

PD-AAR-334 4017A

**CHEMONICS**  
INTERNATIONAL CONSULTING DIVISION

PROGRESS REPORT  
JULY THROUGH DECEMBER 1984

SUBMITTED TO

THE MINISTRY OF RURAL AFFAIRS AND AGRICULTURE

BY

CHEMONICS INTERNATIONAL CONSULTING DIVISION

CONTRACT GOB/AID 511-059-008-HCC

APRIL 1985

TABLE OF CONTENTS

		<u>Page</u>
SECTION I	INTRODUCTION	1
SECTION II	SEED IMPROVEMENT	4
SECTION IIA	SEED IMPROVEMENT, SANTA CRUZ	6
	A. Background and Objectives	6
	B. Progress	6
	1. Foundation Seed	6
	2. Production and Supply of Commercial Seeds	7
	3. Installation and Use of Conditioning Plants	7
	4. Certification	8
	5. Training	8
	6. Other Activities	9
	C. Summary and Recommendations	9
SECTION IIB	SEED IMPROVEMENT, GRAN CHACO	11
	A. Background and Objectives	11
	B. Progress	11
	1. Seed Conditioning	11
	2. Seed Certification	12
	3. Regional Seed Production Strategy	12
	4. Promotion of Regional Seed Program	12
	5. Establishment of the Regional Seed Certification Office	14
	6. Registration of Seed Producers	14
	7. Training	14
	8. Other Activities	15
	C. Summary and Recommendations	15
SECTION IIC	SEED IMPROVEMENT, CHUQUISACA/POTOSI	17
	A. Background and Objectives	17
	B. Progress	18
	1. Foundation Seed	18
	2. Seed Certification	18
	3. Seed Conditioning	19

	<u>Page</u>
4. Production of Commercial Seed	20
5. Orientation of the Seed Program	20
6. Training	21
7. Seed Marketing	21
8. Other Activities	22
C. Summary and Suggestions	22
 SECTION III	
CONSTRUCTIONS	24
A. Background and Objectives	24
B. Progress	25
1. Small Constructions (Extension)	25
2. Seed Drying Bins	25
3. Access Roads	25
4. Foundation Seed Processing Plant	26
5. Completion of Constructions	26
6. Seed Processing Plant	26
7. Computerized Analysis of Unit Prices and Construction Specifications	27
8. Seed Processing Plants	28
9. Flour Mill	28
C. Summary and Suggestions	28
 SECTION IV	
SOIL CONSERVATION	31
A. Background and Objectives	31
B. Progress	31
1. Weather Data	31
2. Terrace Construction	32
3. Training of Students with Scholarships in Soil Conservation	32
4. Video-Filming of the Soil Conservation Program in Yacuiba	35
5. Training of Technical Personnel	35
C. Summary and Suggestions	35

		<u>Page</u>
SECTION V	TRAINING IN NATURAL RESOURCES	37
	A. Background and Objectives	37
	B. Progress	37
	C. Summary and Suggestions	38
SECTION VI	COTTON PRODUCTION	39
	A. Background and Objectives	39
	B. Progress	40
	1. Orientation and Support to Local Institutions in Cotton Production	40
	2. Recovery of Cotton Varieties for Delivery to CIAT and IBTA	40
	3. Information of Results to Producers in the Field	41
	4. Preparation of the Report on Results of the 1983/84 Agricultural Year	41
	5. Registry of Producers and Selection of Areas Planted in 1984/85	41
	6. Technical Assistance to Cotton Producers and Training of Technicians	42
	7. Other Activities	42
	C. Summary and Suggestions	44
SECTION VII	INFORMATION SYSTEMS	45
	A. Background and Objectives	45
	B. Progress	46
	1. Information Bulletin	46
	2. Annotated Bibliography	46
	3. Registry of Professionals	47
	4. Participation of the Committee and Regional Delegates	47
	5. Trainees	48
	6. Training in Documentation Techniques	48
	7. Administration	49
	8. Other Activities	49
	C. Conclusions and Recommendations	49

		<u>Page</u>
SECTION VIII	COORDINATION, ADMINISTRATION AND PROCUREMENT	50
	A. Background and Objectives	50
	B. Progress	51
	1. Reporting	51
	2. Training	51
	3. Project Administration	54
	a. Management of Special Funds	54
	b. Computerization of Accounting System	54
	c. Supervision of Local Staff	55
	d. Office Space	55
	e. Advisers' Meeting	55
	4. Procurement	56
	C. Summary and Suggestions	56
SECTION IX	CONCLUSIONS AND PROJECTIONS	57
	Seed Improvement, General	57
	Seed Improvement, Santa Cruz	57
	Seed Improvement, Gran Chaco	58
	Seed Improvement, Chuquisaca/Potosí	58
	Constructions	59
	Soil Conservation, Gran Chaco	59
	Training in Natural Resources	59
	Cotton Production, Gran Chaco	59
	Information Systems	60
	Coordination, Administration and Procurements	60
	*****	
ANNEX	Table I	62
	WORK-DAYS PAID DIRECTLY BY THE CONTRACT BY TECHNICAL AREA - May 1979 - December 1984	
	Table II	63
	WORK-DAYS PAID DIRECTLY BY THE CONTRACT BY TECHNICAL AREA - July 1984 - December 1984	
	Table III	64
	LEVEL OF EFFORT OF THE ADVISORY GROUP BY SEMESTER - IN WORK-DAYS	

## SECTION I

### INTRODUCTION

This Progress Report is the twelfth since the beginning of the Agriculture Sector II Project in Bolivia, 511-T-059. It reports on the work of the Chemonics International advisory team from July 1 to December 31, 1984. The technical assistance Contract signed with the Ministry of Rural Affairs and Agriculture (MACA) is number 511-T-059-008-HCC. The Contract and the Project are funded by grant and loan funds of the United States Agency for International Development (USAID).

At the beginning of the semester, July 1984, the Contract termination date was December 31, 1984. An amendment to extend the Contract to September 30, 1985 was being discussed with MACA and USAID. This was signed on August 3rd by MACA and approved shortly afterwards by USAID.

Below a summary is presented of the advisory team working during the semester covered in this report.

