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INTERNATIONAL CONSULTING DIVISION

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SECTION I
INTRODUCTION

The purpose of this Report is to provide an official record of progress made in various components of the Agriculture Sector II Project where Chemonics' advisers have provided technical assistance. At the outset of the Report, it should be noted that "progress" refers not only to the work of the advisers. Rather, the definition of goals, and advancement toward them, involve collaborative efforts of many persons and institutions working in conjunction with advisers. This is especially important to bear in mind with regard to the seed improvement component. Here Project efforts have stimulated the growth of a multifaceted, emerging seed industry in which many public and private institutions cooperate in seed production, certification and processing.

This Progress Report is the ninth since the 1979 signing of the technical assistance Contract between the Ministry of Rural Affairs and Agriculture and Chemonics (GOB/AID-511-059-008-HCC). It covers the period from January through June of 1983. Normally, Progress reports are presented within 60 days after the end of the report period. But in July of this year MACA requested a high priority study of Chemonics and, as a result, suggested that the Progress Report should be postponed. USAID Project Manager, Mr. John T. Rifenbark, approved this action.

In March of 1983, Amendment N° 11 was signed with MACA extending the Contract to December, 1984. This extension was made in anticipation of full reactivation of the Project, and for the first time since 1981, allowed for planning and programming of Project activities and technical services for a reasonable period of time. Amendment 11 added two positions in seed technology, included the possibility for a position with CODETAR in land clearing methods and/or heavy equipment maintenance, reduced the machinery maintenance position from 18 to 17 work-months, and increased short-term technical assistance from 45 to 90 work-months.

On the next page are listed the names of advisers who provided services under the Contract during the semester:

Technical Area	Long-Term Advisers	Short-Term Advisers
Seed Improvement	Adriel E. Garay Juan A. Landívar	
Machinery Maintenance	Terrence J. McCarthy	
Soil Conservation	E. Don Hansen	
Cotton Production		Víctor Gonzáles
Constructions		Eddy Decormis C.
Sector Planning	Preston S. Pattie	

Juan A. Landívar began work on April 13th in the newly-defined position as Seed Technologist in the Gran Chaco and Santa Cruz. At this point, Dr. Adriel E. Garay took on a new responsibility as leader in the Seed Improvement activity.

Landívar began his work in Bolivia as early as possible to help with the soybean seed harvest in the Chaco, but by mutual agreement retained the right to take about a month of leave-without-pay during the winter to return to Mississippi. Recruitment was completed for the third seed technology position in May. The curriculum of Dr. Edgar R. Cabrera was presented to MACA and USAID, and received approval in June. Dr. Cabrera was scheduled to arrive in Bolivia on August.

As mentioned above, the machinery maintenance position was curtailed; Terrence McCarthy left Bolivia in February.

Among short-term advisers, Ing. Víctor Gonzáles was re-contracted from April 1 to July 30 to complete supervision of harvesting and marketing of cotton from demonstration parcels and training of local technicians and farmers in the Chaco. Also at the request of MACA, recruitment was done locally for a civil engineer to help prepare designs and supervise constructions financed by the Project. Eng. Eddy Decormis was selected by MACA and Chemonics, and began work the first of June, 1983.

A brief visit by the Project supervisor from Chemonics/Washington was made in March for the purpose of reaching agreements on the Contract extension

to December 1984. Mrs. Candace Conrad provided assistance for five work-days for this purpose. Additionally, it is worth noting that a student from the Catholic University of Bolivia worked in Chemonics' La Paz offices during the entire semester providing services in the area of information systems. Though this student, Miguel Ibáñez, was not an employee of Chemonics during the semester, he did receive technical guidance and administrative support.

On May 26, 1983 the Agriculture Sector II Project was officially re-activated in Project Implementation Letter number 79. After having operated for nearly three years with reduced financial support, many implementational problems need to be overcome during the next semester before activities under the Project can operate more smoothly. These problems are related to planning for activities such as procurements, training and constructions in at least five different technical fields. Further, the seed component covers five distinct geographical regions.

As mentioned in the previous progress report, nearly all Chemonics efforts in Bolivia are now related to field activities, as opposed to institutional strengthening at the central level. The only effort oriented toward institutions at the central government level are those related to information systems mentioned above. However, even these efforts are highly user-oriented and are implemented in conjunction with both public and private institutions. This change in emphasis over the last year is considered by both MACA and Chemonics to be very positive. Please refer the appendices for detailed information on inputs of advisory time by Project activity.

The organization of the present document comprises four sections following the introduction. The next two sections review progress in seed improvement in Santa Cruz and in the Gran Chaco, respectively. Section IV covers the final phase of our work in machinery maintenance. Section V follows with progress in soil conservation in the Gran Chaco, and Section VI reviews work in cotton production. The initial month of Chemonics involvement with constructions is reviewed in Section VII. Section VIII covers work in information

systems. Section IX presents a summary of efforts made in coordination and administration. The last section contains an overall summary of conclusions and recommendations plus objectives for the following semester.

SECTION II

SEED IMPROVEMENT IN SANTA CRUZ

A. Background and Objectives

This semester began with an improved institutional organization which allowed more rapid progress than was previously possible. A Foundation Seed Unit was established in CIAT; MACA developed the Certification Service in cooperation with local institutions; and seed processing was placed under independent local management of CIAT. Ambitious goals were set for production of seed, including rice, soybeans, corn, wheat and cotton. Specific objectives for the program during the semester were:

- * Conduct special training courses for executives and authorities in the planning and development of seed programs.
- * Carry out on-the-job training of MACA technicians in certification of wheat seed.
- * Prepare and conduct short-courses for farmers.
- * Help CIAT reevaluate the costs of seed conditioning in Warnes and establish a new pricing system.
- * Train new personnel to be employed in the Seed Certification Service in Santa Cruz.
- * Advise CIAT in quality control of stored seed, after the completion of storage unit in Warnes.
- * Recruitment and employment of a second seed adviser to work part-time in Santa Cruz.
- * Orient producer associations in planning and execution of seed programs in soybeans, corn, wheat, rice and cotton.

During the semester, one more important objective was added to the above:

- * Advise private firms and individuals on the establishment of seed conditioning plants.

B. Progress

With the signing of Amendment number 11 extending the Chemonics contract to December 1984, two immediate modifications were made in terms of technical assistance in the seed component of the Project. 1) Dr. Garay, seed adviser in Santa Cruz, took on new responsibilities as leader of the seed program, and also filled in during June as acting Director. 2) A second adviser in seed improvement was recruited and hired after receiving approval from MACA and USAID. Juan Landivar began work in April, and will occupy part of his time in development of a cotton seed program in Santa Cruz. However, during the semester covered by this report, Mr. Landivar was occupied full time in the seed program in the Gran Chaco. (See the next Section).

This Section provides details regarding seed improvement activities in Santa Cruz, including: foundation seed, certification, conditioning, production and marketing, and training. With the employment of a civil engineer, construction is now considered to be a separate activity of our firm. Therefore, work in construction associated with the seed component of the Project is reviewed in Section VII.

1. Foundation Seed

Production of foundation seed is an activity that falls under the responsibility of the newly formed Basic Seed Unit of CIAT. This activity has required a concentrated effort, due to the quantity and quality of foundation seed in demand in the region.

Last year the Unit obtained financing from the PL 480 Program for the production of rice, corn and soybeans. By the end of the 1982/83 crop year, 60 metric tons of foundation soybean seed had been produced. This was sold to producers of registered seed for multiplication in the winter of 1983. About 20 tons of foundation rice seed had been harvested and placed in air conditioned storage. At the end of the semester, 20 tons of corn seed were being harvested (Table 1). Both rice and corn seed will be sold for multiplication in the crop year 1983/84.

Table 1

QUANTITY OF PRODUCED FOUNDATION SEED,1982/83

Crop		Quantity in MT
Soybean	UFV-1, Bossier, Cristalina	60 ^a
Corn	Swan, Cubano	20
Rice	CICA-8, IR-1529, Bluebelle and Bluebonnet	20

a - Has been distributed for winter sowing in 1983.

