Banana Production and Packing in the Chapare Region Report and Recommendations

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Prepared for the U. S. Agency for International Development under AID Contract No. 511-C-00-99-00114-00

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April 18, 2000
Cochabamba

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EXECUTIVE SUMMARY

First of all, I want to state that I don't have any comparison of what the project was like in the past. I say this because quite a few people stated that the associations' and growers' farms were in better condition when there were better prices and most agricultural practices were being performed. Now, even the people who assisted me in the field made comments as to the poor state of the farms. The lack of implementation of even some of the more basic agricultural practices, that require nothing more than time and sweat, is obvious. In a few cases, practices are over applied or are being implemented in a wasteful fashion. In only a small percentage of the farms are practices being done correctly.

For a successful outcome of the program, and in order to have a marketable product, the growers in the Chapare will have to consistently produce a known volume of product of good competitive quality. Volume alone is not enough.

I have seen too many good ideas fail, despite good intentions, due to lack of coordination of all the different factors involved. What I interpret from many conversations with different people is that the only problem here is marketing, and when that is solved the rest (consistent volume and quality) will follow. Unfortunately, you can not market what you do not have. They have the cart before the horse.

bananas are produced all year round, but production is not constant. There are different supply curves in different countries and regions, and demand curves are influenced by other substitute fruits. The growers, extensionists, and other support personnel need to get that crystal clear. Using a bad market as an excuse to abandon basic farm practices will only be detrimental to the quality and reputation of the Chapare fruit.

Generally, what I see in the field with respect to the quality and volume o exportable fruit is a lot different from what I hear from so many overly optimistic people. There are some excellent fruit and farms scattered through the Chapare. However, they are surrounded by abandoned farms infected with Sigatoka inoculum and weeds, which causes undue pressure on farmers who are trying to control these problems.

I believe the solution is basically a two step process. First, educate, motivate, and get the extensionists focused on those areas where they can have a positive impact. I think that with the right coaching and focus, the extensionists can and will accomplish the changes needed to produce consistently good quality fruit at a minimal cost that can compete in the international markets as well as supply the local market. At the same time, these changes will help increase the disposable income of the subsistence grower so that he can support his family, his needs, and the continuos improvement of his farm.

All banana extensionists and technicians contracted directly by the associations need more education. This training has to focus on technology that is culturally compatible with the reality of the Chapare. Don't try to pass off high production plantation technology to small subsistence farmers or you will sink them in debt. This technology needs to utilize existing resources when at all possible and minimize the use o costly imported goods. The education focus has to be on cost effectiveness - extensionists have to put themselves to the shoes o the farmer before making suggestions.
Once the skill levels of the extensionists are improved, converting them into value-added assets, keep them motivated by monitoring their successes or 'wins', in a measurable way. This can be done in a number of ways, such as boxes exported, quality of farms and fruit, tonnage produced, income generated per farm, disposable income, etc.

Secondly, and almost simultaneously, the skills of the growers and associations need to be improved. Decision-making skills are lacking, and many poor decisions are made due to lack of knowledge. Understanding the 'why' in a lot of agricultural practices, fruit handling, and logistics is essential for success and strengthening of the associations.

Many poor and costly decisions have been made that have setback the associations as to their readiness to compete in the export market. They need to be able to prioritize those activities that are financially beneficial and refrain from needless ones. Some of these are discussed in the recommendation section. I have tried to focus on those areas and suggestions that really add value and require minimum capital investments.

Without intensive and practical field training, don't expect results in productivity and quality. Right now, the skill levels are too low. There is a lot of interest on the part of both the growers and extensionists to improve their knowledge o agricultural practices. So, set up a program that will focus on those value-added activities that add to growers' disposable income. Then, most will be receptive to continues education and investment that will finally produce returns back to the grower.

GENERAL OVERVIEW OF PRODUCTION, PACKAGING AND LOGISTICS SKILLS OF CHAPARE PRODUCERS ASSOCIATIONS

To get a good understanding of the skill levels of the different associations, I met with the presidents of the eight banana organizations of CODELCA. This was during a UNABANA meeting where the following associations were represented: ABIB, APROBAC, APROBAT, ASIPA, ASPORBAN, ASPROBACI, ASITROC, and ASBA. after this initial meeting I visited all of the above associations, except one that was inaccessible due high river levels, as well as three others, APACSA, AIPAI, and AIUU. In most cases, I was able to walk various farms with the president or members of the association and normally with the owner o the farm as well. In other cases, I walked the area alone and then looked for the grower later.

I also was able to talk with almost all of the banana extensionists, in CODELCA, CIAPROT, INDASA and WINROCK, SAIBOL as well as with few of the people at IBTA. The list of people that provided input to my report is included in Annex 2.

In the area of production, the associations' skills are very weak. The two main two sources for acquiring new skills are trial and error, and to a larger degree, instructions from the extensionists, until such time as the growers believe they know more than the extensionists. On many occasions, they commented that the extensionists came to learn from the growers. Since many times perception becomes truth or fact, I'll address this later.

Many growers commented that exports to neighboring countries are way down from levels at the end of last year, and that the local price paid for the chipa has also recently been at record lows. However, this phenomenon happens in all agricultural products all over the world and, never have I heard, as I do here, that the only problem is marketing and commercialization of the fruit. If that were true, the farms would not be in the shape they are agronomically. In my experience in Asia and the Americas, many subsistence growers know how to tighten their belts to survive market lows and be ready to bounce back when the markets improve. Here, on the other hand, most farmers just abandoned good production practices, extended the time between fumigation cycles too long, or just stopped fumigating altogether. A comment heard frequently in the fieldis that, "I just quit bagging, fertilizing, spraying, etc. because the prices dropped." A skilled grower will cut back drastically on all costs and will only continue those practices that ensure that the farm does not drop below the level where one can quickly take advantage of a market turnaround.

Based on the amount of questions asked by some growers, I believe that they are hungry for new information and need the next level of information that would enable them to make intelligent decisions, especially economic ones that would result in greater disposable income.

A couple of example might illustrate the point a bit clearer. I'll use bagging and age control because without these two techniques you can't successfully export fruit, and sprayingfor Sigatoka, because it is the most expensive practice and without it you can quickly loose an entire farm.

Bagging and taggingwith ribbons were abandoned on most of the farms, resulting in piles of used bags on many farms going to waste or decomposing. In contrast, other growers kept bagging everything, even four and five handstemswith a large bag at a very high cost, due to pressure from the extensionists to keep their farm certified.

What should have been done was to present a survival plan to the farmers, such as: keep putting the age control ribbon on those stems that have seven or more hands, and bag only those stems that have eight or more hands, utilizing the bags that were already purchased or hanging in the fields. This way, you select the largest and cleanest stems for possible export.

With regard to Sigatoka control, most farmers quit de-leafing, extended the interval between sprayings, used the same chemicals too long, or stopped spraying altogether. Others have done periodic de-leafing and spraying, but are losing the battle due to increased inoculum from old infected leaves were not removed before spraying.

What should have been done was to get the members of the association together to plan to maintain heavy de-leafing to drastically reduce inoculum At the same time, they should have planned to use less expensive fungicides at slightly longer intervals and to include periodic sprays using just spray oil at a high doses, as well as a couple of inexpensive systemic fungicides.

If these two examples had been implemented when prices dropped or exports stopped, the associations would be now ready to export with relative ease. However, the situation now is that Sigatoka first needs to be controlled and it will take three months from when age control starts in order to export safely.

In the production area, it's difficult to distinguish the difference between associations. Rather, some individual grower's skills stand out. There a small number of farms that are exceptional despite the economic situation. These growers should be helped via some intensive extension work and coaching. These farms could serve as ideal demonstration areas for the associations and NGOs.

An unskilled extensionist won't be able to capitalize on these opportunities. Grower-to-grower learning clinics, if done properly, help to motivate surrounding neighbors; if not they become a point for arguments and the participants don't

take away any positive change from the exercise. Basically, it becomes a no-value-added experience.

The principle areas in production where the associations need guidance in order to realize the greatest returns are the following:

1. De-leafing and control of Sigatoka inoculum.
2. Ground cover and proper use of herbicides to achieve desired results.
3. Least-cost ways to achieve proper plant distribution.
4. Simple production shifting techniques to increase revenues.
5. How to select and care for quality stems.

I noticed that some of the association leaders did not have the better farms. A major challenge for the extensionists is to increase the leaders' agricultural skills, as well as their organization skills in the associations.

