ASSESSMENT REPORT

AFGHANISTAN
FRUIT AND NUT PRODUCTION, PROCESSING, AND MARKETING

MAY 20, 2004

TRANS SIERRA, INC.

RICHARD BOSIO
DOUGLAS DOTY

Jun 24 04 09:58a Financial Services Unlimi 2095776021 p.2

CONTENTS

Team Activities Summary

Summary of Issues/Problems

Short-term Recommendations

Mid and Longer-term Recommendations

Summation

Team Activity Summary
May 3 – May 15, 2004

May 3 – 4

Travel

May 5

RAMP office, orientation with Dr. Charles Grader and Dr. Ken Swanberg
Meeting with a director in the Ministry of Water, contact arranged by Mr. and Mrs. Saleem _____ of Chowchilla, California
Visit to dried fruit and nut market area in Kabul, with Dr. Swanberg and Mr. Mohibi of RAMP

May 6

RAMP office, meeting with staff
Meeting with 'Afghan Raisin and Dry Fruit Export Promotion Institute' with Dr. Swanberg, Dr. Ken Neils, Mr. Mohibi
Visit raisin processing site 1
Visit raisin processing site 2
Visit pistachio processing site
Visit well drilling and warehouse construction site

May7

Meeting with Afghan contact from United States, nephew of Mr. Ahsim Ayoubi who is involved in construction supply business, demining, and farming
City orientation with Mr. Mohibi

May 8

Tour of Parwan Province, travel with Dr. Grader, Dr. Swanberg, Mr. Mohibi
Visit growers of almonds, walnuts, apricots, mulberries, wheat
Take soil and water samples

May 9

Planning meeting with Dr. Swanberg
Fresh fruit traders meeting with Mr. Mohibi, central market in Kabul, discussed need for refrigerated warehouse and refrigerated transportation
Met with agricultural chemical supplier, Heravi Brothers Agriculture Co. (NOOR)
Searched city for farm equipment availability, located orchard sprayer
Review with Dr. Grader and Dr. Swanberg

May 10

Continued search for equipment, purchased polyglass tanks for use with orchard Sprayer
Made arrangements for sprayer demonstration and training for RAMP staff and grower representatives
Delivered soil and tissue test kit to RAMP office

May 11

Attended meeting at Ministry of Agriculture, presentation by Dr. John Mellor of Columbia University, also present was Afghan Minister of Agriculture
Traveled by air to Kunduz with Dr. Swanberg, Mr. Mohibi and other RAMP staff
Tour of ICARDA research station and tree nurseries
Visited almond orchards
Visited cotton gin

May 12

Visited closed but operable sugar beet processing plant
Met with head of large co-op and some of their growers in Samangan
Did farm tours, including many areas growing poppies

May 13

Visited river port, rail crossing, and fuel terminal at Uzbekistan border
Met with Patti Buckles of USAID at embassy, talked with James Beaver, Mission Director, by phone
Final debriefing with Dr. Grader and Dr. Swanberg

May 14 – 15

Returned to US

SUMMARY OF ISSUES/PROBLEMS

Note: The following problems relate to all crops. Therefore, certain crops may be mentioned but all farmers in Afghanistan face the issues and problems. Actually, farmers all over the world must deal with similar concerns. The solutions will be more specific to Afghanistan because of many unique constraints of this country.

Issues/Problems – Crop Production

Water

The number one issue for production of any crop worldwide is water. This first and foremost problem is critical in Afghanistan because the country is entering its fifth year of extreme drought. Even in average rainfall years the land is arid, requiring supplemental water for good production of any of the tree fruit and nut crops. The pistachios survive on natural rainfall, but only in limited areas and specific elevations. A few grain and cereal crops are rainfed only, but with very limited tonnage in recent drought years.

All of the farming areas we visited were irrigated by gravity flow through various systems of canals. When the streams run low the canals cannot be fully charged. All of the growers we talked to have not had adequate water to give to their crops for three or four years. They may begin the season with enough, but run short by midseason. The immediate effects will be seen in smaller fruit and nut size and the longer term effects will include the general health and/or death of the trees.

Water issues must be addressed first and foremost. All other problems are secondary. Our initial assessment would indicate the drilling of wells to supplement the canal systems. Most of the farmers are familiar with existing wells in their local areas, and suggested plenty of water in depths ranging from fifty meters down to one hundred fifty meters. Supplemental wells would not be owned or assigned to specific growers, but could simply be used to charge the canal systems for many growers to use. To make the system efficient the canals should be cleaned and maintained enabling good flow without spillage or waste.

