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EVALUATION OF THE MARKETING COMPONENT OF THE COCHABAMBA REGIONAL DEVELOPMENT PROJECT

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This revised version includes information that addresses the comments and concerns of both DAI and USAID/Bolivia personnel.

ACRONYMS

UNABANA	Union de Asociaciones de Productores de Banano en el Chapare
CORDEP	Cochabamba Regional Development Project
DAI	Development Alternatives, Inc.
IBTA	Instituto Boliviano de Tecnología Agropecuaria
PDAR	Programa de Desarrollo Alternativo Regional
USAID	United States Agency for International Development
NGO	Non-Governmental Organization
IVS	International Volunteer Services
FONADAL	Fondo Nacional de Desarrollo Alternativo
ASPROPI	Asociación de Productores de Piña de Mariposas
COFRUT	Comercializadora de Frutas Tropicales
SOINAGRO	Sociedad de Inversiones Agropecuarias
UNAPEGA	Unión Nacional de Pequeños Ganaderos y Agricultores
ECOBANA	J.P. Ecologica Bananera S.R.L.
CCI	Centro de Comercio Internacional UNCTAD/GATT
ITC	International Trade Centre UNCTAD/GATT

EXECUTIVE SUMMARY

The CORDEP project is a complex undertaking involving a number of organizations involved in alternative crop development in the Chapare. This evaluation focused on the marketing component in which Development Alternatives, Inc. (DAI) has prime responsibility.

The marketing component of CORDEP is designed to overcome constraints in the entire market chain from the producer to the consumer. It also seeks to facilitate investment in agroindustrial endeavors opened up by project activities. The project goal is to increase the investment, productivity, income, and employment in licit activities as Bolivia transforms its coca based economy. The project purpose is to develop alternative sources of income and employment for people within the Cochabamba Department and associated areas of influence.

The Evaluation was to provide an in-depth assessment of project implementation and progress to date and to recommend any modifications to improve the likelihood of achieving project goals.

Findings and Conclusions:

1. The overall impression of this evaluation is that DAI has done much valuable work, operating under significant constraints.

2. Among the prioritized crops, banana has received the vast majority of emphasis, followed by pineapple. A lack of production volume of palm heart, passion fruit, and black pepper justifiably limit DAI's marketing efforts to only minor involvement. It is felt the project is focusing on the right crops, with the exception of passion fruit.

3. The real constraint to export market development is lack of consistent volume of high quality product.

4. DAI's role in providing technical assistance to the banana and pineapple associations, improving product quality, improving post-harvest handling, offering export incentives, and facilitating market identification and penetration has been the catalyst in the development of the banana and pineapple export industry.

5. Farm family incomes in the Chapare derived from alternative crops was increased from $280 in 1993 to $520 in 1996, with farm gate value of alternative crops rising by an estimated 91 percent.

6. DAI's promotion efforts have resulted in a number of new private sector investments in the Chapare. There are fourteen private investors of significant scale in the Chapare with a total of $3,295,000 directly committed to Chapare endeavors.

7. Sales volume and value of Chapare bananas and pineapples have significantly increased over the past several years.

8. DAI's marketing efforts are several years away from obtaining private sector Sustainability in the banana export business. Currently, there is only one exporter, who does not have a self-sustainable operation.

9. DAI's activities have laid a foundation for future economic impact through improved agribusiness activity, export diversification and growth, and increased value-added agriculture.

10. DAI's activities demonstrate that private sector/agroindustrial involvement should benefit the small farmer.

Principal Recommendations:

See Section IV, "Recommendations" for a full list of the recommendations made under this evaluation. The 16 recommendations which follow are a brief summary of the more important recommendations found within the report.

1. Emphasis should be placed on developing the export marketing capability for three crops: banana, pineapple, and palm heart. DAI should place a lower priority on black pepper, passion fruit, and citrus, which have very little export market potential. Forages should not be a DAI-prioritized crop.

2. DAI should arrange for short-term technical assistance (several months) in order to improve processing plant efficiency, automation, update technology, increase product quality, and improve packaging.

3. DAI should focus on the establishment of new and strengthening of existing value-added or processing industries in the Chapare as secondary markets (e.g. tropical fruit juices, purees, dried fruit, canned pineapple, marmalades, etc.

4. There is an urgent need to finish paving the main highway between Santa Cruz and Yacuiba, especially between Abapo and Camiri. It is the only access road for Chapare products to enter the Argentinean market. While this is not within the scope of DAI's work, it represents a serious impediment to future export growth.

5. Utilization of the DAI-incentive fund for investment promotion in the Chapare should be re-reviewed after the full details of the governmental tax law become known. Incentive funds are a valuable tool in attracting agribusiness development in the region, but may not be needed in light of the new tax-free investment law for the Chapare.

6. Product line managers should be all administered under DAI and each person should have a solid marketing understanding.

7. Every effort should be made to cool the products to their optimal storage/transit temperature as soon as possible after harvest, and to maintain the cold chain during distribution. DAI should introduce forced-air precooling technology to the

banana/pineapple associations or exporters.

8. Infrastructure improvements (packingsheds, wells, roads, etc.) should be grower association-driven. Labor, materials, and construction costs should be shared by DAI and the associations.

9. In order to assure the quality of export crops, DAI should be given a say in the determination of the sites/growers selected by the NGO's for export production. While the U.S. embassy's narcotics affairs section has the final authority to "review...sites and growers...," for the sake of export quality, DAI should at least be able to participate in the selection process.

10. Expanded local marketing efforts should be made to acquaint consumers with the improved varieties of bananas and pineapples.

11. It is essential that DAI place a strong emphasis on avoidance of phytosanitary problems. Producers must continually be educated on proper field sanitation practices in order to avoid pests and food-borne illness problems.

12. A coding system should be implemented in which each box of export fruit is numbered so it can be traced back to individual growers if necessary. This is an important mechanism to have in place in case of future phytosanitary problems.

13. DAI should implement a stronger packingshed worker safety and pesticide handling and disposal education program. Use of latex waterproof gloves should be encouraged by all packingshed personnel that come in contact with pesticides.

14. DAI should work with a local carton manufacturer to produce a high quality wax-impregnated corrugated box for banana and pineapple exports.

15. Emphasis should be placed on strengthening grower associations in business management, organizational skills, and financial management necessary to be a profitable and sustainable business entity.

16. Priority should be put on expanding the value-added, processed product sector.

Lessons Learned:

1. The most serious constraint in establishing the alternative agriculture export trade from the Chapare was not the lack of markets or buyers, but was in fact how to increase volume of export quality crops, ship them on time, and deliver them in the required condition on a consistent basis.

2. The most critical ingredient for successful entry into international markets is almost always the presence of a catalyst, defined as an individual or company or a public agency, or a combination of these, that (a) pioneers the process of development before

anyone else, (b) packages the needed know-how with domestic endowments and external financing, and (c) diffuses the experience and know-how it learns to others.

3. Nontraditional agricultural export (NTAE) businesses are high-risk ventures, and have a high failure rate because of these risks.

4. Smaller, streamlined field packingsheds, built with grower input, have proven to be more utilized and efficient than large, overcapacity, high operating cost structures.

5. Improvement in product quality and development of the export market has a positive effect on local market prices paid to the grower.

6. Credit availability is a necessary element of any alternative agriculture development program. The lack of available credit in the Chapare is a constraint to the growth of agricultural exports.

7. It is not possible to export bananas to Argentina without refrigerated container transport.

SECTION I. INTRODUCTION TO PROJECT EVALUATION

The CORDEP project is a complex undertaking involving a number of organizations involved in alternative crop development in the Chapare (the tropical zone of the Department of Cochabamba). Specific components include agriculture research and plant production (IBTA), field production technical assistance (NGO's under Planning Assistance), credit (Agrocapital), road construction (PDAR), and marketing (DAI).CORDEP is a coordinated, integrated effort aimed at identifying and alleviating constraints along the production and marketing chain for agricultural products from the Chapare. This evaluation took place in September, 1996 and is focused on the marketing component in which DAI has prime responsibility. Throughout this document, the marketing component of CORDEP will be referred to by the name of the institutional contractor which implements it, DAI.

The evaluation assessed how well DAI was doing in contributing to the achievement of project objectives, which are to develop alternative (non-coca) sources of income and employment for people within the project area. These objectives are to be achieved through an integrated strategy which focuses on sustainable small farm production, infrastructure improvement, research, plant production, extension, credit, and marketing.

The Chapare is located in the northeastern sector of the Department of Cochabamba and encompasses an area of approximately 2.5 million hectares. The region has been colonized by giving land grants to groups of families called "sindicatos" (farmers' unions). The sindicato grants are subdivided into individual landholdings.

Although the CORDEP prioritized alternative crops have a high potential for increasing small farmer income, agriculture in the Chapare is still based on subsistence production in which farmers put a high priority on food security and risk avoidance.

A. Purpose

The primary purpose of the evaluation is to provide USAID/Bolivia with an in-depth assessment of project implementation and progress to date and to recommend any modifications to improve the likelihood of achieving the project goals. The scope of work is presented in Annex A.

B. Methodology

An evaluation of DAI's marketing component in meeting the overall objectives of CORDEP in the Chapare was carried out in September, 1996. The evaluation process consisted of reviewing project documents, work plans, technical reports, USAID mission strategy and design documents, and DAI scope of work; interviewing DAI, CORDEP, and USAID staff; interviewing farmers, growers associations, exporters, and processing company representatives; visiting the Chapare region to see infrastructure projects, production areas, meet with CORDEP institutions, and private businesses. The list of persons interviewed is presented in Annex B. The documents and reports used in the evaluation are listed in Annex C.

The information collected from interviews and documents was analyzed with respect to several critical project issues and concerns. The analysis placed particular emphasis on the questions contained in the evaluation scope of work (Annex A). The specific questions are addressed in various sections of this evaluation.

Overall conclusions were drawn with respect to the project's relevance, effectiveness, efficiency, impact, and sustainability. Finally, recommendations were developed to help DAI strengthen its marketing efforts and address critical project implementation issues over the remaining life of the project.

C. Project Rationale

The marketing component of CORDEP is designed to remove bottlenecks and increase efficiency in the entire market chain from the producer to the ultimate consumer. It will attempt to move producers as far as possible into the marketing chain, thus increasing their margins and establishing closer links with the entrepreneurs and markets. It will also seek to facilitate investment in agroindustrial endeavors opened up by project activities.

Marketing and processing functions will be carried out by new or existing private sector organizations, including producers' associations, and individual entrepreneurs such as exporters, truckers, processors, market vendors, etc. The project will encourage the expansion in numbers of such actors and their increasingly efficient operations. These enterprises will help form links in the marketing chain essential to the accomplishment of the project goal of raising incomes of rural families in the project area by improving the quality of commodities produced with a major focus on the export market. Small and medium enterprises including producers'associations will focus on domestic markets, particularly in the project's early stages. Larger enterprises will also help increase rural family income and employment opportunities.

Marketing effectiveness will best be served by a project structure which allows maximum flexibility to respond to changing circumstances and evolving experience, especially in the case of international markets. The measure of success of the marketing

component will be increases in jobs and annual incomes attributed to the unit's work as well as the establishment of new, self-sustaining business activities.

To implement the marketing component, the contractor will establish a project marketing unit to assist farmers and private marketing entities in realizing the economic benefits of alternative crops and income producing opportunities. Key functions of this unit include market information, promotion, sales, logistics, and technical assistance to other private sector implementing units and producer groups. This marketing unit will take the lead in a continuous process of identifying alternative crops with the best market potential and working with researchers, extensionists, and farmers and intermediaries to develop products that will satisfy market requirements, particularly for exports.

D. Project Goal

The project goal is to assist USAID/Bolivia and the Government of Bolivia to implement a project designed to increase the investment, productivity, income, and employment in licit activities as Bolivia transforms its coca based economy.

E. Project Purpose

The project purpose is to develop alternative sources of income and employment for people within the Cochabamba Department and associated areas of influence.

F. Project Outputs

The impact of DAI's contribution to the Chapare marketing system of alternative crops can be determined by analyzing the six individual project output activities.

1. Post-harvest Technologies - Post-harvest technology activities involve improving the handling, grading, cooling, and packaging of crops destined for different markets.

2. Market Preparation/Processing - Market preparation/processing activities involve the development and support of channels that process or add value to Chapare crops.

3. Transportation - Transportation activities involve the movement of product from farm to market in an efficient, sound, and cost effective manner.

4. Market Penetration - The market penetration activities assist buyers and sellers of Chapare products in making trade deals based on a clear understanding of customer needs and on the delivery of products of superior value, especially to export markets.

5. Agribusiness Development - The agribusiness development activities involve the

establishment of production, processing, delivery, and input supply entities that allow for consistent volume of high quality product capable of sustaining the marketing system.

6. Investment Promotion - Investment promotion activities persuade private companies to invest their capital and technology in the Chapare by demonstrating the financial attractiveness of the enterprise, by highlighting joint venture opportunities, and by offering assistance in the planning and start-up phases.

SECTION II. PROJECT ANALYSIS

A. Project Budget/Contract

The total estimated cost for performance of the work plus fixed fee was originally $13,846,766. The original contract will end in May 1997.

DAI has a cost reimbursable contract, based on level of effort. The DAI contract is not performance based and does not specify any targets for additional income, jobs, or self-sustaining business activities the contractor should work toward. CORDEP's semi-annual review reports do contain targets and report on their achievement, but DAI has no contractual obligation to meet these targets.

B. Organization of DAI

DAI initiated its activity in June of 1992 as the marketing arm of CORDEP. The team consisted of five long-term expatriates: Jack Rosholt (Chief of Party), Charles Foster (Export Market Specialist), B. Stevenson (Post-harvest Specialist), W. McDowell (Irrigation Specialist), and P. Alfonso (Banana Association Specialist). In addition, there were five full-time Bolivian specialists on the team. Total support staff, including drivers, secretaries, and field technicians was about 30 people. Initial work responsibility included both the Valleys and Chapare regions. As a result of changes recommended in the April 1994 Project Paper Supplement, DAI discontinued its activities in the Valleys and began to focus solely on the Chapare.

In 1995, the Marketing Unit was expanded and changed in focus to become the Agribusiness and Investment Promotion Unit. This resulted in the addition of two staff members (Oscar Sanchez, Gerardo Rodriguez). In addition, the responsibilities of continuing staff members changed to accommodate the goals of the new unit. Emphasis was shifted from marketing Chapare products to locating entrepreneurs and facilitating investment in the Chapare. Current staff consists of three long-term expatriates, five Bolivian long-term specialists, and about 20 support staff.

The entire DAI staff is located in Cochabamba. Since the inception of the project, DAI has undergone several structural, personnel, and programmatic changes. The most recent CORDEP and DAI organizational charts are illustrated in Annex D and E.

A major change which occurred in 1995 was the CORDEP-wide restructuring of product management. Before, technical assistance activities for each priority product were coordinated through "Equipos Tecnicos Operativos" (ETOs) headed by the Programa de Desarrollo Alternativo Regional (PDAR) and attended by representatives of each of the

CORDEP institutions. While the ETO's had adopted the farm-to-market chain concept, and were conducive to participation, no single institution had clear authority for making and implementing decisions, often slowing the development process. A new system of assigning Product Line Managers was instituted in late 1995, and has made a positive difference in just a short time. Product Managers are now selected on the basis of their special knowledge and competence within a product line and have oversight responsibilities in the entire farm-to-market chain for a given priority product. The Product Line Managers now obtain annual work plan approval directly from the Executive Committee. The products with a separate Line Manager are: bananas, pineapple, palm heart, passion fruit, black pepper, citrus, and forages. The objective of each Product Line Manager is to increase the production of fruit or fruit products of export quality. Product Line Managers have the authority to monitor the activities assigned to each CORDEP institution in a jointly formulated product line strategy. The new system is more streamlined, with a clear assignment of authority, allowing quick and effective implementation. The evaluator strongly supports this approach. It provides a simplified organizational framework in which DAI can work more efficiently. Now DAI can work directly with that individual Product Line Manager in developing the marketing component work plan for that specific crop. A further improvement in organizational structure would be to have all five Product Line Managers administered under the same unit, specifically DAI. Currently, they are dispersed among four different units. Each Product Line Manager has a well defined work plan for his specific crop. Goals, objectives, and activities are clearly delineated. The work plans focus on overcoming existing constraints and indicate the institution responsible for carrying out the action. Each Product Line Manager must obtain annual work plan approval from the same two-person CORDEP Executive Committee (Director of USAID-ARD Cochabamba and Director of PDAR).

Another important change in 1995 was the gradual transfer of technical assistance activities provided to producer associations from DAI to Planning Assistance and to other NGOs.

Communication is good within the DAI organization. Weekly staff meetings are held to share ideas, keep everyone updated, and outline work strategies. There appears to be a spirit of comraderie and cooperation among the team.

C. Inter-institutional Relationships

Numerous organizations within and outside of CORDEP are involved in development of alternative crops in the Chapare. Each has their own mandate, and occasionally project goals are not coordinated between organizations or institutions. It is imperative to bring the various CORDEP organizations together in a coordinated production/marketing program. Positive steps in that direction have recently been taken by the formation of individual Product Line Managers responsible for only one priority commodity from production to marketing.

DAI maintains close working relationships with the majority of CORDEP organizations, farmers associations, individual farmers, and numerous private sector businesses and public institutions. The majority of these relationships center around market training, infrastructure improvement, technical assistance, producer-buyer contacts, and agribusiness cost analyses. In very general terms, DAI is responsible for marketing, IBTA for planting materials and the NGOs under Planning Assistance for extension. In practice, there is some overlap. For example, DAI necessarily works closely with the associations in order to promote the quality of export crops, a necessary ingredient to their marketability. It could be argued that this is the purview of Planning Assistance. These institutions must cooperate closely in order to insure the success of the project.