2. Seed Certification

The Regional Seed Certification Service began this semester with sufficient number of technical personnel, coupled with support of the Regional Seed Board and of the National Seed Department of MACA. Some limiting factors, however, were still present: most personnel were new in this activity; vehicles appropriate for field work were not available; office space and support personnel were lacking; climatic conditions during the semester were adverse, affecting harvest of summer crop and planting of winter soybean seed. Despite the limitations, the Certification Service carried out its tasks in an orderly, systematic manner.

Table 2 provides information related to the quality and quantities of seed produced under the supervision of Certification in Santa Cruz. Average germination percentages and amounts of seed by category shown in Table 2 demonstrate the levels achieved by the program up to the present time. It should also be mentioned that high levels of physical and genetic purity are being attained. The results shown are comparable with those attained in other countries where climatic and technological conditions are similar.

Due to the catalytic effect of the Certification Service in terms of improving seed quality, increased acceptance of the program among farmers is

Table 2

GERMINATION PERCENTAGE OF SEED CONTROLLED BY CERTIFICATION,FIRST SEMESTER 1983

Crop	Category	Producer	Plots	Germination Average in Percentages
Soybean	Foundation	CIAT	8 plots	85,9 ^a
Rice	Foundation	CIAT	13 plots	82,9 ^b
Soybean	Registered	OKINAWA Seeds	4 plots	88,5
Soybean	Registered	VIGOROSA Seeds	18 plots	85,2
Soybean	Certified-Inspected	VIGOROSA Seeds	9 plots	82,8
Corn	Inspected	GEMINIS Seeds	21 plots	88,0
Rice	Inspected	---	11 plots	80,6
Rice	Inspected	F.A.O.	6 plots	79,4
Wheat	Inspected	WHEAT Program	28 plots	86,2
Soybean	Inspected	BRASIL ^c	8 plots	90,8

a - A plot of 68% germination was approved only for CIAT's own use.

b - Some varieties such as CICA-8 still contained dormancy, due to which germination will increase in warehouse.

c - Seed of IAC-8 imported for winter sowing.

evident. The winter season in 1983 and the crop year 1983/84 will be strategic in terms of fomenting this acceptance among both seed producers and also among farmers who purchase and use the seed. It is expected that, with this support from various levels, the goal of autofinancing of the Certification Service can be attained.

As stated above, in this stage of development of the program, Certification has sufficient numbers of technical personnel who are new to this activity. Therefore, the most important activity of the adviser is that of training and technical orientation for the purpose of assuring continuity in the program for the future.

3. Seed Conditioning

The Seed Plant in Warnes has faced serious problems during this semester due to repeated flooding. The plant was completely paralyzed during all of March and was frequently inoperable during April, May and June due to inaccessibility and short circuiting in electrical installations. The causes of the flooding were heavy rains in the area, change in course of the River Pirai, and the poor location of the Seed Plant in an area prone to flooding.

Tables 3 and 4 show amounts of seed processed in the Warnes Plant during the semester. Though these amounts are substantial, they represent only

Table 3

QUANTITY OF SEED CONDITIONED IN WARNES

Crop	Variety	MT
Rice	Bluebelle	975
	Bluebonnet	62
	CICA - 8	726
	IR-1529	547
Soybean	UFV-1	3,555
	Bossier	1,385
	Cristalina	1,321
Corn	Swan Saavedra	2,307
Wheat	Saguayo	2,383
	Quimori	3,364
Total		16,625



Condition of the Warnes Seed Plant after flooding. Note water mark on building above floor level.



Germination tests in sand boxes in greenhouse. This is part of Certification Laboratories provided by MACA and CIAT.

half the quantities previously projected. Because of the above limitations, and the fact that reception of seed occurred sporadically late in the season, use of the Plant was very intense. Fortunately, all corn seed processed this year was dried in driers installed by private seed growers before being shipped to the Plant.

Table 4

MOVEMENT AND DECREASES OF SEED IN THE PLANT OF WARNES

C r o p	Reception	After Drying	Quantities in QQ		Loss/Classif. %
			Loss by Humidity %	After Classification qq	
Soybean	8,662	8,248	4.8	6,261	24
Corn	2,989	2,932	2.0	2,307	11
Rice	3,302	2,724	17.5	2,345	14
Wheat	6,726	6,597	2.0	5,747	13
Totals	21,679	20,501		16,660	

Construction of the acclimatized storage unit suffered delays of about six months due to difficulties encountered by MACA in the preparation of detailed plans and programming of budget. This situation caused serious problems related to holding seed from summer harvest over to the next planting in November of this year.

4. Production and Marketing of Seeds

Through field visits on routine inspections and also through continual meetings, advice and orientation has been provided to seed growers and private companies. This coordination led to the formulation of a strategy for the harvest and marketing of soybean seed which included conditioning and storage of about 1000 tons of seed in Cochabamba. Unfortunately, this strategy could not be carried out because the heavy rains cut the road between Santa Cruz and Cochabamba just at the moment when harvest was to begin. As a result, the quantity of material harvested for seed was reduced to the capacity of the

Warnes Plant and the needs for seed to plant in winter. Again, because of the lack of acclimatized storage in Santa Cruz, soybean seed cannot be held from summer harvest to next summer planting.

However, this year demonstrated that the seed grower in Santa Cruz is gaining experience, and is capable of producing high quality seed, as shown in the germination percentages earlier. As a result of this experience, more emphasis should be placed in the future on training of seed growers and on installation of seed driers and storage. Installation of driers will be made a requisite in the future for growers with more than 50 hectares in summer or more than 100 hectares in winter.

Up to the 30th of June, the quantities of seed produced were: 247 tons of soybeans, 95 tons of corn, 87 tons of rice, and 264 tons of wheat. This reaches a total of 693 metric tons. To this can be added 60 tons of corn and about 200 tons of rice which were in the process of being harvested at the end of the semester covered by this report.

Soybean seed produced in summer was utilized to carry out the winter seed program. Planting of 1000 hectares for this program should be done in May and June. Winter seed production implies risks related to low temperatures, and excess rainfall. Because of late rains during May and June, most fields were not planted until July. This implies that harvest will be extended into October when chances of rainfall and higher relative humidity are probable.

Table 5

HECTARES ENTERED IN THE CAMPAIGN OF WINTER 1983

P r o d u c e r s	V A R I E T I E S				Total
	UFV-1	Bossier	Cristalina	IAC	
CAICO	184	----	172	41.5	397.5
Carlos Rojas	10.5	----	---	23.8	34.3
Geminis	90	----	---	140	230
Agropecuaria del Oriente	41	48	8	---	97
SERVAGRO	50	----	---	---	50
VIGOROSA	60	----	---	25	85
Pedro Balcázar	30	----	---	---	30
Arturo León	15	----	----	30	45
Total	480.5	48	180	260.3	968.8

5. Training

In-service training of personnel in the Certification Service was carried out sporadically throughout the semester. More formal training sessions are planned for July of this year. A course was presented to seed growers of the Cooperative CAICO.

Participation of a technician from Santa Cruz and one from the Gran Chaco was recommended for a Course given in CIAT/Colombia on Seed Technology. Both persons had attended the course and returned to their jobs by the end of the semester.

C. Summary and Suggestions

During the semester, the program has shown success in production of high quality foundation seed and in the systematic quality control of registered and certified seeds. All objectives for the period were met except where severe weather conditions intervened. A great deal will depend on favorable climate in winter to prevent the need for large importations of

soybean seed in October and November. Also, a more vigorous program in cotton seed production will be needed next year to substitute importations of seed.

Additional progress in this technical area seems assured. Still, a series of specific actions can be outlined which should be taken by public and private institutions over the remainder of this year.

In foundation seed production, we recommend the following:

- * Installation of a seed processing plant in Saavedra using funds of the T-059 Project and/or the PL 480 Program.
- * Addition of one technician in the Foundation Seed Unit.
- * Participation of the head of the Unit in a course on foundation seed production to be given in CIAT/Colombia in November.
- * Production of rice foundation seed in areas free of rogelia.
- * Preparation of descriptions of varieties for use in varietal maintenance and multiplication.

With regard to the Certification Service, additional laboratory equipment will be required for the following semester. Appropriate vehicles must also be acquired.

Because of the great demand that will be placed on the Warnes Seed Plant during the winter of this year and the harvest of 1984, we recommend the following improvement to the Plant, in order of priority:

- * Access roads and protective roof over heater/fan.
- * Protective dike and levelling of lot.
- * Completion of equipment and facilities for reception of seed.
- * Covered areas for reception and delivery.