Nutrition

Good plant nutrition is essential for an economic return from any crop. Much more information is needed to determine the levels in Afghanistan. After farm tours and discussions with the farmers it is indicated that additional fertilizer use would benefit production.

The general appearance of the trees from a distance is not alarming. However, upon closer inspection and questioning several shortcomings must be noted. The small size of the leaves, the small size of the fruits and nuts, the discoloration and deformities of the leaves, and the lack of new annual top-growth of the trees all indicate multiple nutrient deficiencies. Each time the harvest is taken to market, a farmer is taking nutrients away from the farm. These must be replaced to continue production.

Laboratory analyses should be performed to determine exactly which nutrients are needed. Each of the growers we talked with said they were applying fertilizer. However, there seemed to be a standard program being used, without regard to what might be needed. For example, in almonds the common program included urea (46-0-0) and DAP (18-46-0). These fertilizers are high in nitrogen and phosphorous. Almonds tend to require a lot of nitrogen and potassium, but only low levels of phosphorous. One must also consider what nutrients are already available in the soil. There may be adequate or short supplies available of any of the above. Therefore, soil and tissue (leaves) testing would help determine which fertilizers should be used and in what quantities. In regard to fertilizer quantity, the farmers informed us of rates that would only be 10% - 25% of the crop needs relative to the production they were claiming.

Also, any time the farmer might be spraying the trees for insect or disease control, foliar nutrients could be added to the solution. Soil and tissue testing would also determine this need. This is a common method to supplement minor element requirements.

Other information would be available from the test results, such as soil type, pH, amount of salts, etc. Any of these conditions may be limiting production and could then be addressed.

Crop Protection

Once a farmer has the proper amounts of water and nutrition to grow his crop he must then be committed to protecting that crop from various other maladies. Weeds, bacteria, fungi, and insects all must be dealt with.

On the Afghanistan farms we visited weed control was not a major issue due to he practice of intercropping. This practice creates problems of its own which will be discussed under the next heading. However, weeds were under control in most cases, which can be attributed to inexpensive labor and not the use of herbicides.

Bacteria /fungus problems were evident in many fields. Various diseases showed up on the almonds and walnuts. The growers did not seem as concerned as we think they should be regarding the effect on quality of the crop when it goes to market. At one site shot hole disease was pointed out to us on almonds. However, it was brought to our attention because they thought it was insect damage. It must be noted that these diseases are not as critical for the nuts as they will be for the fruit because there is a hull protecting the nutmeat. But in the case of apricots, for example, fungus and bacterial problems can cost the farmer the entire harvest. There are remedies available in the form of fungicides provided the growers have adequate spray equipment available.

The issue of most concern is insect control. We could see a great deal of insect damage in all of the orchards we visited. In one location with almonds and pomegranates the worms were causing a great deal of damage, and therefore crop loss, to both crops. These insects were defoliating the almonds and were inside the fruiting bodies of the pomegranate. The growers had been applying insecticides with very poor results. In the case where the worms were destroying the almonds and pomegranates they had sprayed three times with little control.

The real problem is the equipment that is being used. They were trying to spray ten-meter high trees with three-gallon handheld sprayers. There is no possible way the top portion of the trees could be reached. Some very basic spray equipment is needed for insect control to protect these crops. Another important point is that very toxic (to mammals) insecticides were being used repeatedly with very little control. Much safer products could be used with less frequency and better control of the problem when proper equipment becomes available.

Jun 24 04 09:59a Financial Services Unlimi 2095776021 p.7

Farming Practices

Many age-old practices are hampering better production. A key issue is the fact that the average farm size is very small. In most of the groups we talked to each grower only represented one to five hectares for the tree fruit and nut crops. Between their fields were walls, making access difficult for equipment and even manpower, and also limiting the ease of irrigation. In addition, all of the growers intercropped beneath their trees. This means they were growing other crops in the same fields. This makes farming any one crop very difficult because each crop has different needs; each crop has its own nutritional requirements, insect problems, etc. The most important issue may simply be the extra water requirements. We do not see a quick remedy to this problem because the Afghan farmer sees this as the most efficient use of his land to feed his family. (Note: the intercrop in many cases is poppies.)

Another issue, which we do not entirely understand, is the fact that the farmers did not seem to have any replant program. If a tree or vine died, they simply left a blank space. We believe this relates to a lack of long-term thinking because of Afghanistan's recent history. In many cases they were only farming half or less than half of the original number of trees for a given orchard. Production could be doubled in a few years just by replacing the missing trees. In the case of pomegranates, a viable harvest could be gained as soon as the second year after replanting.