1. IBTA

Availability of sufficient quantities of planting materials for expansion in the area planted to priority export crops continues to be a major bottleneck. The role of IBTA is to provide planting material of the CORDEP/DAI priority export crops, develop appropriate vegetative propagation techniques, and establish and monitor community nurseries. Eventually the material is either sold to the local farmers at a subsidized price less than or equal to the cost of production, is lent in kind, or is given freely in exchange for land and labor provided by the farmers. A recent innovation in the project is for IBTA to grow plant material in a joint venture relationship with private companies at prices lower than it has cost in the past to import the plant material or fund IBTA exclusively for this service. IBTA is not able to provide sufficient amount of plant material needed for development of the export industry.

2. NGO's

There are presently three NGO's working in the Chapare on DAI-prioritized export crops. They are IVS, Agropacha and Indasa. IVS works mainly with black pepper, palm heart, citrus, and bananas; Agropacha with banana, passion fruit, and palm heart; and Indasa with bananas, palm heart, pineapple, and passion fruit. They are funded through grants received from Planning Assistance, an NGO funded by USAID to help organize NGO activities in the Chapare and as such operate under the NGO component of the CORDEP Project. The NGO's concentrate on providing technical assistance and planting material to the farmers.

A concern exists between the different roles DAI and the NGO's play in the agricultural development of the Chapare. The role of the NGO's appears to be to increase the amount of hectares planted, regardless of road accessibility, site suitability for the crop, or grower success potential for export. DAI's strategy is to more carefully select the area best adapted for the crop, ensure an adequate infrastructure exists in farm-to-road transport, and chose only those growers willing to technify their parcels for export market production. Basically, the NGO's objective is to increase the quantity of the hectares planted, while

DAI's objective is to increase the quality of hectares planted. As the NGO's work under a different component of CORDEP, DAI has no control over the selection of the site or grower decided upon by the NGO's. In order to insure export quality, it is recommended (see recommendation No. 9 in the executive summary) that DAI have some say in the determination of site and grower selected by the NGOs for export production under the CORDEP project.

3. Farmer Associations

DAI maintains a close working relationship with the farmer associations operating in the Chapare. DAI is assisting the farmer associations to increase product quantity, improve product quality, and increase the reliability of supply for identified markets. There are five individual banana associations and the overall umbrella organization UNABANA, organized in 1991 to facilitate banana exports, and governed by the presidents of the five associations. Each of the five banana producers associations that make up UNABANA receives a Planning Assistance grant that supports a technician to help the association improve production and product quality. All associations have at least one packingshed and two have refrigerated storage rooms. There are also three pineapple associations. DAI is working directly with the banana and pineapple associations in construction of packingsheds, deep wells, water chlorination systems, farm-to-road improvements, establishment of a cable transport system, technical assistance, certification of technified hectares, and provision of incentives for export production. DAI has a full time post-harvest banana specialist who works directly with banana association members monitoring post-harvest treatment, packing, and quality control.

Membership in grower associations has substantially increased over the last several years due to DAI efforts. Some associations are even planting their own banana parcels to pay for the salaries of field technicians. There are now about 600 banana growers actively involved as members of an association. About half of the members of UNABANA now export.

UNAPEGA is mostly a cattle farmers association, but recently became involved in passion fruit production and processing and is planting palm heart. DAI has provided UNAPEGA with a small passion fruit juice extraction machine and is active in identifying market opportunities.

4. Agribusiness Firms

DAI has a strong working relationship with agribusiness and agroindustrial firms. DAI is very cognizant of the need for involvement of the private sector in the development of the Chapare. They put potential investors in contact with producers, provide incentive funds to attract exporters to the region, arrange deals between exporters and buyers, and do cost analyses studies for agribusiness firms thinking about establishing operations in the

Chapare. DAI is active in encouraging private sector investment in the Chapare, focusing on the continuing participation of small farmers in any business venture. DAI has developed strong ties with the Cochabamba Chamber of Industry and its members. This is an important relationship in CORDEP's investment promotion activities.

5. Universities

DAI assists students from several universities (mostly San Simón University), where appropriate, in coordinating their thesis research on alternative crop marketing studies.

6. Agrocapital

Agrocapital began in January 1992, as a non-profit, private sector foundation to serve as the credit arm of CORDEP's alternative agriculture development project. Agrocapital initially had some significant involvement in the Chapare. However, because of the high risk of providing loans to Chapare farmers who are used to obtaining grants or highly subsidized credit, Agrocapital has allocated very little financing to the Chapare in recent years. DAI has had very little interaction with Agrocapital over the life of the project. Currently, Agrocapital is not active in credit provisions to the Chapare though it may expand its operations in the region after approval of its new charter.

D. Project Status - Prioritized Crops

DAI's resources and energies are focused on the market expansion of crops which have strong prospects in either the domestic or regional export markets. These crops have a strong potential to significantly increase the incomes of small farmers in the Chapare and attract outside agribusiness investment in both the production and processing sectors. These crops also have strong prospects for economic and environmental sustainability in the region over the long term. DAI is focusing its marketing efforts on five crops: banana, pineapple, palm heart, passion fruit, and black pepper. However, banana has received the vast majority of emphasis, followed by pineapple. A lack of production volume of the other three crops has justifiably limited DAI's marketing efforts to only minor involvement. In addition to the five priority crops, citrus and forages are part of the CORDEP alternative agriculture development strategy. However, DAI is not active in developing markets for citrus, and has no involvement in the forage area. It is felt that the project is focusing on the right crops, with the exception of passion fruit. The overall impression of this evaluation is that DAI has done much valuable work, operating under significant constraints.

1. Banana

A background of Chapare banana production, post-harvest handling, and marketing is described in Annex F.

a. Contribution of DAI

DAI has played an integral role in the expansion of the banana industry in the Chapare. Substantial improvements in banana yield, quality, and prices have occurred in recent years. The Chapare banana program is clearly a success. Annual yields are estimated to have increased from 12 metric tons per hectare for traditional varieties in 1986 to 44 tons per hectare for improved varieties in 1996. According to commercial sources, this is close to the average annual production of a well run banana plantation (56 metric tons of first quality fruit/hectare). Improved varieties constitute about 10% of the total area planted to bananas in the Chapare in 1996.

In 1992, Chapare farmers were selling traditional chipas (bundles of 720 bananas) in the national market for very low prices, e.g. 7-8 bolivianos per chipa. The bananas were small, of poor appearance, and had a very short shelf life, due to crown rot and bruises. DAI began to provide technical assistance to the five banana associations, initiating a package of simple new production and post-harvest technologies, which came to be called "technification," to improve the size, appearance, and general quality of Chapare bananas. When the quality of the fruit improved, sales of "improved chipas" increased, and farmers began to make more money. Bolivian cities that previously rarely had access to bananas now regularly have them in their markets, due to post-harvest treatments that prevent crown rot, thus allowing the fruit to travel greater distances with less loss. Currently, banana growers receive up to 28 bolivianos per "improved" chipa in the national market, and 32 bolivianos for export. However, they only receive about 18 bolivianos for non-improved chipas in the national market. The average price for improved varieties in 1993 was about $ 3.41 per chipa, and this increased to about $ 4.80 in 1996. In addition, new varieties (Grand Naine and Williams) introduced by IBTA/Chapare came into production in mid-1994. These varieties had greater acceptance in the Argentine market because they were the same size as imported Ecuadorian bananas.

The number of improved chipas sold has increased from 60,627 in 1994 to 103,238 in 1995. Bagging, tagging, pruning, de-leafing, and other improved technologies are now implemented in the nine zones.

The DAI/CORDEP personnel initiated the organization of the small farmers into banana producing associations. This gave the individual farmers considerably more marketing clout. Over the course of the project, a total of five banana associations have been formed, each pertaining to the traditional production zones in the Chapare (San Luis, Senda B, San Carlos, Villa Fernández, Puerto Alegre). In addition, an overall Chapare

banana organization was formed (UNABANA) which is made up of all five of the individual association presidents.

Approximately 80 percent of the members of the five associations of UNABANA now sell bananas in the improved chipa form, and all five associations are providing bananas for export compared to only two in 1994.

DAI played a key leadership role in re-opening the Argentina border to Bolivian banana exports in 1994. DAI invited Argentina authorities to come to the Chapare, look at the packinghouse facilities, take samples for cholera, and re-establish confidence in Chapare product in the eyes of the Argentines. DAI also played a critical role in helping to establish several banana exporting companies. The initial effort involved shipping bananas by rail from Santa Cruz. This venture was not successful, but a new company took over banana exports using refrigerated containers.

The Bolivian company WINNEX S.R.L. has been exporting Chapare bananas weekly since April 1995, for a total of 44 consecutive shipments during the year. WINNEX estimates that Chapare bananas now have a fifteen percent market share in Cordoba. Since WINNEX began exporting, volumes have increased from 500 cartons per week to nearly 3,000 per week. WINNEX exported 39,118 cartons in 1995 a 33 percent increase over the 29,376 cartons exported in 1994.

b. Demand/Market

From interviews and DAI's project data, the evaluator found that the vast majority, over 90%, of the Chapare banana production is sold in the domestic Bolivian market. Exports of packaged bananas almost entirely go to Argentina, although similar quantities of bulk chipas are sold in southern Peru and southwestern Brazil. Currently, about 3,000 cartons are exported weekly to Argentina, of which about 2,000 cartons are sent to the Córdoba market, and the remaining, 1,000 cartons to Buenos Aires. This represents a very small percentage of total production.

Producers from the Los Yungas area have a long established trading relationship with the wholesale buyers in La Paz and almost exclusively supply the La Paz market, except during the months of July and August when the weather in Los Yungas is too cold for banana production. During these months Chapare growers supply the La Paz market.

Interestingly, in spite of the increase in banana production volume, prices have increased in the local market rather than diminished. This reflects an increasing willingness by domestic buyers to purchase improved qualities at higher prices. There are constraints, however, to the continued expansion of Chapare banana production. The national market will eventually reach a saturation point. The domestic demand in Bolivia is estimated to be between 70,000-80,000 metric tons per year.

Argentina imports about 200,000 metric tons of bananas per year, mostly from Ecuador (about 79% of total imports) and Brazil (about 16%). The period of highest

demand and prices is from January to March. It is estimated the potential demand for Bolivian bananas could be between ten and fifteen percent of total imports, or between 20,000 and 30,000 metric tons per year. This would be equivalent to about 900 to 1,350 containers per year (22 kg/carton x 1,000 boxes per container) or about 17 to 26 containers per week sent from Bolivia. Therefore, there are excellent prospects for continued growth in the Argentine market. Argentina prefers the new varieties, not 'Mokotoqui.'

Export market opportunities also exist in Peru, Paraguay, Brazil, and northern Chile for Chapare producers. However, banana exports are constrained by high inland transportation costs to Santiago and to Arica, which make it very difficult to compete against lower cost Ecuadoran bananas in the Chilean market. It is estimated that currently about 60 metric tons of Bolivian chipas (transported in bulk) arrive weekly in southern Peru and western Brazil border towns.

Demand for bananas to be used for drying, flour, etc., is about 2,500 tons per year. There is a strong market for dried organic bananas in Europe, but current supply volumes in the Chapare are not sufficient to fill the demand.

In summary, the advancements made in bananas were the result of a number of DAI-assisted factors, including:

- technical assistance provided to the farmers and associations
- increased production from improved varieties
- improved infrastructure (packingsheds, wells, roads, refrigerated transport)
- improved product transportation from the farm to the roadside by construction of improved paths (and a new cable system)
- improved post-harvest handling and product quality
- opening export markets (which also had the effect of increasing domestic market prices)
- identification of buyers and export market intelligence
- incentive funds
- production and marketing cost analyses for export businesses

2. Pineapple

A background of Chapare pineapple production is described in Annex G.

a. Contribution of DAI

The strategy DAI has adopted to increase pineapple exports, include:

•use of optimum planting densities

•provision of technical assistance in insect and disease control in the field in order to prevent post-harvest problems

•use of Ethrel foliar sprays to induce flowering in order to program the timing and uniformity of fruit harvest

•provision of increased planting material of the export variety 'Smooth Cayenne'

•road construction in the principal growing zones

•packingshed construction in the principal growing zones

•identification of buyers and export market intelligence

•production and marketing cost analyses for export businesses

In the Chapare pineapples naturally flower during the colder winter months (June through August) and harvest is concentrated during November to January. This is the time of lowest prices in the domestic market (0.40 - 0.80 Bs per fruit). DAI has focused on inducing flowering between February and May for fruit harvest between August and November, when domestic prices are higher (3.5 Bs per fruit). In addition, DAI is encouraging farmers geared to the Argentina export market to induce flowering by Ethrel sprays in June and July for harvest in mid-November to mid-December, when Argentine market prices are the highest. Due to climatic limitations, there is little or no harvest from February through May.

DAI played the lead role in helping WINNEX export from the Chapare. WINNEX began exporting Chapare pineapples in the second half of 1995, shipping all available production to Cordoba and Buenos Aires. This was a major accomplishment, as this was the first time pineapples have been available for export during this time of the year. By the end of 1995, WINNEX had exported 16,000 boxes of pineapples to Argentina.

b. Demand/Market

Almost the entire Chapare crop is sold in the domestic market. The domestic demand for fresh pineapple in Bolivia is estimated to be between 4,000 and 6,500 metric tons per year. The La Paz and Cochabamba markets prefer 'Pucallpa,' while Santa Cruz consumers prefer 'Smooth Cayenne.'

Local demand for fresh pineapple in December seems to be more than satisfied, but considerable opportunity exists during the months of August through October. Growers may receive up to $4 per 18 kg box from August through October, but less than $2 per box in December. Additional demand exists in the processing sector to absorb considerable volumes (primarily as juice, chunks, and canned slices). The Bolivian domestic processing demand is about 300 metric tons. In addition to the domestic market, there is a big potential in the export market. However, only small quantities are currently exported to

Argentina and southern Peru. Trade sources and DAI marketing staff estimate the minimum Argentine demand for Chapare pineapples is 100,000 boxes or 1,800 metric tons. The Argentine market consumes the vast majority of its pineapple imports (about 70 percent) from mid-November to late December.

Argentina imports about 11,000 metric tons of fresh pineapple per year, almost all from Brazil. The Argentina market prefers size 10-12 pineapple (medium-large). Chile imports about 2,700 tons per year, mostly from Ecuador. Uruguay imports about 900 tons, mostly from Brazil; Paraguay also imports about 500 tons per year. Chile is also a potential strong market for canned pineapple. Europe has a demand for up to 100 tons per year of raw product in the form of dried organic pineapples for tea formulation.

3. Palm Heart

Cultivated palm heart is a new crop to the Chapare with trials beginning in 1989. Palm heart is very well adapted to the Chapare zone and considerable expansion is occurring with this crop. The variety 'Pejibaye'comprises almost all the hectareage. An estimated 642 hectares are already planted, with about 80 hectares in production in 1996 with an export volume estimated to be 79 metric tons in 1996. It is expected by the year 2,000, a total of between 4,000 to 5,500 tons will be produced from several thousand hectares, with 3,100 to 4,700 tons exported.

Planting density is between 3,300-5,000 plants per hectare and three or more shoots are produced per plant. Positive return to the grower occurs during the first year of harvest, which corresponds to the second year of cultivation. Harvest is year round, or it can be programmed according to the operating schedule of the processing plant. Utilizing recommended production technology, it is possible to obtain yields of 1,800 to 2,000 kg of fresh palm heart per hectare. Each plant is capable of producing between 200 to 350 gm. The initial harvest occurs about eighteen months after transplanting. Each plant has a productive life of five to eight years. Growers receive about $0.40 per shoot.

Cultivated palm heart has distinct advantages over the production of wild types. Yields are noticeably higher, quality is better, and world demand calls for consumption of the cultivated type versus harvesting wild palms, which has a negative environmental connotation.

Brazil dominates world palm heart production, followed by Costa Rica. Peru is increasing production and currently has about 400 hectares planted. Palm heart is highly perishable and must be processed within about 24 hours of harvest to prevent shoot oxidation and associated darkening.

a. Contribution of DAI

DAI sponsored a visit to palm heart growers in Iquitos, Peru, so local industry

personnel could learn appropriate production techniques. DAI is also working with VASCAL in developing new packaging types (e.g., plastic bags) and different size/type cuts for palm heart.

In addition to VASCAL, several companies will be purchasing Chapare palm heart for processing and/or establishing their own plantations. In 1995, DAI assisted NIKKEI and INDATROP in initiating business ventures in the palm heart sector. INDATROP received assistance from DAI both in conducting a soils analysis of their palm heart farm in the Chapare and in conducting analyses of costs and optimum capacity of their proposed processing center. NIKKEI was assisted especially in the activities of small farmer contacts and field consolidation of production. DAI organized a field day for palm heart producers to meet with private sector processors (i.e. technicians from NIKKEI, VASCAL and INDATROP) to establish clear guidelines for harvesting and delivery procedures.

b. Demand/Market

Palm heart is a relatively new product in world trade, and therefore, overall consumption is low. It is not well known by consumers, and is considered a luxury item. About 95 percent of the world's palm heart is processed in its own juices, with salt. The remaining five percent is processed in a vinegar solution. Demand for fresh palm heart is very limited.

There is no available information on Bolivian domestic consumption of processed palm heart, but DAI estimates the national market is about 200 metric tons per year (based on populations of high and medium-high incomes in major cities). Very little consumption occurs in Bolivia, because of its high price and limited consumer awareness. Existing processing plants in the Chapare (VASCAL, NIKKEI) will be able to absorb all the production volume for the next several years, as demand far exceeds supply. Availability of sufficient planting material is limiting the supply.

Regular shipments of cogollos (palm stalks) were made to VASCAL Industrias for processing, totaling 40,000 cogollos in 1995. In addition, 90 farmers were trained in proper harvest techniques. The entire production of palm hearts (30 metric tons) was sold to private sector buyers in 1995.

Trade data indicates Argentina imports about 2,000 metric tons of canned palm hearts, of which Brazil supplies about 77 percent of the total volume. However, Bolivian palm heart packers describe annual demand in Argentina to be up to 1,000 metric tons. Chile imports about 540 metric tons per year, mostly from Ecuador (42%), Brazil (29%), Venezuela (10%), and Peru (10%). Brazil consumes more palm hearts than any country in the world, and even imports up to 5,000 metric tons, according to DAI. Brazilian production is about 100,000 metric tons annually (mostly from wild trees), of which about ten percent is exported and the remainder consumed within the country. Brazil is under pressure to reduce its harvest of wild trees due to deforestation consequences. Therefore, they will need to import palm heart in the future to satisfy its demand, or significantly

reduce its export volume. This will likely create excellent opportunity for Chapare growers to fill the void in supply due to Brazil's lower export volume.