The extensionists are a critical factor in the development of the associations and I need to make some constructive criticism. I realize that a number of the extensionists are in new areas, geographically, and have new responsibilities. They need to understand their mission. Some have a lot of book learning, and can quote the Stove or Soto texts very well. These books were written when the industry was booming, expanding everywhere. Also, they are based upon experiences in large plantations, or for farms of one hundred plus hectares. Times have changed. Market prices are down from the traditional, higher levels.

Extensionists in the project need to dominate the basic agricultural skills at the level of field demonstrations. Then, they need to be pro-active in looking for the new areas where they can assist growers to become more efficient.

The extensionists don't carry any of the basic tools for agricultural assistance. I did not see any machetes, banana gradecalipers, cords to count plant populations, thermometers, or even a check list to evaluate the farms.

A clinic should be set up to give extensionists the skills to assist the growers more effectively. This training needs to be structured taking into consideration the local situation; it should not be patterned after large, expansive plantations. It also needs to focus on value-added practices that increase disposable income, not those practices that are aesthetically pleasing but costly.

A number of times during my visit, I heard recommendations, and saw evidence of other practices, that were not beneficial to the grower. Some, such as planting kudzu as a ground cover in a banana area, and removing the entire pseudostem after harvesting the fruit, will even cause more trouble than any derived benefit.

This clinic with the 12 to 15 banana extensionists in the project would create a base for standard recommended procedures. At the present, there are a number of different viewpoints and contradictory recommendations. The clinic would also help clear up the different sales pitches received from different representatives of the chemical and plastics companies.

As a final note with the extensionsists, they need to be careful not to focus on commercialization, but how to improve the agricultural part of the equation, given limited resources.

Product Skills

Once again, I see a general lack of understanding on proper care of a quality farm. Examples of improper management of priorities are the following:

1. Stopping the bagging and age control.
2. No weed control or ground cover plan, just weeds waist high. Other areas are burned dry with herbicides.
3. Areas where pruning has stopped and plants are clumped. Plant populations are too low throughout the area.
4. Replanting, when it occurs, is done with inadequate planting material, of which I estimate over 80% will not survive as productive plants.
5. Stopping all de-leafing.

These practices only expedite the decline in farm, as well as fruit, quality.

Of course, there should be a fertilizer program, and drainage needs quite a lot of work in different areas; however, this will require heavy financial investments. I don't think that this is the time to invest until the basics are up to speed. It would be a waste of time and capital.

Packing

During my stay, packing only occurred at two stations at INGAVI-B (ABIB). I was able to compare that to the packing that I saw at the Banabol farm and one of Charare Exporta farms.

Banabol has the best process control, but not necessarily the best fruit quality. What they do well is separate the different-sized clusters. One packer specializes in the first three lines, then passes the box to be finished by another. This technique is very good to insure a tight pack, because it enables the first packer to concentrate in finding fruit that fits well in the box, before passing it on to be finished off. and this is a must in a five-line pack.

The five -line pack is a difficult pack when you try to include the entire stem of bananas. It is most successfully accomplished when all the fruit is small, or when you can separate the fruit into different sizes and shapes, enabling uniform packing.

Chapare Exporta, on the other hand, said that the market in Argentina will accept a four-line pack as long as the weight is correct. This needs to be looked into, in order to establish a strategy and have better quality in the exported box. The associations or exporters can then plan based on the results of what the market will accept

In Siete Hermanos, they said that they now send hands to the local market and that they will start exporting hands to Argentina This also should be looked into, since it also opens up other possibilities in the packing area.

The skill level of the INGAVI-B association needs improvement. From harvesting all the way through to the way in which they stack the finished boxes on the wooden pallets, techniques can be refined to improve the quality of the finished product.

There is a lack of understanding of the consequences of rough handling for fruit quality. Although this statement is based on observation of only two stations or sheds, I believe it to be true throughout the region. The process of loading the chipas on the trucks promotes scarring. There is no great concern about the quality of the hands in the local market, and the handling of the fruit in chipas is similar throughout the area, with no marked differentiation in the handling of fruit for the export market.

Four points where rough handling occurs are: the de-handing process where entire hands of bananas are tossed on top of each other in the de-handing tank; in the selection process, the fruit is pushed hurriedly with a long pole causing additional scarring; clusters are not individually dipped but crammed into plastic basins until full; they are stacked on trays up to four clusters deep for packing.

All of these ‘rough handling’ examples demonstrate the lack of understanding on the part of the association as well as the extensionists of the need to minimize the fruit banging into or having rough contact with surrounding clusters or hands. If one were to demonstrate what rough handled fruit looks like the next day, the workers would take better control of the process. Other practices, such as pulling fingers off clusters during packing or selection, instead of cutting them off with a sharp knife, will have to stop.

Prices will increase faster than the farms can recover. There will be a demand for fruit and care must be taken that fruit quality does not drop below market expectations. Fruit will need to be carefully scrutinized and packing improved in order to establish Chapare fruit as a quality product and create market demand.

Closeness to the market works to the advantage of the grower as well as the exporter.

Logistical Skills

Logistical skill basically cover the areas of identification of fruit, fruit estimates, inventory controls, harvesting techniques, fruit handling, cut-to-cool control, packed fruit accumulation, and transshipment points. There are other areas that could be addressed at a later date once a certain level of proficiency is achieved in these basic areas.

Generally speaking, there are few skills in these areas. Even when there was a lot of fruit being exported, there were no fruit estimates or inventory levels. This will eventually crate problems in the associations not being able to fulfill contractual requirements, since they don't know what they are hanging in the field.

I believe that the advanced associations need to get organized since there is ample opportunity for a rapid improvement in these areas. This should be done with the group of CODELCA's associations, because there will be a time when many associations are sending fruit through the same exporter and mutual cooperation is essential for quality reasons. I will address this more in the recommendations.

AREAS OF NEEDED IMPROVEMENT AND COST EFFECTIVE RECOMMENDATIONS IN PRODUCTION, PACKINGHOUSE, AND OPERATIONS

PRODUCTION

Fruit Age Identification

First and foremost is to get a common age control system implemented as soon as possible. This does not have to be elaborate, however all the associations have to be on the same program.

Observations in the field confirm that completely different programs for age control are being used. Depending on the area and decision of the farm owner or association, some use only 8 different colored ribbons while others use up to 12 colors. Most associations that use 12 colors do not use them in the same sequence or order as the other associations. within the same association, all members are not using the same color ribbon on the same week.

Right now it is impossible to identify the age of the fruit. Most growers don't identify the age of their fruit; those that use ribbons, use different colors for the same ages; some use up the inventory of one color ribbon before starting the next color; and some growers don't even identify the fruit on a regular basis. In the field, one can observe different aged fruit with the same color ribbon, indicating that the same color was used for three weeks. It is clear from talking to different growers that there is confusion as to the age of the fruit. What I was told wasn't always what I observed in the field.

I **recommend** the use of a simple inexpensive calendar, showing some patriotic message, national football team, or some national monument, based on a **10 color**-coded pattern. Such a calendar, showing which color ribbon should be placed each week, should suffice to establish a program throughout the region. This calendar could be donated free by some supplier of agricultural inputs such as fertilizers, fungicides, or herbicides. Also, UNABANA and DAI should have their logos visible somewhere on the calendar, to give their seal of approval. Another **recommendation** would be to place the acronyms of the different associations around of the calendar to promote unity within the group. Even if the calendar is not donated, its cost/benefit is well worth it. Agreement by the UNABANA association to use the calendar would give their program greater credibility, and they would distribute the calendar throughout the other associations.

Why ten colors? Keep it simple. With ten colors, a grower can keep track of the colors by counting on his fingers.

Eliminate confusion between pink, orange and red as the colors fade after three months in the sun. Drop the pink.
Don't use light green and dark green, the latter also fades and confuses the growers using two different greens. Drop one green.

Make sure the calendar is easy to understand.

Get buy-in from the associations via de UNABANA group prior to launching the program. Explaining the ripening process and the need for standardization due to different market possibilities is a relatively easy way to do this. A one hour meeting explaining the theory and logistics of collecting fruit from different associations and sending it to different markets where the fruit must ripen uniformly should suffice to start the discussion and acceptance of a single age control system.

Another **recommendation** is to get UNABANA t buy better quality ribbon that does not fade so quickly. At the same time, explain to the growers that the ribbons can be used twice and try to get them into the habit of taking the ribbon off the stem before throwing the stalks back into the fields. Right now, there are piles of used plastic ribbons attached to stalks scattered in the farms or in and around the packing and chipa de-handing areas.

