to an internet café, which didn't open until much later. Basseko and I talked for a while until he left for school. The aunt tried hard, by pouring water and coffee into a cup, to get me to drink something. "Ne fara"- I'm full- over and over again is the only way to stop the insistence. I wondered whether I could have drank something- considering that the water had been boiling minutes earlier. But I was unwilling respect cultural norms at the price of my health so early in the trip.

I walked down to a kiosk nearby and bought another phone card. I called Christin Summers and had a great conversation with her. She fell into working with shea second handedly by going to soap company for entirely different issues and realizing that there was a huge market for using shea butter in secondary products. At her urging, the Peace Corps made shea development a priority and received funding from USAID. Now she does training with illiterate women about how to grow exportable nuts. Some common suggestions are to avoid storing the nuts in pits because they rot or cooking them in stoves because the smoke raises carcinogen levels. The Peace Corps has printed booklets that explain proper techniques.

Women in her village already grew nuts properly, so she next focused her efforts on tapping into a larger market. She found a large buyer from Senegal who required a minimum of 10 tones- since the area where Christin works is so remote it is not economical for transportation of the nuts at a smaller amount. She grouped together 5 villages and they received 150 CFA/kg. The woman choose a selling week and all brought their nuts to a central location during that week and were paid individually but added to the collective pile of nuts.

The problem, Christin explained, is that Mali lost the value added by making the butter. One kg of shea nuts is worth 150 CFA. It takes 3.5 kg of nuts to produce 1 kg of butter. One kg of shea butter is worth approximately 1000 CFA. Therefore, it would be best for Mali to make butter out of all nuts grown in the country.

In terms of quality, it is far easier to change the nut growing process than changing the way shea butter is made. There is a disconnect between rural areas and places like Zantiebougou. Corprakazan cannot produce good butter if they are unable to buy good nuts. Also, the cooperative cannot guarantee a buyer a quantity of butter if the growers do not properly estimate the amount of nuts produced.

The women are struggling with many things, according to Christin. They do not understand how prices are set, why they rise and fall, how to work with buyers, and the materials needed for shea butter production. Women have trouble estimating how much

they can produce. Development groups come in, like CDCI or USAID and put in machines but do not educate the people about how to use them or they break and nobody can fix them. This sounds like a perfect role for the Mali Agribusiness Network to provide with a fee for services.

Christin told me about a network called National Reseau that is connecting people. Right now it is a bit shaky- they don't meet very often and groups are not joining very rapidly. The Peace Corps is trying to help people sign up through publicity efforts. Eventually the Reseau will establish means to help growers understand prices by sharing the going rate and which buyers to avoid.

Buyers, mainly Europeans, have been repeatedly burned by the Malian market because shea butter producers sign a contract for a certain amount but are unable to meet it later. Neighboring countries, like Togo and Burkina Faso, received a whole bunch of money for shea development so they already have more coordinated systems. Now it is very difficult for the struggling Malian market to get caught up. A major opportunity for Mali is to explore the organic market, Christin said. One kg of organic butter is worth around 3,500 CFA. She thinks National Reseau should be the body that finds out about organic certification, but they aren't doing that yet. Here is another role for the Mali Agribusiness Network.

Right now there are basically three fronts of the Malian shea market. World Vision ECRAF- the International Center for Research in Agro forestry, is helping with natural resource management- as in how to take better care of shea trees. The Peace Corps is encouraging women in small villages to tap into larger markets by producing higher quality nuts. National Reseau should be doing the large-scale export organizational work. Christin ended the conversation emphasizing that any practical recommendations made at Zantiebouyou should be shared with the National Reseau.

I called Belco after my conversation with Christin and agreed to meet later in the afternoon. Then I headed to the Cyber Café. Chris Sedlack requested that I make labels on the kit that asks users to wash their hands, not to use the kit near food, keep out of the reach of children, and to not consume any shea butter used in testing. Each kit cost \$34.76 to produce. With the tub, he thinks that the kits can be reproduced for under \$40. I printed out Ada Gusti's trip report (33 pages) and the book prospectus (11 pages). I was online for about 2 hours. The cost was 6,750 CFA. I don't know if that was a rip off or not.

I met with Belco in the afternoon. He said he had a Network meeting arranged. We discussed how much it would cost to Zantiebouyou and decided on 300 CFA per km. He's interested in seeing the entire process from order to completion. We planned to meet the next day to discuss further details. I gave Belco a large binder of information and research that I had compiled before I left the States. He seemed to really appreciate this and read it throughout my following days in Mali. Printing in Mali is very expensive-25 cents a day- so it may be a good idea for future externs to bring hard copies of their research to Africa and plan on leaving them for the host mentor.

I called my parents, Florence, and attempted to take a nap. I tried to get the computer to work, but it did not work. Bob later e-mailed me and said that if I took out the battery and reloaded it, the computer would boot up, which it did. Aissata picked me up for dinner and then we got henna painted onto our feet.

Sunday 20 July 2008

This morning I went to a wedding of Aissata's cousin. In the afternoon, while I was working on the warning translation, Belco called and said he was ready to meet. We decided to leave at 7:00 the next morning. He also dropped his fax machine off for me to fix. I went back to the Cyber Café and finished the translation of the warning with Basseko shown here first in French and then in Bambara:

S'il vous plaît lavez vos mains après avoir utilisé cette trousse.

N'utilisez pas la trousse près de la nourriture.

Gardez cette trousse hors de la portée des enfants.

Ne consommez n'importe quel beurre de karité qui a été utilisé dans l'essai.

Ladilikan

Akèto ikitèkèko nitilala baarala ni minawna.

Ikanason ka ni minaw gèrè douminina.

Idianto ika minaw yorodiaya demsènouna.

Touloumikèrè ka diateminèkè ikana maka ola.

Then we went back to BICIM to get another 150,000 CFA and to buy a phone card. We stopped by some street dancers before going home for me to pack up. I didn't fix the fax machine.

Monday 21 July 2008:

Contrary to Belco's warning that Malians don't have a great intuition for time, he pulled up at 6:30 am sharp. I scrambled to get the last things left out into my pack and out the door. We went to pick up Umar Coulibaly, the Director of AMPJ or the Association Malian Pour la Promotion de Jecnes. While we were waiting for Umar, Belco asked about the difference between certification and the quality kit. I explained about the organic market and the basic chemistry of the kit. The chemistry was a bit beyond Belco's understanding, but he thought it sounded useful. I slept in the car ride down to Zantiebouyou, which took about 3 hours.

We stopped in Bougouni, a larger town about 10 minutes from Zantiebouyou. Umar's NGO has an office there where we stayed during our time in the South. After dropping off our bags, we headed to Zantiebouyou. Mah had a broken leg from a automobile accident and would not be joining us for any meetings. Marime was at a wedding, but joined us on Tuesday. The accountant, Madam Kone Safiatou (Safi) Kone met with us.

After Belco made introductions, Safi said that testing the quality was a big concern for Corprakazan, the Zantiebouyou Shea Butter Cooperative. Umar also reiterated that there would be great interest in the kit and said he would arrange a large audience for a Bamako demonstration. I explained that this kit was a first draft of sorts and the Montanan team needed suggestions about how to make it more useful or adaptable. Safi stated that training people how to do the work was very important and was glad that it would not be difficult to learn. I suggested that the quality kit could be used at different times in transportation or for different batches of shea butter.

I noticed during our meeting the striking difference between ‘us’ two city men and a white student and ‘them’ hard-working, illiterate black women. Nonetheless, Safi explained we had brought a good thing since quality had typically been tested by simply observing the quality of shea which wasn’t enough for Western buyers. Safi also stated that the test was of great interest to her personally and to the associated body.

Safi asked that I, as an industrial engineer, watch the entire process and suggest ways to build or modify equipment or add mechanization to make their process more efficient.