Far better export markets are Europe, North America, and Japan. France is the leading importer of palm hearts in the world, with annual import volumes of about 11,000 tons. The remaining European countries import an additional 2,000 tons per year. Brazil supplies the vast majority (about 70%) of palm heart to Europe, followed by Costa Rica (about 12%). Colombia, Ecuador, and Venezuela are other suppliers. The U.S. imports over 2,000 metric tons per year. Japan imports about 1,000 tons per year. It appears substantial export market opportunity exists for Chapare palm heart. DAI estimates put annual export market demand for Bolivian palm heart to be 7,400 metric tons. However, there is production for export in Trinidad, Santa Cruz, and perhaps other parts of Bolivia outside the Chapare. Importers prefer palm hearts packed in glass jars rather than cans. Currently, all the Bolivian product is canned. Utilization of glass jar packs will be necessary if Bolivia is to successfully penetrate the export market with significant volumes.

4. Passion Fruit

Passion fruit is a relatively new crop in Bolivia, being introduced in 1988. The variety 'Golden Star' from Brazil is the base of industry. Normally, average life of a plant is three to six years, but due to Fusarium problems in the Chapare, the average life is only two years. Fusarium is the most serious disease in the Chapare, and severely limits production. Cost of establishment is high and it is hard to believe growers will recoup their investment in only two years. Plantings established between March and June begin harvest in December and continue until July. It is possible to obtain yields of between seven to nine metric tons per hectare per year of fresh fruit. There are currently about 186 hectares of passion fruit established in the Chapare. Production volume is estimated to be 260 metric tons in 1996, but is expected to rise to 1,675 metric tons in 1997 as new plantings come into production.

a. DAI Contribution

DAI has assisted the market development of passion fruit in several ways. They have provide technical assistance and export market identification to processing companies in order to insure a market outlet for raw product from the small farmers. They have also done cost analyses for establishing a passion fruit farm. DAI has also helped provide UNAPEGA with a juice extractor, labels, and packaging materials for juice and marmalade sales in the domestic market.

b. Demand/Market

Passion fruit has not traditionally been consumed in Bolivia. Local demand is small,

but growing. Fresh product is used mostly to make juice, the primary way it is marketed. Local processors currently have to import concentrate from Ecuador or Brazil to fulfill their requirements. Therefore, there is room for Chapare production to replace imported product. This should be the primary focus of the DAI marketing plan for passion fruit. Therefore, considerable opportunity exists in fulfilling domestic demand and substituting domestic production for imports. Total Bolivian fresh passion fruit demand is estimated at 1,500 metric tons per year (600 tons domestically, 900 tons exported). Currently, there are four processing plants in the Chapare or Cochabamba that have the capacity to process passion fruit juice. Existing processing plant infrastructure is inadequate to develop a competitive frozen concentrate (50° Brix) export industry.

Numerous countries in Africa, South America, and Asia produce passion fruit. Brazil and Colombia have much higher yields, enormously greater volumes, and lower costs of processing than Bolivia. Peru and Ecuador are also large volume producers in the region. The world market is extremely competitive and investments should only be based on up-to-date market forecasts and realistic price expectations and preferably on previously negotiated marketing agreements. World demand is expected to slowly increase, but demand will remain relatively low.

World demand is relatively stable at around 35,000 to 40,000 metric tons per year of single strength juice (15° Brix). Europe is the biggest market with about 90% of world imports, with the U.S. importing the remaining ten percent. Passion fruit juice is primarily used in multi-fruit juices and ice creams. Other uses are for yogurt, puddings, marmalades, baby food, and confectioneries.

Market prices for passion fruit juice have fluctuated tremendously over the years. Historically, prices range from $750 to $2,300 per ton of single strength juice (CIF). Over-production in Colombia and Brazil several years ago caused a precipitous drop in price, and more recent prices have been consistently less than $1,000 per ton. It is unlikely Chapare growers will be successful in penetrating the export market.

5. Black Pepper

The total area cultivated with black pepper in the Chapare is estimated to be slightly over 20 hectares. Productive life is estimated to be between twelve to fifteen years per plant, but Fusarium soil rot is a concern in production. There are three harvests per year. Two varieties of black pepper are being planted. They are:

> 'Valancota' - Production begins 2.5 years after planting. Planting density is about 1,600 plants per hectare. Average yield is estimated at 1.5 to 2.0 metric tons of dried pepper per hectare per year.
>
> 'Guajarina' - Production starts 2 years after planting. Planting density is about 1,100 plants per hectare. Average yield is estimated at 4.0 metric tons of dried pepper per hectare per year. About 80 percent of total world pepper trade is the

black type. The remainder is comprised of white pepper and pepper oleoresin. DAI has not developed a marketing strategy for black pepper due to insufficient product volume at this time.

a. Demand/Market

Excellent opportunities exist in developing black pepper in the Chapare, especially for the Bolivian domestic market. It is estimated that Bolivia consumes about 1,000 metric tons per year, mostly all imported from Brazil, Indonesia, Malaysia, and India. It is estimated that production from 700 to 800 hectares of black pepper could satisfy national demand. The realization of this 700 to 800 hectare goal is being hindered by the lack of genetic material. Argentina imports about 1,200 metric tons, and Chile 130 metric tons. The U.S. imports nearly 40,000 metric tons of black pepper, while western European countries import a total of about 50,000 tons. It will be difficult for Chapare growers to compete against low cost Asian exports in distant international markets. Argentina and Chile offer the greatest prospects, due to their proximity to Bolivia. A recent United Nations study indicated that a new black pepper exporter (e.g., Bolivia) could market between 2,000 to 2,500 tons annually on the world market if the quality was high. Therefore, a reasonable annual demand for Chapare black pepper would be between 3,000 to 4,000 tons (import substitution plus exports to Argentina, Chile, and other world markets).

World black pepper prices fluctuate substantially, principally due to the volume offered from the principal producing countries. Prices over the last decade have varied from $0.70 to $2.37 per pound.

6. Citrus

Oranges and mandarins are the principal types of citrus produced in the Chapare. Production has declined over the past fifteen years due to grower neglect. There are currently about 2,000 hectares of young trees in the Chapare but over 18,000 hectares total. Typical yields are 130,000 orange fruit per hectare from grafted trees and 300,000 fruit per hectare from native ("criollo") trees. Fruit quality is generally superior from grafted trees. Following recommended cultural practices, it is possible to obtain yields of 500 to 1,200 orange fruit per tree. Harvest is usually between May and August, but the season can be extended by planting earlier or later maturing varieties. It is possible to have fresh orange fruit from May to September. Tree life span can be around 40 years. Fruit quality (sweetness) suffers because of cloudy conditions and heavy rainfall, but size is large and juice content is high.

Citrus, especially fresh and processed oranges and fresh mandarins, have strong prospects for growth in the domestic market. Extension of the harvest season by introducing both earlier and later maturing varieties will increase consumption.

Considerable growth potential exists in the domestic juice market. Chapare product could be used by local processors instead of importing orange concentrate from Brazil.

Little or no opportunity exists for Chapare citrus in the international market. Brazil dominates the world frozen concentrate orange juice market. Due to fruit fly problems in the Chapare, growers would not be allowed access to many of the world's fresh markets. In addition, high production costs, low yields, and lower fruit quality from the Chapare are all constraints to success in the international fresh market. DAI should emphasize citrus for the domestic market only. The citrus Produce Line Manager indicated the Chapare could support 8,000 to 10,000 total hectares of citrus for juice and local fresh market sales. DAI is currently not addressing citrus marketing.

7. Forages

The improvement of native pastures in the Chapare provides a productive alternative for marginal soils which are not suited for cultivation of other crops. Improved pastures will afford a basis for the extension of the livestock sub-sector in the Chapare. The raising of beef and dairy cattle can strengthen the alternatives available to farmers in the area and diversify the economy. Establishment of improved grasses such as Brachiarias species and legumes such as kudzu or Desmodium have resulted in significant milk yield increases from 2.5 liters of milk per day to seven liters per day.

Improvement of native pastures in order to increase milk production does not involve DAI personnel. The scope of this work activity falls under the auspices of IBTA and PDAR. This product line should not be administered under the auspices of DAI.

E. Marketing Components

1. Post-harvest Technologies

DAI has made important advancements in the post-harvest handling of bananas and pineapples. The progression since June 1992 to present is indicated below:

Activity	June 1992	1996
Field fruit collection	•Inefficient handling of crops from field to roadside in wheelbarrows •No system in place for consolidating fruit at packing centers or pickup points	•Cost benefit analyses completed for alternative methods of hauling fruit •Improved field-to-roadside hauling procedures implemented on eight farms •Roadside-to-packingshed transport for export now organized and paid for by private sector
Use of supervised packing facilities	•All packing done at farm site •No centralized packing facilities fulfilling export phytosanitary requirements	•Six packingsheds constructed and in use •Packingsheds have received phytosanitary approval from the Argentine government
Adoption of standards for packing	•Fruit packed without regard to customer standards and industry norms	•Standards and norms established for pineapples and bananas for export
Private sector participation	•No dedicated private sector involvement in field collection, grading, and packing	•WINNEX handles large share of farm-to-market operations for banana and pineapple exports to Argentina

Additional post-harvest accomplishments of DAI include:

•facilitated access to the appropriate packaging materials for use by banana and pineapple exporters to Argentina;

•conducted in-field training courses for over 400 farmers in post-harvest handling and packing;

•published banana post-harvest manual;

•implemented a quality control system in which pineapples packed for export are selected from technified parcels engaged in pest control and artificial flower induction;

•sponsored on-farm workshops to train farmers how to harvest palm heart and prepare shoots for shipment;

DAI has helped over 1,000 farmers improve post-harvest quality and yields through the introduction of new technologies like pineapple flower induction, pruning, tagging, bagging, and washing bananas. Improved chipas have reduced post-harvest losses significantly. Approximately eighteen percent of Chapare bananas consist of improved chipas. The long-term benefit of DAI's export efforts has been the elevated awareness of product quality control among farmers.

Quality control is one of the most important factors inhibiting growth in horticultural product development in the Chapare. Unfortunately, this problem results from a cultural pattern of long standing, and it is extremely difficult to break. The norm in Bolivia is to pack and ship field-run produce of all different qualities, and to handle the produce without proper grading, packaging, or care. This is not due to the lack of appreciation of good quality produce; rather the economic benefits for applying high grades and standards are not evident.

Given the heat of the tropics, frequent rough handling, and poor packaging at all stages of the channel of distribution, it is not surprising that the produce reaches the retailer bruised, rotting, and valueless. Breaking these habits with indigenous laborers who are hired to work in packing plants organized to pack fresh produce for export to sophisticated markets and consumers is a most difficult managerial challenge. Post-harvest loss rates for bananas in local market shipments have been reduced from 40 percent in 1992 to less than 20 percent today, due to DAI-assisted improvements in handling and protection during transport.

2. Market Preparation and Processing

It is estimated that there are more than 14,000 hectares of bananas cultivated in the Chapare. Almost the entire harvest is sold to the fresh market. However, about 30% of the

total harvest volume is not suitable for the fresh market because of inadequate fruit size. Assuming a minimum yield of 10 metric tons/hectare/year, the annual harvest volume rejects are a minimum of 30,000 metric tons. A significant benefit to the farmers would be realized from the development of a market for unsalable fresh market fruit. Possible products are banana puree, flour, and dried chips.

The advancements made in this sector by DAI-assisted efforts have been minimal. Fruit volumes available to processors remain very small. Most Bolivian processors import raw product due to undependable supply from the Chapare. Some product is purchased directly from the Chapare and processed (primarily pineapples, palm heart, and citrus). VASCAL has a small processing plant in the Chapare, and NIKKEI will soon begin a palm heart canning operation. UNAPEGA began a small passion fruit concentrate operation, and also made marmalade. However, they are currently not in operation. Several processors in Santa Cruz and Cochabamba utilize raw product from the Chapare, but in relatively small volumes.

Export-grade packing materials for banana and pineapple are scarce and their costs are very high. Imported cardboard boxes are of good quality, but cost is high ($1.86 per box), making it difficult to compete in the international market. Locally made cardboard boxes were tried several years ago, but were of very low quality, not maintaining their structural integrity when exposed to the high humidity of the Chapare. However, they were not wax impregnated which makes a big difference in durability. Wooden boxes, although less expensive, result in more product bruising in transit and do not make as nice a presentation as corrugated cartons. Utilizing a clean, attractive, colorful, labeled corrugated carton adds value to the raw product in the eyes of many buyers. DAI has assisted in obtaining an adequate supply of corrugated cartons for banana export to Argentina.

DAI worked closely with UNAPEGA, the principle producers of passion fruit in the Chapare, to develop processing technologies for juice and marmalades. DAI also obtained funds for a seed separator and juice extractor for installation in UNAPEGA's plant in Ivirgarzama.

3. Transportation

DAI has assisted in many advancements in the transport of product from farm to market over the past four years. Significant improvements in road infrastructure have been realized, including the construction of hundreds of km of improved roads (See Infrastructure section). Farm-to-market access of raw product has always been a serious constraint in the Chapare, but much has been done recently to overcome this constraint.

DAI has focused on improved farm-to-road transport by initiating, with the banana associations of San Carlos and San Luis, three field trials of "improved sendas (paths)," totaling approximately 1500 m. The basic design is a 1.0 to 1.5 m-wide path, stone-paved, and capped with a 5 cm-deep mortar slurry.

Significant improvements have been made in roads and bridges. DAI assisted in identifying critical locations in need of road and bridge improvements and cooperated with the Servicio Nacional de Caminos (SNC) in this effort.

Additional accomplishments of DAI efforts include:

- constructed ten field wagons for hauling bananas from the field to the packing centers;
- arranged to have five refrigerated containers available for hauling produce to Argentina;

The principal weaknesses in transportation technology used to haul Chapare product include:

- improper container loading patterns;
- inadequate container refrigeration capacity;
- insufficient ventilation and air flow;
- an aging container fleet that does not provide T-slatted floor and/or bottom air delivery;
- lack of palletization of loads.

Transportation by road south to Argentina is currently limiting the export trade of perishables from the Chapare. Trucking companies are not willing to risk equipment damage likely to be incurred during travel over the 50 km stretch of unimproved dirt road and several hundred kilometers of gravel surface.

Project investigators have determined the most economically efficient, technically appropriate, and quality oriented transport systems for the movement of banana stems, both on-farm and from the farm to packing center. The traditional system of utilizing a wheelbarrow upon an unimproved path for on farm transport is the optimum method for distances of 100 meters or less, and for production areas of 1 hectare or less. However, this system is the most unreliable operationally, resulting in the greatest percentage of damaged stems. For on-farm haul distances between 100-1,000 meters, cable transport is the most economically effective system, however minimum production areas of between 1.5 to 7 hectares are required to justify the cost of installation. The cable system represents the best combination of appropriate technology and operational efficiency for the widest range of possible situations. However, installation of cable systems is only appropriate where the production volume is moderate, and the physical alignment between collection points and the packing center is relatively free of crossings and right-of-way conflicts. Recent estimates indicate it costs about $3,200 per km to install a cable system. The wheelbarrow/improved path method compares favorably with the cable systems for ease of installation and operation for short to middle hauling distances. The use of a motocultor upon an improved path is economically justifiable only for distances greater than 250 meters, and then only for production areas greater than 10 hectares. However, the typical

production parcel in the Chapare is 1 to 2 hectares, and rarely, if ever, exceeds 20 hectares.

Transport of banana stems from farmgate to the packinghouse is most economically efficient using a cable system for production levels between 250-2000 stems. Quantities greater than 2000 stems are best transported by the tractor and cart method. The tractor and cart method is the most adaptable to changing production levels or adverse conditions and is the optimum transport method from farmgate to packinghouse in the majority of situations encountered in the Chapare.

The cargo truck transport method is the best option for long haul distances (> 10 km).

The project determined the optimum transport method of freshly harvested pineapple from the field to the roadside. This helped lower fruit losses from mishandling, increased the quantity of sellable units, increased operational efficiency of fruit transport, and lowered costs to the farmer.

Project research found the traditional method of transporting pineapples out of the fields on foot and in bags is the least optimum method, regardless of production area, haul distance, or terrain. The optimum system for the majority of Chapare farmers is a well-padded wheelbarrow using an existing or improved path. A motocultor cart running on an improved path is economically optimum for large production areas and long haul distances in difficult terrain.

DAI constructed a prototype two-wheeled hand cart for transporting pineapples from farmers' parcels to the roadside for pickup. The improved cart doubles the quantity of fruit transported per trip compared to the traditional wheelbarrow, and reduces damage to the fruit by ten percent. Currently, there are only four known refrigerated over-the-road containers in operation in the Chapare (all owned by WINNEX). This is not enough refrigerated transport capacity for the anticipated export volume. Each container holds approximately 1,000 cartons of bananas or pineapples. If banana export volumes increase to the expected 5,000 boxes per week later this year, plus several thousand boxes of pineapples, that will result in a deficit of available refrigerated trucks for transport to the border.

Maintaining the cold chain is indispensable in the movement of perishables. Exposure of previously cooled fruit to warm temperatures will result in moisture condensation on the surface of the product, followed by the likelihood of decay. The off-loading of Bolivian produce at the border in Yacuiba and reloading into Argentine trucks is bad for the fruit. It not only increases the bruise damage incurred to the produce, but also results in a break in the cold chain. Completion of the road surface pavement all the way between Santa Cruz and Yacuiba will encourage Argentine refrigerated transport companies to enter the produce trade and alleviate the unnecessary transfer of product from Bolivian trucks to Argentine trucks at the border.