If ribbon recycling (two uses for each ribbon) is presented as an environmentally friendly way to recycle and produce savings, it will have greater acceptance. Most good quality ribbons can be used at least twice, and should not be thrown into the field. There are not biodegradable and can eventually cause son environmental problems, such as forming and impermeable layer in the soil that affects water movement.

A **recommendation** for CODELCA is to establish which fruit they want to bag and identify for export. This is the key to increasing efficiency and quality for the individual growers as well as the associations. For example, CODELCA may want to establish that the ideal fruit to identify is that of six hands or more and that the ideal fruit to bag is that with eight hands or more. This will then become the standard throughout the advanced associations and will enable all involved to established available volumes for export. At the present time, some growers are bagging almost all fruit, whether or not it is of export quality. This is a waste of the bag. Why waste time bagging and handling a stem that is only good for the local market?

A few simulated shipments of fruit should be part of an ongoing program to establish the transport capacity of the fruit, given the different stress levels and physiological age of the fruit, in order to avoid unnecessary risk of premature ripening in the market. This is not an essential requirement if you get good feedback from the market regarding fruit quality upon arrival.

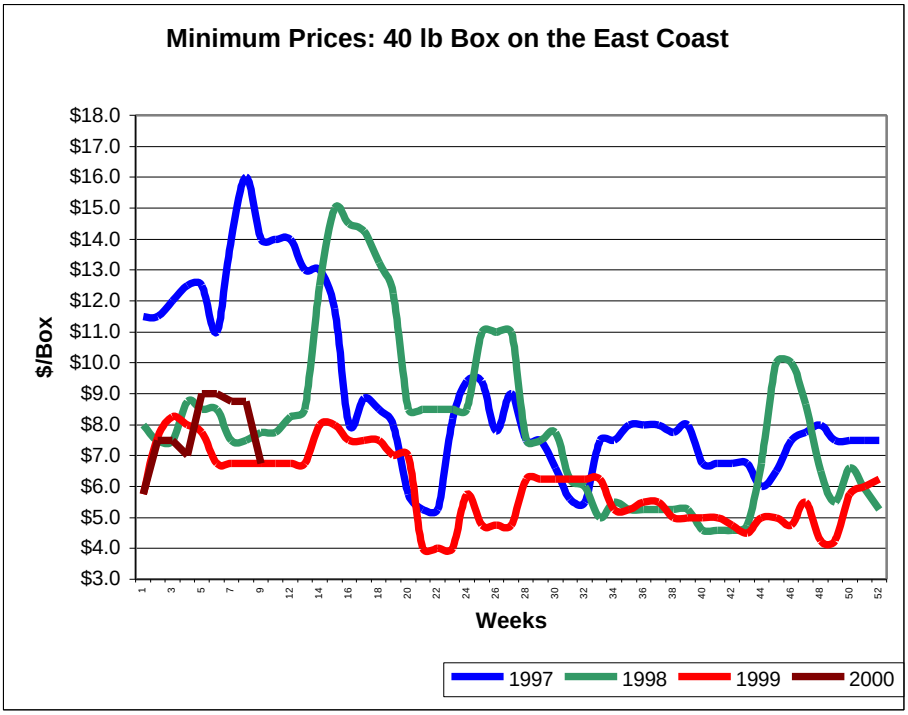
My **recommendation** is to establish a simple code system so that you can identify good as well as problem fruit in the sheds, transshipment points ("acopios"), or in the market. Assigning a letter to each association and then a number to their exporting members does this. All boxes packed from an individual grower will have a letter, then a number. This way, you can trace the boxes in the market or any other place. Example: boxes B-23 or C-12 may be from AIBI grower # 23 and APROBAC grower # 12. Coding the boxes with a crayon is inexpensive, and any quality problems can be traced back to their origin, thus preventing that poor fruit keeps showing up in the market. This becomes a very powerful tool for the extensionists and associations to keep individual growers from ruining the reputation of the region. A grower that has repeated problems with fruit quality should be temporarily suspended from exporting or require additional attention from the extensionist assigned to him.

Given different climatic conditions in the Chapare, bananas may be harvested anywhere from 10 to 16 weeks after shooting. This variability can be an advantage or disadvantage depending upon market conditions when fruit must be harvested. The variability that I have heard here in the zone with regard to proper harvest age ranges from: "we only harvest 12 week old fruit for export," to "we vary the age depending on growth and grade any where from 10 week to 15 weeks." The second response is, of course, more correct.

When asking an extensionist when some of the fruit that was hanging in the field would be harvested, the answer was two weeks. In reality, the fruit should have already been harvested because the grade was above the safe level for exporting. This thinking demonstrates that the extensionists need a lot more training. Also this confirms the statements from the Argentines ripeners and marketing people that Bolivia fruit "explodes". I **recommend** that CODELCA monitor the fruit gauge at the different stations and that they give instructions on when to increase or decrease the age of the fruit.

Grade control

Fruit production in the Southern Hemisphere generally coincides with favorable market conditions in the US and Europe. The coincidence of high demand for the product with improved growing conditions will enable one to harvest more fruit at a younger age, and increase the ratooning rate.



Grade control is the key to customer satisfaction, maximizing throughput, and avoiding excessive waste. The ripener wants the same grade all year long to facilitate the timing and logistics of ripening and distribution. Otherwise, his job is that much harder and will be he prone to look for “easier fruit to ripen”. Also, when the fruit is cooled, then placed in a ripening chamber, it doesn’t help to have that chamber with different stages of ripe fruit. I have heard from various sources that Bolivian fruit “explodes”. This is fruit that, when ripened, splits open rendering it unsaleable. This is caused by improper age and grade control.

In my visits to the different farms, I was able to identify a wide range of finger grade between farms and within the same farm. Since there is a market for the smaller fruit, at the onset you could set a range of between 42 to 48 or 10 to 16 using the other scale. Fruit with a grade of 41 or 49 could possibly go into the market without problems, however it is more desirable to have shorter fruit with a good grade than longer fruit with a thin grade since thin grade fruit is more difficult to ripen. I **recommend** that the DAI commercialization group set a narrower range in grade so that the ripener has more control over the time it takes for the fruit to come to the color desired. Since Bolivia is competing with Ecuadorian fruit, it is best to set the standards by emphasizing uniformity and quality.

Enforcing the uniform grade range in the box should also be one of the missions of the banana associations and UNABANA. To demonstrate this to the associations is a simple, low-cost exercise. The techniques can be explained to the group by demonstrations, such as letting them choose among selected

assorted fruits. Polling the results will show that they themselves desire uniform size and shapes, whether it is for grapes, apples or any other fruit you use in the demonstration.

I also **recommend** photographs showing how bananas are displayed in the larger supermarkets, and the uniform quality and size of other surrounding fruits. This should be part of a presentation to UNABANA and the individual associations stressing the competition that banana has in store displays.

Controls On Harvesting Instructions

I **recommend** that the instructions for harvesting fruit for the export market should be given by CODELCA and possibly disseminated by UNABANA. These instructions will vary depending on feedback from the market and growing conditions. You may have to harvest more that one ribbon color per week; the calibration of the fruit in the field has to be given in the instructions. Records need to be kept in order to anticipate necessary changes that will occur in different seasons. Exporters are not necessarily concerned with fruit inventories and how to handle them, whereas the associations will have a tendency to stretch the age of fruit harvested to the detriment of the quality. CODELCA should have the interests of both parties in mind in order to maximize fruit production.

Sigatoka

In this area, a lot of work needs to be done fairly quickly. As one association president said, ”we’re not growing bananas we’re growing sigatoka”. In many cases he is right.

If one grower is not going to care for his farm, and he won’t rent it to another grower to work it, I would **recommend** that they chop the area down, and plant something else. The good planting material recovered could be sold to cover some of the loss, although collection of the purchase price may have to occur over time or when the material begins to produce. I have seen a number of farms where the amount of dried infected leaves is astounding; for all practical purposes, the area is abandoned. These infected plants are spewing inoculum into the area and are hindering the control of Sigatoka on adjacent farms.

On the other hand, I have found a few growers that are doing a fine job of de-leafing, and other fields that I have entered show some intent at control. Once again, some of the instructions for Sigatoka control need to be redefined, since you should not strip various leaves on the same plant of all the leafy material, leaving just the center vein, or leave plants standing full of Sigatoka even though the fruit had been harvested because "the plant will damage surrounding plants and their suckers, if it is chopped down." This, as well as many other comments, leads me to recommend an intensive reeducation of extensionists in the area of Sigatoka control.