Chemonics also recommends that MACA and USAID place the same priority on private conditioning plants and facilities, such as driers, that is placed on those within the public sector. It is hoped that funds from other lines of credit, such as PL 480 and refinancing credit channeled through the Central Bank can be utilized for this purpose. Chemonics is willing to help with the needed feasibility studies, and hopes that MACA agrees with this use of technical assistance.

SECTION III

SEED IMPROVEMENT, GRAN CHACO

A. Background and Objectives

At the beginning of the semester, the only clearly defined objectives for Chemonics' involvement in the seed program in the Gran Chaco were to: 1) employ a short-term adviser to work in the area, and 2) help construct seed drying bins and install drying equipment in the IBTA experimental station, El Algarrobal. Fortunately, with the extension of Chemonics' Contract to December 1984, it became possible to employ the adviser on a long-term basis, rather than short-term.

With the arrival of the adviser, Juan Landívar, in April, the following problems with regard to the seed program were identified:

- * Two air-screen cleaners (CLIPPER 27) were situated on the MACA property where electricity is not available. Even though there is no other processing machinery available in the region, no plans for the utilization of this equipment had been made.
- * MACA intended to purchase all seed produced in the region and send it to Tarija for processing and storage. However, experience with this method the year before was not considered to be satisfactory.
- * No certification services or processing services were offered to independent seed growers. This severely limited the scope of the program, even though there was a lack of soybean seed in the country due to unfavorable weather conditions during the year.
- * Field inspections indicated a high level of varietal mixtures. This was due to lack of a supply of pure material upon which a seed multiplication program can be based.
- * There was no integrated seed program; independent efforts of several institutions were not being taken advantage of.

Despite these problems, some fields presented acceptable levels quality to be harvested for seed given the lack of material available in the region and the high cost of importation.

Upon the arrival of the adviser at the beginning of harvest season, specific objectives were aimed at salvaging the maximum amount possible of soybean seed of reasonable quality. These objectives were defined as follows:

1. Carry out field inspections for farmers affiliated with the MACA program as well as for independent growers.
2. Set up the drier and an air-screen cleaner at the IBTA experiment station to provide drying and processing services to seed growers.
3. Provide orientation to local institutions with the idea of formation of a regional seed board.

B. Progress

At the beginning of the semester the seed program in the Gran Chaco included 300 hectares of soybeans grown by 27 farmers. None of these fields were planted with pure material, but most were within tolerance for production of non-certified seed. The fields were inspected with the MACA counterpart. However, due to adverse weather at harvest time, only the late planted fields matured in a favorable weather and met the quality requirements. This brought the total area down to 97 hectares.

Seeds of accepted fields were dried, using a small drier donated to IBTA by the Chinese Mission. This drier had not been used before. However the small capacity of the drier presented serious limitations to the program.

A Clipper 27 air-screen cleaner was installed beside the drier at the IBTA experiment station to take advantage of available electricity and of a built-in elevator of the drier. This facilitated loading of seeds either to the drier or to the air-screen cleaner. This activity served as a demonstration to farmers and regional leaders on seed drying and processing, creating increased awareness and receptivity to the guidance provided for the following season.

Once the work was in progress, local institutions became aware of the

need for an integrated seed program so as to better utilize the resources of the region--MACA Seed Certification, IBTA, CODETAR, farmer organizations, and the Cooperative. As a result of this increased interest, at the end of the semester local institutions and a group of farmers had requested a feasibility study for a seed plant in the region.

A major accomplishment for this semester was the incorporation of private soybean growers into the seed production program. Although the growers did not have the necessary equipment to produce good quality seed, this year served to gain experience and to be aware of the requirements to produce good quality seed.

Total soybean seed produced during this season was 80 MT. All of this was processed locally in a small private air-screen cleaner and in the Clipper 27 installed at IBTA.

C. Conclusions and Recommendations

The Bolivian Chaco presents adequate conditions to produce and store good quality seed. This region also has the institutional base needed to organize a functional seed production program, however the institutions of the region work independently of each other. Therefore it is of major importance to integrate all elements that make up a seed program. This is the main objective for the following semester. In meeting the above objective we recommend the following:

* Foundation Seed Production

IBTA should be provided with seed driers, a small seed processing unit and storage facilities for the production of foundation seeds of the recommended varieties of soybeans and corn. Part of the multiplication and storage of foundation seed could be done on the land and warehouse of MACA, located in Campo Grande. The Foundation Seed Department of IBTA should have the financial and technical support to manage this task efficiently.

We recommend that the breeder of each crop work in close cooperation with the technician in charge of production of foundation seed.

* Seed Certification Service

The Regional Seed Department of MACA should be reorganized to provide seed certification services to the region as its only function. To accomplish this it is recommended to equip the Regional Seed Department of MACA with laboratory facilities, and with a team of at least three technicians.

* Commercial Seed Multiplication

Technical assistance should be provided to interested private seed producers in the production of seeds. This should be accomplished by short courses and field supervision by the Seed Certification Department and by Chemonics in cooperation with local institutions, such as IBTA, APOGRA and Integral Cooperative "Gran Chaco".

* Seed Conditioning Plant

Since there are no facilities for processing seeds in the region, installation of a seed plant to provide services to all seed producers of the region is of major importance to the regional seed program.

We are pleased that MACA has requested a feasibility study for this purpose. Upon completion of this study in October, we recommend that MACA, USAID and local institutions enter into a decision to implement the plant by May 1984.

SECTION IV

MAINTENANCE OF AGRICULTURAL MACHINERY

A. Background and Objectives

The original concept of Chemonics' work in this technical field had been to support the Integral Cooperative in the management of its machinery pool. However, the adviser who worked in this area favored the sale of equipment directly to local farmers who had expressed interest and the capacity to own the machinery. After this action was taken in 1982, the adviser's role was redefined as one of training local farmers in the operation and maintenance of their machinery. Interest in this training activity ran high, however, local institutional support was lacking, and MACA reached the decision in late December to terminate the position. At that time, our objectives in this area were reduced to the following:

1. Carry out a course in maintenance and operation of agricultural machinery with farmers and IBTA technicians.
2. Orient the Integral Cooperative and farmers in procedures for ordering parts from outside the country.
3. Terminate the position in Machinery Maintenance in February 1983.

The second of the above objectives came about as a result of interest expressed by the Cooperative in supplying parts to local farmers.

B. Progress

The course was given to farmers and IBTA personnel as planned. Help was provided to several local farmers and others in interpreting manufacturers' catalogues (available mostly in English) and place orders for parts. In addition, while on vacation in the USA, the adviser purchased a number of parts for the Project vehicles under Chemonics' responsibility. These arrived in Bolivia in January 1983.

The adviser prepared his final report, and departed from Bolivia on February 17.

It goes without saying that these activities were barely initiated during this short time, and require permanent support in the future. Fortunately, it was later discovered that a private firm has been established in Santa Cruz to provide equipment maintenance services, including the provision of parts. This firm is reaching a large number of farmers in the Chaco.

C. Summary and Suggestions

In retrospect, we believe that the resulting situation with regard to farm mechanization in the Chaco is favorable for all involved. Farmers are utilizing and maintaining the equipment better than could have been the case through public machinery pools. They are getting the support they require through a private firm.

With regard to the new farm equipment to be distributed by MACA in the Chaco we recommend that this recent experience be built upon. The new equipment should be put up for sale to local farmers to the extent possible.

SECTION V

SOIL CONSERVATION

A. Background and Objectives

Work in this technical area has focused on three types of activities --training, gully control on individual farms, control of erosion over entire watersheds. During the previous semester, efforts had been made at control of erosion with contour canals on individual farms. At that time, it was thought that PERTT could eventually pick up this aspect of the work. Hence our goals for this period were:

1. Complete the training program involving three more phases, including a visit to the PERTT Project in Tarija and two short courses to be given in Yacuiba.
2. Support PERTT in preparation of a document to expand this Project to the Gran Chaco.
3. Conduct special educational courses with farmers on an individual and group basis.
4. Continue helping in organization and planning necessary to deal with area-wide problems caused by major streams.

As work progressed through the semester, it became apparent that the possibility of solving conservation problems over entire drainage basins was not feasible with the limited amount of funds available. Therefore, objective number four above was given less emphasis.