4. Market Penetration

DAI has made considerable strides in developing export markets for Chapare-grown bananas and pineapples. In 1992, all Chapare alternative crops were marketed locally, mostly in Cochabamba. Since then, consistent volumes of bananas and pineapples have been exported to Argentina, Peru, and Brazil. In addition, there has been significant penetration of almost all population centers within Bolivia. DAI's efforts have resulted in the participation of twelve to fifteen steady wholesale customers who have their weekly scheduled pick-up dates and negotiated fixed prices paid to the growers. Domestic processors are also procuring increasing volumes of Chapare raw product. Farmers now have viable sales options in local, export, and industrial markets. Weekly banana export volume to Argentina is currently about 3,000 cartons per week, with volumes likely to jump to 5,000 cartons per week in the coming months. Shipments of bananas will soon begin to go to Paraguay. Argentine demand for Chapare bananas is much higher than existing supply. The real constraint to further export market development is lack of consistent volume of high quality product.

Several value-added products are receiving excellent market penetration in Europe (dried organic bananas, pineapple-flavored tea).

DAI is assisting the banana and pineapple associations to improve their product quality to meet export requirements. It has made numerous contacts with prospective buyers and helped negotiate supply contracts between UNABANA and WINNEX. DAI monitors Argentine market conditions and prices for bananas and pineapples and maintains a directory of buyers in the domestic and export markets. DAI also identifies production sources for processing companies in need of raw product. Additional DAI efforts include:

- maintenance of an updated Buyer's Guide of wholesalers, retailers, processors, and importers engaged in the purchase of the priority crops;
- design of product labels to improve sales of pineapple and passion fruit marmalades, and passion fruit juice;
- design of a newspaper advertising campaign in Cochabamba, along with PDAR to promote Chapare pineapples and passion fruit;
- obtained sales contracts with several processors to buy and process pineapples weighing less than 1 kg, enabling farmers to sell their entire inventories of small fruit;
- increased consumer demand for passion fruit in Bolivia by promotional efforts through newspaper, radio, and television advertising, and supermarket demonstrations;
- sent palm heart samples to several canneries in Santa Cruz and Cochabamba for trial processing.

Market analyses strategy has included personal visits of DAI staff to Argentina,

Chile, Brazil, Paraguay, and southern Peru. Potential buyers were identified and market prices determined. Buyers have also been invited to visit the production zones and meet the growers in the Chapare.

DAI has also subsidized exporter participation in local and regional trade shows. Chapare product was displayed at the trade shows and DAI assisted in deal-making.

DAI has done a lot of work in trade policy between Argentina and Chapare growers to gain access to Argentine markets after the cholera outbreak a few years ago. DAI played the lead role in getting the border reopened, through administrative actions, bringing Argentine officials to inspect the quality control programs in place in the Chapare, etc. Without DAI's efforts, it is conceivable the border would still be closed.

5. Agribusiness Development

A part of the DAI agribusiness development strategy is to assist processors of Chapare crops in securing dependable sources of supply of raw materials. The following processor and producer relationships have been established:

Naturaleza and APAMI pineapple association;

- Del Valle and passion fruit/pineapple producers;
- VASCAL and passion fruit/palm heart/citrus producers;
- Dillman and pineapple producers;
- NIKKEI and palm heart producers;
- INBEAL and banana producers;
- La Khochalita and banana producers.

The private sector is beginning to play an active role in Chapare farm-to-market operations. Farmers are beginning to receive pre-season buying commitments from private sector intermediaries. DAI has been directly or indirectly involved in the establishment of several large-scale company owned farms in the Chapare, including VASCAL, NIKKEI, AGRICANTO, and Siete Hermanos. This has been a significant improvement over the situation in June, 1992 when there were no company-owned farms nor investor groups engaged in production of alternative crops.

As capital drives economic growth and development, the lack of it is a major constraint to alternative agriculture development in the Chapare. Producers need working capital to cover production costs (such as seeds, fertilizers, pesticides, tools, and labor) before they realize a return on production. Processors need capital to buy equipment to upgrade or expand their operations. Exporters need transactional financing to cover procurement, handling, and transport costs. A flexible and efficient financial system is essential to building the Chapare agribusiness sector.

Currently, however, entrepreneurs are effectively shut out from the financial system. Loan interest rates are too high and loan procedures are lengthy and cumbersome. Even though sums are supposedly available, elevated borrowing costs and stringent loan security requirements will likely dissuade most new export entrepreneurs from using formal loans, especially for long-term investments.

The proposed government tax break for Chapare investors will greatly aid in attracting outside capital and stimulate agribusiness development.

6. Investment Promotion

DAI's investment promotion strategy involves identifying potential investors, introducing them to the Chapare, and explaining investment opportunities. Buyers are introduced to the appropriate producer associations for potential deal-making. Interested investors are provided production/market information and assisted in developing investment plans. DAI also serves as a mediator in negotiating contracts between producer associations and/or individual producers and the investor. Investment promotion efforts have brought in investors able and willing to take over many of the activities formerly managed by DAI, including technical assistance in production and post-harvest technologies, quality control, packing, and transportation. In addition, performance-based incentive proposals are prepared, where applicable, for USAID approval. Investors are increasingly becoming interested in exporting, processing, and supplying inputs to Chapare farmers.

DAI has established strong ties with the Cochabamba Chamber of Industry and its members. This is an important linkage in furthering investment promotion activities. Another valuable relationship established in 1995 was with the Fundación Bolivia Exporta. This foundation provides grants and loans to agribusiness ventures. DAI's promotion efforts have resulted in a number of new private sector investments in the Chapare.

There are fourteen private investors of significant scale in the Chapare with a total of $3,295,000 directly committed to Chapare endeavors of DAI-priority crops (see Annex H). DAI conservatively estimates that producers associations and small farmers have another $2,117,000 invested in priority crops. There are twelve projects in the planning/discussion stage; if all were implemented, this would represent an additional investment estimated at $11,870,000 (Annex H).

The incentive fund is a positive stimulus in attracting new investors and/or strengthening existing firms operating in the Chapare. When a company first begins a business venture, costs can be high, while income is low due to low production volumes, inefficiencies, and other factors. The Incentive Fund helps companies offset some of these risks and recover some of the start-up costs. While the Fund has some flexibility, incentives are based on performance and small farmer participation. The company's cash flow and return on investment are calculated before an incentive is considered. The deficit can be no more than 20 to 25 percent of the investment, and there must be a minimum

sixteen percent return on investment. The company must invest about $4 for every $1 of DAI incentive money. In addition, the incentives are calculated by units exported, and the company only receives the incentive upon completing the terms of the agreement. Examples of recently approved or pending incentive allocations are listed in Annex I. In addition, there are numerous companies whose requests for incentives are under various stages of review.

DAI's performance based incentive program to stimulate export-related agribusiness activities in the Chapare was only adopted within the last year. Currently, DAI has approximately $500,000 available to be allocated on a competitive basis to those companies or organizations who submit a proposal that falls within the criteria and objectives of aiding small farmer export efforts in the Chapare. DAI reviews all proposals and determines their appropriateness and funding level. DAI makes payment on a performance basis, that is, when DAI has verified that the results described in the proposal have been accomplished.

F. Infrastructure

DAI/CORDEP has also focused on building the infrastructure and technical capacity needed to sustain marketing activities to benefit the small farmer. Navigable roads and bridges are essential to any effective marketing program. DAI dedicated a full-time advisor to CORDEP's road improvement program in 1994. This has resulted in improved project monitoring and management. DAI was instrumental in forming a Road Commission, which has significantly improved the project selection process for roads.

DAI has identified and cooperated in significant road infrastructure improvements over the life of the project. In 1992, there were less than 500 km of farm-to-market access roads, generally poorly maintained. By 1996, all the principal alternative crop production zones have year round access, as a result of over 500 km of road improvement, thirteen new bridges and many hundreds of km of road maintenance.

Three-fourths of the improved banana and pineapple farms can now access local or export markets easier than before. In addition, it now takes significantly less time for a farmer to deliver the raw product to the nearest improved road.

In 1996, DAI post-harvest infrastructure improvements included:

- two deep wells for pineapple packinghouses;
- seven banana/pineapple mini-packing centers (implemented by local initiative with 25 to 35% of total cost paid for by local resources at a cost of about $5,000 each);
- approximately 1600 meters of banana cable transport system to improve field-to-roadside transport;
- three water treatment (chlorination) installations;

- one mobile pineapple packing center;
- one multi-purpose packing center;
- one km of improved hard-surface farm-to-road trails will be built.

An additional 10,000 meters of cable system will be built in 1997 to facilitate banana transport from the field to road. Also, 10 km of hard surface (river gravel) farm-to-road trails will be constructed in 1997 for bananas and pineapples in seven different growing regions.

G. Phytosanitary Issues

As fresh fruit exports from the Chapare increase to neighboring countries, there is always the possibility of introducing new insects, diseases, pests, or food-borne illness pathogens into the importing countries. Along with increased product volumes, it is inevitable that countries like Argentina and Chile will impose stricter phytosanitary regulations in order to protect their domestic industries and ensure the safety of their people.

It is absolutely essential that DAI place a strong emphasis on avoidance of phytosanitary problems, which could be disastrous to the development of the Chapare region, if for example, Argentina closed its borders to banana or pineapple imports from Bolivia. Producers must continually be educated on proper field sanitation practices in order to avoid pests and food-borne illness problems. A particular concern of Argentina is the avoidance of Johnson spot (*Piricularia grisea*) on Bolivian bananas. For export, growers should bag their bananas in the field during development of the raceme and use insecticides to control Johnson spot.

Continued strong emphasis should be put on water sanitation and worker hygiene in the packinghouses. Food-borne illness pathogens like *cholera, Salmonella, Listeria,* certain *E. coli* races, etc., may be transferred from contaminated water or humans on to the fruit. It is imperative to prevent a food-borne illness scare linked to Chapare produce, which would be disastrous to the industry. Wash tank water for bananas should be chlorinated and continually checked during packing. Packing houses should maintain the concentration of chlorine at the recommended 150 ppm and the pH of the water should be between 6.0 and 6.5.

Another important phytosanitary issue is the use of only those permissible pesticides approved by the importing country. In addition, growers and exporters must avoid the excess application of a permissible pesticide, so residues don't exceed the established tolerance level. Pesticide abuse during the production or post-harvest handling of a crop could result in load rejections in the export country and destruction of the product at the expense of the Bolivian grower or exporter. No misuse of pesticides was observed during this evaluation, but DAI should be well aware of the negative ramifications of potential pesticide abuse among growers and take precautionary steps to prevent this problem from

occurring in the future.

It is important that DAI take a proactive position on phytosanitary issues and prevent a future debacle. Argentina does not currently have excessively rigid phytosanitary controls on imported Bolivian produce. DAI can help ensure that this continues by constant education and technical assistance efforts to the growers and handlers in the future. The type of rigid phytosanitary restrictions Chile puts on imported Bolivian produce should be avoided in the case of Argentina. Chile requires methyl bromide fumigation for fresh banana and pineapple imports from Bolivia. This treatment can cause severe fruit damage (e.g. surface discoloration) if not properly administered, and is an additional expense.

A coding system should be implemented in which each box of export fruit is numbered so it can be traced back to individual growers, if necessary. This important trace-back mechanism to have in place which will allow for rapid identification of the sources of future phytosanitary problem.

H. Worker Safety and Environmental Protection

An inevitable consequence of the development of a large volume fruit export industry in a tropical region is the use of pesticides to control insects, diseases weeds and other pests. DAI should implement a stronger packingshed worker safety and pesticide handling education program. Personal observations were made of packingshed workers submerging their bare hands and arms in fungicide solutions for extended periods of time. This cannot be good for the health of the individual and should be corrected as soon as possible. Use of latex waterproof gloves should be encouraged by all packingshed personnel that come in contact with pesticides.

Dump tank water treated with Benlate or other fungicides for banana crown rot control or pineapple *Thielaviopsis* rot is currently drained onto the surface of the surrounding soil. While these particular fungicides may not be excessively toxic, DAI should implement an educational effort on environmentally sound pesticide disposal practices. After all, the ultimate goal of this project is to build an economically and environmentally sustainable agriculture export industry in the Chapare. DAI should encourage the use of proper pesticide disposal practices and can help by designing and constructing isolated settling ponds or holes filled with activated charcoal or similar material. DAI should work to instill an environmental conscious mentality among the Chapare farmers and workers and to prevent pesticide run-off from packingshed water into nearby streams or rivers which may be used for drinking or washing.

SECTION III. CONCLUSIONS AND LESSONS LEARNED

A. Relevance

The development constraints the project was initially designed to address are still problems that are germane to the current development strategies. The project emphasis on alternative agriculture development is at the heart of CORDEP's development efforts, and serves as the mechanism to restructure the agricultural sector away from coca production.

DAI's resources and energies are focused on the market expansion of crops which have strong prospects in either the domestic or regional export markets. These crops have strong potential to significantly increase the incomes of small farmers in the Chapare and attract outside agribusiness development in both the production and processing sectors. These crops also have strong prospects for economic and environmental sustainability in the region over the long term.

B. Effectiveness

The effectiveness of DAI's component to the CORDEP project should be judged in light of the complex social, political, physical, and economic factors associated with the Chapare region. DAI began its effort in June, 1992 but due to security problems in the Chapare, was not able to have unrestricted access to the region until mid-1993. However, tension and instability continued to persist in the region, largely because of the dominant coca industry. Private sector investment in the Chapare was extremely limited, and the agriculture sector was dominated by many poor, inefficient, small farmers. DAI was charged with developing the export (and domestic) market for alternative (non-coca) crops, specifically for the small farmers. These small farmers had almost no access to credit or financing, due to the fact that many did not have title to or own their property, and had nothing else for collateral. Average farm size was several hectares or less, and there were very few improved access roads to the farms at the start of the project. The limited resource farmers had little to work with, no machinery, and no knowledge of what it takes to be successful in the export market. In addition, many farmers had hilly terrain, no way of moving perishable crops off the farm during the rainy season, and were using crop varieties mostly unsuited for export. The whole Chapare area suffered from a poor transportation infrastructure, lack of packingsheds, and no refrigerated storage for perishables.

The small farm size continues to persist, making it very difficult to achieve efficient economy of scale crop output. Nevertheless, alternative agriculture development efforts moved forward and progress was made. It should be made clear that DAI's progress in the

development of the marketing of the various crops was very much influenced by the efforts of a number of other organizations affiliated with CORDEP.

Significant changes have occurred since the project started in 1992. Alternative development is now respected as an effective tool against coca production. The Chapare as a region was formerly feared by investors as a high risk area, and thought by many to be a wasteland where no quality products could compete with the high returns of growing coca. Products that did come out of the Chapare, like bananas, were of poor quality, reinforcing this impression.

Currently, many of these impressions have changed. Alternative development has gained new respect, as the Chapare agribusiness economy has grown approximately 30 percent in each of the last three years in terms of productive area, number of families involved, farm gate income, and sale value of alternative crops. The largest pineapple grower in the Chapare indicated monetary return per hectare for pineapple was double that of coca. He is replacing all his coca with pineapple. This positive attitude towards DAI-prioritized crops is prevalent.

The project is making satisfactory progress towards its stated objectives, although new emphasis is needed on expanding client investment and increasing marketing efficiency. The project emphasis on agribusiness development is being addressed within a framework that also recognizes the need to take an industry-wide perspective on each priority commodity or product. Clients (e.g. grower associations, private firms) are supported within an assistance package that includes production, post-harvest handling, processing, and market components.

One parameter to use in judging the effectiveness of CORDEP's efforts in the Chapare is to look at the changes in targeted crop hectareage and production volume over the past three years. Annex J shows the number of hectares and production volume in the Chapare increased for each of the targeted export crops since 1993, except for black pepper.

Exports of Chapare bananas to Argentina began in 1994 and are continuing at a rate of about 3000 cartons per week. Considerably more demand than supply exists, so future growth of the Chapare banana industry is assured. Substantial opportunity for growth exists in the Argentine market. Aware of the excellent market opportunities in Argentina, several investors are planting over 100 hectares each in the Chapare. Lesser export volumes are also sent to southern Peru. The combination of improved banana quality and export demand has caused domestic banana prices to rise, benefitting the small farmer. Family incomes of Chapare farmers are increasing. Small farmers who use improved production technologies and varieties obtain a significantly higher return and profit than traditional banana growers.

The project has been successful in helping to establish or strengthen a number of private sector businesses. The multiplier effect of DAI's efforts cannot be quantified because of inadequate data availability. DAI's accounting structure is not set up to calculate the cost-benefit ratio of the project's economic impact on Chapare farmers. It is set up to

accurately measure the level of technical assistance directed to the project, not to calculate its own cost/benefit contribution to CORDEP's priority product lines. While the importance of maintaining data on the cost benefit or economic impact on Chapare farmers cannot be stressed enough, this is not within DAI's scope of work.

C. Economic Impact

Bananas have provided the biggest economic impact to Chapare farmers among all of the prioritized CORDEP crops. There are currently about 5,000 families involved in banana production in the Chapare. Currently, about 10% of the total hectares of bananas in the Chapare is planted with the improved export varieties. This percentage is expected to increase in the near future as more planting stock becomes available, and additional private investment for the export market occurs. Total production volume anticipated for 1996 is 97,510 metric tons for the traditional Mokotaqui variety and 12,646 metric tons for the new export varieties. Approximately 30%, or 3,794 metric tons of the total volume from the newer varieties are expected to be exported in 1996. The new varieties are produced by some 500 families, organized into 6 associations which comprise the banana producers' union, (UNABANA). Currently, only one firm (WINNEX) exports bananas to Argentina, but two more private companies expect to start export operations within the next year (ECOBANA, COFRUT).

In addition to the official export volumes, it is commonly known that considerable volumes of Chapare bananas are exported to the border towns in southern Peru and southwestern Brazil. Unofficial estimates indicate that about 3000 box equivalent volumes are sent weekly to Peru and Brazil. They are transported in bulk.

As a consequence of the development of the export trade, banana prices in the Bolivian market have increased. This can be partly attributed to removing some of the supply from the local market to export, and partly to higher quality bananas being sold in the local market, which command higher prices. The increased local market price is passed directly down to the farmer. Farmgate price per chipa (720 bananas) has risen from 7 Bs in 1992 (for traditional bananas) to approximately 35 Bs in 1996 (for export quality fruit).