Control has to begin with agricultural practices. Since most spraying is done from the ground, there is a crucial need to clear out infected leaves in order to achieve proper coverage. This necessitates the removal of plant barriers, so that the young unprotected # 1, 2, and 3 leaves receive the proper dosage. I didn't find many areas that were not behind on the de-leafing practices.

Members of the associations state that Sigatoka control is the most expensive practice, however they don't seem to fully understand the need for timely de-leafing. Quite a few stems with hanging fruit have only two or three functional leaves, but up to five dried intact leaves spreading spores throughout the plantation. I **recommend** that de-leafing be addressed by the extensionists on a constant basis until proper de-leafing practice becomes a weekly standard practice, just as in the case of age control.

In the area of aerial application of fungicide, I **recommend** that someone carefully look at this operation. I saw one day's operations that would not be accepted anywhere else in the banana areas. The quality of the mixture, temperature and wind during application, quality of coverage on the leaf, as well environmental issues at the airstrip are major concerns. Someone from IBTA, or some other agency needs to oversee what is going on, especially with producer associations that rely on recommendations from IBTA and supervision from the NGO.

Mixing the chemicals with a stick in 5-gallon plastic containers, pouring the mixture into 55 gallon rusty drums, then into the planes, is not a recommended practice. You don't need a state-of-the-art mixing station, just a small portable high-speed mixer that is inexpensive and easy to use. It can be adapted to plastic drums and will provide a good emulsion, not the slurry that was produced or the chunks of undissolved chemical left in the bottom of the containers. I **recommend** that a portable mixing station be built that can fit on the back of a truck. This will insure a proper mix and avoid the spillage that is occurring now.

Some of the products that I saw were not on the EPA approved list of chemicals for use on bananas. I **recommend** you stick with those chemicals approved by the EPA and/or ITBA, to avoid any problems in the future, and to enable the shipment of fruit to any available market. Some markets require a list of

chemicals applied or a statement that certain products were not applied. The program should not limit itself to different markets due to chemical usage.

The aerial spray operation also needs to be improved. I don't believe that the larger of the two planes being used is adequate – it is too large and bulky for proper spraying of these areas. The entire process is sloppy, however, it can be brought up to speed with a minimum effort, such as limiting the time when spraying occurs to optimize the effectiveness of the chemicals and the coverage. One plane took off at 9:15 a.m. and the other at approximately 10:20 a.m. when temperatures were too hot for effective spraying. My thermometer had the temperature in the low 90's.

Someone who knows what he is doing needs to follow up the quality of the application. I happened to review the areas sprayed in the days following the spraying. The smaller plane spraying Banabol had average to good coverage on the young leaf surfaces, but for the larger plane that sprayed INGAVI-B section one, I could not find any evidence of fungicide on the leaves. Growers said the plane flew over very high. There was not any evidence of fungicide, even on older leaves. I am not familiar with the older type of spray nozzles that are used on that plane. If there is no evidence of spray on the leaves, it is not doing a proper job. **I recommend** that the plane be changed because it is less maneuverable and the areas being sprayed are surrounded by forests and trees. With the expanse of crops in Santa Cruz, other aircraft should be available for fumigation.

I also **recommend** that the doses of oil be increased to at least 8 L/ha or possibly 10 L/ha at this time until better control is achieved. Check with IBTA first because I don't have experience with the oil that is being used here. With Orchex from Exxon or Spraytex from Texaco, there are no problems with these higher volumes of oil application.

The costs of the fungicides that were quoted to me by the growers is very high, at times double the cost available in other banana growing areas. I **recommend** that a mechanism be set up to either negotiate a price on the part of all the associations involved in UNABANA and that stipulated price be charged directly

to each association individually. Alternatively, the commercialization department of DAI could call in the six or seven suppliers and suggest that they deliver products to this project at reduced margins for the next 3 years. IBTA should present estimated volumes of agrochemical use for all DAI alternative crops and they should try to negotiate lower prices based on these higher volumes. I'm sure that with high volume purchases better prices can be passed on to the associations.

Some growers have admitted to me that salesmen have "helped " the association with their recommendations for applications. I **don't recommend** this practice - it lends itself to abuse and loss of effectiveness of the chemicals due to increasing resistance. I **recommend** that someone from DAI have a meeting with the representatives of these agrochemical products and lay down the law.

The representatives from these companies should do the following:

1. Train all associations on the proper use of their products.

2. Instruct all users on proper protective equipment to be used during application.

3. Provide a service to collect used containers of their product.

4. Do resistance testing twice a year at different strategic locations to avoid resistance to their products; such results should be delivered to DAI and IBTA.

5. Periodically provide feedback as to quality of mix and the application of their products.

All this should be done free of charge if they want to keep selling these products. I **recommend** that DAI put the responsibility for the proper usage of these chemicals back onto the provider of these products. You will be amazed at how well they cooperate. I know, because I have done just that before.

Because of the exposure of the project, and the implications for the health and safety of these growers and communities I would not delegate this responsibility to the NGOs. Only a week is needed to set up the meetings with the chemical representatives and for them to start training. Insist on reports from representatives as to their advances and compliance with the established programs.

PACKING

Having only seen a small bit of the packaging operations. I will touch on only the actual packing of the fruit. I **recommend** that only one or two extensionists train

the different associations in fruit packing since the priority at this time should be to get your extensionists up to speed on the agricultural practices; we may be expecting too much for them to be packing experts also. There are not that many people that I saw packing per station, normally only one or two. Since there are so few, it makes more sense to have only one, or at the most two, specialists to work with packers.

The five line pack for Argentina is very difficult to do correctly. The box that is being used was designed for less weight and a four line pack. In order to get all the additional weight into the box, the bottom lines must be very tightly packed. The young girls that I saw packing had a difficult time, because of their size and the fact that they were too low in relationship to the box to do a proper pack. For that reason, all the boxes that I saw had the top cover that would not fit properly.

Another important factor for a proper quality pack is the classification of the clusters before attempting to fit them in the box. The mixture that was being put into the boxes would not fit, no matter who tried to pack it. There are many other details in the handling or processing of fruit before and after selection where people are ruining fruit quality, however, the worst damage was being done at the time of packing into the box.

Within the group of extensionists, it would be very easily to give a packing test to all. Identify the most advanced and work with one or two to improve their skills; then have them conduct packing seminars with those members of the association that actually do the packing. The other problems can wait until the packing improves.

INFRASTRUCTURE

Roads and Bridges

Roads and bridges are adequate throughout the area. There is evidence from all the deep holes in the main highway that in the near future major repair work will be needed in order for this not to have a detrimental effect on the quality of all goods shipped to market.

The tendency of the drivers for rapid acceleration and braking near the holes in the road will cause major shifts of the banana loads, especially in the brick stowage pattern that I have observed throughout the area. It is not a critical factor yet, however it is a quality issue that will need to be addressed sometime.

In the farm areas, particularly near the loading areas at the entrance to the packing stations, additional ballast material needs to be added. I **recommend** leaving additional truckloads of ballast near the packing stations that can be used for filling in occasional potholes and the low areas. This can also help the drainage around the stations.

Packing Stations or Sheds

A lot needs to be done in this area. Right now, when the packing sheds are little used, is a good time to clean them up to avoid quality problems in the future when they will be used for packing for export. If they are not kept clean, quality problems with crown rot and mold will arise. The associations must keep the area in proximity to the packing stations free from organic materials that will decay. Now, there are ripe bananas in some, and banana leaves that are used to cover the chipas are left around the station. Some of these leaves have been sprayed with Benlate in the fields, and most everyone is dipping fruit in a Benlate mixture which, after use, is then dumped on the decaying material, bananas, leaves, and stalks. This will only cause a more rapid resistance to Benlate right there at the packing plant. My two **recommendation**s are to change to Thiabendaaol and to clean the station up at least weekly and take the organic material back into the fields to decompose as fertilizer. A lot of packing centers are not taking the stalks back into the field; this is a waste of potassium rich organic material.

Scattered throughout the different associations are portable plastic/fiberglass tanks that were once used as packing stations for exportable fruit. None that I was able to see were being used. These can be utilized in the areas where there is good quality exportable fruit near a stream or creek with clean water. If someone is using these tanks they will last longer than just sitting in the sun becoming more brittle.