Umar then left back for Bamako. We started to talk about the process of making shea butter. The women explained that the drying of the nut is very important and impossible to do without the sun. They are therefore looking for technical improvements to make to the drying process.

The members of Corprakazan then started to explain the entire process of producing shea butter. Members of the cooperative bring the kernels of the nuts to Zantiebougou to be made into shea butter. If any part of the process could be improved, they’d like to know how.

Starting at the very beginning...the shea fruit containing the nuts are collected from the ground and left to soak/rot for 3 days. Corprakazan requests that the nuts are boiled no later than 3 days after collection, but admits that some women wait up to a week. Then the fruit pulp is pulled away from the nut. The raw nut is placed into a pot to boil. This step makes the liquid inside the nut evaporate, which otherwise increases acidity in the butter. It also enables the nut to dry better. The member then removes the nut with a slotted spoon and pours out the boiling water. The member will then scatter the boiled nuts in a place in her house where water cannot reach to the nuts, such as a raised patio. The nuts are dried for 10-20 days. It is best if the nuts are dried under plastic, as they are collected during the rainy season, so that when there is moisture in the air the plastic can cover the drying nuts. Not all of the women have the plastic to do this however. I noticed while at Zantiebougou that chickens ran through the cement drying blocks, over the nuts.

Belco wants to set up a similar cooperative in Katibougou. We chatted briefly about the fact that the network does not produce shea butter, but knows many organizations that do and is therefore in place to capitalize on the exportation market. Before the Network can profit on the exportation however, it must master the process. Belco mentioned that Binta Boucum had commissioned a consultant to do a study about mastering the process and that we will ask her about it when we meet.

The next step of the process was not available to see- which is breaking the kernel out of the nut. We talked about the quantity, quality, and price that the cooperative pays for the nuts. The quantity is variable, as women harvest enough kernels as needed to pay for their demands. For example, Monday morning a women came with several kilos of nuts to pay for her daughter’s medicine. There are three million women in Mali that are dependent on shea trees for their livelihoods. To ensure quality, the cooperative inspects the nuts to see whether they were dried by fire or the sun- and there is a visible difference between the two. They pay members 100 CFA/kg and non-members 75 CFA/kg.

The cooperative used to be a union with 2,250 members. Recently it became a cooperative, with the help of a Canadian NGO that suggested such an action after a two year investigation found that union’s years of efforts had yielded no results. The women

were hesitant to start the cooperative because they did not understand the underlying philosophy. The NGO trained the women about marketing and the activities of a cooperative. The cooperative started with 69 members. The membership fee is a one-time 1000 CFA charge plus 150 CFA/month and 200 CFA for a cooperative membership card. Today Corprakazan has 369 members. Belco and I returned to Bougouni and went out to dinner. My meatballs cost 1000 CFA. Belco asked me to get in touch with Jake Cummins, the President of the Montana Farm Bureau ((h) 406.585.3366, (w) 406.587.3155) to talk about collaborating on a project. . Florence said that there is money in her grant to bring two Malian farmer or villagers over to Montana.

Tuesday, 22 July 2008:

Today we began by finishing the entire process demonstration. After the nuts are dried they are de-shelled by a crushing them in a millet pounder (a steeped walled bowl with a wide paddle/hammer that is slammed into the nuts.) The nut shells and kernels are poured out onto the tarp and the kernels are collected by hand. It often requires the worker to hand slam (usually with a rock) the nut shells that were not beaten off in the millet pounder. Kernels that are very light, small, or have holes are thrown away. The free kernels are put into a bag, brought to the cooperative, weighed and sold.

The cooperative looks at the kernels to check the quality and then puts them into the storage building, behind the main weighing/vending building. The nuts are brought out of storage as needed, since kernels are only collected during the rainy season but shea butter is made year round. After being weighed, the kernels are washed in warm water so that the skin can be easily removed. The kernels are then taken to the iron chopper to be cut into smaller pieces.

Next, the kernel pieces must be dried in the sun for two days (in full sunlight). Corprakazan usually collects kernels and keeps them under tarps if it is raining. Sometimes the cooperative dries the nuts in the torrificateur (a barrel over a fire with a hand-cranked mixer.) I'm concerned that the smoke from this torrificateur may cause or be carcinogens. The kernels are then taken to the iron grinder to be made into a shea paste.

Workers then take about 12 liters of the paste into large plastic wash tubs and combine it with about 9 liters of cold water and 1.5 liters of hot water. The women add and increasing amount of cold water and the same amount of hot water three more times before the next step. The water is added when the whipped butter starts to whiten and gets a bit harder. Once the butter is properly whipped, foam like solid is washed and then separated from the liquid. This happens about 10 times. The washed shea butter is poured into a large stainless steel pot with hot water.

The washed, whipped shea is added to the pot above the fire as it is completed. The first batch is added around 10 and the last batch around 2. The butter sits over the fire for until 4, when the liquid shea is poured in big metal washbasins. While it is sitting on the fire, the women clear out the waste/solids from the bottom of the pot. They believe this keeps the butter from burning and affects the color/quality of the shea. The waste is collected in another basin, cumulated over 3-4 days and then is re-melted and used for soap. Marime is concerned that adding differently whipped shea clumps to the fire pot at different times may be a problem. The liquid shea is filtered and poured into a large

bucket. Eventually the shea in the large bucket is reheated, just so that it melts, and put into its final container.

Once Marime showed up, we slowly started gathering under a tree for the chemical quality kit demonstration. The notable people present were: Madam Ouattara Marime Ouattara, the President of the cooperative, Madam Mariko Korotomou Manko, the production manager, Madam Kone Farta Smake, the cashier, and Mr. Soleymane Kone, the manager of provision. The women brought over a fire base and pot to provide the boiling water. I first carefully reiterated the importance of the warning labels-translated above by Basseko. I also clearly emphasized the importance of keeping the stirring sticks, samples, test tubes, and watch glasses away from each other to avoid contamination by using the washable marker to label each with a number. I labeled them with English numbers and wondered whether dashes would have been better for those that were illiterate.

The first test works as follows: A stirring stick is used to take 3 cowpeas worth of a shea sample into a test tube. The test tube is then placed in boiling water, using a test tube holder, and melted completely. Eight drops of a liquid chemical solution, discovered by Chris Sedlack, is added to the melted shea. After swishing around the tube for a couple seconds, the liquid turns colors. These colors are calibrated and indicate the number of Free Fatty Acids (FFAs) in the shea sample. The basic chemistry is that FFAs unbind from the triglyceride (a stem that holds an acid leaf of sorts) allowing a hydrogen to disassociate and the butter becomes acid. The test uses alcohol to separate out the fat so that the FFAs are trapped in the water and then it tests the acidity of the water. I demonstrated on one test sample, and then three of the women did the other samples on their own.

The second test is for organic peroxides (OPs) which, by their chemical make-up steal electrons from FFA chains to cause the breakage. The test works by combining 2 cowpeas worth of shea and a solid reactive agent (also developed by Chris Sedlack) in a watch glass, stirring for 2 minutes, and then comparing the color to a calibrated chart. Again, I demonstrated on one sample and then the women of the cooperative did the others.

The reactions to the tests were very positive. Marime said that they will definitely use the kit. She was hesitant to say how often they would use it, but decided on once every 3 months. Belco suggested that the kit may be used to try different ways to improve the product- as a way to experiment with grinding, heating, or production changes. I added that it may also be useful in discovering how the shea breaks down with storage, transportation, and time. The women asked for suggestions about specific temperatures to strive for during the multiple heating stages of the production. It would have been better to do the demonstration inside, as some leaves bits got in the way of the chemical test.