The rising export volume has had a significant positive effect on Chapare banana farmer income. Considerably more demand exists in the Argentine export market than Chapare farmers can supply. Therefore, the Chapare banana industry will likely have a much greater economic impact in the next several years. DAI's role in providing technical assistance to the banana associations, improving product quality, offering export incentives, and facilitating market penetration has been the catalyst in the development of the export industry.

Pineapples are the second most important crop in terms of economic impact to the region. Improved cultural practices, pest control, Ethrel-induced flowering uniformity, and post-harvest handling techniques introduced by DAI has resulted in the development of an

export industry to Argentina. In 1996, it is estimated that 12% of the Chapare pineapple production will be exported representing a volume of 405 metric tons. The variety 'Smooth Cayenne' represents 73% of the total exports, and 'Pucallpa' 27%. DAI has increased the hectareage of certified (technified) 'Smooth Cayenne' to 44.6 hectares and 13.7 hectares with 'Pucallpa'. This represents 133 farmers with 'Smooth Cayenne' and 124 farmers with 'Pucallpa'.

In addition to helping increased export volume, DAI has cooperated closely with the major pineapple processors in the Chapare and Cochabamba (VASCAL, Del Valle, Agroindo, La Naturaleza, Dillman). Value-added processed product volume is estimated to increase 9% over last year. Principal value-added products are juice, dehydrated fruit, canned slices, and marmalade. Each of these companies employ a number of workers (the total is estimated to be over 400) who have benefited by the pineapple industry (e.g. the source of raw product) in the Chapare.

Palm heart, passion fruit, and black pepper are recent crop introductions to the Chapare and have not had the economic impact on the region that banana or pineapple have had. Hectareage is relatively small, production volume is just starting to begin, and as of yet there has not been enough supply to export. However, palm heart and black pepper have potential to make a strong economic impact in the Chapare. Passion fruit currently has serious limitations due to Fusarium wilt susceptibility.

A total of 30 families were involved in passion fruit production in 1995, from a total of 37 hectares. It is estimated that more than 200 families will be involved in production by the end of 1996, with more than 200 hectares established.

In 1993, farm family incomes in the Chapare derived from alternative crops was $280 (Agricultural Production Survey, 1993). Annual farm family income derived from the production and sale of alternative crops has increased to $520 in 1996. The farm gate value of alternative crops rose by an estimated 91 percent, mainly due to improvements in production, post-harvest handling, and exporting.

Sales volume and value of Chapare bananas and pineapples have significantly increased over the past several years, as shown below (CORDEP figures):

Sales Volume/Value of Bananas and Pineapple, 1993-1995

Commodity	**Volume** (metric tons)		**Value** ($ x 1000)	
	1993	1995	1993	1995
Banana	4,041	10,074	737	1,983
Pineapple	679	1,332	679	1,332

Unit sales for bananas have increased substantially as shown below:

Sales of Bananas, 1994-1995

Unit Sales	1994	1995	% Change
Improved Chipas	60,627	103,238	70%
Boxes for Export	29,376	39,118	33%
Chipas for Processing	4,250	7,500	76%

Average banana farm gate price has also significantly increased as shown below:

Farm Gate Price for Bananas, 1994-1995

Av. Farm Gate Price	1994	1995	% Change
Improved Chipas	Bs 16	Bs 24	50%
Boxes for Export	Us $1.10	US $1.30	18%
Chipas for Processing	Bs 7	Bs 11	57%

The impact of improved pineapple quality due to DAI's pre-harvest certification and post-harvest treatment process has resulted in a noticeable price increase to the small farmer. In 1992, producers received an average of $0.18 to $0.20 per pineapple, with little distinction made for quality. Currently, prices average $0.35 per pineapple for export quality and approximately $0.25 to $0.30 per pineapple for the domestic variety.

DAI's efforts over the last year have resulted in significant increases in pineapple sales volume and prices, as shown below:

Sales Volumes for Pineapple, 1195-1195 (Boxes of 10 Fruit)

Unit Sales	1994	1995	% Change
Boxes for National Market	45,216	49,583	10%
Boxes for Export	15,000	16,000	7%
For Processing	7,900	8,750	11%

Farm Gate Prices for Pineapple, 1994-1995 (per 10 Fruit)

Av. Farm Gate Price	1994	1995	% Change
National Market	$2.40	$2.90	21%
Export Market	$3.00	$3.50	17%
Processing	$2.00	$2.30	15%

DAI has been an integral part of the development of the alternative crop sector in the Chapare. In 1993, there were about 59,800 hectares of alternative crops established. By January 1996, this increased to 70,400 hectares and continues to increase.

It is clear that DAI's efforts are contributing to solid growth in the Chapare. There is evidence of increased employment, gains in rural income, and improved rural living conditions. The alternative agriculture sector in the Chapare offers promising prospects for continued growth. Because of the integrated role of DAI with other CORDEP organizations, it is difficult to differentiate the economic activity generated directly from DAI from that associated to other CORDEP programs. However, it can be assumed that the vast majority of export agriculture development activities in the Chapare are a direct result of DAI's involvement.

DAI's activities have laid a foundation for future economic impact through improved agribusiness activity, export diversification and growth, and increased value-added agriculture.

D. Sustainability

The objectives of the project are to leave behind sustainable, economically viable alternative means of obtaining employment and income from licit activities.

DAI's marketing efforts are several years away from obtaining private sector sustainability in the banana export business. Currently, there is only one exporter. This company, as of yet, is not self-sustainable. However, progress is being made and if they obtain the 4,000 to 5,000 box volume per week they need to break even, they will likely become sustainable. They are also establishing about 100 hectares of bananas in their own fields. Several new banana exporting companies, ECOBANA and COFRUT, are also establishing 150 hectares and 70 hectares of their own bananas respectively. They will procure the remaining volume for export from small growers. These two additional banana exporting companies are confident in maintaining long term operations in the Chapare.

By 1996, approximately 5,000 families were involved in banana production in the Chapare. Membership in the banana associations increased from several hundred a few

years ago, to about 700 today, and that number is increasing monthly.

DAI has been responsible for numerous infrastructure improvements in the Chapare, including the construction of packingsheds, wells, water chlorination treatment facilities, and farm-to-road transport systems. It will require two to three more years of DAI infrastructure improvements to obtain sustainability.

It is likely that both the pineapple and palm heart industries, and possibly the banana industry, will be sustainable within three years.

E. Lessons Learned

The following list comprises the most important lessons learned from the DAI experience.

- The most serious constraint in establishing the alternative agriculture export trade from the Chapare is not the lack of markets or buyers, but is in fact how to increase volume of export quality crops, ship them on time, and deliver them in the required condition on a consistent basis. Lack of supply is the critical bottleneck in export growth.

- The most critical ingredient for successful entry into international markets is almost always the presence of a catalyst, defined as an individual or company (domestic or foreign) or a public agency, or a combination of these, that (a) pioneers the process of development before anybody else, (b) packages the needed know-how with domestic endowments and external financing, and (c) diffuses the experience and know-how it learns to others so that, hopefully, self-sustaining industries can be born.

- Nontraditional agricultural export (NTAE) businesses are high-risk ventures, and have a high failure rate because of these risks. The main cause of failure in NTAE enterprises in lesser developed countries is a lack of know-how: product, market, technical, or managerial.

- Smaller, streamlined field packingsheds have proven to be more utilized and efficient than large, overcapacity, high operating cost structures.

- A number of farmers outside UNABANA have started to wash and treat their bananas, thus improving quality and increasing price. This practice contributed to higher family income from bananas in areas outside the project's direct influence.

- Improvement in product quality and development of the export market has a positive effect on local market prices paid to the grower. The domestic market has responded with increased demand and higher prices for "treated chipas" and export quality bananas. This favorable response was not expected at first. It shows that local consumers can and will pay more for quality products.

•Credit availability is a necessary element of any alternative agriculture development program. The lack of available credit in the Chapare is a constraint to the growth of agricultural exports.

•It is not possible to export bananas to Argentina without refrigerated container transport.

SECTION IV. RECOMMENDATIONS

This list of recommendations follows directly from the lessons learned outlined in the previous section. These recommendations are listed from most urgent to least urgent in the eyes of the evaluator. It should be pointed out, however, that all of these recommendations are important and should not be discounted simply because they appear at the bottom of the list.

1. Emphasis should be placed on developing the export marketing capability for three crops: banana, pineapple and palm heart. DAI should place a lower priority on black pepper, passion fruit, and citrus. These three crops have very little export market potential, considering the vast production of citrus and passion fruit in Brazil and other South American countries. It would be foolhardy to think that Chapare growers could effectively compete against large economy of scale production in Brazil for world markets. India, Indonesia, and Malaysia would be difficult to replace in the world black pepper market, unless it can be demonstrated the Chapare black pepper is of superior quality. However, considerable domestic market growth potential exists for citrus, passion fruit, and black pepper. Therefore, DAI should maintain involvement with these three crops, primarily focusing on import substitution efforts in the Bolivian market. Activities with other crops should be eliminated. However, if the project is extended for some years more, activities in additional crops could be increased at a later date as market and other conditions warrant. Annex K provides some suggestions for future crop emphasis in any follow-on CORDEP program (after 1997).

2. The overall focus of DAI should be on market driven expansion of the priority crops, and should include a greater level of participation of the private sector and agroindustrial processors, for a more rapid development of the Chapare. However, this private sector/ agroindustrial involvement should always be linked to the benefit of the small farmer. It is envisioned that private sector development will allow more market outlet opportunities for small farmers to sell their wares. DAI should encourage relationships between small farmers and processing/exporting companies in which the small farmer is a partner in the business, not just a provider of raw product. This would also serve as a mechanism to get more allegiance between the farmer and the processor/exporter.

3. DAI should cooperate with Planning Assistance to arrange for a short term consultancy (several months) by an experienced "association builder" to work with banana and pineapple associations in business management practices, organizational skills, contract drafting, administration, financial planning, and accounting. The long term objective should be to provide small farmer associations all the necessary

organizational, financial, and agribusiness skills necessary to be a profitable and sustainable business entity, capable of marketing their product in the best interests of their members. Possible sources of this expertise may be found in the CLUSA project in El Salvador (responsible for strengthening cooperatives) or in WINBAN in the Caribbean (West Indies Banana Association in St. Lucia). Specific objectives of the consultant should include:

- Strengthen the administrative, organizational and financial management capacity of the directors and managers of grower associations. Adopt a comprehensive strategy that integrates the development of the management and administrative systems of the associations with their production and marketing functions.
- Develop practical, management accounting systems within the associations that provide specific information relating to all of the production and marketing functions of the associations.
- Build communication skills and techniques to improve the ability of managers to report and communicate to the directors and improve the capacity of the directors to communicate to the general membership.
- Combine technical assistance, training, and timely assistance at key points in the negotiation of contracts to guide the limited resource growers through the process from site selection to final payment.
- Establish cost accounting systems and practices that allow the association management to monitor and increase their control over their cost of production and packing.
- Establish enterprise budgeting and accounting that determine the costs and contributions to overhead of each activity within the association operation.
- Establishing tracking and control systems that monitor and control the flow of inputs to specific crops and parcels and track product from the field to the exporter's warehouse.
- Establish financial reporting mechanisms that fulfill the reporting functions of the credit institutions and the directors of the associations.

4. DAI should arrange for short term technical assistance (several months) in order to improve processing plant efficiency, automation, updated technology, increased product quality, and improved packaging. In addition, international buyers will request rigid sanitation protocols to be followed to ensure product safety. This will necessitate training in and implementation of a Hazard Analyses Critical Control Points (HACCP) inspection program to prevent metal or glass particles entering the processed product and sanitation of processing lines to prevent food-borne illnesses. Knowing the location of the hazard areas, or critical control points, provides

industry professionals with the understanding of how to prevent the contamination in the first place. International market place demands for high quality, safe food are becoming more strict as product liability lawsuits can destroy the company at blame. The short term consultant should be an expert in all these areas.

5. Establishment of new (and strengthening of existing) value-added or processing industries in the Chapare as secondary markets (e.g. tropical fruit juices, purees, dried fruit, canned pineapple, marmalade, etc.)

6. There is an urgent need to finish paving the main highway between Santa Cruz and Yacuiba, especially between Abapo and Camiri. It is the only access road for Chapare products to enter the Argentine market. Currently, only one Bolivian firm (WINNEX) is willing to risk the excessive wear and tear on their trucks in order to transport bananas into Argentina. No Argentine trucking company is interested in exposing their very expensive refrigerated trucks to the potential structural or mechanical damage incurred by driving over the existing unpaved road section. It is critical to entice more than one perishables trucking operation into the Chapare for destination to Argentina. This will be facilitated by completion of the road surface pavement. The export corridors leading to Argentina must be a top priority for the government of Bolivia and the international donors. While road-building is not within the scope of work for DAI, this problem represents a significant impediment to future export growth.

7. Utilization of the DAI-incentive fund for investment promotion in the Chapare should be re-reviewed after the full details of the governmental tax law become known. Incentive funds are a valuable tool in attracting agribusiness development in the region, but may not be needed in light of the new tax-free investment law for the Chapare.

8. Product line managers should all be administered under DAI and each person should have a solid understanding of marketing.

9. Every effort should be made to cool the products to their optimal storage/transit temperature as soon as possible after harvest, and to maintain the cold chain during distribution. DAI should introduce forced-air precooling technology to the banana/pineapple associations or exporters. Failure to remove field heat after harvest reduces product quality and shelf life. Existing infrastructure at WINNEX and San Luis association can be modified, with minor adjustments to provide adequate product forced air cooling. Portable forced air coolers using several tons of refrigeration capacity and one cubic foot per minute ventilation capacity per pound of product would be ideal for on-farm units. These units could adequately cool several hundred boxes of product for a cost of around $5,000. It would then be essential to make refrigerated transport vehicles available, to prevent product re-warming during the time from container loading until shipment. USAID personnel reporte that while attempts have been made to introduce forced-air cooling to the

associations in the past, these attempts have failed because farmers are unable or unwilling to pay the costs associated with this measure. Nonetheless, until forced air-cooling is intoduced, exports will be at a significant disadvantage relative to the competition (for example, Ecuador).

10. Infrastructure improvements (packingsheds, wells, roads, etc.) should be grower association-driven. Labor, materials, and construction costs should be shared by DAI and the associations. Grower participation and financial commitment in infrastructure improvements increases the likelihood of long term usage. Large expensive turn-key operations, built without grower obligation will be underutilized, too expensive to maintain, and way beyond the capacity for limited resource grower associations to sustain.

11. In order to assure the quality of export crops, DAI should be given a say in the determination of the sites/growers selected by the NGO's for export production. While the U.S. embassy's narcotics affairs section has the final authority to "review...sites and growers...," for the sake of export quality, DAI should at least be able to participate in the selection process.

12. Expanded local marketing efforts should be made to acquaint consumers with the improved varieties of bananas and pineapples and persuade them to continue paying more for a higher quality product. Additional marketing and promotion efforts should be made in La Paz for the variety 'Smooth Cayenne'. La Paz consumers generally have little familiarity with this variety and usually assume it to be a variety called 'Wacapiña', which is an inferior quality pineapple produced in the Los Yungas area. Therefore, consumers are not willing to pay a higher price for 'Smooth Cayenne' because of its similar appearance to 'Wacapiña.' More domestic marketing should also be done with passion fruit juice. Increased use should be made of radio and newspaper advertising in promoting and marketing Chapare crops in the major Bolivian markets. Offering Chapare products in conjunction with Lloyd Aero Boliviano in-flight meal service could be an excellent method of enhancing consumer awareness and increasing domestic market penetration.

13. It is essential that DAI place a strong emphasis on avoidance of phytosanitary problems. Producers must continually be educated on proper field sanitation practices in order to avoid pests and food-borne illness problems.

14. A coding system should be implemented in which each box of export fruit is numbered so it can be traced back to individual growers if necessary. This is an important mechanism to have in place in case of future phytosanitary problems.

15. DAI should implement a stronger packingshed worker safety and pesticide handling and disposal education program. Use of latex waterproof gloves should be encouraged by all packingshed personnel that come into contact with pesticides.

16. DAI should work with a local carton manufacturer to produce a high quality wax-

impregnated corrugated box for banana and pineapple exports. Only a waxed carton will be able to withstand the rigors of high humidity environments and still maintain its structural integrity. The objective is to replace high cost imported boxes with lower cost, but high quality local product. In addition, wooden boxes for pineapple do not make as attractive a presentation as corrugated cartons. Buyers often pay higher prices for packages that give the product a better presentation. It is a form of adding value to the product.

17. Improvements in post-harvest management are needed to ensure a high quality product in the export market destination point. Farmers and exporters often do not understand what measures must be taken to maintain their product in merchantable condition at the point of export, nor do they realize why proper handling is important to ensure quality. The post-harvest system for bananas/pineapples exported from the Chapare was observed to suffer from the following deficiencies:

- bruising during transport from field-to-packingshed (fresh fruit should be handled like eggs, not like hardware);
- lack of forced-air cooling for pineapples (optimum storage temperature is 10 to 12°C) and bananas (optimum storage temperature is 14°C);
- overfilling banana cartons causes considerable product bruising during transit;
- variability in banana size within the same carton;
- lack of cooling the product to its optimal transit/storage temperature before loading in the container (the refrigeration unit of the over-the-road container does not have sufficient capacity to rapidly remove product field heat - both bananas and pineapples would benefit by forced-air precooling before loading into refrigerated containers);
- lack of palletized loading of the product inside the container (this results in each individual carton having to be loaded and reloaded, increasing the likelihood for additional bruising, dropping, and mishandling);
- interruption of the cold chain during off-loading at the border in Yacuiba (this encourages moisture condensation on the surface of the fruit followed by concomitant decay);
- lack of humidity control inside the containers during transit (bananas and pineapples should be kept at 90 to 95 percent relative humidity after harvest to minimize weight loss and maintain freshness).