Pruning practices need to be greatly improved. In actuality very little pruning is even apparent. Proper pruning develops the shape and strength of the trees for increased output. It can increase the amount of sunlight available to the leaves for photosynthesis. A difficult situation regarding pruning is the fact that playing catch-up may mean that production would go backward the next crop year, but would more than make up for this in future years. A rotation of some sort would need to be initiated.

Harvest practices will also have to be assessed. During this tour there was not much discussion, other than a description of the types of hand harvesting. There may be room for improvement, not necessarily in the displacement of labor, but in the sanitation of the crops at harvest. As an example, grapes are cut and laid on the dirt to make raisins, which makes for a very dirty product when sent to the processor. The introduction of paper for this drying process would make the cleaning much easier and make a more presentable product to take to market.

Jun 24 04 10:00a Financial Services Unlimi 2095776021 p.8

Issues/Problems Processing

Farm Size

Once again, farm size enters into the equation. Because these growers are of such small size there is little opportunity for vertical integration of the processing into their operations. Even if associations are formed, the growers are not generally involved in the processing of their crops. After harvest the crops are sold to buyers for central processors.

Sanitation

We visited two raisin cleaning and packaging plants. Through their buyers raisins are purchased form many growers for which variety, size, and quality range all over the board. The one common thing of note is that all of the incoming raisins contained a lot of dirt and foreign materials (in one case, nails). This makes cleaning very difficult for the men and machines. We were somewhat amazed at the finished product considering how the incoming stock looked. The finished raisins looked OK.

Besides starting with rough product, the maintenance of the equipment was very poor. Our visit was off-season, yet the cleaning line appeared to have had no attention since it was shut down on the last run. Everything was dirty, moving parts had not been greased or serviced. The paint was original from twenty years ago. We are talking about food products, and the sanitation is terrible.

Storage

We visited storage facilities for raisins, nuts, and spices. All products were stored in fabric bags (raisins were boxed) in warehouses. There were no pallets because everything is moved by hand. We saw no refrigeration in this hot climate. Again sanitation is a problem.

Issues/Problems - Marketing

Grower Size

The farmers themselves are not in a position to control their destiny. Other than a small amount of their harvest, which may go to a local fresh market, they must sell to the brokers and buyers of distant processors and marketers. We were not made aware of exact pricing, so can only conclude that this system may be adequate. But in the very least, the farmer does not have much control.

Associations

Associations seemed to be common enough within the farming communities we visited. These groups of growers certainly should be able to help the individuals on many fronts. If the growers will truly band together when negotiating prices for their products, it should only benefit them.

Brokers

This segment serves an important function in Afghanistan because of the small size of the farmer on average. This is the first step in gathering the quantities required to address larger markets. At this level the product quality is also controlled, even though at this point all products we saw were below the standards of most world markets. In our contacts the brokers played dual roles, one of a local marketer and also that of exporter, depending on price and availability of course.

Transportation

Nearly 100% of all products in Afghanistan are moved by truck. There are no seaports, no rail, and very little air transportation available. The trucks serve as the lifeline to this country. However, the trucks move slowly because of the state of disrepair of the road system. We heard many stories of products arriving at export locations (like Pakistan) only to be turned back or declined. Apparently there are no refrigerated trucks. Most of the trailers are flatbeds with side-racks. These trailers are also used to carry enclosed containers. Refrigeration units could be installed in these containers to make for cooled transportation for foodstuffs.

SHORT-TERM RECOMMENDATIONS
PRODUCTION

Water

If you want more agriculture, add more water. This is the 'simple' solution to farming anywhere in the world. We believe there are things that can be done in Afghanistan in the short-term to help the farmer's plight.

The country is in the midst of a drought, yet the perennial tree crops must be kept alive. If we let them fail it will take many years to replace this production. Trees are long-term projects. The primary irrigation used at this time is gravity flow through various systems of streams and canals. All the growers cooperate with the use of the water in turn for each of their small farms. They have adequate water early in the season, but run short by mid- to late-season.

The most effective immediate means to help these growers would be to drill wells to add supplemental water to the canal systems. These would effectively be community projects, because many people would have access. The farmers could also be involved in the cleaning and maintenance of the canals, creating employment.

Plant Nutrition

At this time fertilizer is being used in Afghan farming. However, we are not sure if the proper nutrients are being used for each crop, each soil type, etc. We are quite certain that the rates of application are too low.