There are quite a few issues concerning the design and use of packing station structures. There is lot of "rebar" used in the construction of these structures. These reinforcement rods are designed to be encased in concrete beams and not exposed to the elements. They are not intended to support the loads in these structures, especially the columns. In any future construction, I **recommend** a stronger design for the columns. And for those already built, a proper maintenance program of anticorrosive paints should be implemented to extend the useful life of the structure. For those that have rebar columns to the floor, I **recommend** they pour at least a two-foot base of concrete to keep them from rusting so fast. Make sure the base is sloped to keep water from accumulating

around the bars. One packing station had waste bananas piled three feet around the metal column, which will accelerate its disintegration.

These sheds need to have some system of drainage, to protect the investment and well as for health and sanitary reasons. Very few have shallow wells; one in particular had food wastes, in addition to plastics and other assorted garbage, flowing toward a shallow open well instead of away from it. I will address worker health and safety issues later. However, these stations need to be free of pigs, chickens and other animals, standing water and muddy areas. Wastes from the banana processing need to be carried 50 meters away from the station into the farms to be recycled as organic additions. The state of cleanliness of most of these stations is deplorable, even with the very limited use of these facilities. This situation will only get worse with increasing export fruit.

Somehow quite a few of these stations have been redesigned to eliminate the delatexing troughs in the delatexing tanks or have some unusual modifications added that are impractical for banana production. And in others, in order for some of the modifications to work, good water flow is needed but is not available. I **recommend** that someone who knows packing stations review all future plans and recommend low-cost modifications to the existing stations to improve their performance for quality-based reasons. This is a priority in those stations that are presently exporting or are under construction.

The stations that have an attached room for storage need to keep that area clean. In (ABIB) Ingavi-B, there is spilled Benlate on the floor as well as a few ripe bananas, old wet boxes and other assorted “junk” that needs to be cleaned up. I **recommend** that a review of the facilities be a part of the extensionists checklist to fill out during the visits to the associations

Wells Around the Packing Sheds

One station had a very low-cost open well with plenty of clean water. This type of shallow well, using culverts as support for the walls, works in many countries and gives excellent results. I **recommend** that these shallow wells be installed in all those remote packing stations that don’t have a deep well. A small pump may provide sufficient water flow for proper delatexing.

Not only can this water be used for processing of fruits, it is also available for herbicide and fungicide control on the farms and will increase the efficiency of the workers. I have seen growers carrying twenty liter plastic containers full of water into the areas, thus slowing down the agrochemical application process each time water is needed. Plastic drums can be provided to facilitate the movement of water through out the farms in the areas via the cableway systems.

Cableway Systems

The system presently in place was installed using very low-cost, light weight materials, but using a design for heavier gauged materials. This is stretching the limits of the material being used. In many cases, light weight fruit causes no immediate problem, but the dual role of the cable way is to bring heavier inputs such as fertilizer sacks and water tanks for herbicide and fungicide sprays closer to the site of application. Most farmers are not utilizing the cables that way. Many are still making various trips to bring up to 20 liters of water into the field at a time, when larger containers could save time and energy for the growers.

Most of the cableways that I reviewed need different amounts of repair and preventive maintenance. The oxbows for cable support are too small or thin to support much weight. There are sections I saw that have completely buckled under the weight of fruit and need to be replaced. I recommend that no more cableways should be installed until a stronger design is agreed upon. The pipe presently used can be used for support if the spacing between oxbows is reduced from its present 10 meters and the cable sufficiently tensioned in order to avoid the sagging that is now occurring. Some of the fruit I have seen in areas without cables would definitely break the cable system unless it is modified somewhat.

Sagging, due to a lack of tension in the cable, is causing breakage in the metal band that attaches the cable to the support oxbow. The attachment of this band is incorrect in many instances and an inferior quality metal has been used. Some of the cables are loose and not attached to the oxbows. This can cause accidents as well as loss of fruit and quality. In one area in San Luis (ASBA), the fruit was dragging on the ground.

The Z-shaped bar attaching the cable to the galvanized oxbow pipe is made of “rebar”. This is rusting in some instances and will need to be replaced. In order to prolong its life, it should be greased to try to keep the rust to a minimum. Because of its shape and placement, it is hard to paint and many are already oily, which inhibits a good coat of paint.

The shim or brace that keeps the oxbow from sinking into the ground through the concrete base is made of “rebar”. Sometimes this is in contact with the soil and will be subject to rapid oxidation. Preventive maintenance will be needed especially in those areas near the packing sheds where a higher volume of fruit will pass through. If not maintained, the oxbow poles will sink into the ground, lowering the cable, dragging the fruit, and ruining the quality.

The only wooded supports for cables I saw were in very poor condition. The wood used was not the proper class or type and there is a problem with termites and rot. The grower, Leon Montaño, president of the association (APROBAT)

had commented on its condition. Some pieces need to be changed before he loses fruit when it breaks.

The cableway system needs maintenance; it is not going to last unless the growers take care of it. I don't think that this was clearly explained to the growers, or they think someone else is supposed to fix it. I **recommend** that a careful explanation of care and maintenance be given to the individual associations so that they fully understand that they are the ones that have to care for this valuable asset. Probably the creation of small independent contractors or some member of each association should be responsible for maintenance.

There is also the possibility of removing kilometers of cable when it is not being used. This is a way to increase the efficiency and use of this investment. The design of the cable installation also needs to be modified. Many cables go beyond the planted area of bananas, and this is not necessary. They should stop about 40 m to 50 m before the end planted area. This saves quite a lot of cable, piping, and time.

Storage Facilities

The facilities that are present at the associations are adequate for the function that they provide: office spaces, storage of equipment, and warehouses for agro-chemicals. The one major element that needs direct attention is cleanliness and order. This is not only a health risk, but also affects control of the agrochemicals used. In many facilities, chemicals are spilled and left without clean up; many stanchions not labeled and mixed in a way that could easily lead to confusion; there is little rotation of products; and some fertilizers are rock-solid.

There is no special place designated for clean-up of the spray equipment. I highly **recommend** a small 2 m x 2 m area filled with a minimum of three inches of gravel where growers can wash their equipment and contain runoff in an area away from fresh water sources. This can be right next to the cableway, as long as there is no runoff. Also, there is no program to bring the empty containers of fungicide and herbicides back from the field.

Cooling Rooms

The two cooling rooms in the area are in the following conditions.

1. The unit in front of La Jota, is in fairly good shape. It is kept clean and orderly and is being used occasionally. According to the people at the facility they don't use the cooling unit properly. That is, they don't cover the boxes with the tarp and force the airflow through. This was confirmed by visual observations of dust that had settled on top of the tarp. The temperature gages are not attached to the wall, and I would **suggest** in the near future that a layer of

fiberglass or other material be placed on top of the exposed fiber board ceiling.

2. The unit in San Luis has been abandoned. Floods in December deposited mud throughout the area. There are still indicators of where the level of the waters reached and the soil deposited is still present. The entrance gate had not been fully opened until my arrival. The gate was partially buried and could not be easily opened. That the diesel powered electric generator was partially under water was obvious from the dirt marks left on the unit during the floods. Probably the electrical generator as well as the diesel unit should be cleaned and repaired as soon as possible. It may already be a total loss. The ceiling in the cooling room has partially fallen in and is being propped up by pallets and poles. I would have someone check the ceiling and roof for termites and dry rot before it all comes down. A small investment now may enable the recovery of the use of the cooling room. I was told that the unit has not been turned on for a number of years. It needs to be turned on and have regular maintenance or be salvaged and sold and put to use. My **recommendation** is that someone review the costs to bring this unit back on line.

I **recommend** that in the future these types of investment not be made. There is little ownership of the facilities, and there are other low-cost ways to design and operate fruit storage facilities. Given the amount of through-put of bananas, these facilities were over-designed. If there arises a need to accumulate fruit to expedite the time from harvest to cooling, or to increase the efficiency of trucking to reduce load time, I **recommend** using containers.

There are ways, by using false walls, to effectively collect and cool fruit before dispatching it towards its destination. In the Chapare, I observed a number of facilities that lend themselves to a transshipment point with a minimum investment. Used containers that have some structural damage so they can't be lifted on board vessels fully loaded, are available and can be used, some at a fraction of their original cost.