Also at the outset of the semester, one of two IBTA counterparts resigned and was not replaced. The remaining counterpart, Eng. Jorge Balderama, has done an excellent job of working with local farmers and others in applying soil conservation methods to the conditions in the Chaco.

B. Progress

Construction of contour canals or terraces was completed in January with farmers in four locations, covering about 100 hectares in total. Construction was carried out with agricultural tractors and disk plows, hence terraces were not always as high as recommended. In some cases, farmers planted straight across the field, rather than obeying the contour patterns established by the terraces.

Despite these problems plus the very heavy rains in January (497 mm), most canals held and channeled excess water to desired drainage way. In some cases, terrace systems need to be repaired or reconstructed to assure proper functioning in the future.

The third phase of training was carried out with a visit by the adviser and his counterparts to the PERTT Project in Tarija. Along with the training of counterparts, the adviser helped in the preparation of a plan to extend the activities of this institution to the Chaco. Unfortunately, shortly after the presentation of this plan in La Paz, it became apparent that PERTT would not be capable of expanding its activities in the near future.

A survey of erosion problems in Villamontes area was carried out. Most of the 1600 hectares recently cleared in the area are located in places with modest slopes. However, the beginnings of erosion are evident, and problems will develop in time if steps are not taken to implement conservation methods.

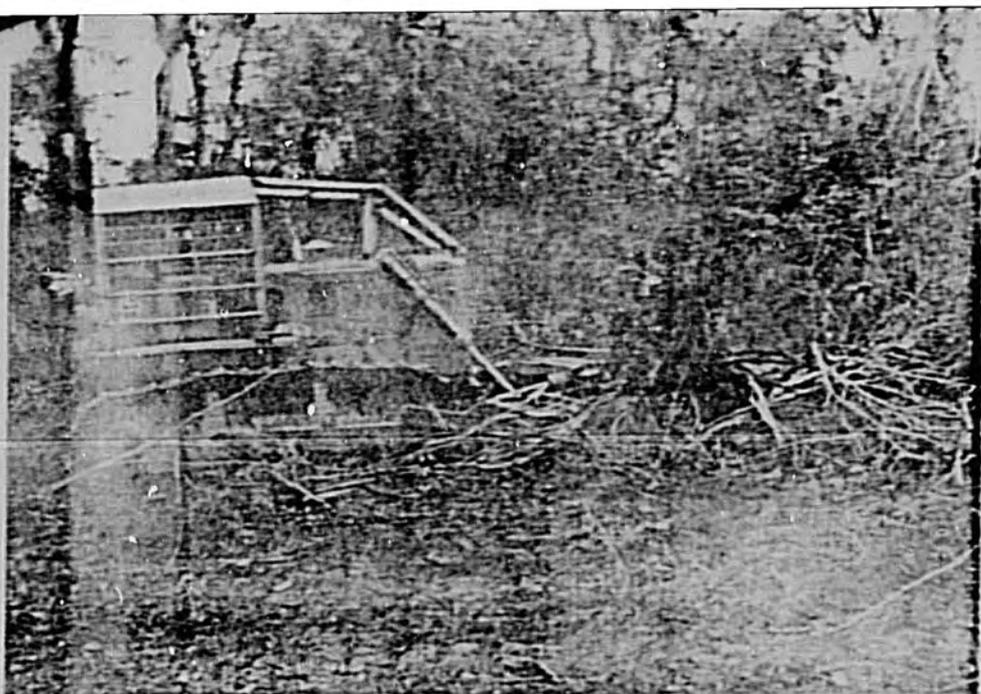
Assistance was provided to IBTA in the preparation of the yearly "Manual for Farmers". Concepts of soil conservation were introduced for the first time. The IBTA/Chemonics team also prepared a manual on the design, construction and maintenance of terraces for erosion control. Programs were prepared for radio programs, such as "Campesinos en Marcha". Additional information regarding climatic conditions in the Chaco was gathered and analyzed for use in planning soil conservation methods for the area.

Regarding region-wide problems considerable topographical work was done

on some of the major streams and recommendations were formulated to control their flow and control sedimentation. However, it became apparent that funds for these activities would not be available in the short-run. A study was made of the area where SENARB is building offices and laboratory. The soils in this area are severely affected by erosion and the structure is being threatened even before its completion. After consideration of various alternatives, and after making attempts to construct and stabilize a drainage way, the team was forced to recommend that SENARB rebuild in another location.

Special courses were prepared on land clearing technics emphasizing the importance of soil conservation and erosion control methods. The course content placed emphasis on land clearing with minimal disturbance of the topsoil, and included training sessions in the classroom as well as field practice. The training was carried out in June with the cooperation of the Dirección del Núcleo Escolar Campesino de Campo Grande and the Regional Director of CODETAR. The courses were attended by all eight of CODETAR's Caterpillar tractor operators and their field assistants. During field practice each operator performed land clearing in the traditional method and by a new method called "desmonte en sucio". Rather than digging out roots with the bulldozer blade and scrapping off the top layer of soil to the windrows or to the edge of the field, the blade is kept above the ground surface. Only the vegetative cover is removed. Large trees are left untouched. Roots remaining in the ground must be dug out by hand or burned. Data gathered during the training sessions demonstrated that the "desmonte en sucio" method saves about 4 centimeters of topsoil, as well as reducing tractor hours per hectare, i.e., an average of 7 to 8 hours per hectare could reduce to about 4 hours in tall forests.

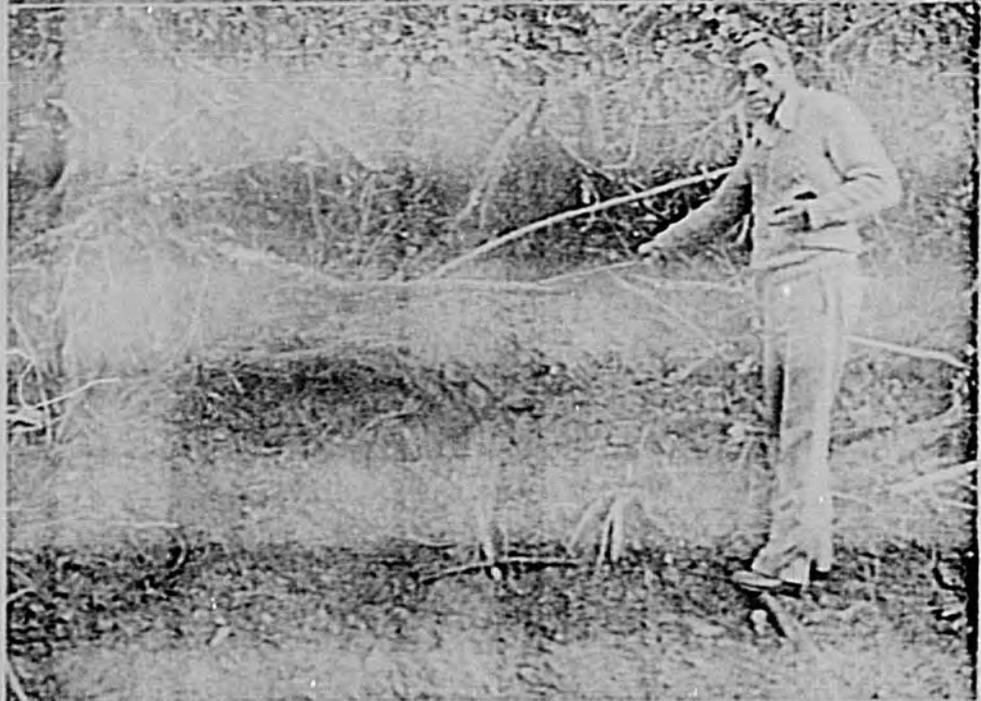
Toward the end of the semester, it became apparent that interest among farmers was growing in regard to conservation practices. Several farmers had asked the IBTA/Chemonics team to visit their farms, and expressed a desire to implement terrace systems. This increased interest is a direct result of the educational efforts made by the technical team. Farmers in the Chaco are now generally aware of the consequences of erosion, they are aware of the



Practicing the method of land clearing "en sucio" during a training course.



Measurement of topsoil removed by regular land clearing methods (left) versus land clearing "en sucio" (right).