18. More farmer-oriented written and video materials should be made available and disseminated to grower organizations specifically addressing post-harvest handling requirements needed for export market success. These should include export market

grade standards, product bruise prevention methods, and packingshed sanitation.

19. DAI should emphasize improvements in value-added products, including new packaging types. For example, all Bolivian palm hearts are currently packed in enamel coated cans. The world market prefers glass. Processing plant packing technology should be shifted to glass jars in the case of palm heart. Lower cost packaging for palm hearts should be investigated, in particular, plastic bags or bottles to replace the expensive enamel coated cans.

20. Increase the number of exporters. Currently, DAI has just one company, WINNEX, involved in exporting bananas and pineapples. This is a very precarious position to be in. If WINNEX folds, no company has been groomed to continue the export marketing. Competition among exporters is healthy and should be encouraged.

21. The DAI post-harvest banana specialist essentially works for WINNEX, as he is responsible for quality control, and packing for all export products. However, there is only one exporter. WINNEX should hire him.

22. Throughout the remaining life of the project, DAI should continue to assist new growers in improving their cultural practices and post-harvest handling, help form new associations, and help open new areas for banana and pineapple exports.

23. Over the remaining life of the DAI contract, the associations should be assisted in increasing volume and quality of product. They should be encouraged to market their fruit through a good distributor/exporter and not try to market independently at this time. However, eventually the goal should be for independently sustainable exporting directly by the associations or UNABANA. Currently, the producer associations are too dependent on WINNEX and DAI for assistance with the logistics of exporting fruit, including packaging, transportation and quality control.

24. DAI should link processors with radio stations in the Chapare to announce raw product prices to the growers and when product is needed.

25. DAI should encourage banana farmers or associations to concentrate their production in specific zones by providing infrastructure support in the form of cable transport systems. This farm-to-road transport system is very efficient and low cost when large areas of crops are concentrated in specific regions. It also reduces post-harvest losses, thus increasing export quality fruit.

26. DAI should actively pursue additional refrigerated container companies to enter the perishable transport business to Argentina. As banana and pineapple volumes increase later this year, and in subsequent years, additional refrigerated transport capacity will definitely be needed.

27. A concerted effort should be made to determine the cause of internal browning in pineapples. This is currently a major post-harvest quality problem in 'Smooth Cayenne.' Three truckloads were rejected last export season in Argentina due to

this disorder.

28. Aggressively solicit the support of the government of Bolivia in providing duty free import status of all farm equipment, vehicles, agricultural chemicals, packaging materials, supplies, etc. to be used in the establishment and operation of alternative crop export enterprises in the Chapare. This incentive has proven to be very effective in the establishment of non-traditional agriculture export industries in numerous countries worldwide. Perhaps some of these benefits will be realized in the proposed new tax law for the Chapare that the government is implementing.

29. Export market penetration into more countries than Argentina should be stressed. The vast majority of banana and pineapple exports go to only one country. There are obvious reasons for this, but niche market opportunities exist for organic bananas in Europe, dried fruit products in Europe and North America, and processed products in other Mercosur countries.

30. A long term objective of CORDEP for exports from the Chapare should be the development of a quality assurance program. A seal of quality would contribute to CORDEP's promotional plan for expanding Chapare exports.

    The quality assurance program would incorporate proper post-harvest management practices along with the safe use of pesticides and residue control. The objective would be to establish a reputation for delivering only the highest quality products. When CORDEP ends, it is possible that a non-profit company could be established to exclusively bestow the seal on products in accordance with the inspection and approval criteria which CORDEP developed.

31. Rigorous quality control parameters should be adhered to with all export crops. Grade standards should be written that specifically define the quality, condition, size, and maturity required in each export destination. This is fundamental to a modern industry's structure and discipline. Compliance with improved standards of quality and more vigorous grading procedures will require continuous education and supervision of the labor force.

32. Transportation of fresh bananas and pineapples in controlled atmosphere (low 02; high C02) containers should be trialed. Post-harvest life is typically extended 1 to 3 weeks longer utilizing controlled atmosphere transport with these two products. This may allow for additional market penetration in Argentina due to less transit loss. It will also allow for harvest of a more mature, riper, sweeter pineapple fruit which could have a higher demand and market niche in Argentina.

33. DAI should actively solicit the participation of university students in helping investigate or overcome marketing-related constraints. Utilization of university students doing their thesis research on alternative crop marketing issues is a very cost effective approach and would be mutually beneficial to DAI and the student/university. In addition, in order to realize long term sustainability of DAI's

marketing efforts, a cadre of experienced Bolivian nationals will have to be called upon to continue the development and marketing efforts. DAI should attempt to strengthen the human resource base in Bolivia for future project sustainability.

ANNEX A - TERMS OF REFERENCE

PIO/T 511-0617-3-40161

CORDEP Marketing Component Evaluation

I. Background

The goal of the Cochabamba Regional Development Project is to increase investment, productivity, and employment in licit agricultural activities as Bolivia transforms its economy from dependence on coca to alternative economic activity. This activity supports the Mission's Economic Opportunity and Access Strategic Objective and Intermediate Results Package.

CORDEP's purpose is to develop alternative sources of income and employment for people within the Department of Cochabamba and its areas of influence. CORDEP has two major strategies: to help farmers produce crops for established markets, and to bring together buyers and producers.

CORDEP consists of three components: marketing, capital resources, and sustainable agricultural production. Since its inception in June 1992, CORDEP has maintained a strong market-driven orientation. Decisions on issues such as crop research and extension, crop production, and the location of farm-to-market road construction are based on information provided by the marketing component.

At the outset of the marketing component's activities, Chapare farmers producing licit alternatives to coca were isolated from markets and buyers, uninformed about product and packaging standards, and confined to selling in a local market characterized by inadequate transport, product loss, and slow pay. This poorly functioning market system acted as a brake on alternative development by limiting market opportunities, keeping farmers'incomes low, and preventing new job creation.

CORDEP has put much effort into improving Chapare farmers'market system. It has:

- identified new customers;
- communicated their requirements to producers'associations;
- determined standards of product quality and packaging;

- implemented these standards in the field;
- organized meeting between producers'associations and prospective buyers;
- contacted foreign importers to widen sales opportunities to regional and distant markets; and
- promoted private sector involvement in the farm-to-market chain to assure the system's sustainability.

CORDEP contractor Development Alternatives, Inc. (DAI) has principal responsibility for marketing support to Chapare farmers. Until recently this was done through a Marketing Unit comprising four sales specialists: two in local markets, one in export markets, and one in field sales coordination. In July, 1995 the unit was reorganized into the Agribusiness and Investment Promotion Unit comprising a unit manager (Charles Foster), a marketing specialist (Nelson Bowles), and an investment promoter (Oscar Sánchez).

DAI also supports CORDEP's Small Farm Production component, designed to strengthen producers'associations, expand small farm production, and advise farmers on pre-harvest and harvest practices. The evaluation should not assess these activities except when they have a direct bearing on DAI's marketing interventions and outcomes --for example, technification of farmers fields to yield export-quality products, which is done between post-harvest and the next planting season.

Since July 1995, production has been organized into seven product lines (bananas, pineapples, palm hearts, passion fruit, black pepper, citrus and improved pasturage for milk production, each under the aegis of a product line leader. Each line leader has responsibility for the development of the product from its planting to its sale. The contractor should interview each line leader to determine the nature and effect of the marketing unit's support for his product.

II. Objective

The evaluation will identify and measure the impact of DAI's contribution to the Chapare marketing system. For the purposes of this evaluation, **marketing** encompasses activities from harvest to final sale, including agribusiness development and investment promotion.

III. Statement of work

The farm-to-market chain in the Chapare comprises pre-production, production, post-harvest, preparation for market, transport, and market. The evaluation should focus on DAI's contributions to the last four components.

Post-harvest means improvements in handling, selection and packaging of crops destined for differentiated customer markets.

Preparation for market, or **processing**, means development and support of channels that process or add value to Chapare crops through canning, juicing, drying, etc.

Transport means the availability and appropriateness of systems for hauling crops to the market efficiently and cost-effectively.

Market means identifying and establishing repeat customers, agribusinesses, and investors.

The evaluator should also look at DAI's impact on achieving marketing related results in USAID's Results Framework Package (RFP).

In addition, agribusiness development and investment promotion are included in this evaluation, because both activities relate directly to private sector participation in alternative development. **Agribusiness development** engages private companies in the farm-to-market chain to sustain the marketing system after USAID donor support ends. **Investment promotion** uses publicity, escorted site visits, and incentives to induce private sector investors to establish new ventures in the Chapare with their capital, expertise, and market contacts.

IV. Specific Duties

With the considerations noted above in mind, the contractor shall:

1. Evaluate the effect of DAI's marketing strategy on the alternative development program in general.

2. Evaluate DAI's strategy for marketing, agribusiness, and investment promotion, and suggest improvements in key areas.

3. Evaluate the effect of DAI's marketing strategy at the individual level: on Chapare farm families'incomes, job opportunities, market confidence, attitudes toward licit crops, buyer contacts, etc.

4. Using a 15-year projection beginning September 1992, determine whether increases in product movement and farm-gate prices attributable to the Market / Agribusiness Unit are in proportion to the costs incurred.

5. Determine which activities now conducted by the DAI marketing team might more appropriately be shifted to farmers or the private sector or eliminated altogether.

6. Predict the sustainability of marketing strategies after the end of CORDEP, and recommend ways in which such sustainability can be enhanced.

The contractor's methodology should include a review of documents from CORDEP's files, including the economic opportunity and access results framework; analysis of CORDEP's financial data; and interviews with farmers, producers'associations, processors, packagers, investors, local and regional business people and business organizations, and staff of CORDEP and affiliates.

Specific questions include, but are not limited to:

1. What interventions has DAI made in improving the marketing system for Chapare-grown alternative crops?

2 Is the marketing system functioning measurably more smoothly as a consequence of these interventions?

3. Are these interventions having a demonstrable, positive impact on Chapare family incomes, employment opportunities, etc.?

4. Are DAI's agribusiness development and investment promotion well conceived and generating the desired results?

5. Have these interventions resulted in greater participation by farmers in alternative development?

6. Can a multiplier effect be demonstrated and quantified? How can this effect be widened?

7. What effect have incentive funds had in attracting investors to the area?

8. Could adjustments to the work plan provide economies in implementing the marketing unit's promotion activities?

9. What lessons have been learned?

V. Evaluation Specialist's Qualifications

The Evaluation Specialist should have ample experience in conducting appraisals and assessments of agricultural development projects affecting small farmers. It would be helpful if this experience were derived form evaluations of projects sponsored by USAID or similar donor organizations. However, the specialist shall not have been involved in any phase of CORDEP's implementation.

Familiarity with marketing principles and investment promotion strategies is critical. Marketing includes specialized terminology for orienting business activities to customers' needs and adjusting the marketing mix so that products and services meet customers. Investment promotion includes specialized skills for preparing and analyzing business plans and determining incentives to encourage a private company to invest. The candidate's record should demonstrate a working familiarity with this terminology or formal training in

marketing or finance. The specialist should be comfortable in small group meetings with both farmers and businessmen.

VI. Dates of Evaluation

The evaluation will take four weeks, beginning on or about September 1, 1996. The contractor will be based in Cochabamba, but extended trips to the Chapare production zone are required.

VII. Deliverables

1. A written draft evaluation report to the Director of ARD/La Paz that includes the contractor's findings, comments, and conclusions on the questions cited above.

2. An oral presentation of the principal findings to the ARD Office Director, the ARD Regional Coordinator, and others they may wish to include in the presentation.

3. A final written report incorporating the suggestions of the ARD Office Director, the Regional Coordinator, the Evaluation Officer, and others as appropriate.

D. Appendices

i. A description of the methodology used in the evaluation

ii. A bibliography of documents consulted

iii. A list of institutions and individuals consulted

iv. A summary of recommendations

v. Sections H and J of USAID Project Evaluation Summary

Form 1330-5 (available from USAID (Bolivia)

Feedback from the Mission will be given at the time of the oral presentation and, as necessary, forwarded to the contractor during the following week. The contractor will include any feedback or revisions and submit the final report to USAID/Bolivia within three weeks after leaving the country.

A final report must be submitted to USAID/Bolivia within three weeks after leaving the country.

Five copies of the draft report shall be submitted to USAID/Bolivia. Ten copies of the Executive Summary in English and Spanish shall also be provided; translation will be arranged by the Specialist.

ANNEX B - LIST OF INDIVIDUALS AND BUSINESSES VISITED

Dr. Charles Hash	Director, USAID Office of Agriculture and Rural Development, La Paz
Ms. Virginia Wheaton	Monitoring and Evaluation Specialist, USAID, La Paz
Ms. Carola Uriona	Informational Services, USAID, La Paz
Mr. Harry Peacock	Deputy Coordinator of CORDEP, USAID, Cochabamba
Mr. Jack Rosholt	Chief of Party, DAI/CORDEP, Cochabamba
Mr. Charles Foster	Manager, Agribusiness and Investment Unit, DAI/CORDEP, Cochabamba
Mr. Nelson Bowles	Marketing Advisor, Banana Product Line Manager, DAI/CORDEP, Cochabamba
Mr. Christopher Seeley	Post-harvest Infrastructure and Water Resource Advisor, DAI/CORDEP, Cochabamba
Mr. Gerardo Rodriquez	Post-harvest Coordinator, Palm Heart Product Line Manager, DAI/CORDEP, Cochabamba
Mr. Oscar Sanchez	Investment Promotion Manager, DAI/CORDEP, Cochabamba
Mr. Eduardo Valerde	Monitoring and Evaluation Advisor, DAI/CORDEP, Cochabamba
Dr. Jose M. Gonzales	Private investor in dried banana operation, Cochabamba
Mr. Tex Ford	Former Director of USAID/ARD office, Cochabamba
Mr. Romulo Grageda	Technical Assistant for the San Carlos Banana Association, Chapare
Mr. Gustavo Meriles	Post-harvest Coordinator for Bananas, DAI, Chapare
Mr. Julio Velasquez	Engineer/Sales Manager for SOINAGRO, private agriculture equipment dealership in the Chapare, Chapare

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Mr. Geronimo Fernandez	Pineapple grower in German Bush area, Chapare
Mr. Sergio Cassab	Project Manager for Fondo Nacional de Desarrollo Alternativo (FONDADAC), La Paz
Mr. Enrique Rivas	General Manager, WINNEX, Chapare
Mr. Miguel Zambrana	Co-owner, WINNEX, Chapare
Mr. Claudio Beltran	Post-harvest Technician WINNEX, Chapare
Mr. Leon Montano	President UNABANA, President of San Carlos Banana Association, and banana farmer, Chapare
Mr. Miguel Adrian	Administrator, Villa Fernandez Banana Association, Chapare
Mr. Primitivo Mariachi	Banana Farmer, Member of San Luis Banana Association, Chapare
Mr. Rene Caballero	Director, Plant Production, IBTA, Chapare
Mr. Eduardo Ayala	Head Grain Crop Production, IBTA, Chapare
Mr. Max Rojas	Head, Citrus, Passion Fruit Production, IBTA, Chapare
Mr. Angel Zambrana	Farmer, Head of Chapare Palmito Association, Chapare
Mr. Enrique Jaldin	Citrus Product Line Manager, PDAR, Chapare
Mr. Arturo Quispe	Product Line Manager for Black Pepper, IBTA, Chapare
Mr. Benito Gonzales	VASCAL S.A., Production Superintendent, Chapare
Ms. Janet Echazu	International Voluntary Services (IVS), National Coordinator, Chapare
Mr. Mario Arrazola	IVS Technical Coordinator for Palm Heart, Black Pepper, and Banana, Chapare
Mr. Felimon Cornejo	Tecnologia Agropecuaria Canadiense (TAC), Bolivian government black pepper production manager, Chapare
Mr. Luis Choque	President, Asociacion de Productores de Mariposas (ASPROPI), Chapare
Mr. Jorge Cala	Administrator of ASPROPI and Mariposas farmer, Chapare
Mr. Jose Carrasco	UNAPEGA technician in Ivirgarzama, Chapare
Mr. Ignacio Ajalla	UNAPEGA member, passion fruit farmer, Chapare

Mr. Antonio Vallejos	Product Line Manager for Pasture Grasses, IBTA/Chipiriri station, Chapare
Mr. Alvaro Cruz	General Manager, ECOBANA (Chilean-Ecuadorian banana export company), Cochabamba
Mr. Jorge Gutierrez	Director of Planning, PDAR, Cochabamba
Mr. Victor Olivera	Technical Director, VASCAL S.A. processing plant, Cochabamba
Mr. Javier Beltran	Technical Director, La Naturaleza tea processor, Cochabamba
Mr. Adolfo Mier	General Manager, La Naturaleza, Cochabamba
Dr. Remy Arandia	General Manager, SOINAGRO, Cochabamba
Mr. Demetrio Zurita	General Manager, La Khochalita, dried organic fruit export company, Cochabamba
Mr. Javier Tejada	General Manager, COFRUT and President Cochabamba Chamber of Industry, Cochabamba
Mr. Carlos Sarabia	Executive Director, PDAR, Cochabamba
Mr. Jorje Aldunate	Chapare Coordinator, USAID/Cochabamba and Product Line Manager for Pineapple.
Mr. Rene Marquez	Product Line Manager for Passion Fruit; Sub-Director, Planning Assistance, Cochabamba
Mr. Ramiro Irabien	Director, Planning Assistance, Cochabamba
Mr. Ray Baum	Director, ARD office, USAID, La Paz

ANNEX C - DOCUMENTS CONSULTED

Seeley, C. 1996, Economic, Technical and Operational Analysis of on- Farm Pineapple Transport in the Chapare. DAI.

Seeley, C. 1995. Analysis of Economic, Technical, and Operational Aspects of Transporting Banana Stems in the Chapare. DAI.

Ocampo, L. 1994. Cuantificación de Pérdidas de Banano en Cada Etapa de Manejo. Trabajo de Tesis.

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Joel, C. 1994. Banana Production in the Chapare: Trends in Yields, Output, Prices, Exports, Incomes and Employment. DAI.