Technical Area	Long-term Advisers	Short-term Advisers
Seed Improvement	Adriel E. Garay Juan A. Landívar Edgar R. Cabrera	Nicholas Minot Gover Barja D.
Soil Conservation	E. Don Hansen	Omar Serritella
Cotton Production	Víctor González	
Constructions	Eddy Decormis C.	
Agricultural Planning	Preston S. Pattie	Miguel Ibáñez
Administration & Training		Bernard L. Delaine
Natural Resource Courses		Juan Arandia Fred C. Tracy Edgar Ortíz Iema

In addition to the advisers, home office support funded directly by the Contract included a visit by the Director of Chemonics, Mr. Thurston F. Teele, in December. This was Mr. Teele's first visit to Bolivia during the implementation of the Project. The procurement staff in Washington also provided 15 days of support to the Project during the semester. The time of procurement personnel is billed directly when acquiring items financed by the Project through the technical assistance Contract.

A new position was added to the team with the employment of a Deputy Chief of Party (DCOP), Dr. Bernard Delaine. The position was defined as short-term to coincide with the availability of the candidate. The DCOP takes responsibility in administrative supervision, and also for coordination of training events financed by the Project in Bolivia. This has permitted the role of the Chief of Party to become more technically oriented during the July-December period.

Locally, two technicians were employed by Chemonics to assist with implementation of the cotton component of the Project and one was employed to help in seed improvement in Chuquisaca. A third technician is being added in cotton production. In addition, the Project finances eight scholarships for student/trainees to work in information systems (sector planning component) in La Paz. This component also has the support of volunteer representatives in each major region of the country.

Seed improvement continues to be the strongest area of work, however increased efforts were also made in soil conservation during the semester. Three trainees were incorporated into the soils program beginning in October. Mr. Serritella from the home office was hired as a short-term adviser for the preparation of audio-visual materials, especially video tapes, giving priority to activities in soil conservation.

The appendices provide a detailed summary of advisory services provided by Chemonics in terms of work-days funded by the T-059 Project. Similar tables are given for the semester covered in this report and for the entire life of the Project since May of 1979.

The next Section, which includes three major sub-sections, covers our work in seed improvement nationally and by region. Efforts of three long-term seed specialists plus two short-term agricultural economists and about half the time of the Chief of Party are covered in the seeds component. Section III covers our work in constructions, most of which is also closely related to the seeds component of the Project.

Section IV addresses our efforts in soil conservation including the long-term adviser in this area plus the short-term adviser in filming of audio-visual materials and the three trainees in soil conservation. Formal training in natural resources, including a course in soil conservation, is reported in Section V. This is an area of work that involved three short-term advisers/instructors.

Section VI reports on the work of the long-term cotton adviser and two local technicians hired by the Project. Section VII covers the work of the adviser in information systems along with eight student trainees in La Paz and eight volunteer regional representatives.

The activities of the Deputy Chief of Party and the local staff regarding coordination and administration of the resources managed by Chemonics is presented in Section VIII. Finally, section IX presents a few conclusions and projections for the first semester of 1985.

Since the reporting periods corresponding to semesters of the calendar years do not always coincide with the agricultural seasons of different parts of the country, a special note may help the reader. The following

table gives a general idea of planting and harvest dates for the major crops in each region. Winter crops are most common in Santa Cruz, but are also becoming more popular in the Gran Chaco. Also note that many areas of Chuquisaca have a great deal of flexibility in terms of planting and harvest dates, more so than is reflected in the table.

	SUMMER	WINTER
<hr/>		
Santa Cruz:		
planting	nov-dec	may-june
harvest	mar-may	july-aug
Chaco:		
planting	nov-jan	
harvest	april-june	
Chuquisaca:		
planting	dec-feb	
harvest	april-june	
<hr/>		

From the above it can be seen that the current report, which covers july through december, corresponds to the post-harvest seasons for summer crops of 1983/84, the harvest season for 1984 winter crops in Santa Cruz, and the beginning of planting seasons for summer crops for 1984/85.

## SECTION II

### SEED IMPROVEMENT

The semester started with a permanent team of three long-term advisers in seeds located in Santa Cruz, Chuquisaca and Yacuiba plus a short-term agricultural economist posted in Chuquisaca. During the semester a communications expert came to Bolivia from Chemonics' home office to prepare video materials regarding seed production. The communications expert distributed his time between the Yacuiba soil conservation program and the Santa Cruz seed program. The Chief of Party also reinforced the seed component, dedicating more time to feasibility studies especially for Yacuiba and Chuquisaca.

During the semester, increased interest and participation of local institutions were clearly observed. This was reflected by requests for technical assistance to carry out feasibility studies, for help in organizing grower associations, and for help in design of seed facilities. Most requests were satisfied with existing personnel working in the Project. These tasks are carried out in close cooperation with local institutions.

As seed production activities per se are implemented in each region, increasing amounts of time are dedicated to development of human resources. The overall objectives for seed program development at the national level reflect this emphasis:

- \* Help organize and carry out the Second National Round Table on Seed Program Development in Santa Cruz the last week of August.

- \* Support the National Seed Department in following up on a series of recommendations that came out of the Second Round Table.

- \* Increase training activities through: 1) Round Table, 2) short courses for local technicians, 3) seminars, 4) dissemination of information to growers and the general public, and 5) identification of training opportunities outside the country.

The First Round Table had been held in August 1982 and the second was scheduled for August 84. This is the month when field activities in the various regions are at a minimum. However, a national strike caused the postponement of this event for one week. It was carried out the first week of September. About 40 persons attended, representing seven different regions of the country where seed programs are either operational or are being planned. Participants represented a balance between public and private sectors. However, participation from officials of central government and international donor institutions was not as great as had been hoped. This was mostly due to the last-minute change in schedule of the event.

Dr. Adriel Garay presented "Experience in the Seed Program in Santa Cruz." This strategy of seed program development has been developed from experience in other countries, but is tailored to the needs of Bolivia. Dr. Preston Pattle presented a paper prepared by Nicholas Minot on the wheat seed market in Santa Cruz and also a paper estimating economic

impacts of the soybean seed program in Santa Cruz from 1981 through 1984. The other advisers worked with the commissions from their respective regions in developing strategies for their particular seed programs.

The report from the Second National Round Table was prepared in Santa Cruz by the Certification Office with help of Chemonics. General recommendations from the overall commission are included. The principal focus of these recommendations is two-fold:

- 1) Continuation of technical and financial assistance from the T-059 Project of USAID and/or other projects, such as the Emergency Seed Project of BID.

- 2) Formation of the National Seed Commission to be made up of two representatives of each regional seed council plus the National Seed Director of MACA.