Next we discussed ways to keep records and evaluations. The women said that they want to have a table to fill out, so that it is the same every time and they don't forget anything. I said that the Montana team would like to have carbon copies of the records, so the table they fill out, with carbon copies, is something we'll have to work on. They agreed to include the following:

- Name
- Position
- Institution

- Background
- Source of sample
- Age of sample
- Storage condition for sample
- Results for FFA test
- Results for OP test
- Suggestions for making the kit easier to use.

At that time, the women did not have any suggestions for increasing ease of use, because they hadn't used it enough. The women were shocked that I asked how much they would pay for the kit and hesitant to estimate. In the end, the accountant decided that 25,000 CFA sounded reasonable. Chris said that the current kit, not counting transportation costs, was \$34.13.

Mr. Soleymane Kone, the manager of provision, asked what the end result of using the kit would be. I said that if the cooperative got consistently good results they would know they were ready for an export market, something requested by Corprakazan. Belco said that there was a buyer named Horst Rachelbacher from Minnesota with a new company called Intelligent Nutrients. Val, an old neighbor of Florence (for 30 years) who is in the personal care products businessman met Horst, the creative genius behind Aveda and founder of Intelligent Nutrients. Horst is interested in buying as much shea butter as the cooperative has to sell, but the butter must be certified organic and 100% pure. It has been difficult to find an acceptable certifying body in Mali or in the U.S. The American Shea Institute has been used by other export companies for certification.

Belco told the cooperative women the story of Horst drinking his shampoo in front of an audience to prove how healthy Intelligent Nutrients products were. The women's eyes seemed to temporarily pop out of their heads at the conclusion of the story.

Next, we talked about the certification and exportation processes. I explained that there were efforts being made all over the United States. At Montana State University Chris Sedlack was working to improve the chemical kit and create a moisture content kit. The University of Saint Thomas had worked on the marketing and exportation information. Virginia Tech was working on diversification options.

Marime asked whether the chemical products present in the kit could be used for other things like honey. They can't be, as far as my knowledge I replied, because the solutions were a combined especially to result in a calibrated color that reveals acidity levels. Marime said they've been told the honey the cooperative sells has water in it. She asked whether the kit that Chris develops to test the water content of shea butter might also be designed to work for honey. I said I would pass along the information and there could possibly be some follow up if Chris comes back to Mali in the coming months.

Belco suggested that the kit may be used to investigate best shea practices. For example- an employee could test shea that had been processed differently and see if there were differences in the results. The results would lead the cooperative to make improvements in production techniques. The ideas for possible alterations are changing: use of the chopper, use of the grinder, and boiling the shea over the fire.

I asked if they see the cooperative tapping into larger export markets. Marime explained that the cooperative had two efforts: the production in Zantiebougou and the commercial sector in Bamako. She asked me to ask the Bamako team about commercial related questions. The thought of the Bamako team initially sounded like a middle-man to me, but after meeting with them later I think it's truly operated under one coordinated effort.

The women talked about profits and the cooperative's status next. They said that if it cost them 1000 CFA of materials to produce a quantity of shea butter that they'd like to sell the shea for 1750 CFA. In general, since Coprakazan became a cooperative things are functioning smoothly.

Next, I shared the results of the American Shea Institute test of Zantiebougou shea butter from September 2007. Montana State University paid Dr. Samuel Hunter \$600 for the analysis of the Coprakazan Cooperative shea samples. This was paid from the USDA Challenge Grant from the invoice submitted by Dr. Hunter, Director of the American Shea Institute. The test basically can be summarized as follows:

- The physical properties of the shea- color, spread ability, and odor- are all excellent.
- The chemical properties – free fatty acid, peroxide, bioactive nutrients, iron, rancidity value, and estimated shelf life- are all far too high and rated to be poor or low.
- The microbiological properties- mold, yeast, and e coli- are not detected in the sample and therefore rate excellently.
- Peroxide levels cause rancidity. Common causes for high peroxide levels include:
 - Inappropriate heating during preparation
 - Elevated iron and or other metals in the shea butter
 - Storage temperature greater than 21° Celsius
 - Mixing old shea butter with new freshly prepared butter
 - Elevated moisture content
 - Improper, non-air tight packaging
 - Crushed nuts left to stand for more than 1 hour before extraction continues
- Suggestions to reduce peroxide levels therefore are:
 - All equipment, utensils, pots, and bowls should be wood, stainless steel, or plastic.
 - Never mix old shea butter with new shea butter
 - Keep butter in airtight containers in a dark, cool, dry area.
 - Storage and shipping should never exceed 21° C.
- Metal in the shea butter promotes rancidity and are potentially harmful to the end user. Causes for metal in the butter include the use of metal equipment, utensils, pots, and bowls. Therefore all equipment, utensils, pots, and bowls should be wood, stainless steel, or plastic.

- Bioactive ingredients, like Vitamins A and E, are favorable in shea butter. Common causes of reductions in bioactive ingredients are:
 - Inappropriate heating during extraction
 - Refining attempts after extraction to reduce odor and color via various procedures

- Suggestions to improve bioactive fraction are to control heating time and heating temperature.

The women said they knew that the iron came from the machines they were using. The suggestion that the crushed shea meal should not stand for more than an hour was contrary to other information that Corprakazan had received from a previous quality trainer. Marime said she was not happy about the results of the chemical test, but was happy to have such solid recommendations for improving the quality. She said the test was very useful. She also added that the results indicate that the women are not respecting all of the measures they encourage for high quality shea with respect to collection and heating etc. As such, the leaders will call a meeting and share the information with them. Belco mentioned that he will translate the entire test later to share with the women. The cooperative will work on higher enforcement and sort bad nuts from good nuts more carefully.

We talked about drying nuts as it relates to quality. The cooperative said they may also change the method of drying the kernels by using the machine that rotates them over the fire instead of using the sun. I think that may increase carcinogens but am not sure. The plastic that covers the kernels during the drying phase is light and doesn't last that long. Harder more durable plastic cost 50,000 CFA.

At that point it was 3:30 pm and we decided to call it a day with Corprakazan. We went to visit Mah at her home, since she was unable to join the meetings due to her broken leg. Mah said that the acidity was a problem that they've been trying to fix for a long time. The cooperative, according to her, is still in the learning process even though the Canadian NGO worked hard to teach them skills and sent Corprakazan representatives to Burkina Faso to gather information. We gave some Montanan Huckleberry tea and 1000 CFA to Mah and then said goodbye.

In the car ride, Belco and I debriefed. He really liked the kit because all over Mali people have been asking for a way to test the quality of shea in the field. The Network needs to set a price of the kit, taking into account the cost of transportation, and then sell the kit to cooperatives and others. The profits could be reinvested into the Network's further efforts to improve quality. I asked whether he thought we were using a holistic process to which Belco said as a result of the demonstration and test the cooperative got very useful information that they had been asking for. He was happy that Merime took good notes and read back the summarizing results. Belco thinks that action proves that she really owns and controls the results. He also thinks that someone needs to study the heating and that the Network or Zantiebouyou should possibly work with the American Shea Institute to figure out exactly what temperature is optimal for making shea butter. We talked about how Chris has

intellectual property rights over the kit but would allow the Network to reproduce it and sell it for a profit.

Belco said that a third of the shea trees in Africa were found in Mali and a third of Malian trees were grown around Katibougou. He's interested in setting up a cooperative in Katibougou that is similar to Zantieougou but avoids the mistakes it made in planning buildings and poor production practices. He hopes that Katibougou could become a model for Mali. We went out for a lunch/dinner at 5:00 and paid 2500 CFA for a chicken and fries. I didn't tip, but you are suppose to do so in Mali Belco said.