LOGISTICS

Fruit Estimates

The associations need to be able to estimate how much fruit they have available for export. At the present there does not seem to be any system set up. They just agree to pack a given number of boxes, based on gut feelings, and this can cause major waste. Having a local market enables lot of errors to occur and not be noticed, however, the associations are not being efficient in the amount of fruit that they could possibly export. I **recommend** a seminar on an easy way to control fruit inventories and estimates. Do not try to implement a computer estimating system. There are many different ones that exist, however they are not as accurate as people will lead you to believe. There are very simple

methods that are very accurate and easy to understand. A one-day seminar with each association is sufficient, and I **recommend** that the entire active membership attend so that there is better understanding of the need for accurate numbers and, most importantly, buy-in on the part of the association. Surprisingly, the one who best understands the estimation procedure may not be in the leadership of the association. The former person can help in the dissemination of the technique throughout the organization.

Harvesting

I **recommend** that the associations rent sponges in order to improve the quality of the fruit for export arriving at the packing shed. The sponges reduce the friction caused in harvesting and in transporting the fruit along the cableway. With proper explanation, and on a trial basis, this could be a low-cost way to improve fruit quality for many exporting growers.

Care for the quality of the stem during harvest is insufficient. Insertion of sponges or other soft material between the fingers, before the stem is cut and carried to the cable, will improve quality. It is not necessary that each grower have his own sponges; the association can provide them at a minimal fee in the same way they rent spray equipment for Sigatoka.

Controls and Monitoring

At present, there is no system established to rank the associations or even the individual growers in terms of which ones are doing basic agricultural practices, what shape is the farm in, and what are the priorities for the grower to improve his production and quality. These and other questions need to be answered. If you don't know where you are now, it is difficult to get to the destination, and it is even more difficult to set up a game plan to get you there. Since each grower is a bit different as to where the farm is at agronomically, the extensionists should establish priorities for both the association and the individual grower. This program needs to be designed based on cost/benefit criteria.

It makes no sense to recommend a lot of changes all at once if the grower can't see a return to his effort. However, if there is a base line or starting point, the extensionist can follow a plan to implement those recommendations that are beneficial to the grower.

I **recommend** that a ranking system be formulated with the extensionsits and other members of the NGO's, right after they complete their practical clinic. Why? Right now the priorities are based solely on commercialization and those agricultural practices that have been book learned. The extensionists need to first understand the goal, then get their buy-in as to how that goal can be reached in a cost-effective manner. The return on the growers' investment of time and effort need to be paramount in the prioritization.

Extension Agencies or NGOs

The organizations that are providing technical service are very weak in the area of actual banana management and field practices. Courses have been attended and trips taken, however, I haven't come across anyone yet that has ever run a farm for any time. With the banana plant, a person needs years of experience in order to take into consideration the different factors, including financial concerns, that affect small growers. Many of the comments of growers and others in the field raised concerns about the lack of creativity or rote manner in which some extensionists manifest their recommendations. Plus, I have heard many interpretations of agricultural practices that I disagree with, such as: not certifying a grower because he has "too many plants per hectare" (I considered it an ideal population given the existing conditions in that farm), or insisting on replanting small seeds or potted plants in a production area, fully knowing the grower does not fertilize. These examples and many others lead me **recommend** that the expertise of the extensionists needs to be looked into.

Growers in the Chapare are used to getting high returns from coca with very little effort. It doesn't seem that the program explained clearly enough that alternative crops need intensive cultivation in order to reap lesser rewards, which is the case for most agricultural crops, especially banana, pineapple, and palmito. At least bananas will provide a year-round income, unlike many other agricultural crops.

Of the thirty or so grower/owners that I was able to talk to, there is concern about the expected returns and what they are going through now. Some of the comments of the officers of different advanced associations reflect this concern. Comments such as "we will have to go back to coca if the situation with the markets don't improve", or "those of our neighbors that have cocales are doing fine (financially) and we who have switched can't sell our production". This wide-scale concern, coupled with weak technical support, calls into question the creditability of the program on the part of some of the growers.

My understanding is that the extensionists basically repeat what they have heard while attending different courses, and that they can't rely on actual experience. The desire on the part of the extensionists to be an effective value-added member is present among all whom I met; however their lack of experience is obvious. I answered an awful lot of basic agricultural questions from the extensionists that denote a lack of complete understanding that comes with years of experience.

I don't believe that trips to the other banana growing regions will solve this problem. Problems in the Chapare are unique to the area and transplanting technology without preparation or adaptation will result in local rejection. Then, the fall-back position of "we tried that but it won't work here" will be used as an excuse. In a project of this magnitude and diversity of problems, the

extensionists should have an established and demonstrable set of skills before turning them loose to sell the program.

A very strong **recommendation** is to help the NGOs' extensionists strengthen their practical banana knowledge. This can be done with banana training clinics which are practical clinics with some theory first and then plenty of field work to increase extensionists' proficiency and hone their skills. I am sure if they were to demonstrate the skills that they have now, the results would be disappointing.

After having met formally and informally with the extensionists, my impression is that there seems to be a very strong emphasis on commercialization, and a secondary focus on agricultural practices. This is probably due to lack of understanding of the agricultural problems and how to resolve them. I **recommend** that the extensionists focus on those areas where they can have significant impact and that they refrain somewhat from blaming the commercialization of the fruit as a cause of all the problems.

Another observation is that the extensionests have no tools to assist them in their mission to provide technical support. A basic set of implements needs to be agreed upon and then used during visits. These could start with a machete, finger length gauge, caliper for fruit grade, cords to measure plant populations, etc.

WORKER HEALTH AND SAFETY AND ENVIRONMENTAL ISSUES

I would like to make some recommendations that are slightly outside the deliverables. These deal with health, safety, and environmental issues.

This project is not so old that a rapid and low-cost effort couldn't bring the entire program into compliance on a lot of issues. If left unchecked, DAI may have numerous problems in the future, and by being pro-active the program can avoid unwanted criticism. From my conversations and observations it seems that many problems arise from a lack of awareness. People are doing things out of habit. They need to be told the consequences of what they are doing and how to do the same function a little bit differently in order to promote safety and conservation. This in not an additional responsibility of the DAI program, but an educational awareness that involves DAI, the NGO's, UNABANA, the associations, extensionists, and the individual growers. This message can easily be included in the calendar of colors mentioned previously.

I already addressed a few problems related to the involvement of the chemical companies. Others would involve campaigns to collect the existing plastics in the field. The plastics scattered throughout the farms will cause problems if they keep accumulating unchecked. In many cases, this was due to the chop down of stems in January when the market deteriorated. There may be some value for the plastic in a recycling program run by the banana associations, UNABANA, or within the school or community system. I was in INGAVI-B where they collect the plastic to burn it inside the banana plantings.

The areas around the packing sheds should be kept as clean as possible, especially those that visitors frequent. Future investors, exporters, even the media promoting the project, as well as future contractors and government representatives, will all be visiting these sites. An education and clean up effort will go a long way in correcting these obvious problems. Trash barrels are a minimum requirement to have at these stations.

Collection of all plastics and empty chemical containers should begin in earnest. The area where the associations store their agricultural chemicals needs to be cleaned up. In this case, someone needs to be trained and held responsible for general order and cleanliness of the areas. Sales representatives can take a leadership role in this since they are supposed to have been trained in these areas

A program oriented toward the use of safety equipment, especially gloves and other safety equipment for handling chemicals, is needed, especially for people dipping clusters in the packing sheds and those dipping the hands forming chipas. Also, a switch from benlate to thiabendazole is recommended for post harvest applications.

Large parts of the control of agrochemical use fall of the shoulders of the banana and other extensionists. They need to have more training in safety and environmental managment, and this has to be on their agenda of things to improve. The extensionists, as well as the other support people in the NGO's, need to get this item on their checklist. The more people involved at the association support level, the faster keeping the work area clean and safe will become second nature.

CONCLUSIONS

There seem to be some uncertainty as to the direction of the program as it pertains to the associations and growers. There is also a problem of lack of enthusiasm on the part of the associations and growers with many of the extensionisists. This is probably because the program has had a lapse of a number of months between contracts. At the same time, there was a drop in the market prices, furthering the problem.

Many of the NGO's are bogged down in the designing of performance indicators and the like and have not gotten out of the starting gates. What has to be done is to separate the administrative part of the project from those who are out in the field on a daily basis. This applies to all extensionists in banana and other crops.

I would also try to improve existing farms before trying to plant more area to complete a block. Returns on investment should be greater in improving an existing plantation than in planting new areas. In some cases, growers who keep their farm in good shape can be encouraged to purchase or possibly lease other farms if they want to expand their operations.