The advisers prepared an agenda and invitation for the first meeting of the National Commission. A date was set in December for the first meeting in Cochabamba. These activities were coordinated with the National Director of Seeds in MACA. However, the National Director later cancelled the meeting for reasons that are not yet clear. It had not been rescheduled by the end of the year.

Regarding national seed courses, Santa Cruz has been chosen as the training center to take advantage of all-year-round activities in the field, availability of seed plants and laboratories, and expertise of local counterparts and institutions. These aspects greatly contribute to the effectiveness of the courses.

Two seed courses were carried out at the national level, both in Santa Cruz. The first was coordinated by Dr. Edgar Cabrera on drying, conditioning and storage of seeds. Eighteen participants spent one week in theoretical and practical applications. The second was a two-week course on analysis and certification coordinated by Adriel Garay. Eight technicians in seed certification from various regions participated. Emphasis was placed on wheat and soybeans.

Other activities related to seminars and dissemination of information to growers are covered in the following sections covering activities in specific regions.

## SECTION IIA

### SEED IMPROVEMENT, SANTA CRUZ

#### A. Background and Objectives

The previous semester was characterized by intense activity in field work with wheat, corn and soybeans. Results were outstanding, especially in wheat seed production. Soybean seed production in summer, however, was low. Therefore a strong winter seed program in the second semester of 1984 was planned. Objectives for the semester were:

- \* Follow through with corn seed crop which is expected to reach about 250 tons.

- \* Assist growers with the winter soybean crop of about 1500 hectares. Substitution of imports depends on the success of this crop.

- \* Purify wheat seed fields in lowlands and Comarapa area with the goal of obtaining pure foundation seed. Some of this may be used for the Chuquisaca program.

- \* Provide guidance to certification personnel in field inspections, record keeping and testing of seed lots of local wheat, corn, soybeans and rice, as well as imported seed.

- \* Orient owners and managers of new seed plants on methods of seed conditioning, internal quality control and design and building of acclimatized storage units.

- \* Review certification standards in December after an evaluation of the 1984 production year.

- \* Help local institutions and Regional Council in planning for 1984/85 seed crops.

#### B. Progress

##### 1. Foundation Seed

The Foundation Seed Unit of CIAT concentrated its efforts on wheat following up the purification work initiated earlier in 1984. Foundation seeds harvested the previous summer were planted on 80 hectares to produce registered seed in winter. The seed harvested complied with standards for registered class. At the end of the semester, the seed was being distributed to produce certified class in the valleys of Santa Cruz.

Two hectares of wheat were purified more rigorously in the field with the participation of certification personnel from all over the country. The 40 hundredweight (1.8 metric tons) from these fields were distributed by CIAT to the best farmers in Comarapa and Jaqué to be maintained and multiplied as foundation class seed. Part was sold to the Chuquisaca program. Purification activities of foundation class will need to be

continued in the future.

## 2. Production and Supply of Commercial Seeds

The second semester of the year is normally dedicated to post-harvest conditioning of all the corn, some rice and a small part of the wheat produced in the first half of the year. However, the major activity each year constitutes the winter soybean seed crop.

Due to the lack of adequate storage facilities, summer soybean seed production is normally small. Without acclimatized storage, it is not possible to produce in summer and hold seed over to planting the following summer. Therefore a strong winter seed crop (2834 hectares) was planned for 1984. The severe drought at planting and during the growing period, plus stink-bug damage, decreased the final accepted area to 1713 hectares. Bad weather at harvest caused additional losses after the last field inspections (pre-harvest inspections). The final harvest of certified seed was 1,125 metric tons. Despite losses in the field, this amount was a record local seed crop. It directly diminished the amount of imported seed from 1200 tons the previous year to 800 tons this year. Including all crops, the amount of certified seed produced in different classes was 1,783 metric tons, which was superior to previous years. The Adviser assisted these activities through orientation in the field, conditioning plants, testing laboratories and in coordination sessions. The Adviser works through Certification personnel to take every opportunity for on-the-job training.

Several activities were initiated to plan the 1984/85 seed crop. A half-day evaluation and planning meeting with the 60 CAICO seed growers was carried out at the end of winter season. An evaluation and planning seminar was carried out with all soybean seed growers and local institutions, such as ANAPO, CIAT and Certification. Practical recommendations were prepared for wheat seed growers, who are small farmers from Comarapa and Vallegrande having from 0.5 to 5.0 hectares. This material was to be distributed with seed and other inputs to all cooperators of CIAT. Several news-letters were sent to seed growers in Santa Cruz, pointing out major weaknesses in technology observed in the field.

## 3. Installation and Use of Conditioning Plants

Warnes seed plant worked very effectively with little assistance from the Adviser during the semester. CAICO seed plant had already worked with a few tons of soybeans during the previous semester. Installation of Cordillera seed plant was being completed in September. With these three seed plants, local installed capacity has been increased to about four or five metric tons per hour.

The Adviser from Chuquisaca provided assistance on aspects related to seed plants in the region. Both advisers periodically evaluated the drying, conditioning and storage facilities of CAICO and Cordillera. Improvements were suggested for both plants regarding drying, screens needed for adequate cleaning, and minor changes in design and construction of acclimatized storage facilities. It is expected that for the next one to two years, constant orientation on all aspects (design, construction and use) of acclimatized storage will be needed to strengthen both soybean and

wheat seed programs. Further technical assistance and coordination will improve the utilization of the two new seed plants.

#### 4. Certification

This activity along with training were the two activities that required most time and effort of the Adviser. Certification in the region has several field inspectors and is active in coordination, technical orientation, and leadership of the program. As a result, it is an effective multiplying factor for the Adviser's time.

Assistance on inspections, sampling, analysis, tagging and recording keeping for all national certified seeds was intense. Imported seeds of corn, soybeans, sorghum and cotton were also sampled, analyzed and tagged. To accelerate tagging of national soybean seeds, it was recommended to sample and perform basic analyses in seed processing plants. This was found to be effective and desirable for future seasons.

At the end of the semester, an internal evaluation and planning seminar of seed certification was carried out. Guidelines on certification procedures were developed with the Regional Director of Certification. An evaluation chart was developed and a review team was established to provide an unbiased evaluation of applicants.

Red rice, a noxious weed with considerable potential to damage the rice industry, was identified in many rice fields. This problem does not have a simple solution, and will require considerable effort during this Project and future seed projects to stop it from spreading even more.