Wednesday, 23 July 2008:

Today Belco and I went back to Zantieougou for a follow up discussion and to talk about diversification. I asked a series of questions and Merime answered them. The questions and responses were:

- What are some barriers to adoption of new technology? Merime said that if a machine doesn't produce as much shea as can be produced with the same amount of inputs by hand than they would not use it.
- Is the cooperative still having problems with a parasitic plant? Yes. It is still a problem, but not a huge problem. The parasite affects about 10-20% of the shea trees. Corprakazan is not really concerned about finding a way to get rid of it. The parasite is a concern but not a priority.
- Is the cooperative using the videos that UST made about shea? No, they don't even have a copy of the video. They would like a copy however. They have a video player and a screen to watch such a film.
- Who owns the land on which the shea trees grow? About 60% of the land is privately owned and rest is communal. **The shea trees are owned by the women.** I commented that Alaffia, a company selling shea products from Togo, is not certified as 100% organic because the nuts are collected from communal trees that cannot be tested for consistent lack of pesticides.
- Are pesticides used in cotton production close to the shea trees? Shea trees are found in fields of millet or corn. The famers use fertilizer on the corn. The field use rotates between cotton and corn. There is sometimes as little as 3 meters between the cotton and shea fields.
- What is the relationship between the cooperative and the Network? There is a partnership between the two. The Network came, took samples, and analyzed the quality through the kit and the Shea Institute test. They'd like the Network to come back in 3 or 6 months and help them find a market for their product as well as follow up on suggestions for improving the quality of the shea. Merime stressed there needs to be follow up.

Next we talked about ideal markets and exportation plans. I talked about the background I had learned: Horst and Agribankarate said that they want to import raw shea butter and develop their own projects. In addition, there is more profit to be had in producing as much as possible on site. On one hand, there is a lot of profit to be

made from large exportation of raw shea butter. On the other, in Mali there are many people who want to buy shea products and therefore diversified products may sell well in local projects.

The cooperative would like to sell their product in both local and international markets. They would be willing to diversify into lip balms, hand soaps, hand crèmes, and pomade etc. depending on the needs of the clientele. If they do diversify however, they need training on how to produce different products. Merime asked about Horst's and Intelligent Nutrients' desire. I said that he is willing to buy as much certified organic and pure shea as the cooperative can produce.

Then we discussed diversification into honey and beeswax in preparation for Rick Fell's visit in January. Rick sent me an email before I left that said, "I was excited to hear that you will be looking for new market potential for the villagers and would be very interested in their thoughts, etc on honey or beeswax. I had the opportunity to spend some time with Aliou Cisse several years ago, as he works with bees and some of the beekeepers in the area around Bamako. He is with the IER and is their beekeeping specialist. He set up a co-op to market honey and has done well, so I think there is good potential for looking at honey production if there is interest. I am also very interested in the possibility of beeswax collection and marketing. Because of parasitic mite problems in the US and Europe it is almost impossible to find beeswax that does not have pesticide residues. Mali has the potential to produce beeswax that is free of any kind of contamination (although it is something we would need to test). It is a product that would be relatively easy to work with, doesn't spoil, and has a fairly high value. I will look forward to hearing from you. - Rick Fell"

The cooperative does not produce the honey, but rather buy it from their members. But the men own honey and beeswax. So it is really the husbands of the members of Corprakazan that have hives, collect and clean the honey and bring it to Zantiebouyou. Corprakazan then cleans it another time, packages it, and tries to sell it.

The men sometimes take the wax and sell it, but this is not very organized according to Merime, the cooperative manager. She's seen candles made of shea butter and beeswax in the area. I asked if they might be interested in diversifying into the beeswax market. She asked how much they could expect to earn from selling wax in Western markets. I had no idea and told them that I would contact Rick and then have Belco tell them. The cooperative can buy a kilogram of wax for about 600 CFA. They are excited to work with Rick and gave me a few e-mail addresses and phone numbers to facilitate communication. Merime speaks French as do the members of Coprokazan's business team in Bamako. Merime's phone number is:

Merime said that if they want to start exporting beeswax they'll need to supervise the farmers from the cooperative to get better wax. The wax around Zantiebouyou can be many different colors. They gave me a sample of wax colored the traditional mustard yellow but said one can also find white and black wax. I was unable to take any pictures of the hives or collection because this usually happens at night. The hives are smoked to scare the bees away, as the men do not have the protective gear that is used in the States. The cooperative has no idea how much is produced in the local area. They are however quite willing to collect information about the quantity

and quality of wax available in the area and hope that Rick will send specific questions that might facilitate his research and preparation.

Lastly, we discussed the cooperatives goals for the future. They'd like to have a small lab for testing their products. Belco thinks this is a logical ambition. Secondly they'd like to be trained in ways to make soap, hand crème, and cosmetic products. Thirdly, they'd like to secure a market outside of Mali for their products. Fourthly, they'd like to get some equipment to further mechanization- specifically to eliminate the hand whipping or to more efficiently dry the kernels.

They are looking forward to more meetings with the Network and American teams. They encouraged us to send e-mails to the commercial group in Bamako as they check it daily. Belco and I then said goodbye and Merime said she hopes I'll come back and sends greetings to my mother and father.

On the car ride home, I interviewed Belco about a vast range of issues regarding shea and the Network. Overall he was very excited about all we had learned and shared in Zantiebouougou and was almost anxious to get to work. Below are the questions I asked and his responses:

1. What do you want to do now regarding work with Zantiebouougou? Belco: I'd like to bring Dr Hunter's unit is in Columbus GA to come and give more suggestions about the heating temperature of the shea. I want the UST team to put together one comprehensive report on their findings from last spring semester so that the Network can really master the process of exportation. I'd like to visit the United States and have a meeting to get feedback.
2. Why are we bringing the kits to Bamako? The kits need to be administered by the Network. I'd like Aissata and Abdoulaye to know how to use the kits. I'm also concerned about simply giving the kits away. That sets a dangerous precedent if we are hoping to sell the kits eventually. We will send a kit to Zantiebouougou with a team member. The original plan was to have a training program that would go along with the kit. The training program such as training in quality management and quality determination would be provided by the Network.
3. What are the members of the Network doing now regarding Agribusiness work? Not much. They are working for IPR or IER as a real job. As far as the Network is concerned, I'm the only one trying to make and maintain contacts and preparing the business plan. The Network is looking for a place to be housed. I think it's likely that we'll find a place in Sotuba and the Network will ask Madam Gamby to help find a place.
4. What are your current thoughts on the Network's operation? Belco: I'm concerned that going into the cooling system, shea, and seed potatoes at one time is too much. It would be better to just focus on one thing. I'd like to focus on shea because we have more information, contacts, and literature. Everyone else will say something different. People want to stay in their field and work in their field. I think that, as a business, the Network should study how to export shea. We should ask Binta Boucum about the study that she commissioned to study this process. The problem is Aissata has said she has nothing to do with shea. But working with villages on shea issues probably the best hope to get paid for their expertise and support. The Network could look

for potential buyers, check quality, and manage exportation and get an interest on those profits. They would buy and sell shea from producers. We need to talk with potential buyers about paying for the butter, transportation, and insurance. I think that if a buyer likes the quality and certification, they can advance the money to pay for the shipment and then can take that advancement out before a portion of the profits are returned to the Network from retail sale. It may work to focus initially on shea, as the results are more immediate. At the same time, Aissata could collect information about seed potatoes and do the research. The results will not be fast for potatoes but could be for shea butter. The Network team needs to all agree.