Ing. Jorge Balderama of IBTA showing amount of soil removed to windrow under regular land clearing methods.

techniques available to control erosion, and they understand that technical guidance is available through IBTA to solve their problems.

In anticipation of intensive field operations during the up-coming dry season, drafting materials and field equipment had been ordered earlier and were delivered in March. New plans were developed to implement contour canals on demonstration plots throughout the Yacuiba Valley, and also in the Caraparí and Villamontes areas.

C. Summary and Suggestions

Most of the objectives established earlier for this component of the Project turned out to be in error. PERTT was not able to take on the responsibility of implementation of conservation projects in the Chaco. Attempts to control the flow of major streams surpassed the resources available. Other activities, such as the training and demonstration of new land clearing methods, turned out to be more productive. Also, interest among farmers for implementing terrace systems on their land was underestimated. Hence, this semester can be seen as one in which the activities of the soil conservation team became reoriented to focus more directly on the farmer as the primary target.

The principal problem facing the team in the construction of terrace systems is availability of appropriate machinery. If larger earth-moving equipment is not available, large (65 hp) agricultural tractors can be used for this purpose. MACA has promised to assign one of the tractors being sent to the Chaco for this purpose. CODETAR may also be in a position to dedicate some of its machinery to this activity. Project funds should be made available to pay part of the cost of construction of terraces.

SECTION VI

COTTON PRODUCTION

A. Background and Objectives

Last semester a feasibility study of cotton production and ginning had been done for the Gran Chaco. After review of the study, MACA requested that Chemonics take responsibility for implementation of the program during this first year of effort. This involved the implementation of demonstration parcels throughout the area for the purpose of training farmers and local technicians in the methods of cultivation of this crop.

Eng. Víctor Gonzáles was hired as a short-term adviser on October first of last year to carry out this work. Because Chemonics' adviser in seed improvement in the area, Juan Landívar, has considerable experience with this crop, it was decided that he also spend a minor portion of his time backstopping the cotton production component of the Project.

In November and December of last year, nine demonstration parcels were planted with seven farmers. For details regarding the parcels, see Chemonics' previous Progress Report for the period July through December, 1982. Objectives for the semester covered by the present report were defined as follows:

1. Follow-up the nine demonstration parcels through the production cycle, harvest and marketing of seed and fiber.
2. Train the extensionist hired by the Integral Cooperative in the technical aspects of cotton production.
3. Organize and carry out a special training program consisting of a visit to Paraguay for 10-12 persons from the Chaco.
4. Conduct demonstrations and short courses for farmers.
5. Support the Comité Impulsor in their efforts to insure provision of cotton ginning services in the Chaco.
6. Publish a manual of cotton pests prepared especially for the Chaco farmer.

These objectives remained largely unaltered throughout the semester.

B. Progress

Supervision of the nine demonstration parcels was the responsibility of the adviser and his local counterpart, Eng. Edgar Arroyo. The latter was hired by the Integral Cooperative, acting on behalf of the Comité Impulsor which coordinates work of the technical team with farmers and local institutions. Each farmer carried out the cultural practices on his own parcel. Only in one or two cases farmers hired extra workers to help with weeding and/or harvest.

The cultural practices occurring during this semester included thinning, weed control, pest control and the start of harvest. Thinning of cotton plants is not practiced in all places where cotton is grown and with all varieties. But for the Chaco, thinning to one plant every 25 centimeters in the row was recommended. Farmers were at first skeptical of this practice, but saw the advantage of it after remaining plants began to develop. They also saw that early thinning (25 to 30 days after planting) takes less labor and causes less damage to root systems and stems.

Weeding was done with hoe and by oxen-drawn plows. Most of the participating farmers carried out this task with sufficient frequency. In one case a special demonstration was made to convince the farmer to take more care in weed control. This was done by counting the weeds per square meter that were competing with cotton plants. It was recommended that a special yoke, 2.3 meters long, be used to reduce damage to plants caused by trampling by oxen.

Pest control was not a major problem because of the small amount of cotton being newly introduced to the area and the number of beneficial insects present. Use of traps showed that some insects, such as the "pinkworm", are present in low numbers in tropical areas of Bolivia, even when cotton is not commercially produced. Table 6 shows the kinds of insects which required chemical control and the percentage of fumigations

performed for control of each. Less than two fumigations were performed on average in each parcel.

Table 6 PEST INSECTS WHICH WERE CONTROLLED IN COTTON

DEMONSTRATIVE PARCELS

1982/83

Common Name	Scientific Name	Percentage of Fumigations
1. "Tobacco Bud Worm"	<u>Heliothis virescens</u>	58
2. "Cotton Stainer"	<u>Dysdercus ruficolis</u>	26
3. "Cotton Leaf Worm"	<u>Alabama arguillacea</u>	11
4. "Cotton Aphid"	<u>Aphis gossypii</u>	5

A manual describing insect pests common in cotton was written during the previous semester by Eng. Roberto Baldomar while working on the feasibility study. This manual was edited and published in February; 100 copies were distributed in the Chaco.

It is recommended that seed be treated in the future to prevent damage to young plants by aphids, thrips, and others.

Special demonstrations were given to larger groups of farmers in order to familiarize them with the methods used in cotton production. These were carried out in Campo Pajoso, San Francisco del Inti, El Barrial and Campo Largo. During these field days, it became apparent that farmers have a great deal of interest in planting cotton next season. In addition, a special field day was set for technicians and local leaders. Persons attending this demonstration included the following:

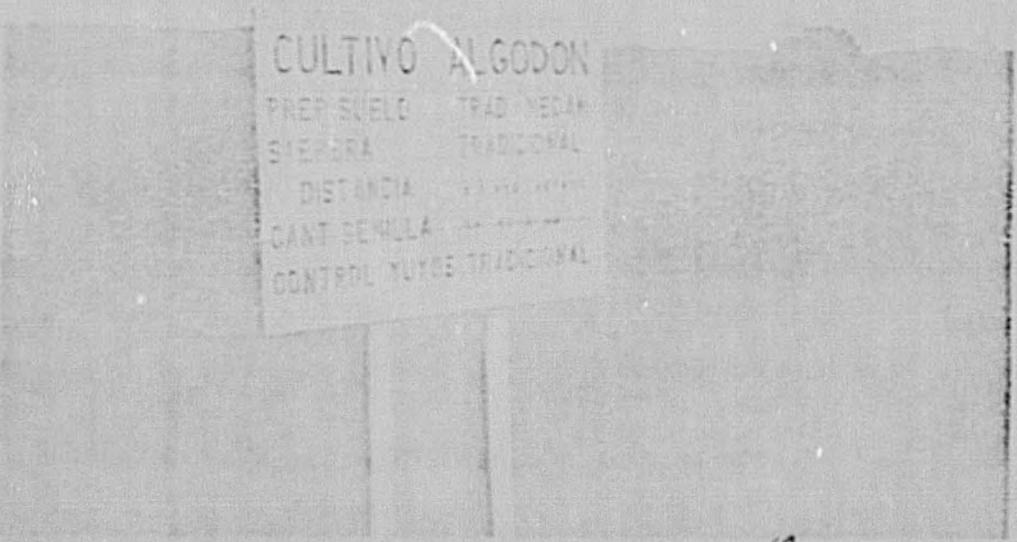
- * 4 from the Agricultural Bank
- * 3 from IBTA
- * 2 from the Integral Cooperative
- * 1 from APOGRA
- * 1 from a local radio station.



John Williams of
MIRA, and
Juan Lariver of
Chamela check a
cotton parcel for
planting.



John Lariver, Controller
of MIRA, right,
examines parcel with
Ing. Raúl Salas, Director
General of MIRA.



CULTIVO ALGODON
PREP SUELO TRADICIONAL
SIERRA TRADICIONAL
DISTANCIA 4.3 KM
CANT SEMILLA 4.3 KM
CONTROL TUYOS TRADICIONAL

John Williams
examines parcel
belonging to Gen. José
Marques in Campo
Pajoso.

A special bulletin titled "Cotton, an Alternative for the Chaco Farmer" was written and published. It describes cultural practices used in this crop, including fumigation by the ultra small volume method. Over 500 copies have been distributed in the area.