Some of the new plantings are very poor. One at INGAVI was burned out. In the future, the timing of planting needs to be planned, so as to not to force the grower to plant when climatic conditions are inappropriate for planting. In other words, do not let the desire to complete certain indicators be detrimental to the grower or his farm.

The objectives of the field personnel need to be clear to them and they need a coach that can monitor their performance as well as formulate objectives for the associations or farmers. Since they lack some of the skills required at the present, pick out some of the easier recommendations and see how long it takes to implement them.

For example, it should not be very difficult to establish a universal age control system especially now that many farmers are not tagging their fruit. That can be an easy win for the extension team. Then, pick out another area, such as cleanup of the storage facilities in the different associations. Win number two, and so on.

At the same time, start the practical clinics, knock off a few practices, then let the group implement them. This is a better approach than to show up to a grower spouting out a bunch of new ideas all at once, when the grower does not have the time to implement any of them properly.

There are good examples of farms in the area that are very good with respect to agricultural practices and fruit quality. That should be a key standard to strive for.

I see some good talent out there, but they don't have a game plan or coach to get them all pulling in the same direction. If you were to poll them right now, I doubt that they know what is expected of them.

Once the extension team has direction, then start working with the associations by utilizing receptive growers. Show them how to save on their purchases and increase their product with little effort. You do need to get them to work harder, only smarter, to accomplish a lot of the objectives of the program

COMMENTS AND REFLECTIONS

Now that you have advanced in the commercialization stage, a close team effort is needed to get the growers up to speed with regard to the need for consistent product quality and to take advantage of the uniqueness of this project.

There is no reason that all the carefully selected, top-quality fruit has to compete with run-of-the-mill Ecuadorian fruit. Top quality fruit should be marketed as special fruit that is keeping drugs off the street. Therefore, it merits a special price which helps provide social benefits in ex-coca growing areas.

Get the organic consumers, the NGO organizations, the government-to-government relationships working to assist in this marketing effort. Chapare fruit could possibly be marketed at a premium just by promoting the fact that it is a vital effort in the battle to reduce cocaine use. Play up the fact that the end-drug-user in the US or Europe is the reason that these growers even started in the first place. Therefore, these growers need help in contributing to alternatives to coca.

Since you can fix the problem, feature it. Capitalize on “just say no” to drugs and say yes to Bolivian ex-coca growers and buy their bananas. Novelty or niche sales could be a win/win proposition with a proper advertising campaign.

A good marketing campaign with a well thought-out strategy will succeed in selling some of this product. Maybe going as far as putting the USAID symbol and the EC circle of stars on the box for export is needed. This should not be limited solely to North America. Europe is an equally viable outlet for top quality fruit.

Some thoughts on utilizing presently available resources follow. Since American Airlines flies into Santa Cruz, they might be convinced into giving reduced air transportation tariffs for a given volume of this fruit. Since American has had some problems with cocaine smuggling in the recent past, they can help make amends by reducing air cargo fares for alternative development fruit. Refrigerated cargo units fit into the cargo holds and are used extensively elsewhere and their use would enable next-day service to Miami.

Some ripeners in Miami have also had problems in the past with drugs found in their shipments. With a little persuasion, some of the Bolivian fruit could easily be absorbed into the existing ripening and distribution system. There is a large population of South Americans in south Florida that could be targeted.

I would also target companies that use containers to donate some used containers to a worthy cause (alternative development). I think that if you reach

out and ask for some help, you might get quite a few inputs. There are always a number of obsolete items and some chemicals that may soon expire.

A good marketing campaign with a well thought out strategy will succeed in the marketing of some of this product. Organizations are more than willing to pay a social premium, if used for betterment of communities in developing countries. This type of approach has a double advantage since not only should you receive a premium price at market, but this type of incentive makes it all that more attractive for the small grower to classify his fruit into different categories. Most fruits and vegetables have a wide range in quality that is reflected in a wide range of prices.

For the obvious markets, such as Chile and Argentina, a marketing survey is needed so that one doesn't commit the common mistake of forcing someone else's ideas of what is wanted onto the consumer. Smaller boxes or hands pack could possibly interest some of the larger retailers. Europe and the United States are considering banning heavier boxed goods due to worker compensation complaints of back aches due to lifting 40 lbs of bananas. Most other fruits are in the 20 to 30 pound range. The 50 lbs box here is difficult to handle. Using smaller boxes could be a possibility to explore further.

Another idea to promote "good quality" mentality is to have signs encouraging national pride and quality of exports hanging in the packing sheds that are exporting fruit. "Bananas Orgullosamente Bolivianas."

Over time, you will have more growers that are thinking like entrepreneurs. They will increase the size of their holdings and become mid to large size growers, employing many of those that have farms now. I believe that this is a natural succession that should be encouraged. Once these growers have been identified, the amount of exportable fruit will increase in quantity and quality.

ANNEXES

ANNEX 1. EPA APPROVED CHEMICALS FOR USE ON BANANAS (12/1999)

	Chemical Name	Trade Name	Company	Type	Used For	Toxicity Class	Fed Register
1	Mancozeb (Zinc Ion & Maneb)	Dithane MB, Vondozeb SC Dithane 60SC	Rohm & Haas, Dupont, Atochem	Fungicide Contact	Black Sigatoka	IV	180.176
2	Maneb	Various	Various	Fungicide Contact	Black Sigatoka	IV	180.110
3	Chlorothanlonil	Bravo	Zeneca	Fungicide Contact	Black Sigatoka	II	180.275
4	Azoxystrobin	Bankit	Zeneca	Fungicide Systemic	Black Sigatoka	IV	180.507
5	Propiconazole	Tilt	Novartis	Fungicide Systemic	Black Sigatoka	III	180.434
6	Tridemorph	Calixin	BASF	Fungicide Systemic	Black Sigatoka	II	180.372
7	Benomyl	Benlate	Dupont	Fungicide Systemic	Black Sigatoka	IV	180.294
8	Thiophanate Methyl	Topsin M	Nippon Soda Co	Fungicide Systemic	Black Sigatoka	IV	180.371
9	Bitertanol	Baycor	Bayer	Fungicide Systemic	Black Sigatoka	III	180.457
10	Triadimenol	Baytan, Bayfidan	Bayer	Fungicide Systemic	Black Sigatoka	III	180.450
11	Fosetyl-Al	Alliete	Rhone-Poulanc	Fungicide Systemic	Black Sigatoka	IV	180.415
12	Difenconazole	Sico	Novartis	Fungicide Systemic	Black Sigatoka	III	180.475
13	Trifloxystrobin	Tega	Novartis	Fungicide Systemic	Black Sigatoka	IV	180.555
14	Fenbuconazole	Indar	Rohm & Haas	Fungicide Systemic	Black Sigatoka	III	180.480
15	Tebuconazole	Folicur	Bayer	Fungicide Systemic	Black Sigatoka	III	180.474
16	Fenarimol	Rubigan	Dow Elanco	Fungicide Systemic	Black Sigatoka	II & III	180.421
17	Hexaconozole	Anvil	Zeneca	Fungicide Systemic	Black Sigatoka	IV	180.488
18	Orchex 796	Orchex 796	Exxon	Spray Oil	Black Sigatoka	IV	180.1001
19	Spraytex	Spraytex	Texaco	Spray Oil	Black Sigatoka	IV	180.1001
20	Thiabendazole	Mertect-F, Mertect 20S	Merch & Co	Fungicide Systemic	Crown Rot Organisms	III	180.242
21	Imazalil	Fungaflor	Janssen	Fungicide Systemic	Crown Rot Organisms	II	180.413
22	Myclobutanil	Various	Various	Fungicide Systemic	Crown Rot Organisms	1	180.443
23	Terbufos	Counter	FMC, American Cyanamid	Nematicide Contact-Systemic	Nematodes	I	180.352
24	Ethoprop	Mocap	Rhone-Poulanc	Nematicide	Nematodes	II	180.262