5. What are you hoping teams in the US will do now? I'd like to see a commitment towards really helping and following through with things the Network asks for. I don't think I have all the reports from the UST class and there is no follow up. I'd like the UST class for next Fall to continue building on what the last class found. But I think they're moving onto seed potatoes. We need to focus on and finalize a business plan. It would be better to work on shea.
6. What is your hope for the internet connection? I'd like a connection installed in my office and a more reliable one established at Sotuba. Their internet is so slow it isn't a valuable connection right now. The suggestion that Sidy found will be too slow.
7. Do you have personal plans for Network work? Yes. I don't have to teach until October. I will be working on marketing, production, exportation and a business plan for the Network. Plus the Network needs funding as it hasn't received enough initial support. We cannot always count on money from the USDA Higher Education Challenge Grant of the Higher Education Challenge Grant program. There are many aid organizations in the West that could help. I'd like to know what each university is doing in the US to build a stronger relationship with them. I will also translate the findings of the American Shea Institute for Zantiebougou and others to read.
8. What do you want to talk about at the Network meeting? What to do next. How to manage the kit. Whether the team wants to consider having IER hire someone to take Assa's place. We'll have to ask Madam Gamby to backfill the position if that is the decision of the Network. The main goal is to coordinate efforts and get the Network to drive all future actions. I want the Malians to be involved in every visitor from the US. For the people in Africa to make the plans for the trip and ask people to come, instead of being told that people will be sent.

I added that Florence want to ask about the sustainability plan and to help prepare for a report. Belco did not know what report I was referring to.

This was cleared up and addressed in the Network meeting on Monday, July 28, 2008.

9. Does Bamako have a Rotary club that provides teaching scholarships? Bamako has a Rotary club and a Lions club. Florence said that there will be a teaching scholarship for professors.

10. Was there a large meeting in Katibougou about hunger? Yes. It was a real mess. My wife was meant to go for the opening. It wasn't very well organized. Some people in the IER building were in charge.
11. Could people from your small enterprise class help with Zantiebouougou efforts? Yes, but they need to be funded. What I'd like to see is Malian students working with American students to do research, for example on ways to make quality improve. For example, the Malian and American students could go to Corprakazan and try different heating methods. Then the Malian student could follow up later. Professors could also be involved in such research, if they had the funding. I have all sorts of ideas, but they need to be acted on to be implemented.

Belco dropped me off at Aissata's parents house and I ate with the family Malian style. That was quite different than how Americans eat. I also spent a long time on the phone with technicians from Panasonic trying to fix the fax machine. After trying to reload all the physical parts and reprogramming the machine, the technicians told me that the fax could not be fixed over the phone. Belco will need to bring it in to the repair shop. The type of ink to buy for the KX- F1000 machine is KX- FA133. The number to call is (888)263.4752.

Thursday, 24 July 2008:

Today we met with the marketing/commercial part of Corprakazan, a new organization created in January 2008. The group has an office with 3 computers, a printer, and a reliable internet connection. I met with 3 men- Souleyman M. Traore, the manager, Dusman Fombaand, the office manager, and Drissa Daou, the accountant. The name of their marketing firm is called Sibolo and was put in place by the cooperative to take care of the commercial activities. There is, in the men's minds, two efforts of Corprakazan- the technical producing team in the field and the commercial team in Bamako. The manager is on the board of Corprakazan and said that the board makes all the decisions regarding Sibolo. The board meets once a month.

In a sense, the marketing team/business is just a semi-autonomous branch of the cooperative. The mission is to develop activities that sell shea butter from the cooperative. However, if they are able to secure an order that Corprakazan cannot fill then they are allowed to go to other producers for help. The marketing/commercial team finds and communicates as an outlet of Corprakazan for the world outside of Zantiebouougou. Dusman Fombaand got involved after the cooperative was created. The board wanted to hire an economist and he was selected to help with marketing efforts.

Belco explained the Network's efforts and relationship with the cooperative. Then we started asking questions about receiving/filling orders, customers, products etc. The men choose to not deal with orders from companies outside of the market of Mali. They are sending products to U.S. and Senegal buyers, but these buyers have personal connections to Mali and that is how they found out about Corprakazan

projects. One U.S. customer had a friend bring back some Corprakazan shea as a gift and liked it so much she ordered 150 kilograms to sell in her shop.

The men had sent the shea to a health lab in Bamako to test for impurity, humidity, acidity, and peroxide. The cost of the test was 39,000 CFA. The men are fairly confident in the results. After they received the results, Corprakazan sent representatives to Togo to get educated about improving the quality of their butter.

Customers can place orders online or by the phone. They're not really advertising right now, but going door to door to promote sales. I saw some Corprakazan shea in the National Museum in Bamako, so their efforts must be somewhat successful. The most popular product for the African market is the small 250 gram bags of shea in clear plastic bags. Corprakazan is the only producer packaging shea butter this way, which is popular because the consumer can see what they're buying. Westerners tend to like the jars of butter (Belco added that Africans don't require such complications). For 14 kilos of shea they received 15,000 CFA.

The Bamako office has a small stock of Corprakazan products (see photos). A regular truck or a motorbike is used to transport the products between Zantiebougou and Bamako, so there are no refrigerated truck or nighttime precautions taken. Basically it only costs the price of gas to collect the product. Sometimes they place a cool cloth over the boxes of shea butter to keep them from getting as hot. The buyer must pay for the transportation. It's about 250% of the price of the shea butter to export, transport, and get the products through customs.

The men do not want to work with big firms because they require so many certifications and the cooperative cannot produce the amount they're asking for. If the cooperative tried to produce as large of an amount that large companies are asking for, the quality will be terrible the men said. The marketing firm said that they have many small buyers lined up that aren't as concerned about quality perfections. One person from Senegal wants to buy 10,000 packets, and was willing to pay up front and wait for the cooperative to fill the order.

I tried to specifically decipher how the profits worked. The manager said that all the money they made from sales goes to the cooperative. I asked about how they were paid and he said they are willing to incur initial costs and losses while the business is getting set up. A Canadian NGO that had funded Corprakazan in the past, stopped temporarily for lack of progress, has started again to fund them. This NGO paid for computers for the office.

The next step, according to the men, is to get the cooperative up to a level of production that can meet the demands of the buyers. This was new information for me, because I had assumed that the cooperative was overproducing and didn't have buyers lined up. Since May the cooperative has only produced 200 packets of the 10,000 ordered. In general, the manager said there has been a 40% increase in demand in the past year. If the cooperative chooses to diversify into other products, the marketing team will of course represent the new products, as the commercial efforts are one in the same as the production efforts.

After the meeting we went to the headquarters of Orange, the major phone company in Mali, to ask about the internet connection. Belco was excited about the information because the LiveBox options was fast, reliable, affordable, and came with a phone line.

Basseku and I went to Artisana, the craftsmen's market, and to the National Museum. Then for dinner, one of Aissata's brothers and I went to a restaurant called Bla Bla that attracts many Westerners and ate very good food.

Friday, 25 July 2008:

Today Belco picked me up at 7:00 and we went to meet Jean Harman, the Director of Economic Development for USAID. Her colleague, Gaoussou Traore- the program manager for the Accelerated Economic Growth team, also joined us. Jean basically talked the entire meeting after I explained that I went to Zantiebougou to work on issues of quality, exportation, and diversification. Here is what she said:

"I'm glad to hear you're doing ground work for diversification into beeswax. I'm a big proponent of groundwork. It seems like Malian efforts jump around, as if the question to ask is 'what are we exporting this week?' Before you think that beeswax is a viable market, you must know what are the requirements for exportation and the quantity available. Without the groundwork, new ideas are not helpful.

Things in Zantiebougou have gotten worse. I was there three years ago and all they could talk about was needing and wanting USAID to pay for a fence. This is unfortunate. I am not enthusiastic about the cooperative. According to foremost shea experts, Zantiebougou is only producing at 30% of capacity as calculated by the number of trees and members.

Your efforts are not addressing the fundamental issue, which is the quality of the nut. The cooperative just lumps everything together in sacks. There is little incentive for individual women members to produce more or at a higher quality. Therefore, the internal capacity is not there. Corprakazan efforts are not sustainable because they rely on outside funding and are not making money from profits themselves.