Harvest was inhibited by heavy rainfall during April and especially in the month of May (323.5 mm from April 30 to May 23). High humidity caused losses averaging 37 percent, and as high as 47 percent in one parcel. Farmers using hired labor suffered greater losses because the harvest was often not done on time. Still, by the end of June, harvest was nearly complete, and estimated yields were nearly 14 hundredweight of fiber per hectare. Parcels planted in November averaged more than 20 hundredweight. These yields can be compared to an average in Santa Cruz of about 10 hundredweight per hectare, which was reduced to only 5.5 this year due to late rains in that region. Additional demonstrations were held during harvest period in which 19 farmers were able to evaluate preliminary results.

The Integral Cooperative agreed to market the product for the farmer. The technical team picked up the cotton from each farmer, weighing and grading it on the farm at time of pick-up. The entire harvest was temporarily stored at the Cotton Gin belonging to the University of Tarija for later ginning. Fiber is to be taken to Santa Cruz for sale by ADEPA, and seed will be taken to the CBF plant in Villamontes.

The adviser travelled to Paraguay on a preliminary visit in early January for the purpose of planning and programming a visit by a group of Chaco farmers and technicians. Upon his return, the program and budget for the trip were prepared. The objectives for this trip were to:

- a) Permit the Bolivian farmer to witness the standard of living achieved by the Paraguayan farmer in a similar physical and social environment.
- b) Observe the significance of cotton in Paraguayan agriculture and its effect on the economic and social well-being of the small farmer.

- c) Allow the Bolivian farmer to appreciate the efficient management of resources achieved in Paraguay.
- d) Obtain information related to the organization of production, institutional interrelations, and the practical orientation for delivering services such as research, extension, credit, and marketing.
- e) Explore methods for establishing in the Bolivian environment a strategy of action among all institutions involved.
- f) Familiarize Bolivian personnel with agricultural practices employed in production of cotton in Paraguay.

Participants were selected according to their role in the cotton production program in the Chaco, and included community and agricultural leaders who carried out demonstrative parcels, technicians of IBTA and the Integral Cooperative, and others. The delegation consisted of eleven persons plus the adviser.

Official arrangements for the visit were made between USAID/B and USAID/P with ample cooperation from the Ministry of Agriculture (MAG) of Paraguay. The visit was carried out between March 9 to 16. The activities carried out include the following:

- March 9 Travel from Santa Cruz to Asunción.
- March 10 Presentations by the MAG, USAID/P, and CREDICOOP.
- March 11 Visit to farmers in the Cordillera Department; also met with extension agents and the Director of the Cotton Improvement Program.
- March 12 Visit to an area of colonization recently incorporated into cotton program.
- March 14 Visit to production area and cotton gins; examined methods of marketing.
- March 15 Visited cotton seed producers near San Lorenzo.
- March 16 Return to Santa Cruz

Before returning to Yacuiba, on March 16 and 17th, the group was able to receive additional training in Santa Cruz from CIAT and the Cámara Agrope-

cuaria regarding technology transfer, including a visit to the Campanero area where CIAT works with small farmers in cotton production.

An additional activity resulting from special requests made by farmers was the demonstration of oxen-drawn implements. Three demonstrations were carried out by Mr. Benedicto Quiñones from the Menonite Center of Santa Cruz. Costs of this activity were borne by the T-059 Project. Metal plows, disk harrows and cultivators were used in the demonstrations, which were attended by about 140 farmers. Because of the great interest expressed, further efforts in this area are planned for next planting season.

C. Summary and Suggestions

Objectives in this area have been achieved in their entirety. The feasibility of cotton production by small farmers in the Gran Chaco has been clearly demonstrated. Next semester, harvest will be completed and ginning and marketing will be carried out. In this regard, the Comité Impulsor has expressed concerns about the ability of the University (UBJMS) to operate a cotton gin successfully. At this moment, the UBJMS has promised ginning services for the small amount of cotton obtained from the demonstration parcels. However, we understand that CODETAR has been asked to assist in the actual operation of the plant, plus financing of materials. Hopefully, a more viable option can be found for future years.

After the completion of marketing tasks, a final report should be prepared and planning of next year's program should be carried out. For this purpose, we recommend the extension of the adviser's position from July 31, to September 30, 1983. At this time, MACA and USAID should decide on the means for continuation of the pilot program through the following crop year.

SECTION VII

NATION AGRICULTURAL INFORMATION SYSTEM

A. Background and Objectives

At the end of 1982, the only objective remaining for Chemonics in this area was the publication of the Registry of Professionals of the Agricultural Sector. Though Chemonics had no advisers in this area during the entire semester covered by the present report, we continued to provide support to IBTA, MACA and the Catholic University (UCB) to see that this phase of work reach completion. A student from the UCB, Mr. Miguel Ibáñez, worked continuously in Chemonics' offices throughout the period of this program. An additional goal defined later was to assist in the organization of a technical team and guidance committee to continue with this effort in the future.

B. Progress

Editing of the Registry was completed in April and USAID funds were approved for publication of 2000 copies. A new questionnaire was prepared to be included in the publication. Information from this form will be computerized, making publication of the next edition much more rapid and accurate. The Coordination Office awarded the publication contract to a local private printing company. Unfortunately this firm did not meet the deadline of May 20 for completion of the publication, and had not yet met this obligation as of the end of June. This has created serious problems because of the great expectation of many persons throughout the Sector of obtaining this information.

In March the agreement was signed among MACA, IBTA, UCB and USAID establishing CICTAR, Centro de Información Científica Técnica Agropecuaria y Rural. Upon the signing of this agreement, a Committee was established which will oversee the work of a team of students. The technical team will maintain an up-to-date Registry and prepare annotated bibliographies on subjects of interest to professionals working in the Sector. The Committee met for the first time in May to prepare for the formation of the technical team.

C. Summary and Suggestions

It is understood that the base of financial support for CICTAR is very weak. However, we feel the strategy should be one of demonstrating an interest and need for the work of this group, and slowly but deliberately developing the capacity to carry out the program. We do recognize, however, that an important error was made in the original design. This relates to the assumption that the technical team of students could receive the required supervision and guidance through the institutions represented in the Committee. We recommend that MACA and the other institutions involved search for solutions to this problem. One option which we feel is viable is the employment of a short-term adviser to lead the technical team and train personnel through their first year of work.

SECTION VIII

CONSTRUCTION

A. Background and Objectives

Before reactivation of the T-059 Project, attempts were made to begin two minor constructions in support of seed programs in Santa Cruz and the Chaco. One was the installation of an acclimatized storage area within an existing building at the Warnes Seed Plant, and the other was construction of drying bins at the IBTA Research Station, El Algarrobal. Rough plans for both were presented last semester but were turned down in USAID. More detailed plans were prepared by the Engineering Office of MACA, but were completed too late to be of use for the 1982-83 crop year. When were again presented, they were turned down a second time by USAID.

As a result of the above, MACA requested that Chemonics employ a civil engineer as short-term adviser. The responsibilities of this person fall generally into three categories:

- * Prepare designs, specifications, budgets
- * Backstop MACA in supervision of constructions
- * Evaluate the condition of older, unfinished constructions and recommend the best course of action for their completion.

After a rigorous selection procedure carried out with the Coordination Office of MACA, Eng. Eddy Decormis was selected, and began work on June 1.

Objectives were to: 1) follow-up the process of contracting with a construction firm and supervise construction in Warnes, 2) complete an evaluation of unfinished constructions at the Toralapa Research Station in Cochabamba, and 3) begin from scratch on designs for seed driers in Yacuiba.

B. Progress

Contracting with the firm CINDECO for the installation of a seed

storage and a metal roof over the heater/blower unit was done by the Coordination Office with the assistance of Chemonics. A model contract prepared two years earlier by USAID was used as the basis. Upon the signing of this contract, the adviser took on the role of acting supervisor until a local counterpart could be named by MACA. Unfortunately, this was not done, so supervision of the project was done informally with several persons in the area backstopped by the adviser.

New designs were begun for the Yacuiba drying bins, however a limitation developed with regard to drafting of designs in final. Neither the MACA engineering office nor PL 480 had the capability of doing the drafting. This problem was overcome in part by the designation of a full-time counterpart to the adviser, Architect Raúl Garrón. Drafting furniture and supplies were not on hand, however, until July, and then only minimally. At the same time, USAID made more demands as to the amount of detail and quality of plans that would be expected.