	Chemical Name	Trade Name	Company	Type	Used For	Toxicity Class	Fed Register
25	Carbofuran	Furadan	AG FMC, American Cyanamid	Contact-Systemic Nematicide	Nematodes	II	180.254
26	Oxamyl	Vydate	Dupont	Contact-Systemic Nematicide	Nematodes	I	180.303
27	Fenamiphos	Nemacur	Bayer AG	Contact-Systemic Nematicide	Nematodes	I	180.349
28	Cadusafos	Rugby	FMC	Contact-Systemic Nematicide	Nematodes	II	180.461
29	Diazinon	Diazinon	Novartis	Contact Insecticide	Insects	I & II	**180.153**
30	Chlorpyrifos	Dursban	Dow Elanco	Contact Insecticide	Insects	II	180.342
31	Carbaryl	Sevin	Rhone-Poulanc	Fumigant Insecticide	Insects	I	180.169
32	Glyphosate	Roundup, Ranger	Monsanto	Contact Herbicide Systemic	Weed Control	II	180.364
33	Simizine	Simizine	Novartis	Herbicide Systemic	Weed Control	IV	180.213A
34	Oxyfluorfen	Goal, Koltar	Rohm & Haas	Herbicide Systemic	Weed Control	II	180.381
35	Ametryn	Gesapax	Novartis	Herbicide Systemic	Weed Control	III	**180.258**
36	Diuron	Karmex	Dupont	Herbicide Systemic	Weed Control	II	180.106
37	Paraquat dichloride	Gramoxone	Zeneca	Herbicide Contact	Weed Control	I	180.205
38	Diquat Dibromide	Diquat Reglone	Zeneca	Herbicide Contact	Weed Control	II	180.226
39	Glufosinate-Ammonium	Basta	Hoeschst	Herbicide Contact	Weed Control	II	180.473
40	Glyposate-Trimesium	Touchdown	Zenceca	Herbicide Systemic	Weed Control	II	180.489
41	Bacillus Thuringiensis	Dipel, thuricide	Various	Insecticide BT Spores	Leaf Eating Insects	III	180.1011
42	Aqueous extract of seaweed	Cytokin	Mylar	PGR Systemic	PGR	IV	180.1042
43	Fonofos	Dyfonate	Zeneca	Insecticide	Soil Insects	I	180.221
44	Magnesium phosphide		Various	Insectidide Fumigant	Insects: stored foods	I	180.375
45	Thiram	Various	Various	Seed Protectant Fungicide		III	180.132
46	Sincosin	Organic Extracts	Appropriate Technology	Nematicide Plant Regulator	Nematicide	IV	180.1179
47	+Myrothecium verrucaria	+DiTera	Abbott Laboratories	Biorational Nematicide	Nematodes		180.1163

ANNEX 2. PERSONS INTERVIEWED

IBTA

Severo España	Raul Mejia
Gunter Marcos	Rolando Escobar

CODELCA

Yuri Maldonado	Jorge Antizana
Roberto Cayo	Raul Alcon
Lucio Flores	Frans Molina
Romulo Gajada	Daniel Flores

INDASA	Gerardo Torres	Max Coca

WINROCK/SAIBOL

Emilio Salaues	Raul Nuñez
Gilmar Flores	Adolfo Vega

CIAPROT	Rene Marques	Ivonne Carvajal
BANABOL	Carlos Flores	Julio Santos
Chapare Exporta	Pastor Zambrano	
Siete Hermanos	Jaime Orellana	Oscar Galacia

PRODUCERS

Erasmo Flores	Juan Cancio Orellana
Jaime Roque	Raul
Octavio	Leon Montaño
Oscar Zavala	Leonard Jaikita
Gregorio Gusman	Benjamin Nenaja
Leocario Lopez	Alfredo Zamietz
Felix Olmos	Felix Manani
Leonardo Jieta	Isaias Montaño
Silvaro Mamani	Eriminio Luna
Miguel Adran	Luciano Peran
Antonio Ledesma	Mosis Gusman
Theodoro Banta	Don Primo Manillza
Hernan Flores	

Others that I could not get their names

ANNEX 3. TERMS OF REFERENCE

BACKGROUND/JUSTIFICATION

Potentially, one of the most viable economic businesses in the Chapare is growing and selling bananas. There are approximately 14,000 hectares of bananas under cultivation in the zone; the great majority are Cavendish variety. There are two private company banana plantations (i.e., Chapare Exporta and Banabol) experiencing moderate success exporting boxed bananas to Argentina and northern Chile. There are 5-6 "more advanced" producers' associations growing and packing bananas for the national market and, in one case (i.e., Ingavi B), for export to Argentina. The banana producers' associations have received extensive technical assistance in crop management, have a reasonably well developed productive infrastructure (e.g., packing sheds, wells, offices, and cableways), and are comparatively strong in terms of membership retention and recuperation of revolving funds.

Nevertheless, the Chapare banana producers' associations - managed by small farmers - are critically behind-the-times in modern production, packing and training techniques. This absence of adequate technology results in reduced efficiency, higher costs, and lost market opportunities. To remain competitive and assure sustainability, packing centers operated by small farmers' associations must offer the product (fresh bananas) bundled with value-added services which create customer satisfaction through an enhanced product offering. Currently, exporters are required to closely supervise the selection of bananas arriving from the field and all phases of the packing process. To accelerate the pack-out, many exporters place their own personnel on the packing line alongside the association's packing crew. There is no systematic training of packinghouse personnel to assure consisnt quality and high efficiency. Some packinghouses are barely able to pack-out 250 boxes per 8-hour shift; as a consequence, the exporter incurs additional costs for transport delays.

Clearly, production, packing and logistical requirements are are all tied together in a sequential process. If bananas arriving from the field do not meet export standards, packers expend inordinate amounts of effort culling out unsuitanble bananas (i.e., bananas for export must be selectively harvested in the field). If packing operations are inefficient and unnecessarily time-consuming, customer rejections are more likely and incremental costs are incurred by both packer and exporter. If logistics (i.e. farm-to-packinghouse and packinghouse-to-receiver) are not carefully coordinated, inefficiencies will abound throughout the system and result in lost productivity and customer dissatisfaction.

Of additional concern is the fact that of the 14,000 hectares of bananas under cultivation, only 5% (700 hectares) are destined for export. How can a greater percentage of available production be moved through export channels? An export market reduces losses incurred when the national market becomes saturated, with consequential drops in prices. We have observed that a strong export market tends to stabilize prices throughout the year and places appropriate pressures on growers and packers to dynamically improve both product process efficiencies.

For all these reasons it is urgent that the Specialist develop appropriate ways to modernize production and packing processes, as well as develop training programs to assure that these skills are fully transferred to farmer organizations. The transfer of these skills, through demonstration and training, is critical to the economic growth and viability of the Chapare banana producers' associations.

OBJECTIVES

To upgrade banana production, packing and logistical skills in a manner that contributes to the economic viability of Chapare producers'associations.

TASKS

The Specialist will collect primary data from existing banana growers in the Chapare, especially from the more advanced banana producers' associations (e.g., Ingavi B, San Carlos, San Luis, Senda B, and Villa Fernandez). Secondary data are available in the DAI Library in Cochabamba.

We expect the Specialist to combine current information about the Chapare banana sector with his/her practical experiences in other banana-growing countries. Properly done, the study will give DAI and the CONCADE project a clear direction in building a strong, sustainable banana sector among Chapare small farmers. .

OUTPUTS/DELIVERABLES

The Specialist will provide a comprehensive written report closely approximating the outline presented below:

Cover Page and Table of Contents
Executive Summary

General Overview of the Production, Packing and Logistical Skills among Chapare Producers'Associations
Critical Drivers of Quality and Efficiency in Production, Packinghouse and Logistical Operations
Areas of Needed Improvements in Production, Packinghouse and Logistical Operations
Cost-Effective Recommendations for Implementing These Improvements
Conclusions, Reflections and Comments

In addition, the Specialist is expected to verbally present an overview of his/her findings and recommendations to the DAI Chief of Party, the Executive Director of PDAR, and possibly other stakeholders (including banana industry personnel) in the CONCADE project.

WORK SCHEDULE AND REPORTING

This assignment begins on February 21, 2000 with an expected completion date of April 15, 2000. We will permit the Specialist to work in two-week increments, covering the entire assignment in up to three increments with a total of 30 working days dedicated to the assignment.

TEAM AND RESOURCES

The Specialist will receive technical support/consultation from DAI's Senior Advisor for Agriculture from North Carolina State University:Dr. Larry Szott. Other DAI staff will be available upon request. DAI will provide transport for the Specialist between Cochabamba and the Chapare, as well as within the Chapare zone. DAI will provide housing accommodations for the Specialist in both Cochabamba and the Chapare. The Specialist will have access to DAI's office equipment and supplies for preparing the report and making copies.