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Antezana, O. et. al. 1994. The Alternative Development Program: Assessment and Options. USAID/Bolivia.

USAID. 1995. Chapare. Progress of Economic Development.

Economic Opportunity Sot Access Results Framework.

CORDEP Project Paper

Project Agreement

Original DAI Scope of Work (5/92)

CORDEP brochure(1993)

CORDEP Evaluation Summary (1/94)

New Project Description (5/95)

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Modified CORDEP SOW (7/95)

CORDEP Operating Plan 1996 (sow only)

Project Paper Supplement (2/94)

Virginia Wheaton's background notes (4/96)

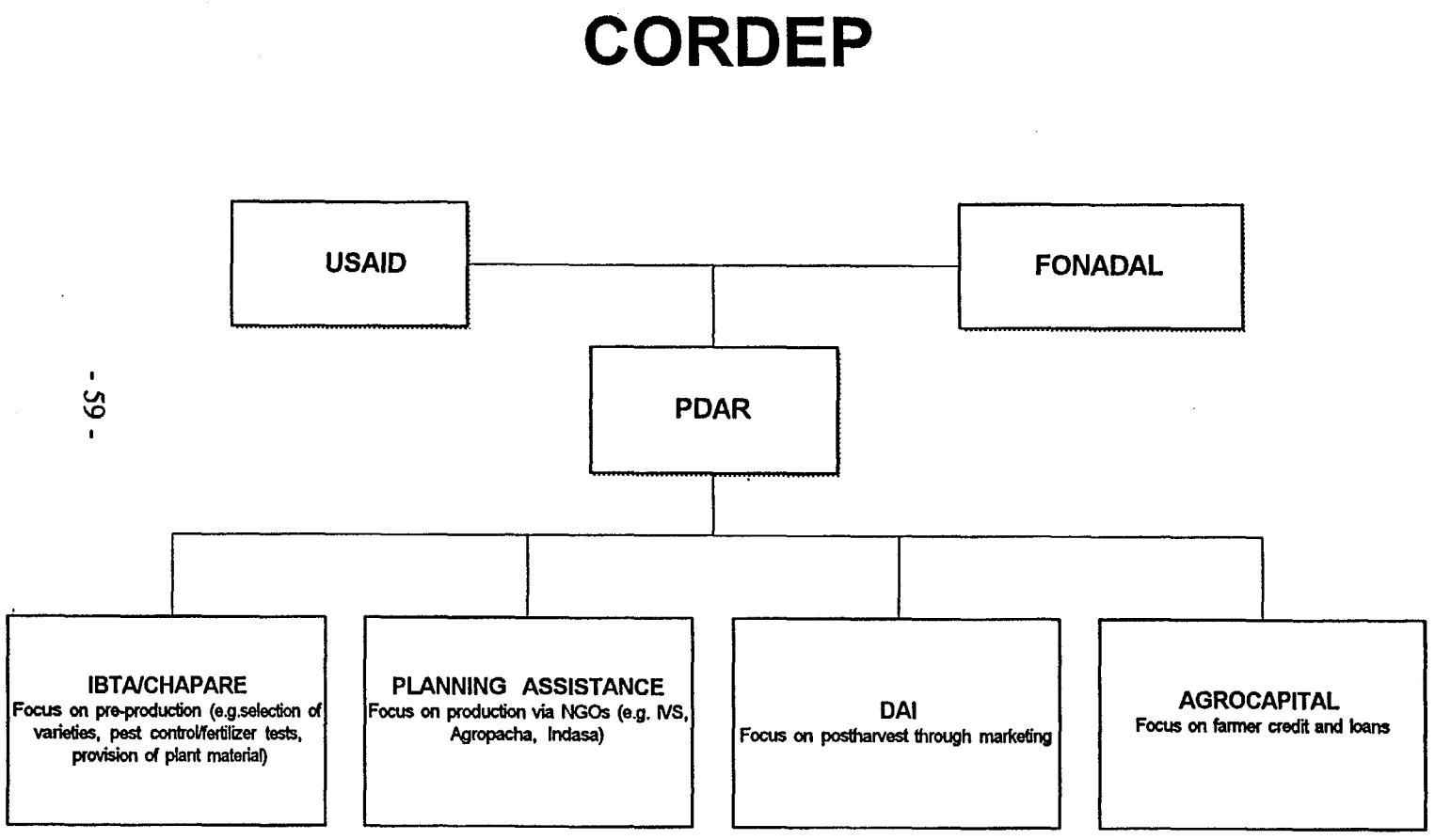
CCI 1993. Pimienta. Oportunidades de exportación para la region andina.

ITC 1993. Passion Fruit. Export opportunities for the Andean region.

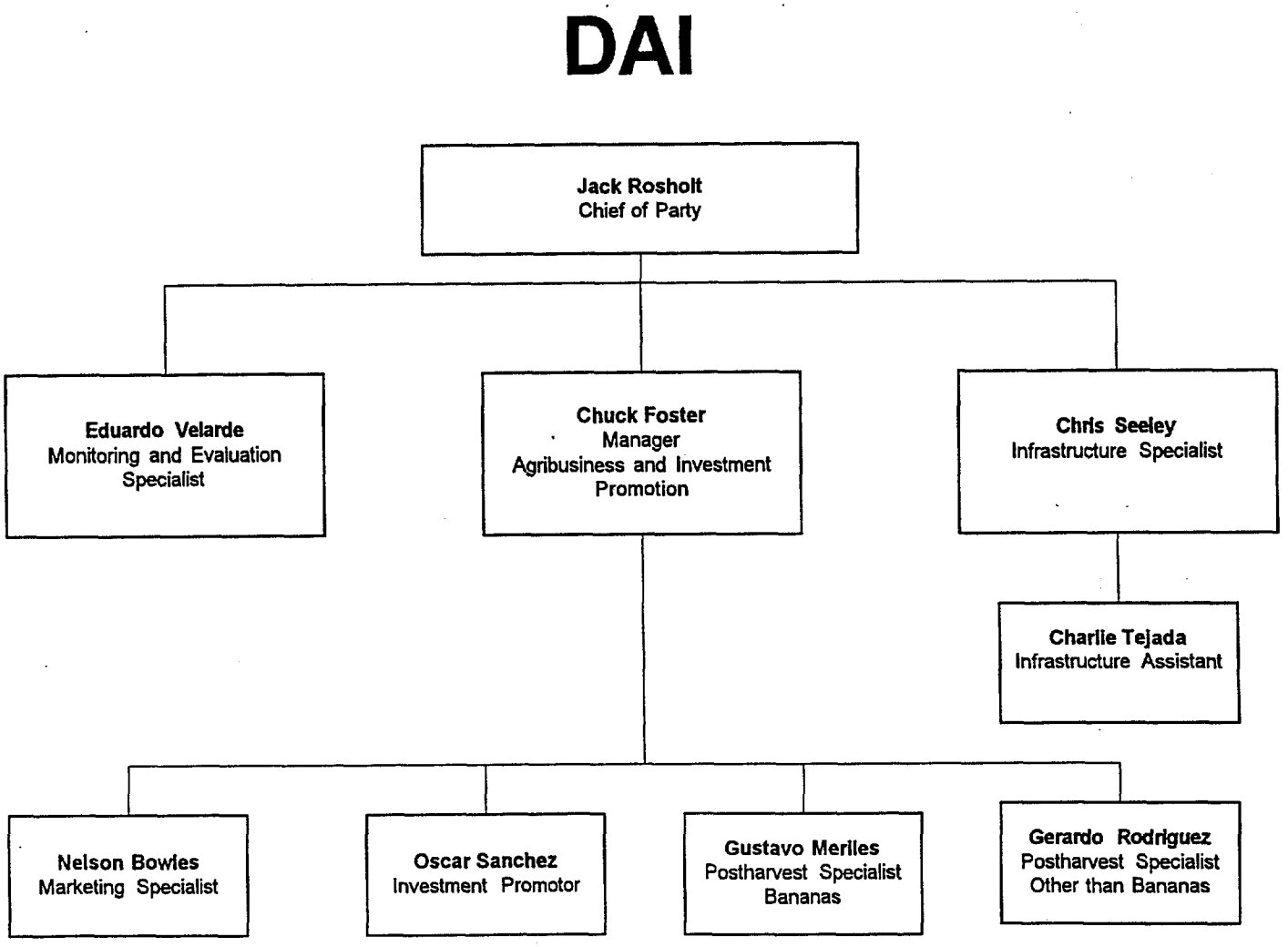
CCI 1993. Corazones de Palmito.

CCI 1993. Banana, Piña, Mango, Palmito, Aguacate, Aceite de Palma.

ANNEX D - CORDEP ORGANIZATIONAL CHART



ANNEX E - DAI ORGANIZATIONAL CHART



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ANNEX F - CHAPARE BANANA PRODUCTION, Post-harvest HANDLING, AND MARKETING

Bananas have been grown in the Chapare region for many years. About 80% of Bolivian banana production comes from the Chapare region. The secondary area of banana production in Bolivia is in the department of La Paz, primarily in the Los Yungas and Alto Beni areas, along with some production near Santa Cruz. About 14,000 hectares are in production in the Chapare. Harvest is year round, although greater volumes are produced in the summer months (December-February) than in the winter season (June-August). The traditional variety, 'Mokotaqui,' comprises about 90% of the hectareage, although there is rapidly expanding hectareage being planted to the improved varieties 'Guayaquil,' 'Grand Naine', and 'Williams,' which all have nearly double the average yield per hectare than 'Mokataqui.' Guayaquil seems to be the best adapted among the export varieties. Several levels of technology of banana production exist in the Chapare. The traditional method used for generations consists of growing the 'Mokotaqui' variety planted at densities of between 425 to 600 plants per hectare. There is no use of fertilizers, pesticides, or bagging of the fruit racemes. Yield is about 20 metric tons per hectare. After the first harvest, the grower retains three to four replacement plants per mother plant and obtains about 2,000 racemes per hectare. Quality and yield decrease with each subsequent harvest. The losses are around 20 percent. Farmers using this traditional method of production have small parcel sizes and limited economic resources. They generally sell their product to truckers who are also wholesale buyers. The bananas are generally sold in local markets.

The improved method of banana cultivation uses more advanced technologies, but still the 'Mokotaqui' variety. Planting density is up to 1,200 plants per hectare. Generally, insecticides, fungicides, and herbicides are used. The racemes are bagged in the field during maturation to improve fruit quality and program weekly harvests. The fruit are heavier and larger and are harvested and handled more carefully. Destination markets may be local or for export.

The most advanced type of banana cultivation uses new improved higher yielding and better quality varieties like 'Guayaquil,' 'Grand Naine' and 'Williams.' Fruit size is larger and yield is around 44 metric tons per hectare. Planting density is between 1,600-1,800 plants per hectare. Export quality yield varies between 1,600-2,600 cartons per hectare, although 3,200 cartons per hectare have been attained. Agricultural chemicals (fertilizers, pesticides) are always used, and the racemes are bagged in the field during development. Most of the fruit produced from this type of cultivation is destined for export to Argentina.

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Banana farmers in the Chapare growing 'Mokotaqui' sell the majority of their production to wholesale buyers, who have their own trucks and buy the chipas from the side of the road. The chipas are generally not washed or graded. The growers employing improved production technologies or using newer varieties generally wash the fruit, followed by grading for export through UNABANA or to truckers who demand higher quality.

Post-harvest loss of traditional chipas averages about 34%, mostly due to crown rot. Post-harvest loss of washed chipas averages about 19%, mostly due to mechanical damage and fruit rot.

Currently, there is one overall banana export organization UNABANA, in the Chapare. Producers who export through UNABANA typically transport their product by truck to mini-packinghouses, where the fruit is graded, washed in chlorinated water, treated with Alum to stop latex flow from the cut area, treated with fungicide (Benlate) to prevent crown rot, and packed in cartons containing 22 kg of fruit. The farmer is responsible for the entire post-harvest handling. UNABANA picks up the cartons in their own trucks from the mini-packinghouse, paying the grower currently $ 1.60 per carton for export quality fruit.

UNABANA sells the bananas to WINNEX, a private Bolivian export company. Product is transported in refrigerated containers at 14°C (about 1,000 cartons per container). It takes about 36 hours to arrive by truck from the Chapare to the Bolivian-Argentine border town of Yacuiba. Due to current Argentine transport laws (soon to be changed), the bananas have to be off-loaded at the border and reloaded into Argentine trucks. They are then transported to Cordoba (an additional 36 hours) or Buenos Aires (an additional 72 hours). Total road distance from the Chapare to Cordoba is about 1,950 km and to Buenos Aires is about 2,650 km. Argentine government regulations (in order to protect their domestic growers in the north) do not permit the sale of Bolivian bananas north of Cordoba (e.g. in Salta, Tucuman, Santiago de Estero, Jujuy, Misiones).

ANNEX G - CHAPARE PINEAPPLE PRODUCTION, Post-harvest HANDLING, AND MARKETING.

Pineapples have been grown in the Chapare for about 35 years. About 61 percent of Bolivia's pineapples come from the Chapare and the remainder mostly from Santa Cruz or the Los Yungas area. Pineapples in the Chapare are cultivated on a diversity of terrain types, ranging from flat and easily accessible, to steep foothills with difficult access.

The vast majority of pineapple producers in the Chapare have 2 hectares or less, and their parcels are rarely located further than 500 meters from a roadside. Only recently has the production technology been significantly improved in the Chapare. The traditional variety 'Pucallpa' comprises the majority (about 75%) of the hectareage. The improved variety 'Smooth Cayenne' was introduced to the region in 1974 and is the other important variety. There are three pineapple production zones in the Chapare. Over 3,400 total hectares are cultivated in pineapples, but only about 600 hectares are used for domestic or export marketing. The remaining production is consumed locally or within Chapare families. Lack of technification of pineapple stock is a real limitation in the Chapare to the development of the export market. Fusarium wilt and internal browning are severe production constraints. There are also a number of other insect (mealybugs, fruit borer) and disease (Penicillium rot) problems affecting pineapples in the Chapare. In addition, inadequate plant nutrition often results in small, non-export size fruit.

There are three ranges in production technology in the Chapare. The least advanced is the traditional system using 'Pucallpa' planted at a density of about 17,500 plants per hectare. Fertilizers or agrichemicals are not used, nor is Ethrel to induce flowering. The first harvest occurs about 18 months after transplanting, and the second harvest 13 months later. Production ranges from 5,500 to 9,000 fruit per hectare or about 2.5 metric tons per hectare. However, there can be up to 75 to 80 percent fruit loss before it reaches the consumer. About 30% of the total harvest is of first class fruit (> 2.2 kg/fruit), 40% second class (1.7-2.2 kg/fruit) and 30% third class fruit (< 1.7 kg/fruit).

The next advanced production technology is the "improved" system, using either 'Pucallpa' or 'Smooth Cayenne.' Improved vegetative material is used for transplants. Planting density is between 17,500-44,000 plants per hectare for 'Pucallpa'and between 30,000-44,000 plants per hectare for 'Smooth Cayenne'. Fertilizers, pesticides, and floral induction are all used. Harvest volume is about 25,000 fruit per hectare for 'Pucallpa' and 35,200 fruit per hectare for 'Smooth Cayenne.' Post-harvest fruit loss is significantly less compared to the traditional system.

The most advanced cultivation system is the "technified" system using both

'Pucallpa' and 'Smooth Cayenne.' Transplant vegetative material is carefully selected. Planting densities range from 35,000-37,000 plants per hectare for Pucallpa, and between 45,000-47,000 plants per hectare for 'Smooth Cayenne.' Fertilizers, pesticides, and Ethrel for flower induction are all used. More carefully monitored and regular use of agrichemicals distinguish between the technified and improved systems. Typical yields from technified parcels are 4.5 metric tons per hectare for 'Pucallpa' and six tons per hectare for 'Smooth Cayenne.' Usually two to three crops are obtained over the three year life cycle of the pineapple. There are currently about 140 hectares of 'Smooth Cayenne' in the Chapare.

ANNEX H - HECTAREAGE, VOLUME, AND VALUE OF THE CORDEP PRIORITIZED CROPS IN THE CHAPARE

	Hectares	Hectares	Production Vol (metric tons)	Production Vol (metric tons)
Crop	**1993**	**1996***	**1993**	**1996***
Banana	10,762	14,190	57,942	177,388
Pineapple	2,608	3,424	3,148	26,707
Palm Heart	227	642	82	123
Passion Fruit	63	186	70	319
Black Pepper	24	21	1	------
Oranges	5,037	12,829	55,860	79,080
Mandarins	2,741	5,275	23,422	28,147
Forages	20,561	22,769	----------	-------

Source: Agricultural Survey in the Tropical Area of the Department of Cochabamba, INE.

*Provisional data.

ANNEX I - EXAMPLES OF DAI INCENTIVE ALLOCATIONS (RECENTLY APPROVED OR PENDING)

Firm: ECOBANA

Amount: $190,000

Project Objectives/Description: Develop a new banana export business in the Chapare, by establishing a banana plantation managed by the company, which would serve as the base of its operations, and also for increasing the production of export-quality bananas among small farmers. The company is expected to serve as a model of farm management efficiencies (e.g. planting methods, cable ways, drainage systems, packing operations) which small Chapare farmers can emulate to raise their incomes derived from their expanded production of better quality bananas.

ECOBANA will receive payments of:

1. $500 per hectare of bananas newly established on the company farm owned and managed by ECOBANA, up to a maximum of $75,000 or 150 hectares;

2. $500 per hectare of bananas that have been technified on existing plantations owned and managed by small Chapare farmers, up to a maximum of $50,000 or 100 hectares; and

3 $650 per hectare of bananas newly establish on farms owned and managed by small Chapare farmers, up to an amount of $65,000 or 100 hectares.

Firm: La Khochalita

Amount: $65,000

Project Objectives/Description: Increase the incomes of small-farm banana growers in the Santa Rosa and Mejillones areas of the Chapare through the development of a sustainable export program of dried organic bananas processed by La Khochalita that is based on a consistent supply or organic quality fruit being produced on small farm parcels certified by La Khochalita. La Khochalita will provide technical assistance to participating banana growers in the areas of Santa Rosa and Mejillones; they will purchase all of their organically grown bananas at guaranteed prices; and will assume full responsibility for the sales of processed banana products.