#### 5. Training

A training plan for 1984/85 was prepared in coordination with advisers from Yacuiba, Chuquisaca, local counterparts and Chemonics' Deputy Chief of Party. As the program is developing with more institutions participating, new seed companies being formed, new seed plants being installed, and new crops being incorporated in the seed program, training activities are becoming an essential activity.

Seed courses offered during the semester for the Santa Cruz area were two. The first, "Seed Production of Tropical Crops", was for seed growers with emphasis in corn and rice. Ten growers participated for three days. It was coordinated by Dr. Juan Landívar. The second course, also of three day duration, was carried out under the leadership of Ing. Jorge Rosales for leaders in communities which produce wheat seeds in the valley areas of Santa Cruz. These leaders will later be cooperators for the Seed Certification Service, of which Ing. Rosales is Director.

Seed courses were designed to fulfill specific objectives according to the needs of the program. They were offered only to persons directly involved in actual seed production. The three seed advisers and local counterparts from Certification and CIAT participated as instructors.

In-service training is another activity that is permanently carried out in the region, regarding daily activities and problems encountered in the region. Specific activities included testing for seed vigor by the

seedling classification method in soybeans, field inspections, tagging, and others.

#### 6. Other Activities

The Adviser dedicates considerable time to coordination among activities of the regional seed program. This responsibility is gradually being transferred to the Director of the Regional Seed Certification Service. This is desirable because the person in that position is the permanent secretary of the Regional Seed Council. Therefore he will be the key person who coordinates and orients activities in the future. Starting this semester, the Adviser has had less direct interaction with the Seed Council. Instead, orientation to the Council was provided through the permanent secretary and the executive secretary.

A communications expert worked in the region for three months to prepare a documentary film on seeds. Since there is no wheat, corn or rice production in winter, the documentary will not be completed until mid-1985. A one minute promotional spot about the advantages of planting certified seed was prepared and is ready to be used starting in March of 1985. In this activity, the seed Adviser concentrated on elaboration of the script and message of the film regarding seed technology.

Mass media communication about the seed program will be necessary in the future. Seed supply activities are developing at a rapid pace, but utilization of high-quality seed may be a limiting factor due to lack of information.

#### C. Summary and Recommendations

Objectives of the second semester of 1984 were met successfully. Outstanding results have been achieved in winter soybeans. The work carried out by Certification was more orderly and systematic than in the past. Given the importance of this aspect of the program, further orientation is urgently needed to assure its self sufficiency before the end of the T-059 Project.

The primary needs of the Certification Service are as follows:

1) A study to provide guidelines for the self financing of operating costs.

2) Adequate infrastructure for offices and laboratory.

3) Vehicles and laboratory equipment. Lab equipment is needed at the latest by March of 1985 to allow sufficient time for training of local technicians before the end of the T-059 Project.

The foundation seed supply component of the program is becoming a limiting factor for soybean and wheat seeds. The construction of the foundation seed plant and orientation for its self-sufficiency will be needed. This will require closer assistance from the Adviser and an economist.

In the future, the Project and advisers will need to concentrate on storage, training, promotion of certified seed, and financial self-sufficiency of public services within the program. These include: foundation seed production, conditioning services at Warnes, and certification services. Accomplishment of these objectives is essential for the continued growth of the program after the Project is finalized. This requires the permanent assistance of at least one seed adviser and partial assistance of one agricultural economist in the region.

## SECTION IIB

### SEED IMPROVEMENT, GRAN CHACO

#### A. Background and Objectives

Following the recommendations of the first Seed Round Table, the regional seed program included private seed producers in the multiplication component of the program during the 1983/84 growing season. Several private growers were registered as seed producers. Later the Integral Cooperative Gran Chaco decided to purchase the production from individual growers for processing and marketing. Poor weather conditions during the month of June reduced considerably the potential seed production of the region. By the beginning of this semester, practically all seed fields were harvested. Therefore the activities of the Adviser for the semester covered by this report were to continue support in the conditioning, storage and quality control of local seed production, as well as to develop a production strategy for the following season. Specifically the objectives set for this semester were:

- \* Help the Integral Cooperative in conditioning 50 tons of soybean seed produced by their growers.

- \* Assist and orient seed certification personnel in analyzing and tagging local seed as well as imported seed.

- \* Work with local institutions in preparing a work plan for the 1984/85 seed production season and in developing strategies for the program.

- \* Help in the registration of seed producers for the 1984/85 season.

- \* Work with the Integral Cooperative and with other institutions involved in seed production in the promotion of the seed program, and inform their cooperating growers about the scope of the program.

- \* Work with the Regional Seed Certification Service in establishing an office with two technicians and a secretary/bookkeeper.

- \* Offer a course on seed production of tropical crops, and organize meetings to discuss topics on seed production and related areas.

#### B. Progress

##### 1. Seed Conditioning

The drying and grading of the seed produced by the Integral Cooperative and other private producers was done locally. Drying was done using two sets of fan and burners to force heated air through a tunnel-like structure made out of bagged seed. Using this technique the seed was successfully dried to less than 13% moisture content in approximately 24 hours. Each tunnel-like structure was made up of approximately six metric tons of seed. Therefore we were able to complete this task in approxima-

tely one week.

The grading of the seed was done using a Clipper 27 air-screen cleaner. The seed was loaded using an elevator borrowed from the seed conditioning plant of Zudáñez. Since the seeds were free of the kinds of contaminants that are difficult to separate, the Clipper 27 successfully conditioned the seed to pass certification standards for the fiscalized seed class. Estimated capacity of the equipment was approximately one metric ton per hour.

## 2. Seed Certification

All the seed produced by the Integral Cooperative was sampled, tested and tagged by the Regional Seed Certification Service. Seed lots were sampled after being conditioned and tested to determine its physical purity, genetic purity, and germination. In addition of testing the Cooperative's seed, the Certification Service tested seed produced by other private growers and by IBTA. Results are shown in Table 1.

Plans were made to inspect all imported soybean seed available for sale in the region. However the seed was sold immediately after it arrived in Yacuiba. This was unfortunate because farmers purchased seed not knowing its actual germination (which can be used to calculate seed planting rate). Also by not testing the seed, Certification lost a significant amount of badly needed income.

Although the Seed Certification Service was able to test most of the seed available for sale, it needs to develop an organized procedure to sample, test and tag seed lots as soon as possible to avoid delay in the distribution of seed. It also needs to develop organized file and record keeping procedures.