A solution would be to set up small soil and tissue (leaf) laboratories to be able to test for the needs of the crops. This can probably be done for less than $2,000 each for the basic equipment. Then a one- or two-day training period for local technicians would be required. No special skills would be needed in advance for the volunteers. The efficiency of using the correct fertilizers in the correct amounts would benefit the farmers a great deal. Fertilizers have the highest multiplier effect on return for each dollar spent of any crop input.

Spray Equipment

Crop protection has been very difficult for the Afghan farmers in regard to insects and fungus diseases. They have insecticides and fungicides available to them, but do not have adequate equipment to do the application. This is partly due to the small farm size, because larger equipment items are hard to justify for small acreages. By forming associations for the common use of this type of equipment many growers could benefit. They could simply share the sprayers or could have these associations do the applications for a charge.

This equipment would also reduce pesticide usage. At this time the growers are spraying very harsh pesticides three times with little control of the pests. With the proper equipment and technique they could use less toxic insecticides and spray less times for complete control. This is very much a 'win -- win' situation.

Other Grower Training

Additional training is also needed in many of their farming practices. This would include pruning for additional tree strength and structure. Proper pruning will increase production. Also the Afghan farmer must be schooled in replanting missing or damaged trees and vines. Nurseries should also be considered, because no commercial nurseries exist to propagate future stock.

This training can be done in groups, probably their own associations, in the field with hands-on demonstrations.

SHORT-TERM RECOMMENDATIONS
PROCESSING and MARKETING

Processor Training

Preparing a high quality product is essential to selling your wares in the marketplace. Quality control must be taught at the processor level. We saw dried fruit being packaged off of the dirt floor in one warehouse. Sanitation must meet a higher standard if these products want to enter new markets. Part of this QC would also include better maintenance of processing equipment.

Grading and sorting is almost nonexistent at this time in the places we visited. It was either adequate or rejected. By establishing various levels and requirements it may be possible to select certain products for certain markets.

Cold-Storage

Obtaining a good and fair price in any market is generally a matter of timing. When you hold quality product at the time demand is high you win the game. Afghanistan farmers and marketers have traditionally had little control over their timing because there has been no way to store their goods. Refrigerated warehouses should be established as collection and storage centers. This can extend windows of market opportunities for many days and sometimes weeks. The use ozone should also be added to sanitize, stop the maturation process, and further extend the shelf life of all food products.

Once cool storage is established, then cool transportation must follow. The Afghan trucking system has very little or no refrigerated capabilities. However, a natural entry may be the prevalent use of containers in the country. The conversion of containers into refrigerated units should be considered. This would give the versatility of on-board/over-the-road cold storage or even temporary on site cold storage. Ozone should also be added to these units to further enhance the products.

MID- AND LONGER-TERM RECOMMENDATIONS

Large Farms

While traveling in the northern pert of Afghanistan, in the Kunduz, Baglan, and Samangan Provinces, we noticed large areas of wheat farming. These were not the typical small individual farms. They were, however, being farmed without irrigation. They were 'dryland' or 'rainfed' only. The elevations (by GPS) were only 100 to 150 meters above the elevation of the northern border river (Darya?). It should be determined whether or not water for irrigation could be moved to this area for large scale farming of higher value crops. This could be done by gravity from a location farther upstream with a canal system, or possibly by pumping stations to lift the water. Water, as always, is the only missing ingredient.

Pomegranates

We believe a special note should be made regarding pomegranates for two reasons. First, this crop is the one tree crop that can be brought into production in a relatively short period of time. Generally, economic harvests can be gained in the second or third year after planting. Secondly, the world demand has increased greatly in recent years because of medicinal, or health related, uses of the juice.

Associations

The formation of associations must be emphasized. Small scale will not lead Afghanistan to additional markets. Groups must join together at all levels; growers, processors, and marketers. The many issues that encumber this idea will have to be overcome.

Investment

Outside, or foreign, investment should also be sought. Partnerships of any sort should be explored. There may be investors that already have infrastructure for processing, or already have farming expertise, or have influence or control over certain markets, or all of the above. Afghanistan does not have to go it alone. Profits for investors can be available while still adding value to Afghan products and increasing employment in country. Help in adding quality will benefit everyone.