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La Khochalita will receive payments of:

1. $0.75 for each kilogram of dried organic bananas processed and sold by La Khochalita, up to a maximum of 60,000 kilos, utilizing fruit produced in the Chapare on small farms certified by La Khochalita.

and/or

2. $200 for each hectare of newly technified fields producing organic bananas in the Chapare areas of Santa Rosa and Mejillones, that are established with technical assistance provided by La Khochalita, up to a maximum of 100 hectares.

Firm: WINNEX

Amount: $37,417

Project Objectives/Description: Increase the incomes of small-farm banana growers through the development of a sustainable banana export program that is based on a consistent supply of superior quality fruit being produced on parcels certified by the exporter and/or by the growers' associations. This will be accomplished by having the exporter inspect and certify banana parcels belonging to, and managed by, association members who are providing fruit for export. This certification by the exporter is intended to assure that the fruit meets the necessary quality standards. The exporter will pay the grower an incentive to carry out the activities required to produce quality fruit on a regular weekly basis. Participant associations will be encouraged to gradually take over the inspection certification activity as additional members join the export program, for which they also will receive incentive payments per box from the exporter. WINNEX will receive payments for 22 kilo boxes of bananas that are exported to Argentina under the following conditions:

(i) A minimum of eighty percent (80%) of the boxes in each shipment contain bananas produced by participant farmers on parcels certified by WINNEX.

(ii) A maximum of twenty percent (20%) of the boxes in each shipment contain bananas produced on a plantation managed by WINNEX.

(iii) If the number of boxes from certified parcels in any shipment is less than 80%, the number of boxes from the company plantation will be reduced to obtain the 80/20 ratio in determining the total number of boxes for payment purposes.

(iv) Payments will not be made for boxes with bananas from other sources.

Payments, totaling $37,417 will be made starting with $0.83 per box for the first 10,000 boxes exported. The remaining amounts per box exported under this Agreement will be based on the accumulative number of boxes up to a total of 136,000 boxes.

WINNEX also received assistance from April 1995 to April 1996 of approximately $2.00 per box of bananas exported. A number of conditions were placed upon the incentives, however. WINNEX needed to provide technical support to participating banana farmers, pay the farmers cash at farm gate, purchase its own boxes and packing materials, and handle all transportation. In addition, WINNEX had to establish permanent roots in the Chapare, by establishing a company farm or other installation. A total of $190,000 was allocated to WINNEX for this endeavor.

Several smaller incentive payments were allocated to initial banana exporters in late 1993 to September 1994 to establish TAVALCO as an exporter to Argentina ($6,000). The business failed since transportation was by train and lack of refrigeration resulted in inferior quality product upon arrival in the destination markets. In addition, INBEAL was given an incentive ($10,000) to produce bananas and yuca and export the flour to France. The flour line was discontinued.

ANNEX J - AGRIBUSINESS INVESTMENTS IN THE CHAPARE

Existing or Initiating Operations (only includes DAI-prioritized crop related investments; mint, tea, or vanilla investments not included)

Company	Investment($)	Items/Product
VASCAL S.A.	350,000	Orange juice, palm heart, pineapple, passion fruit
NIKKEI S.R.L.	350,000	Palm heart
INDATROP	250,000	Palm Heart
AGRICANTO	60,000	Palm Heart, Pineapple, Papaya
SISAM	180,000	Wood boxes, Dolomite
COFRUT	300,000	Pineapple, Passion Fruit, Papaya
NATURALEZA	40,000	Dehydrated fruit, Tea
PERROGON	500,000	Banana, Plantain
EMNACAN	80,000	Phosphate, Dolomite
WINNEX	650,000	Banana, Pineapple
SIETE HERMANOS	75,000	Banana
LA KHOCHALITA	50,000	Dehydrated Banana
BANECO	350,000	Banana
SOINAGRO	60,000	Machinary distributor and repair
TOTAL	3,995,00	

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Grower Associations or Small Producers

(only includes CORDEP-assisted associations/growers; not total Chapare industry)

3	Grower Associations	610,000	Pineapple
10	Grower Associations	500,000	Palm Heart
6	Grower Associations	545,000	Banana
	Various Small Growers	42,000	Black Pepper
	Various Small Growers	420,000	Passion Fruit
	TOTAL	**2,117,000**	

In Planning Stage

BANCO DE LA UNION	500,000	Bank
EMCOPAIVZ	40,000	Passion Fruit
ODECO G.M.B.H.	8,600,000	Fruit juice Concentrates
PARQUE INDUSTRIAL	3,000,000	Business Park
FABE	500,000	Cans
AROMA ORGANICA AGROIND	50,000	Dehydrated Organic Banana
ERICK PINEDO	30,000	Dried Banana
CARLOS CARVAJAL	500,000	Pineapple Pulp
CARLOS CARVAJAL	1,000,000	Banana Puree, Palm Heart
GEORGE VELHO	250,000	Palm Heart, Passion Fruit
RENATO LEIGHE-CAO	600,000	Palm Heart, Banana
WHIPALA	200,000	Banana Puree
TOTAL	**$11,870,000**	

ANNEX K - SUGGESTED ADDITIONAL CROPS FOR THE CHAPARE

The following crops are suggested for consideration as additional crops to be included in the future development of the Chapare. Clearly, the efforts of the existing DAI marketing component should remain focused on bananas, pineapple, palm heart, and black pepper until the end of the project. Diversifying into additional crops at this stage in the remaining contract would be counter productive and spread existing resources too thin. However, if USAID obtains funding for a follow-on CORDEP multi-year agriculture development project in the Chapare, the following crops seem to have excellent potential in the region.

They should be considered, but it should be clear that the above mentioned crops (banana, pineapple, palm heart, black pepper) should still be the most prioritized crops.

Plantain:

- for a snack food (chips)
- fits in perfectly with current banana associations/infrastructure
- adapted to same zones as banana
- Cochabamba, La Paz have highest demand

Exotic Bananas:

- burro, finger, red
- dried, chips

Papaya

- smaller varieties only ('Solo,' 'Sunrise'). They transport better, and are sweeter.

Potential markets:

- juice concentrate
- fresh market
- dried fruit
- papain (later from green fruit used as meat tenderizer, beer flocculent).

Currently production area is very disperse, and there is a lack of concentrated production area.

Crops of lesser consideration:

Yuca

- currently very low yield
- Santa Cruz market potential is strong (limited in Cochabamba)
- fresh market should be emphasized
- don't repeat UN. solar drying project
- animal feed (with protein supplement)
- flour

Cashew

Rubber

- takes six to seven years to begin production

Tea

ANNEX L - ITINERARY

Monday Sept. 2

a.m.	Reviewed secondary documents
2:00 p.m.	Drove to Baton Rouge airport
3:40 p.m.	Departed for Dallas on American Eagle# 5704
7:20 p.m	Departed for Miami on American # 1802
11:50 p.m.	Departed for La Paz on American # 923

Tuesday Sept. 3

6:15 a.m.	Arrived in La Paz
7:20 a.m.	Checked in to Plaza Hotel
8:00 a.m.- and 6:00 p.m.	Contacted USAID offices in La Paz and Cochabamba to schedule meetings plan itinerary for next few days. Made hotel reservations, rescheduled airline departures. Reviewed evaluation reports of other USAID non-traditional agriculture export projects.

Wednesday Sept. 4

8:00 a.m.-	Continued to review secondary documents.
1:30 p.m.	Attended morning security briefing at USAID offices with Ms. Carola Uriona B.
	Met in the afternoon with Dr. Charles Hash, Director of the Office of Agriculture and Rural Development to discuss DAI-CORDEP evaluation procedures and strategies.
	Visited with Virginia Wheaton, Monitoring and Evaluation Specialist, to clarify evaluation report expectations.
	Visited various supermarkets (Zatt, Gava, Ketal) to see quality and diversity of produce offerings.

Thursday, Sept. 5

7:00 a.m.	Departed La Paz for Cochabamba on Lloyd Aereo #821
7:30 a.m.	Arrived in Cochabamba.
9:30 a.m.	Met with Harry Peacock, USAID Deputy Coordinator of CORDEP. Discussed evaluation and logistics.
2:00 p.m.	Met Jack Rosholt, Chief of Party for DAI's component of CORDEP. Discussed the project and schedule for the next several weeks. Obtained detailed information on CORDEP.
5:50 p.m.	Interviewed Charles Foster, manager of CORDEP's Agribusiness and Investment Unit.

Friday Sept, 6

8:00 a.m.	Met Nelson Bowles, Marketing Specialist and Banana Product Line Manager for DAI/CORDEP. Discussed marketing efforts in banana, pineapple and palm hearts.
to 6:30 p.m.	Met Chris Seeley, Post-harvest Infrastructure and Water Resource Advisor for DAI/CORDEP. Continued discussion with Jack Rosholt.

Saturday , Sept. 7

8:00 a.m.	Reviewed DAI/CORDEP documents.
10:00 a.m.	Continued interview with Jack Rosholt and Charles Foster.
1: 00 p.m.- 5: 00 p.m.	Continued interview with Chris Seeley.

Sunday, Sept. 8

8:00 a.m.- 5:30 p.m.	Reviewed DAI/CORDEP documents.

Monday, Sept. 9

8:00 a.m.	Met with Jack Rosholt. Attended DAI staff meeting.
9:15 a.m.	Interviewed Gerardo Rodriguez, Post-harvest Coordinator and Palm Heart Product Line Manager, DAI/CORDEP.
12:15 p.m.	Interviewed Oscar Sánchez, Investment Promotion Manager, DAI.
2:15 p.m.	Met Dr. José María Gonzáles, potential investor in dried banana operation.

3:00 p.m.	Interviewed Mr. Eduardo Valerde, Monitoring and Evaluation Advisor, DAI.
3:45 p.m.	Met with Harry Peacock, USAID. Discussed report outline; oral presentation.
5:45 p.m.	Continued interview with Oscar Sánchez.

Tuesday, Sept.10

7:00 a.m.	Left with Charles Foster to the Chapare. We were joined by Tex Ford, former Director of USAID-ARD office in Cochabamba. Discussed nontraditional agriculture in the Chapare.
10:45 a.m.	Traveled to San Carlos banana production zone, toured packingshed, observed banana post-harvest handling and packing for export. Discussed process with Romulo Grageda, technical assistant of the San Carlos banana association and with Gustavo Meriles, post-harvest banana coordinator for DAI.
2:00 p.m.	Traveled to Chimore. Toured WINNEX packinghouse and pineapple nursery.
2:45 p.m.	Visited newly established agriculture equipment dealership SOINAGRO. Met Julio Velásquez, company engineer and sales manager.
3:30 p.m.	Traveled to Entre Ríos. Toured technified pineapple farm and packingshed. Met Gerónimo Fernández, farmer. Discussed pineapple situation.
4:45 p.m.	Traveled to Shinaota. Toured pineapple packing center in Germán Bush.
6:00 p.m.	Returned to Villa Tunari.

Wednesday, Sept. 11

8:00 a.m.	Toured warehouse and offices of WINNEX. Observed banana packaging. Met Sergio Cassab Ontiveros, Project Manager for FONADAL in La Paz. Discussed DAI project evaluation. Met Ing. Enrique Rivas, General Manager of WINNEX, co-owner Miguel Zambrana, and Banana Post-harvest Director Claudio Beltrán.
10:30 a.m.	Visited with León Montaño, President of UNABANA, president of San Carlos Banana Association, and banana farmer. Toured his farm. Observed installation of DAI cable system for banana transport out of the fields.
2:00 p.m.	Visited Villa Fernández banana packingshed. Met administrator Miguel Adrián.
2:30 p.m.	Visited Villa Fernández, banana nursery.

3:00 p.m. Visited San Luis banana packinghouse and warehouses. Met Primitivo Mariachi, member of Board of Directors and farmer.

4:15 p.m. Visited IBTA/Chapare, La Jota Experiment Station. Met and discussed station operations with René Caballero, Director of Plant Production. Toured tissue culture facilities for plant propagation and nursery and fields. Met Eduardo Ayala, head of grain crop propagation. Met Alex Rojas, head of citrus and passion fruit propagation.

6:15 p.m. Stopped to meet Angel Zambrana, head of Palm Heart Association for the Chapare.

8:00 p.m. Interviewed Enrique Jaldín of PDAR in his office. He is also Citrus Product Line Manager for CORDEP.

Thursday Sept. 12

7:00 a.m. Met Palm Heart Association President Angel Zambrana. Toured his 6 hectare palm heart fields. Discussed DAI/CORDEP.

8:00 a.m. Interviewed Arturo Quispe, Product Line Manager for Black Pepper at IBTA/ Chapare station. Toured propagation plots.

9:00 a.m. Visited VASCAL processing plant in the Chapare. Interviewed production supervisor Benito Gonzáles. Observed palm heart packaging and tropical fruit jelly.

10:15 a.m. Visited office of International Voluntary Services (I.V.A.)in Chimoré. Interviewed Janet Echazú, National Coordinator and Mario Arrázola, Manager of Palm Heart, Black Pepper and Banana. Toured research plots at Tecnologia Agropecuaria Canadiense (T.A.C.) station nearby. Observed black pepper trials. Interviewed Filemón Cornejo, Production Manager. Observed black pepper processing.

11:15 a.m. Visited Mariposas pineapple production area and El Piñal packinghouse in Carrasco. Interviewed several pineapple growers and Mariposas Pineapple Association president (ASPROPI) Luis Choque and ASPROPI administrator Jorge Cala.

1:00 p.m. Visited UNAPEGA association offices in Ivirgarzama. Interviewed Jose Carrasco, Technician Manager, and Ignacio Ajalla, member of UNAPEGA and passion fruit farmer.

Visited passion fruit farm. Discussed pasture forage program of UNAPEGA.

7: 00 p.m. Returned to Cochabamba.

Friday, Sept. 13

8:00 a.m.	Interviewed Alvaro Cruz, General Manager of ECOBANA, a Chilean-Ecuadorian group establishing a banana plantation and export business in the Chapare.
9:00 a.m.	Interviewed Jorge Gutiérrez, Director of Planning of PDAR.
10:00 a.m.	Interviewed Victor Olivera, Technical Director of VASCAL S.A. fruit processing company.
11:00 a.m.	Interviewed Javier Beltrán, Technical Director, and Adolfo Mier, General Manager, La Naturaleza. They are a processor of dried fruit and fruit flavored teas.
12:30 p.m.	Interviewed Antonio Vallejos, Product Line Manager for Forages, IBTA/Chipiriri.
2:30 p.m.	Interviewed Dr. Remy Arandia, General Manager SOINAGRO. Discussed their farm equipment distributorship and other Chapare related investments.
3:45 p.m.	Interviewed Demetrio Zurita, General Manager of La Khochalita Cooperativa. Toured their organic banana dehydrating/export facilities.
5:00 p.m.	Interviewed Javier Tejada, General Manager of COFRUT. Discussed their banana and pineapple growing projects in the Chapare.

Saturday, Sept. 14

7:00 a.m.	Visited Los Campesinos Alalay Wholesale Market in Cochabamba. Observed product diversity, quality, packaging, transport.
9:30 a.m.	Visited several additional downtown wholesale/retail produce markets. Obtained price information, interviewed vendors.
11:00 a.m.	Reviewed DAI documents. Summarized to 7:00 p.m. interview comments.

Sunday, Sept. 15

8:00 a.m.	Continued review of DAI background documents.
2:00 p.m.	Discussed banana export projects in the Chapare with Charles Foster and Alvaro Cruz.
4:00 p.m.	Discussed DAI projects and incentive programs with Jack Rosholt.

Monday, Sept. 16

8:00 a.m.	Met with Jack Rosholt in DAI office.
8:30 a.m.	Went to USAID office to confirm date for oral presentation. Discussed evaluation progress with Harry Peacock.

10:00 a.m.	Met with Carlos Sarabia, Executive Director of PDAR.
11:30 a.m.	Interviewed Jorge Aldunate, Product Line Manager for Pineapple, USAID/CORDEP.
2:30 p.m.	Returned to DAI offices to continue interviews with Oscar Sánchez and Jack Rosholt.
4:00 p.m.-	Reviewed DAI documents.
8:30 p.m.	

Tuesday, Sept.17

8:00 a.m.	Continued review of DAI documents.
3:00 p.m.	Interviewed Rene Marquez, Sub-Director of Planning Assistance and Passion Fruit Product Line Manager/CORDEP. Visited with Ramiro Irabien, Director, Planning Assistance.
4:45 p.m.	Returned to DAI office to discuss marketing issues with Charles Foster.

Wednesday, Sept. 18

8:30 a.m.	Oral presentation of evaluation to USAID, CORDEP, and DAI staff.
2:00 p.m.	Continued interviews with Charles Foster,
to 6:30 p.m.	Chris Seeley, Eduardo Valerde.

Thursday, Sept. 19

8:00 a.m.	Reviewed DAI documents.
3:00 a.m.	Went to DAI office to meet with Charles Foster, Jack Rosholt, Chris Seeley, Oscar Sanchez.

Friday, Sept. 20

8:00 a.m.	Reviewed DAI documents
10:30 a.m.	Visited VASCAL processing plant in Cochabamba. Hosted by Aida Mancilla, Manager, and Nelson Ledezma, plant supervisor.
2:00 p.m.	Met with Jack Rosholt, Eduardo Valerde
to 6:00 p.m.	Chris Seeley. Met with Harry Peacock

Saturday Sept. 21	
8:00 a.m.-	Continued work on evaluation report.
5:00 p.m.	
7:30 p.m.	Flew to Santa Cruz on Lloyd Aero Boliviano #822.
Sunday, Sept. 22	
8:45 a.m.	Departed Santa Cruz on American Airlines to Miami, Dallas, and Baton Rouge.
11:00 p.m.	Arrived Baton Rouge.
Monday, Sept. 23-	**Final draft preparation**
Friday, Oct. 4	
6:00 p.m.	