Finally a superficial evaluation of the Toralapa constructions was begun during June. The report to MACA was completed and submitted in July.

C. Summary and Conclusions

Original objectives set for this technical area mistakenly assumed that more general designs would be sufficient for small, low-valued construction projects. They also assumed, incorrectly, more cooperation from MACA regarding drafting--personnel, furniture, utensils and materials. Objectives were later redefined to be more realistic.

SECTION IX

COORDINATION, ADMINISTRATION AND PROCUREMENT

A. Background and Objectives

Specific objectives in these areas of work at the beginning of the semester were:

- * Delivery of equipment and materials for use in the soil conservation program under a previous agreement with MACA and USAID.
- * Procurement of seed processing machinery and laboratory equipment.
- * Purchase of parts for Project vehicles under Chemonics' responsibility and carry out necessary repairs.
- * Administer special training funds in cotton, seeds and soil conservation. Make periodic reports to MACA and USAID.

With the long-term extension of the Project to December 1984 and the extension of the technical assistance Contract between MACA and Chemonics, these objectives were amplified to include the following:

- * Prepare long-term extension to MACA/Chemonics technical assistance contract, including procedures for increased responsibilities in procurement.
- * Streamline administrative procedures related to support of field offices outside of La Paz.
- * Initiate procurement of office supplies and equipment needed for nearly two years operation under the Contract.
- * Recruit two seed technicians, and employ one for the Gran Chaco before end of harvest, 1983.
- * Assist MACA and USAID develop implementational plans in anticipation of reactivation of the Project.
- * Initiate purchase of three new Project vehicles.

B. Progress

Funds for Bronco parts and seed processing equipment were approved by USAID in early January. Chemonics had already initiated this purchase during the previous quarter, and the equipment was delivered in February. The Coordination Office of MACA took possession of the seed processing equipment in Santa Cruz. In accordance with the letter of understanding, a portion of the equipment was shipped by Chemonics to Yacuiba for delivery to IBTA. Some items, principally a large industrial dehumidifier, were backordered from the factory, and will be delivered in a second shipment.

In addition, Mr. Terrence McCarthy, adviser in Farm Mechanization, purchased a series of emergency parts for Project vehicles while on vacation in December of last year. These were shipped to Bolivia and repair of the Broncos in Yacuiba was initiated under his supervision.

The Semiannual Progress Report for the period July through December 1982 was completed and delivered to USAID and MACA within the 60 day limit stipulated in the Contract.

Materials and equipment for use in the soil conservation program were shipped to Bolivia and delivered in Yacuiba to IBTA. This equipment consists of topographical instruments, drafting tools and supplies, and audio-visual equipment and materials.

The Project Supervisor/Administrator for Chemonics' home office in Washington arrived in Bolivia on February 26 for a routine supervision visit plus development of short-term extension to June 30, 1983. This action was considered necessary because the Project could not be reactivated before the end of March. However, due to increasing problems associated with implementation and the possibility of losing experienced personnel currently working under Chemonics' Contract, USAID approved a long-term extension of the Project. MACA and Chemonics then developed Amendment 11 extending the technical assistance Contract to December 1984. Amendment 11 provides for long-term advisers in the following areas:

- * Seed Improvement/Santa Cruz
- * Seed Improvement/Gran Chaco of Tarija
- * Seed Improvement/Chuquisaca and Potosí
- * Soil Conservation/Gran Chaco.

In addition, MACA approved the continuation of an adviser in the area of cotton production in the Gran Chaco under the area of short-term technical assistance.

Even without reactivation of the Project as a whole, extension of the technical assistance Contract has had many advantages to implementation. One of these is the possibility of recruitment of long-term advisers for seed improvement for new areas of the country where potential for developing seed production programs is greatest. Candidates were promptly presented to MACA, and approval was first received for Mr. Juan Landívar to work in the Gran Chaco of Tarija. Mr. Landívar arrived in Bolivia in April.

With the signing of Amendment 11, Chemonics was authorized to proceed with the purchase of three new vehicles for the Project. However, special waivers were required in order to continue with the same type of vehicle as are presently used. This was not received until April.

In order to begin mechanization of local accounting procedures in La Paz, Chemonics purchased a small computer. It will also be used for report writing and economic analyses needed for feasibility studies. A program for calculation of per diems under various different systems was written.

Because of the heavy load placed on the local staff in the Santa Cruz office, the secretary there came to La Paz for more than a week to receive special training in preparation of reports, local procurement and accounting. A system of checklists and work order forms were developed to control the large quantity of actions required to support the offices, advisers and local institutions involved with the Project in various parts of the country.

During April a supervisory trip was taken to Santa Cruz and Yacuiba by Chemonics' Chief of Party accompanied by the Director General of Agriculture and the Director of the MACA Seed Department. Travel expenses for the Director

General, Ing. Raúl Salas, were covered under Project funds for purposes of training in seed production. In Santa Cruz the group visited the CIAT experiment station in Saavedra, the Seed Processing Plant in Warnes, and the Certification Offices in Santa Cruz. In the Gran Chaco, the group visited the MACA property where seed was being grown and the IBTA experiment station where basic seed was produced, and where processing facilities were to be set up. Additionally, Ing. Salas visited several cotton demonstration parcels and the cotton gin owned by the University.

At the request of MACA, a civil engineer was recruited and hired locally as a short-term adviser. Offices were situated in the Coordination Office, and a full-time counterpart, Architect Raúl Garrón, was assigned from the Engineering Office of MACA. Drafting tools and supplies were ordered; MACA supplied a drafting table and stool.

Assistance was provided to MACA and USAID in developing a three-month plan of action for April through June. Unfortunately, this effort failed when reactivation did not come about when expected.

Chemonics also assisted MACA, CODETAR and USAID in developing a new organizational strategy for the land clearing component of the Project. The implementation of this plan will be carried out with a regional director of the land clearing program to be hired by CODETAR later this year.

At a result of interest expressed by the Villamontes/Sachapera Project (PROVISA), Chemonics' Chief of Party helped prepare an outline for technical assistance needed to complete a final design of phase I of their Project. This plan was presented to MACA by representatives of PROVISA with the suggestion that Chemonics provide the necessary technical assistance.

Finally, Chemonics helped in the preparation for a National Round Table in Seeds to be held in August of this year in Cochabamba. This will be the first of its kind in Bolivia. Funds for the Round Table were budgeted under the Ag. Sector II loan.

C. Summary and Suggestions

Objectives were achieved in these areas of work, including newly defined objective after extension of the Project and the technical assistance Contract, with the exception of presenting financial reports to MACA on the status of special training funds. Because of the very heavy administrative burden being placed on Chemonics, it is recommended that future special funds for training and other purposes be administered, to the extent possible, by the Office of Coordination. However, we recognize the limitations of this Office in operations outside the capital city of La Paz.

Special efforts to involve the Director General have shown positive results for the Project. Chemonics work is understood in more depth by MACA. Through field visits, an awareness has been achieved regarding the effects of advisers work in terms of production and increasing farmer incomes. Further, MACA and Chemonics now identify with common goals for the Project in conjunction with local counterparts, including farmers and local institutions, both public and private.

SECTION X

CONCLUSIONS AND PROJECTIONS

As projected in the previous Progress Report, nearly all technical assistance provided by Chemonics in Bolivia during the first semester of 1983 was oriented to field programs (nearly 90 percent as shown in Table IV of the Annex). Over the life of the Project, field activities account for two-thirds of our efforts in Bolivia (Table III of Annex). The other major area of effort is in Project coordination, administration and procurement, which accounts for over 10 percent of total efforts since the initiation of technical assistance under the Project in June of 1979.

During the semester covered by this report, work in Maintenance of Agricultural Machinery was completed. Efforts were initiated in 1) Seed Improvement in the Gran Chaco, and 2) Construction.

It is felt that the orientation nearly exclusively toward field activities has brought very favorable results for the Bolivian farmer in various parts of the country. An expansion of efforts in seed production to the Gran Chaco, Potosí and Chuquisaca seems justified. Expectations are very high for these programs within a period of only two to three years. Efforts in soil conservation will need to be evaluated later this year before reaching a decision to continue this work under IBTA and Chemonics.