Development efforts are perpetuating and reinforcing dependence, not independence. So much money has gone into that cooperative and there is little to show for it. Of course, they are going to accept money at every turn. They are not structured in a way that will result in profits.

You must do first things first. You cannot focus on exporting until the quality of the organization is established. So many groups have come in, gone halfway towards development and left. The nut is the most important part of quality. Christin Spardley has been at the forefront of this effort to get the nuts improved. The nuts are $\frac{3}{4}$ of the reason that Burkina has a better market than Mali.

Then after the nut, the set up of the cooperative must be changed. Corprakazan is mixing shea nuts, which compromises the quality of the butter. One bad apple ruins the barrel."

At this point, I interjected that I had spoken with Christin and that Corprakazan had mentioned they were willing to separate the nuts produced by high quality growers from those that were not as good. Jean continued, "The nuts are tough because of course they need to be collected during the rainy season, when everything gets wet. I'm sure you know that. So there are two problems: 1) How the nuts are handled and 2) how the cooperatives are managed. The problem with Corprakazan is everyone is treated equally."

I think Jean sensed my shock at her attitude, and explained why she cynical. She asked about the kit's cost and stressed that transportation costs must be included.

Generally, she said, technical assistance subsidizes a process that breaks down when the support leaves as Malians don't see the value or money in the technology. Jean suggested we speak with Sambutu Jabutea (?sp.) who is at the forefront of business development when it comes to shea. Sambutu's organization helped with the Peace Corps effort to educate women growers about increasing the quality of the nut.

Jean concluded the meeting stating that the Network should focus on developing the business skills of the women. Belco said he had just thought of creating a subset of the cooperative that is in charge of management- as in creating a separation between the entrepreneurs and the cooperative. The question is whether the cooperative's leaders are qualified managers or simply elected. If Americans just help Zantiebouyou to export more shea, they will have been the third or the fourth group to do so. Zantiebouyou is close to being a real business; their mistakes could really be corrected in a season. But they need to be systemized and ran as a business.

The four of us, Jean, Gaoussou, Belco and I, had a general discussion about the socialist thinking prevalent in Mali and cooperatives. Such thinking kills essential individual incentives that drive a market economy. The Network, it was again stressed, needs to push for the development of the business skills so that the cooperative can work towards independence. Jean warned not to recreate the wheel, as people who think they are going to do things differently are not inclined to work together.

We left the meeting, which I thought had gone terribly. Belco thought it went well. He said Jean is always very pessimistic and often walks away to do other things during the meeting time. She was very engaged during our meeting and gave us some good suggestions, so Belco felt good about it. We quickly navigated through traffic to get to Sotuba to do another kit demonstration.

Oumar Coulibaly, the director of AMPJ or the Association Malienne Pour La Promotion Des Jeunes, has assembled an array of 10 people involved with shea efforts in Bamako. This included interns of Sambutu Jabutea and Binta Boucum. We were late to the meeting and things were a bit chaotic, with people talking over each other.

The demonstration for the FFAs went well. People took careful notes and were very interested and impressed. They didn't ask any questions. The test for the OP level didn't work because the shea butter samples had melted. We put the watch glasses with melted shea on them in the refrigerator and then it worked. The fact that shea often melts in the heat here is an important consideration for future, improved kits. The scientist of Sotuba were so interested they tested a sample of shea themselves. The shea they used was very old, green, and everyone agreed it was poor quality. The OP test on their sample however did not turn the sample dark- it made the sample light yellow indicating the OP level was very low. The scientist didn't think that this was so. Aissata then did the OP test on a Zantiebouyou sample that yielded a dark result indicating high OP levels. Overall, the FFA test was received well and people seemed to believe at the end that the OP test was valuable as well.

I didn't have time to explain the chemistry and the people didn't ask. So we proceeded to summarize the results and suggestions of the American Shea Institute tests. Everyone was very interested and wrote down the recommendations. It was time for people to go pray in the Mosque by then, so we said goodbye.

I cleaned the kit in Aissata's lab and then met with Belco, Abdoulaye and Aissata. Abdoulaye was very upset about the finances of the project, and said that he was quitting

because he did not understand the cost-reimbursable accounting process required by the USDA. In the end, he decided not to quit and to accompany me to Sanambele. We concluded that there would be a lot to talk about at the Network meeting on Monday.

Saturday, July 26, 2008

I spent several hours typing my trip report. Then I went out to dinner and played Monopoly with Aissata's girls.

Sunday, 27 July 2008:

I worked on the internet connection proposal and my trip report. I explained to Belco that the US faculty want the continuation of the internet to be conditional upon increased communication. Florence explained that proposal would need to be sent to a UST accountant who would work with someone in the Network to figure out where to wire the money after the proposal had been approved. Malians don't use internet nearly as often as the States, so a reliable connection would really simply facilitate cross Atlantic communication.

Monday, 28 July 2008:

We had a team meeting this morning. I first met with Keriba who explained his research to me and that he is looking forward to going to back to the U.S. to finish his masters. The team met and spoke in English for the most part. Below is the transcript of the meeting:

- Belco: Good morning. We'll speak in English I think.
- Aissata: Did you try to call Sidy? The day he was leaving to come back from his honeymoon was last week, and he hasn't called me back. He is almost getting a scholarship from Fulbright.
- Belco: His cell phone is not in the country but we tried to call him. Ok, we'll get started. As you know, Kate is here until tomorrow. We had planned to meet before we went to Zantiebougou, but I was busy and the husband of my wife's younger sister died, so I had to go to be with the family. We spent three days there and came back and had a kit demonstration and Aissata was the only one that could come. What I plan to have is to leave the floor to Kate.
- Katy: I have a series of questions that I'd like to ask to see if everyone is on the same page in terms of the project. So to begin, could you all please tell me what are your current efforts for the Network and commitments?
- Belco: I'm still motivated and committed.
- Aissata: Just last month I went to Borko and paid my own way. I think that shows that I'm obviously committed.
- Keriba: I'm committed but I have a problem with coordination because I'm living so far from Bamako. I am still committed, but having trouble living so far away.
- Katy: What are your complaints of frustrations that you'd like to address in the near the future?

- Belco: So far we don't have a business plan or funding. The main frustration is the connection that makes me not able to contact people all the time.
- Aissata: The lack of communication. I do not understand cost-reimbursable accounting. I want to be part of decisions about how money is spent (Editorial note: further indication that the **cost-reimbursable (CR) accounting** was not understood. In CR accounting, the person to whom the funding is allocated, e.g. Aissata for her part of the grant, is the person who decides how the funds are used, but that person, in this case Aissata, must first spend the money and then submit the proper receipts or invoices to get reimbursed. Everyone, Americans and Malians have the same rules when they use USDA funding.)
- Keriba: The commitment with us was for me to continue with my degree. I made a budget for my research. She said that I could pre-finance my research and then send her the bill. Our salary is not enough for our living; we can't use it for research.
- Aissata: It is not possible to pay for anything beforehand. We need the money before we can go. Nobody has money for research.
- Keriba: This is why I introduced my paper for regular activities for IER. I cannot stay and wait forever without funds.
- Katy: Basically you'd like to have the money first and then things can be justified later?
- Belco: This is what is usual for people- advanced money and then justification.
- Aissata: The money is to do work. We need money before we can do work.
- Keriba: Last September it would have been better to start research. I didn't have the money to do so. So now maybe I'll start next September.
- Belco: Florence must be dealing with all aspects of the project. She must show the fiscal manager for our USDA project that the funds have been spent in a cost reimbursable manner. Therefore, it is crucial that she asks us all what she wants and explains the situation and we as individuals must decide how our part of the money should be spent for this educational grant. We must remember that for our part of the mentorship of US students, we are the ones who decide things about spending of money. (Editorial note: this is the beauty of the **Cost-Reimbursable Process**. Money **can't** be spent unless the person in charge of the funding submits the bill after the money is spent.)
- Aissata: Holistic practices start between the Network members and the faculty. This needs to be reiterated. We need to drive all decisions, and definitely financial ones.
- Katy: Do you still want to be organized as a group?
- Belco: Of course we want to be organized. Want to be in Agribusiness, and there is no change in the document/mission made. There are a number of things that need to be done however.
- Katy: What is your mission?