## 3. Regional Seed Production Strategy

A seed production strategy was developed with the purpose of defining the responsibilities of the institutions involved in the regional program. The production plan included the expected role of public and private sectors in the program. It outlined production goals and defined responsibilities of each of the elements that make up the seed production chain. It was first presented to the Regional Seed Council. Once approved by local institutions, it was presented as the regional seed production strategy in the second National Seed Round Table and published in its proceedings.

## 4. Promotion of Regional Seed Program

This work was initiated with the Integral Cooperative by coordinating activities with its administrators and organizing meetings with potential seed producers. During the latter part of the semester two meetings were held. One of them was oriented toward the presentation of technical information on seed production. Approximately 20 local technicians, as well as seed producers, attended the meeting. The Second meeting was offered with the purpose of explaining to seed producers the scope of the program and the economic benefits they could obtain by becoming seed producers. The Integral Cooperative took advantage of the meeting to

Table 1

LABORATORY ANALYSIS OF LOCALLY PRODUCED SOYBEAN SEED AND OF  
IMPORTED COTTON SEED

Producer & Lot Id.	Crop	Variety	Quantity MT	Class	Percentage Pure Seed	Germination Percentage	Varietal Mixture Seed/Kg
<u>Cooperative:</u>							
Lot 1	Soybean	IAC-8	4.85	Fiscalized	99.60	80.00	10.00
Lot 2	Soybean	IAC-8	8.65	Fiscalized	99.60	83.30	10.00
Lot 3	Soybean	IAC-8	6.55	Fiscalized	99.70	87.60	6.00
Lot 4	Soybean	IAC-8	6.70	Fiscalized	99.60	87.30	14.00
Lot 5	Soybean	UFV-1	7.05	Fiscalized	99.50	84.00	4.00
Lot 6	Soybean	UFV-1	4.75	Clasif. Grain	96.50	82.70	96.00
Lot 7-8	Soybean	UFV-1	8.16	Fiscalized	99.70	86.70	4.00
Lot 9	Soybean	Cristalina	1.80	Fiscalized	97.50	84.30	10.00
Lot 10	Soybean	UFV-1	0.69	Foundation	99.88	80.00	8.00
Lot 1	Cotton	STN 825	10.00	Registered	-	73.00	-
<u>IBTA:</u>							
Lot 11	Soybean	UFV-1	15.00	Fiscalized	99.60	81.60	22.00
Lot 12	Soybean	<b>Cristalina</b>	3.60	Foundation	99.80	83.80	14.00 <sup>a</sup>
<u>F. Ferrari:</u>							
Lot 13	Soybean	UFV-1	4.00	Clasif. Grain	99.90	74.00	
Total Seed Analysed (mt).			----->	81.80			

a -- Segregation

present the scope of its seed production program to producers.

As a result of the involvement of private soybean growers in seed production and of the promotion of the program, a second group of growers became interested in developing their own seed production program. They formed a company called "Compañía Semillera Yacuiba" (COSEY). This has become the second seed company established in the Chaco region, the first one being the Integral Cooperative. Although COSEY had already begun its production program by the end of the semester, they were not registered as seed producers in the Certification Office. Other groups have shown interest but are not yet registered as seed producers.

Once interested growers are registered, they will receive a monthly newsletter with news about the seed program as well as technical information on seed production. By the end of this semester the first newsletter had been prepared, but was not yet distributed. This is because few growers were officially registered as seed producers.

#### 5. Establishment of the Regional Seed Certification Office

During the month of October, a new head of the Regional Seed Certification Office was assigned, Ing. Guido Revollo. The Adviser, with his new counterpart, developed plans to reorganize the Seed Certification Office. The reorganization of the Office was oriented toward improving the efficiency of the service and self finance its operation. To accomplish these goals, it was necessary to set up an office with two technicians and a secretary/bookkeeper. Early during this semester the national head of the seed department authorized the hiring of a technician and a secretary/bookkeeper.

Since financial contributions of private seed producers during the 1983/84 growing season were not sufficient to cover operating expenses for the following season, a feasibility study was prepared with the purpose of obtaining funds to cover the deficit. The study showed that, with projected production goals, it is possible for the Seed Certification Service to self finance its operation. The study was presented to the Coordination Office of MACA and later approved.

#### 6. Registration of Seed Producers

This activity was initiated during the latter part of the semester. The Adviser was mainly involved in helping seed companies and the Certification Service in developing a registration procedure of seed producers. However, by the end of the semester seed companies did not have their growers officially registered. This activity will be continued during the following semester.

#### 7. Training

During this semester an intensive training program was prepared by seed advisers of Chemonics. The training program included courses on several topics of seed production and technology. The training is offered at the national level. This semester two technicians of the Chaco region (one of IBTA, and one of MACA) attended a seed processing course. Later two Seed Certification Service technicians attended a course on seed certi-

fication. Both of these courses were offered in Santa Cruz. At the international level, a person from the region attended a course on management of seed companies in CIAT, Colombia.

A seed production course was offered in Yacuiba. Originally the course was planned with the participation of the seed advisers of Santa Cruz and Chuquisaca, as well as experienced technicians from Santa Cruz. However due to a national strike, the instructors could not travel to Yacuiba. The course was offered in the absence of the visiting instructors. Twenty local technicians and seed producers attended the course.

Besides the above, meetings were held with seed producers with the purpose of informing them on the scope of the program as well discussing techniques of seed production.

#### 8. Other Activities

Two other activities were carried on by the Adviser during this semester. These were:

\* Follow up on the construction of the seed processing plant of El Palmar.

This activity was done in coordination with Chemonics' civil engineer, Ing. Eddy Decormis. By the end of the semester, the construction of the seed plant was assigned to a construction company from Tarija. Work was to be initiated during the first week of January of 1985.

\* A feasibility study to determine the needs for funds to strengthen the services of the local Oil Crops and Grain Producers Association (APOGRA).

The study was done with the help of Chemonics' Chief of Party, Dr. Preston Pattie, and leaders of APOGRA. By Mid December it was finished and presented to the Board of Directors of the association.

#### C. Summary and Recommendations

Local seed production was well below expected levels, but for the first time in the Chaco private companies entered the production scheme.

Seven goals were set for this semester. The only one that was not fully completed was the registration of seed producers. Although seed companies seemed enthusiastic about the program, they did not fulfill the registration requirement for becoming seed producers. This is partly due to the lack of personnel to manage their seed program.