In addition to field programs, minor efforts in the area of Information Systems has sparked a great deal of interest among institutions as well as potential users of information services of CICTAR. Even though Chemonics did not have specific responsibilities in this area at the end of the semester covered by this report, we sincerely hope that MACA, IBTA, UCB and USAID will provide the support required to set up a sound technical team under CICTAR. Chemonics is available to help with this effort.

Projections for each technical component of the Project are shown in next pages.

Seed Improvement, Santa Cruz

- * Assist the Certification Service in quality control of winter soybean seed.
- * Prepare and present a 10 day training course to Certification personnel.
- * Carry out in-service training.
- * Update and improve technical norms applied by Certification.
- * Help plan and initiate the 1983/84 production campaign.
- * Prepare specifications for equipment needed for various seed plants in the region, including Warnes and Saavedra.
- * Orient private seed companies in the purchase, installation and operation of seed processing equipment.
- * Assist CIAT in its program for production of basic seed in soybeans, corn and rice, including the introduction of a new soybean variety, IAC-8.
- * Help CIAT initiate a new foundation seed program in wheat.
- * Coordinate with ADEPA and Certification in selecting of cotton seed producers.
- * Help provide technical assistance to cotton seed producers through the planting stage.

Seed Improvement, Gran Chaco

- * Provide guidance in the formation of a Regional Seed Board and a Certification Service.
- * Cooperate with IBTA in the organization of a Foundation Seed Unit and in the planting of 20 hectares of foundation seed of soybeans and 10 hectares of corn.
- * Provide guidance and train local personnel in quality control of commercial seed, both local and imported.

- * Provide assistance in methods of storage of local seed and initiate the 1983/84 production campaign for soybeans, corn and cotton in the Chaco.
- * Orient and assist private seed producers.
- * Prepare a feasibility study, design and equipment specifications for a seed processing plant for the Region.

Seed Improvement, Chuquisaca/Potosí

Objectives for this area of work cover the period from August, when the adviser is expected to arrive, through December, 1983.

- * Develop a work plan in collaboration with local institutions.
- * Initiate the production campaign 1983/84 in commercial wheat seed.
- * Explore methods for development of varietal improvement and a foundation seed program in the area of Potosí.
- * Explore interest of local institutions of participating in a study to orient the seed program of the area, including study of the feasibility of a seed processing plant in Chuquisaca.
- * Orient local institutions in the formation of a Regional Seed Board.

Soil Conservation

- * Implement contour canals (terraces) on fields of interested farmers in the Gran Chaco.
- * Develop a new work plan and budget for construction of terraces.
- * Coordinate with CODETAR regarding land clearing methods and use of equipment for soil conservation purposes.
- * Prepare bulletins, radio programs and audio-visual materials for training programs in the area.
- * Continue to analyze meteorological data in the region for use in

specific study areas where special erosion problems are evident.

- * Cooperate with interested institutions and communities in evaluating alternative methods of erosion control in small drainage basins.
- * Orient and supervise farmers during planting on methods of contour farming and maintenance of terraces.

Cotton Production

Objectives in this component are defined for completion of the 1982/83 crop year and planning for the following season. Based on this experience, a decision will be made by MACA and USAID regarding Chemonics' continuation this activity for the following year.

- * Orient farmers through the remaining period of harvest and marketing of products.
- * Assist the Integral Cooperative in collecting cotton, ginning and marketing.
- * Prepare an evaluation of the first year's experience and a work plan for the following year.
- * Assist in programming and attaining input for the 1983/84 season, including production credit.
- * Provide special training courses for farmers interested in growing cotton next year on use of ultra small volume spraying techniques.
- * Provide in-service training to the extension agent hired for the program during the first year.
- * Help the local Committee with recruiting of a second extension agent for the following year.
- * Assist IBTA and the local Committee in planning activities in cotton research.

Information Systems

- * Assist and orient institutions on the formation of a technical team to provide services in this area.

Construction

Initial objective for this area only cover the period July through November, which corresponds to the current contract of the short-term adviser in civil engineering.

- * Support MACA in contracting a local construction firm and supervise constructions in the Warnes Seed Plant.
- * Redesign drying bins for the IBTA experiment station in the Chaco; prepare specifications and budget for MACA and USAID approval.
- * Carry out topographical work and prepare designs, specifications and budgets for access roads for Warnes Seed Plant.
- * Initiate preliminary designs for seed processing facilities in Saavedra.

Coordination, Administration and Procurement

- * Complete pending Project procurement of seed equipment.
- * Carry out Contract procurements of office supplies, vehicles, office equipment, drafting equipment and field equipment.
- * Train Chemonics and MACA personnel in computer applications for accounting and other administrative purposes.
- * Assist two new long-term advisers in locating housing; carry out shipment of household effects.
- * Assist MACA in obtaining adequate office space for Certification Service and Chemonics in Santa Cruz and for IBTA and MACA counterparts in Yacuiba.
- * Assist MACA in carrying out first Nacional Round Table on Seed Improvement in Cochabamba.

- * Assist MACA and USAID in the development of implementational plans, budgets, and specifications for the Project for 1984.
- * Carry out a supervisory trip with the Project Coordinator/Supervisor from Chemonics home office in Washington.
- * Advise local institutions, MACA, and USAID on training opportunities outside the country in all areas where Chemonics is involved.
- * Transfer a secretary from La Paz to Sucre where she will work with the new seed adviser, Dr. Edgar Cabrera.
- * Work with MACA in extending the short-term adviser in cotton production to the end of August of this year.

ANNEX

Table I

WORK-DAYS PAID DIRECTLY BY THE CONTRACT BYTECHNICAL AREAMAY 1979 - JUNE 1983

Technical Area	Long-Term		Short-Term Advisers and Acquisi- tion Agents	Home Office	TOTAL
	Advisers	Chief of Party			
	(Work-Days)				
<u>Field Programs</u>					
Seeds	828.5	159.5	154.0	16.2	1,158.2
Land Clearing and Machinery Maintenance	1,512.0	155.0	-	17.8	1,684.8
Soils	377.0	37.5	-	3.9	418.4
Cotton	-	16.8	179.0	1.3	197.1
Production and Marketing Studies	-	51.8	200.5	6.2	258.5
Construction	-	1.3	22.0	0.1	23.4
<u>Institutional Strength- ening</u>					
Planning	-	122.2	284.5	13.5	420.2
Data Processing	-	16.4	36.0	2.0	54.4
Institutional Reform	541.0	83.3	143.3	9.9	777.5
<u>Support</u>					
Administration	-	372.5	9.0	40.3	421.8
Procurement	-	52.7	74.1	28.3	155.1
TOTAL	3,258.5	1,069.0	1,102.4	139.5	5,569.4

Table II

WORK-DAYS PAID DIRECTLY BY THE CONTRACT BYTECHNICAL AREAJANUARY-JUNE 1983

Technical Area	Long-Term		Short-Term Advisers and Acquisi- tion Agents	Home Office	TOTAL
	Advisers	Chief of Party			
	(Work-Days)				
<u>Field Programs</u>					
Seeds	186.0	34.9	-	1.4	222.3
Land Clearing and Machinery Maintenance	62.0	8.3	-	0.3	70.6
Soils	129.0	7.0	-	0.3	136.3
Cotton	-	9.3	129.0	0.4	138.7
Production and Market- ing Studies	-	-	-	-	-
Construction		1.3	22.0	0.1	23.4
<u>Institutional Strengthening</u>					
Planning	-	14.1	-	0.6	14.7
Data Processing	-	-	-	-	-
Institutional Reform	-	0.3	-	-	0.3
<u>Support</u>					
Administration	-	51.1	-	2.0	53.1
Procurement	-	2.7	-	0.1	2.8
TOTAL	377.0	129.0	151.0	5.0	662.2

Table III

SUMMARY OF WORK-DAYS PAID DIRECTLY BYTHE CONTRACTMAY 1979 - JUNE 1983

	Work-Days	Percentage
Field Programs	3,740.4	67.1
Institutional Strengthening	1,252.1	22.5
Administrative Support	576.9	10.4
	5,569.4	100.0

Table IV

SUMMARY OF WORK-DAYS PAID DIRECTLY BYTHE CONTRACTJANUARY 1983 - JUNE 1983

	Work-Days	Percentage
Field Programs	591.3	89.3
Institutional Strengthening	15.0	2.3
Administrative Support	55.9	8.4
	662.2	100.0