- Belco: Mission has not changed.
- Katy: How will you accomplish your mission?
- Belco: We need a business plan and funding.
- Aissata: Why don't we have a business plan?
- Belco: We need to do it.
- Aissata: That is our own problem. We need to work on it.
- Belco: I had trouble with connection. But I will work on it.
- Katy: How do you support each other?
- Belco: Can only do moral support.
- Aissata: I'm still working with Adama. I ask him to come but he said it is not possible to come today. I am still persecuting him. I came with seed potatoes that he developed. I went with Sidy at Borko and he gave ideas.
- Katy: Is sustainability and self-sufficiency a network goal?
- Belco: Still a goal. For me sustainability and self-sufficiency are very important.
- Aissata: Eventually. We still need initial support. Can't do anything without money. We need initial funding.
- Katy: How will you accomplish sustainability?
- Belco: We need initial funding, that I'll look for once I finish the business plan. The business plan and initial funding for 3 years.
- Katy: How can the small enterprises that you incubate lead to your self-sustainability as a group?
- Belco: One example is the kit. We can buy the kit from Chris and send it to shea producers all over Mali. We were thinking of manufacturing the cooling system also and selling them. Now that Sidy is leaving to work on scholarship maybe his student can work on it. The student's developed it and know it better than anyone.
- Aissata: If he can train people from ENI to work on it, they can work on it and be introduced to the team.
- Belco: Now students know more than the team. This person must have the same mindset as the team- IER/IPR sometimes don't coordinate well with ENI people.
- Katy: And seed potatoes?
- Aissata: Disease free will take at least 3 to 4 years before can have money
- Keriba: It's a long process
- Katy: Other services....
- Abdoulaye: We need to go to village and listen to them help to solve their problems
- Belco: But if we provide free services, we need some funding ourselves.
- Aissata: It's ok if they pay us for some things and take advantage of presence to help with some other things... We were asked to feed the crocodiles in Borko and give them some ideas. Met with public services without formal meeting. I gave them an idea and they will work on it. We were not directly involved but still addressed a problem the villages asked for. Things like that could happen,
- What about malaria?

- Belco: Similar to last question. If you say you'll help other people, you need profit yourself. Even without transport, how can you get them?
- Aissata: How did malaria come in the Network?
- Abdoulaye: From the Village of Sanambele and a focus group that we held there (among 10 other villages) about what was their greatest concern related to water.
- Aissata: Exactly. It was not from the Network.
- Katy: Do you want to drop malaria?
- Belco: No not drop all of a sudden. But we will not commit to working unless there is support to go there. If an extern comes to Mali, network will go along and help them.
- Aissata: No we won't drop it, but Florence decided students would address requests of the village to work on malaria.
- Keriba: I can understand the problem of malaria when they came to Sanambele. There were holistic sessions and malaria was first problem. It doesn't matter. We are not malaria specialist. Florence said to solve malaria, people can find something from what they do to solve malaria. For example, farmers can ask how to improve cowpea to sell those to buy bed nets to escape from malaria. I can understand this. But to do big action about malaria, I cannot understand that from network To improve income from farmers to escape from malaria or everything bad that is fine. But since there is no malaria specialist there is no one that can address everything.
- Aissata: It was a great idea. But I don't understand why Abdoulaye is suppose to working on malaria. He is willing to go to Sanambele from your MSU funding. He wants to have a different project though to be closer to his specialty.
- Belco: It's the same as before. You cannot decide to take money from individual funding without asking the person. (Because in the cost-reimbursable process, the person with the funding, such as each of us, spends the money and then asked to be reimbursed through receipts or invoices.)
- Aissata: The grant has money for 4 trips for professors or farmers to come to Mali. From our side, the Mali Agribusiness Network, one of our trips is for Binta to work with students in potato lab at MSU . The other three- one of those is for the Internet connection. We never said that should come from Belco's funding. We need to discuss before you make any decisions about finances. (Editor note: Here again it is not quite yet understood what Cost-Reimbursable accounting guards against.)
- Belco: I asked for ink and Camille told me it was from my grant. Is the faculty visit necessary? We need more money. We need to figure out if we want the faculty to come and visit. There is no per diem (There is per diem. It is \$23 per day. The hotel bill can be reimbursed with a receipt, but if the person does not stay in a hotel, there is no receipt and not money is spent by the person visiting and so there is no reimbursement.). It was a fiasco when the director of IPR went without per diem- when he was at

UST and stayed close to my apartment. For two or three days. Even in Bozeman and UST didn't have per diem. He is a big boss. For us, those faculty grants those are not nice. For big bosses, like Madam Gamby, those are not nice. If that is the way it is it should not be repeated. We'd like to use the money for other ways. (Editor note: Again, it was not understood that US government funding, such as from the USDA, has strict rules associated with it. These rules are audited at the close of the project and must be adhered to. If they are not adhered to, the people who received the grant must legally pay the money back from their own pockets.)

- Katy: So hopefully once this report is written and the internet connection is established, this can be discussed. When do you get together for meetings?
- Belco: A visitor or problem. Very difficult to meet,
- Aissata: Me, Abdoulaye, Belco met regularly. But after that we stopped. Now it is just for visitors. Calendar/schedule is very difficult.
- Katy: Do you want to keep it that way?
- Aissata: We cannot meet every week. We were meeting once a month.
- Belco: Would you like to keep up with one month meeting?
- Aissata: Up to you, Belco.
- Belco: I will come once a month... depending if there is more to follow up can have more frequent meetings. Maybe we can use grant to pay for gas and Keriba's transportation. Maybe use unassigned grants for them.
- Aissata: Belco is doing a lot of things without any money. Doing a lot of stuff. Need funding for that. We try to do our best without funding, but it is hard.
- Who is your accountant?
- Aissata: In the team, Abdoulaye is accountant.
- Abdoulaye: But there is no accounting going on.
- Katy: So it's ok to go through Abdoulaye all the time. Like sending invoices and receiving money. I think the easy way is to have money wired to the network account.
- Belco: We cannot have bank account since we're not an institution,
- Abdoulaye: If the money was in Mali it is good for us. Put all money in Mali and each month we will send invoices and justifications.
- Katy: Since you cannot have an account here do you use Abdoulaye's account?
- Aissata: It is not good. If there is a problem. We use Madame Gamby.
- Belco: The center doesn't have account.
- Abdoulaye: IER takes 40% if you go through Gamby.
- Aissata: A personal account is dangerous not good idea,
- Katy: So I see two problems- the Network isn't sending invoices and American institutions don't have a place to send money.
- Belco: In mean time, can send moneygram? We need to be institutionalized before we can have account. The priority is a business plan and then to be an institution.