Experience gained this semester was positive. Seed produced by local companies was of acceptable quality. However it is highly recommended that seed companies hire full-time technicians to manage their programs. Otherwise the chances of obtaining the projected quantities of good quality seed may be seriously reduced.

Although the conditioning of the locally produced seed was done with severe limitations regarding equipment, it was carried out successfully. To condition larger quantities of seed, we need to assign this job to an institution with the capacity to maintain the equipment and hire personnel to manage the seed conditioning operation and to work in two shifts.

Considerable progress was made in certification services. The new Regional Director, Inq. Guido Revollo, is directly responsible for this improvement. Delays occurred in the tagging of the seed because of the unavailability of tags. However with the recent allocation of funds to the Certification Service, we believe that materials will be readily available and that the Service will be able to perform its responsibilities efficiently.

Our objectives for training at the local level were somewhat frustrated by the difficulties of travel to Yacuiha on the part of instructors from other regions of the country. However the planned courses were carried out. Courses at the national level were successfully offered with the participation of four technicians from this region. At the international level, a person from the region attended a course on management of seed companies in Colombia.

Since there is little chance for the seed conditioning plant of El Palmar to be ready by May of 1985, we recommend that CODETAR or the Integral Cooperative administer the conditioning of local seed. This is recommended because CODETAR and the Integral Cooperative are institutions with the capacity to maintain the equipment operational and hire the necessary personnel to keep up with the demand for conditioning services.

## SECTION IIC

### SEED IMPROVEMENT, CHUQUISACA/POTOSI

#### A. Background and Objectives

During the previous semester most activities revolved around the production of wheat seed. Even though harvesting had been almost totally completed by the end of June, no seed had been collected from farmers for conditioning and testing. Despite the availability of approximately 1000 tons of wheat seed, only about 14 percent of this volume was collected from farmers. Thus, activities of this semester involved processing and testing of this seed, as well as preparing for a more organized production program for the next growing season. Three hectares of Saquayo wheat seed were rogued with the purpose of having enough pure seed to plant around 30 hectares in 1984/85. The three lots had three percent or more of other varieties and had to be classified as fiscalized seed. Some foundation seed had to be purchased to overcome this shortage. A foundation seed program was needed to produce the required quantities of this category.

The following objectives were set forth:

- \* Collect and process approximately 140 tons of wheat seed.
- \* Transfer the seed testing laboratory from Zudáñez to Sucre.
- \* Conduct on-the-job training of MACA personnel in Chuquisaca and Potosí in the area of seed analysis for the labeling of the 1983/84 production.
- \* Support the Director and Small Grain Breeder of the Chinoli Experiment Station in preparing a foundation seed project to produce wheat, barley and potato seed.
- \* Present a document requesting the transfer of bulk storage bins in Tomina from the MICTP to the regional program.
- \* Design a seed conditioning plant for the feasibility study being conducted in Chuquisaca.
- \* Present a feasibility study of a seed processing plant to the Regional Seed Council.
- \* Install surge bins above the seed cleaner and bagger in the seed conditioning plant in Zudáñez.
- \* Select farmers and plant 20 hectares of wheat and barley foundation seed.
- \* Select farmers and plant 120-160 hectares of fiscalized seed.

## B. Progress

### 1. Foundation Seed

Roguing of fields was carried out with three farmers that produced wheat seed of the Saquayo variety. The harvested seed was taken to Zudáñez for conditioning in the MACA plant. After processing, a sample was taken from each lot and, among other tests, varietal purity was evaluated. This test indicated that this seed still had between 2-3 percent of other varieties, mainly Jaral and Quimori. Under these circumstances all lots were classified as fiscalized seed. Two varieties of foundation seed (Chinoli-65 and Chinoli-70) were being grown in the Chinoli Experiment Station in Potosí. The fields were properly rogued; a harvest of two tons was expected. Unfortunately early frost damaged most of the seed, drastically reducing the yield and lowering the germination and vigor, since most seed were still immature.

Following the recommendation of the First Round Table concerning the responsibility of the experiment stations in the production of foundation seed, a project was written for the production of wheat and barley foundation seed and potato seed for IBTA-Potosí. Through this project, IBTA would produce 20 hectares of foundation barley seed and 20 hectares of potato seed in Chinoli. Twenty hectares of foundation wheat seed were to be produced in Tomina and Zudáñez (Chuquisaca), to avoid the risk of early frost and hail. The project was presented to PL-480 in October for financing. However, after a visit to the IBTA Regional Office in Potosí, PL-480 rejected the funding. The project was considered well conceived, however they feared that IBTA lacked the personnel to carry it out.

Since no foundation seed was available locally for 1984/85, efforts were made to find other sources. CARE purchased 0.91 tons of Saquayo from CIAT in Santa Cruz and CORDECH purchased 0.23 tons of Totorá and 0.23 tons of Tarata from Cochabamba. By the end of the semester, farmers had been selected to plant this seed and multiply foundation seed. The three varieties previously mentioned might replace some of the most common varieties currently in use but already characterized by lower yields and susceptible to rusts.

### 2. Seed Certification

MACA's Seed Division had two technicians at the start of the semester. However Renán Rosas, who had been hired in April, left the Seed Division to join the CORDECH Soil Department. Unfortunately this vacancy had not been filled by the end of the semester. The Seed Division is in desperate need of an additional person. Chemonics hired Julio Loredó as a local technical assistant the first of November. He has since been working directly with MACA's only technician, Angel Claviño.

The seed testing laboratory in Zudáñez was moved to the MACA/Chemonics offices in Sucre. The new location provided ample space for the seed testing equipment as well as for work. Rent of the new place is presently handled by T-059 Project funds, but it is expected that in the near future the Seed Certification Service (SCS) will be self-supporting. Starting this year, the SCS charged for the services provided. None of the institutions objected to this procedure.

Twenty-five samples were drawn from the seed conditioning plant in Zudáñez and were taken to the laboratory in Sucre for testing. Routine testing included a purity test (to determine presence of other crops and weed seeds as well as inert matter) and a germination test. The results from these analyses are summarized in Table 1.

Table 1 SUMMARY OF LABORATORY REPORT CONCERNING WHEAT SEED CONDITIONED  
IN ZUDÁÑEZ PLANT

Variety	Pure Seed (%)	Germ. (%)	Other Crops (Seed/Kg)	Weed Seed (Seed/Kg)
Jaral	99.04	98.72	13.29	1.71
Quimori	98.91	98.75	67.50	0.00
Saguayo	99.65	98.82	1.31	8.88

A quick view of the previous table shows that the purity and germination of all lots were excellent. There was only one lot that had a lower germination than 96 percent. The reason for such high germination is mainly attributed to the excellent climate (mild temperature and low relative humidity). The presence of other crop seed in both Jaral and Quimori reflect the lack of field roguing. Most lots were contaminated with oats and barley which can be easily removed during the roguing procedure. By far the most common weed seed found in the samples tested was Buttonweed which can be easily controlled by herbicides (used by many farmers) or hand pulling.