Simple Things

Help Afghanistan help itself in small ways in the beginning. Take baby steps. Someone should provide water trucks for dust control. This could be done in Kabul and in outlying areas with the use of any water available. Clean up the streets and the air by simply driving around spraying water. Second, assist with trash and garbage removal. Maybe this needs to be more trucks, or maybe additional funds for manpower. Both of these simple things would provide health benefits to all. Additionally, we need to help bring the pride back to Afghanistan.

SUMMATION

Trans Sierra believes the best and fastest market potential lies within only three or four crops. The focus should be on almonds, apricots, and pomegranates. Initially we should concentrate on helping with production by assisting with water needs in any way possible, by testing soils and leaves to determine nutritional needs, by providing spray equipment and teaching better pesticide use, and giving the farmers training on other farm practices such as pruning. These short-term goals are basic but can make a tremendous difference in both quantity and quality. In the short-term, as well, the processors must be taught more about quality control. This would include cleanliness, grading, and equipment maintenance. Possibly the most important short- and longer-term improvement would be the addition of cold-storage warehouses and transportation. Products like a trail-mix can work if Afghanistan can produce higher quality fruits and nuts, and can process them to meet world standards.

ADDENDUM I
POMEGRANATE NOTES

(The following represents a summary of my notes gathered while doing research reading and from interviews with California pomegranate farmers and Crop Consultants. Doug Doty)

My studies concluded that the pomegranate would have good potential to be further developed in Afghanistan for the following reasons:

- this plant is native to the Middle East and prefers dry climates with hot summers and cool winters
- the pomegranate tree can bear a crop by the second year after planting
- trees are long-lived, producing for over 20 years
- the crop requires low inputs (water, fertilizer, insecticides) relative to others
- propagation is fairly easy from cuttings (in the nursery or on the farm)
- pomegranates have a long storage life (6 months or more in cool storage)
- the juice is popular because of the health benefits

In considering which crops to focus on in Afghanistan one must realize that most of the orchard crops grown there take a minimum of 5-7 years before economic returns are realized. This can happen in the second or third year with pomegranates. This crop, like almonds, is native to this part of the world and has been developed over centuries for this growing environment, like climate and soil type. Propagation could be done on the farm, but would almost certainly be better if controlled in a nursery setting with a warm soil medium, good moisture, and growth hormones.

The pomegranate is a hardy plant. It requires less water than many of the other tree crops. For example, in California the almonds are given up to 4 acre/feet of water in addition to rainfall and pomegranates are only given 2-3 acre/feet. In Afghanistan's current drought situation this is very important. Pomegranate trees are self-pollinating (in California some growers use bees to enhance pollination). In California annual fertilizer rates are 100 pounds/ acre for nitrogen, 50 pounds/acre for phosphorous, 50 pounds/acre for potassium, and small amounts of zinc and magnesium. This is less than half of the amounts used for almonds, apricots, or walnuts. Also, disease and insect problems are not as prevalent as with most of the other fresh fruit trees, like apricots and peaches. (After seeing the worms in the pomegranate fruit in Afghanistan, information now leads me to believe that the insecticide Lannate would control that pest.) Winter orchard sanitation would need to be emphasized. Any fruit mummies would have to be removed to avoid care-over diseases for the next crop.

Modified pruning techniques could be taught to Afghan farmers to increase yield. In Afghanistan pomegranates are left as bushes. In California the plants are trained into trees with a main trunk about 1 foot out of the ground and then 5-6 main scaffold limbs. The trees are then topped and pruned to maintain shape. This also helps in regard to hand harvesting. After the third year pruning becomes less and less a chore, with the exception of suckering. This plant throws many new shoots (suckers) out of its base, and these must be removed to maintain a tree shape. Pomegranates prefer total sunlight, but can be grown in partial shade. This lends itself to the Afghan practice of intercropping, whereby pomegranates may be grown within an orchard of larger trees.

In California pomegranates are being stored for up to 7 months at 40 degrees F and 80% humidity. The fruit has a fairly long shelf life without cool storage, but can be doubled if the temperature is controlled. This can allow a broader market for the fresh fruit when Afghanistan has cold or cool storage.

However, the main market today is for the juice of the pomegranate. This is related to the health benefits of this juice. Research has shown prostate health benefits, as well as heart disease and cancer reduction. Pomegranate juice contains antioxidants, high potassium, and high vitamin C. Trans Sierra, Inc. is researching juice machines for Afghanistan at this time. In the past most juicing required opening the pomegranate to extract the seed-pack. Currently in California, Paramount Farming is using whole fruit in their presses, which saves several steps in the processing. Also note that after pressing the remaining parts of the fruit can be used as feed for livestock.