- Katy: Ok so the long term plan is to be institutionalized and have bank accountant for center. But short term?
- Keriba: By western union?
- Abdoulaye: Expensive.
- Aissata: It isn't secure or accountable?
- Belco: Only way is through Madame Gamby? In the short term, we'll wire money through Abdoulaye's account or Keriba's account?
- Keriba: For reimbursement can send it to individual accounts.
- Belco: As a last resort, Gamby is best and we'll make sure they don't take 40%.
- Katy: How are you keeping the Cheetah fund appraised of your work?
- Belco: This is a problem. Cheetah and agribusiness. I started and didn't go very far. How to go about it is a question. Should we be a combination of cheetah and agribusiness or just cheetah. We have not done anything except back and forth transportation. Next funding is for institutionalization of business. Sent him pile of files about what to do. We can choose to be a big private company or we cannot be private. Two different entities or combined into just one.
- Katy: Who is responsible for the Network reports?
- Belco: We need to do a report for Ayithey. For time being, don't have any funding from Florence.
- Abdoulaye: There is nothing from Florence.
- Belco: No USDA funding, but maybe towards the end of this year.
- Aissata: Even without funding, it is good to know what the expenses were.
- Belco: Who want to be responsible for the report?
- Abdoulaye: I'm doing the accounting so it is between you three.
- Aissata: Expecting report. We accept to do it.
- Belco: I'll be responsible with Abdoulaye, but the others will help us and will be available.
- Does everyone have a copy of the invoice?
- All: No we need it e-mailed.
- Belco: Problem- if we bought something from somebody else, we pay to him.
- Abdoulaye: We need to clarify this portion on the top of the invoice. Here To Montana State University on this line.. I just need the total of cost and will sign. Once I sign it, I fax to Bozeman. Or I will go to the cyber café to scan and will send. And this is money. That I need.
- Belco: To whom do we send the invoices to. We cannot pre-finance our activities.
- Katy: So obviously this need a though explanation. Is there interest in back filling Assa's place?
- Abdoulaye: We will send an e-mail to her and explain that she will be replaced. Everyone will write to her. They are a number of criteria to be member of center. If she can fill them, she will be part of center. If she can't then we will replace her. Depending on her answers will discuss.

Then Belco talked about the connection problem. Abdoulaye will call the boss of Orange and make it cheaper.

- Belco: What I'm planning now is that we have collected much information about the shea- UST's 5 teams worked on marketing, management, quality, distribution etc. What I'm trying to see now is that since the people from UST worked on those issues and we worked fully on it in Zantiebougou. So as a priority, I'll write a business plan for the shea. Because it is too much to do cooler, seed potatoes, and shea. So I'll ask the UST what info. I need for the business plan and then I'll go to the US and finish the plan. At the mean time, the UST team will work on the seed potatoes. The next person can go and work on the business plan for the seed potato.
- Aissata: Or once we have one plan for shea we can refer to it for the seed potatoes. And why didn't we receive the final UST report to the team about shea?
- Abdoulaye: I want to work in the potato lab to help the farmers with identifying diseases I sent this to Florence.

It ended with Keriba agreeing to send invoices to Florence and that serious follow up should be made addressing the above issues.

Then I met with Binta Bocum, the project director of ProKaritea and director of shea projects in the Ministry of Women, Children, and the Family. Belco updated her on our work the past week. She was very interested in the kit and the results from the American Shea Institute. She asked for a training to be planned for her organization to use the kit. She also stressed that next time we're in Mali, we must go to Douila, which Belco would like to do. Binta told us about a grinder being used there made of rocks, to avoid getting iron in the butter. The results from a study about shea exportation is partially finished, she said. The report states that shea could be sold for 9 to 18 times the local price, but transportation is an issue. There are also demands made by foreigners that Malians will have a hard time completing- such as paperwork.

Tuesday, 29 July 2008:

Abdoulaye picked me up at 9:15 a.m. and we went to Sanambele with Sideke. We met with Djibril Samake from the health center, Hawa Diarra from the health center, Hawa Coulibaly a farmer, and Bourama Coulibaly a farmer that also works with the grinder. After introductions and sharing photos from Florence, I started asking questions about malaria. The health care workers said that the disease is prevalent from August through October and there are many, many mosquitoes right now because it has been hot and wet this summer. There is also a lot of larvae, so next month there will be even more mosquitoes. This year there are more mosquitoes than last year because the rain started early and came regularly.

The clinic has an average of 10 people per day with malaria. Most of the sick are from the ages of 0-6 years old. People in the center are sick for about 5-10 days and those that don't come in can stay sick for up to 20 days. The symptoms are high fevers, headaches, vomiting, and stomach aches.

The use of bed nets is limited. They use them at night, if they have them. Only the people doing crochet work have nice bed nets (about 7 people) and some of the other people in the town have nets, but they have holes in them.

Djibril and Hawa asked for everyone to have bed nets and to use the BTI to kill the larvae. The last suggestion was to engineer a better system to collect human waste- as it now sits outside of the house walls in a pool that breeds larvae. The children are using the posters and explaining the malaria process to their parents, as explained in the earlier video conference.

Then we talked with Bourama Coulibaly about the grinder. He said the new piece is much better because it is thinner and seems like it will last. On a whole, the grinder is working well. Women are using it for peanuts, sorghum, millet, cowpeas, and corn. They have taken 3 actions with results:

1. The price was reduced to 15 cents for a small bowl full of ground material. There has since been an increase in use.
2. The women that had been grinding peanuts etc. the traditional way now have an alternative and don't have to work as hard.
3. Therefore, people are happy and lazy (said tongue and cheek.)

Bourama was happy to show me his impressive record book. He is the only one that keeps records of the use including: date, material, quantity, and price. Bourama said that he is happy to keep records so the American people that spend money know that it is being used well. Overall, the people of Sanambele are happy to have the grinder and it is very useful for the women. The village would like to have other machines to cut down work as well, like for grinding shea kernels into shea mill.

We hurriedly returned to Bamako. I gave a brief report to Madame Gamby about my trip. She hopes that next time, I can stay longer. I told her that Chris wants to come with expanded and improved kits.

I went to the internet café, finished this report, and sent it to the team. I also typed up the following list of suggestions and to-dos that Belco asked me to compile:

- Contract to have the internet connection set up as soon as possible. I think it may help both the Malians and American faculty to have a regular weekly or biweekly phone meeting.
- Figure out where you'd like money wired from the US to Mali.
- Make sure the team is clear on how to invoice- see Florence's e-mailed step by step instructions coming soon.
- Print evaluation forms for the kit (as suggested in the report) and include questions to gather feedback. Eventually, give this information to Chris Sedlack for kit improvements.
- Work on the business plan for shea.
- Contact UST and ask them what information they need before they can help you with a business plan.
- Work on institutionalizing the Agri-business Network.
- E-mail Assa and ask her if she wants to be a part of the Network. If she doesn't, consider back filling her place.
- Follow up with the Cheetah fund.
- Encourage Keriba to finish his studies.

- Try to increase inter-team support and collaborative efforts.
- Ask Sibolo for more details about the many buyers.
- Be honest with the US faculty about the amount of time you have to spend on Network activities and whether you have a desire to be paid for your effort.
- Contact Sotuba Jarata (?spelling) as Jean Harman suggested.
- Meet with Gaussuo to talk about cooperatives.
- Look at applying for Engineers Without Borders project.

Engineers Without Borders - USA

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- Help figure out Abdoulaye's situation with respect to his desired research and the contract between Madame Gamby, Florence, and himself.
- Ask to allocate the mini-grants differently, if you don't want to use them for faculty or farmer trips.
- Set up a kit demonstration/training for Binta Boucum.
- Contact Rick Fell or look for an e-mail about the price of a kilo of beeswax and research questions they'd like to ask the women in Zantieboucou. Then follow up with Corprakazan. I would heed Jean Harman's advice about diversifying too quickly at the expense of decreasing shea efforts.
- Send a kit to Zantieboucou with a team member.
- Translate the results of the American Shea Institute test.
- Bring a copy of the translated results to Zantieboucou.
- Ask Binta for the results of the commissioned study about shea exportation when they're finished.
- Consider ways to improve transportation and storage of shea butter.

Abdoulaye drove me to the airport after dropping off a package in the mail. I left Bamako at 19:35 on Kenya Airways flight 513Q to Nairobi to work on an Engineers Without Borders at Montana State University project in Western Kenya.

6.0 List of Persons Met (complete name with correct spelling, their title, organization, e-mail)

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