Laboratory results indicate that, in the future, the presence of other crops and weed seed can be held to a minimum through supervised weed control. Routine analysis did not test for the presence of other varieties. But in a few samples such a test was run and most lots still contained around five percent of other varieties. Such high contamination with other varieties can hardly be lowered with the traditional farmers in the area. In order to have purer varieties, efforts will be made to intensely rogue fields of foundation seed, so that farmers producing certified seed will have to remove a much smaller percentage of other varieties, which they could be expected to do.

### 3. Seed Conditioning

Ninety-seven tons of wheat seed were conditioned in Zudáñez (see Table 2) using a Clipper No. 27 air and screen cleaner. This cleaner was equipped with a gasoline engine, which was hard to start and on many occasions would not start at all. In addition, the engine produced a large amount of smoke that, combined with dust, made a difficult environment in which to work. To overcome these problems, an electric motor was purchased with T-059 Project funds, once electricity was available in the plant.

Farmers that produced for MACA brought their seed to the seed conditioning plant in Zudáñez. CORDECH contracted MACA's truck to bring the

seed to the same plant and CARITAS brought a portion of the seed to Zudáñez on their own and left about 45 tons in Redención Pampa. The idea was to move one of MACA's cleaners to Redención Pampa to process that seed. Unfortunately the seed was never cleaned since CARITAS did not purchase bags.

Table 2 VOLUME OF WHEAT SEED CONDITIONED AND STORED IN ZUDÁÑEZ

Variety	Class	Volume	
		Cwt. (qq)	Tons
Jaral	Fiscalized	839	38.13
Quimori	Fiscalized	200	9.09
Saguayo	Fiscalized	1099	49.95

#### 4. Production of Commercial Seed

Due to late planting, a few lots were harvested as late as the middle of July. Neither CARITAS nor CORDECH had a defined mechanism for the recovery of the seed from the farmers. Each institution, including MACA, had contracts with farmers in which the farmer had the commitment of returning a certain volume of the seed harvested to pay back the seed given to him during the planting season. The institution that provided the seed to him had priority in purchasing the rest of his harvest at a price agreed upon by both parties. Because of the lack of a defined system for the collection of the seed from producers and insufficient funds to purchase the total production, institutions collected only that which the farmers owed them.

Following the recommendations of the Wheat Seed Project, CARE-CORDECH planted 250 hectares of Saguayo in the areas of Zudáñez and Tomina during the last two weeks of December. CARITAS planted 70 hectares of Saguayo in Tomina during the same time. As opposed to the previous growing season, planting this year was done early and with adequate moisture. Some farmers had previously been selected and during January the SCS will visit all potential seed growers to select the best fields. It is estimated that most of the harvest will take place in April and May and it is very likely that by that time an association of seed growers might have already been formed.

#### 5. Orientation of the Seed Program

The formation of the Regional Seed Council was mentioned in the previous report. Due to the large number of members in the Council, it became apparent from the beginning how difficult it was to get a quorum for regular meetings. To overcome this problem, an executive committee was elected and meetings have been held regularly with little difficulty. The members of the committee are CORDECH, MACA, CARITAS and IBTA. During this semester the Regional Seed Council has adopted several actions. A document was prepared and approved by the Council requesting from the Ministry of Industry, Commerce and Tourism (MICT) the transfer of the 600 ton bulk storage facility in Tomina to the regional seed program. Such facilities have not been in use during the last three years. Even though the Council had the support of AID/Bolivia and PL-480, MICT responded negatively.

The Regional Seed Council requested the funding of \$b 50,000,000 from P17-103 in order to help improve the services provided by the Regional Seed Certification Service. This came as a result of the difficulty of hiring another technician, mainly because of low salaries paid by MACA. This funding would allow the strengthening of the SCS during the first two years, after which period it should become self-supporting.

Nine people from Regional Seed Councils in Chuquisaca and Potosí participated in the Second Round Table in September. During the meeting it was recommended that a foundation seed program be established to serve both regions. It was also recommended that an association of seed growers be formed and that all seed produced in both regions receive the support of Certification, including barley seed produced for Cervicera Boliviana Nacional.

#### 6. Training

Several people received specialized training during this semester. A MACA technician in Chuquisaca participated in the Seed Drying, Conditioning and Storage short course taught in Santa Cruz during the first week of August. One seed inspector from MACA in Chuquisaca and one from Potosí, as well as a wheat breeder in Chinoli Experiment Station participated in the Seed Certification Short Course. One of them stayed an additional week for on-the-job training, and later on, another MACA technician in Potosí spent three weeks in Santa Cruz to receive training in wheat seed field inspections. One technician from CARE and another from CARITAS participated in the Seed Marketing Short Course that took place in CIAT/Columbia during the first three weeks of August. All this training was possible because of funds especially set aside for training in the Project budget.

#### 7. Seed Marketing

As opposed to other regions in the country, seed in this region reaches farmers through indexed credits. CBN provides barley growers with seed, but farmers do not pay in cash. At the end of the harvest they return part of their production as payment for the seed given to them. About 50 percent of the fiscalized wheat seed harvested in June-July was distributed to farmers for additional multiplication. The rest was utilized for grain production.

The advisers provided CARITAS a considerable amount of cooperation in reviewing the Charcas flour mill project. Initially a flour marketing study of the region was conducted, and later a project to provide technical assistance to the wheat growers was initiated. The latter focuses on an agricultural program that Charcas should undertake in order to improve yields and quality of locally produced wheat. One of the main components of the agricultural program is the introduction of improved varieties through a well established seed program. The document, which is expected to be finished by the end of January 1985, identifies a need of 105 tons of seed for 1985 and 1177 tons for the following two years. Such local demand would provide an excellent market for the wheat seed produced in the region.

#### B. Other Activities

Among this semester's objectives was the final preparation of the feasibility study of a seed conditioning plant in Chuquisaca. A preliminary design of these facilities was prepared in November. The proposed design assumes the installation of existing equipment in the Zudáñez plant as well as some equipment being purchased by the T-059 Project. Since all seed is handled in bags, a flat receiving area for 22 tons under roof was proposed. A storage warehouse for 2000 bags (90 tons) is adjacent to the plant. In order to have one ton per hour capacity, the design makes use of two Clipper 27 cleaners which would work in parallel. In addition, an Oliver-50 gravity table, a Gustafson 100-SS seed treater and a Howe-Richardson G-17 bagger would complete the plant. This plant would have enough capacity to condition the seed produced during the next few years, but it will require a very dynamic administration to be efficient. Because the regional seed program is in its initial stages, it has been very difficult to obtain information to complete the study. However it is estimated that the report will be completed by March of next semester.

#### C. Summary and Suggestions

Most of the objectives adopted during this semester were successfully met. Only 69 percent of the seed was conditioned and tested for routine analysis. The Certification Service played an important role during this semester, providing services in collection of seed from farmers, conditioning seed in Zudáñez, sampling of processed seed lots, testing for purity and germination and labeling bags. All of these services were provided for a fair charge which will permit improving the services provided. Since the transfer of the seed testing laboratory to Sucre, better services have been provided and closer contact with the institutions has been achieved.

A Foundation Seed Project was prepared and presented to PL-480 for financing. The project was well received but funding was not provided due to the instability of personnel in Chinoli. Despite this limitation CARE and CORDECH purchased enough seed to plant 11 hectares of foundation seed during the next growing season. This will prevent disrupting the goals of the regional program for the next few years. A document requesting the transfer of the bulk storage facility in Tomina to the regional seed program was prepared, approved by the Regional Seed Council and sent to MICT. Despite the fact that such facilities are not in use, MICT did not accept the request.

The feasibility study of a seed conditioning plant in Chuquisaca was not finished in this semester. A design of a seed conditioning plant which would utilize existing equipment in Zudáñez plant, as well as equipment being purchased by the Project, was prepared. The installation of surge bins above the cleaner and bagger in Zudáñez was not done because they could only be used in conjunction with elevators. The elevators needed electricity. When this was finally installed, the money previously budgeted had already been affected by two devaluations. These funds were used instead to buy an electric motor for the cleaner in Zudáñez.

The support that the Project has provided the regional program through an economist has played a very important role in accelerating the develop-

ment of activities in the region. Three studies or projects have been completed and presented this semester and two more will be completed by the beginning of next semester: the feasibility study for the seed conditioning plant and the agricultural program for Charcas. The latter will provide valuable information for the seed program, since it will reflect the demand for improved seed in the region.

One of the weakest elements and vital importance to the program is the Seed Division. It continues to be understaffed, a factor that greatly limits its efficiency. It is therefore recommended that at least one more person be hired as soon as possible, since it will not be possible to create the Seed Certification Service until this unit is properly staffed. It is also hoped that the IBTA Experiment Station in Chinoli will obtain the funding to establish the foundation seed program for the Potosí-Chuquisaca region. It is important that such a program be as closely affiliated as possible to the variety testing program.

During the next semester it is expected that projected volumes of wheat seed for the region will be produced. Therefore, one of the main objectives in the following semester will be to support the SCS in inspection and processing of this seed.

SECTION III  
CONSTRUCTIONS

A. Background and Objectives

Most construction projects and related activities from the first semester of 1984 were still pending during the present semester. However, the Adviser's role in many of these projects was reduced. This is because financing sources were found outside the T-059 Project and responsibility of implementing Projects was shifted to local institutions. The original objectives for the second semester of 1984 were:

\* Arrive at a definitive solution to the conflict among CINDECO Ltda., MACA and USAID regarding payments for readjustments for work done in the Warnes Seed Plant.

\* Conclude the construction of drying bins for IBTA, El Algarrobal by the end of the year.

\* Follow up with CIAT and PL 480 regarding the construction of access roads into the Warnes plant.

\* Provide support as required in the supervision of construction of the foundation seed processing plant in CIAT/Saavedra.

\* Support MACA and IBTA in order to reactivate the construction of facilities in the Toralapa Experiment Station.

\* Collaborate with and encourage CODETAR to comply with the schedule of activities for the seed processing plant in the Gran Chaco.

\* Conclude in December the first phase of a program for analysis of unitary prices for constructions.

\* Provide engineering support relative to the feasibility study for a seed processing plant in Chuquisaca.

Two new objectives were defined in the course of the semester. The first was contemplated in the 1984 Implementation Plan for the T-059 Project, while the second came about as a result of a feasibility study done by Chemonics for Caritas in Chuquisaca.

\* Develop designs and budgets for installation of seed processing equipment in Chuquisaca, Potosí and Tarija.

\* Assist in possible pre-designs, quotations and budgets for the feasibility study for a flour mill in Tarabuco.

## B. Progress

1. Project: SMALL CONSTRUCTIONS (EXTENSTON)  
Location: SEED PROCESSING PLANT. WARNES, SANTA CRUZ

The analysis and legal report entrusted by the Coordination Office to Dr. Hidalgo was submitted at the end of July. A series of meetings were held between the Coordination Office and USAID officials, however the latter still presented some objections. Dr. Ladislao Vásquez, Legal Adviser of USAID, held conversations with Ing. Jorge Landívar, Manager of CINDECO Ltda. Thanks to these talks Landívar sent a proposal with the purpose of reaching liquidation.

Ing. Decormis analyzed the proposal and sent a final recommendation to USAID. The Adviser recommended to accept the proposal of CINDECO Ltda. since it suits the interests of the T-059 Project. It consists of paying readjustments in a practically symbolic way up to January 1984, leaving aside the fact that in reality this problem had been delayed until October of the same year.

The vouchers under conflict have now been paid to CINDECO Ltda., and this construction project has been liquidated.

2. Project: SEED DRYING BINS  
Location: IBTA EXPERIMENT STATION. GRAN CHACO

During an inspection trip made by the Adviser at the end of July, it was evident that CODETAR-Yacuiba lacks the capability to carry out this and other projects. At that time, work on the drying bins had just gotten underway, but with a series of errors. The Adviser had to increase his attention to this project to insure that it be carried out within assigned deadlines.

In September it was estimated that the bins were only 40 percent complete, and at the last inspection at the end of November, there was 70 percent progress. Assembly of metallic roof and burners remained to be accomplished, as well as minor aspects of the bins themselves.

3. Project: ACCESS ROADS  
Location: SEED PROCESSING PLANT. WARNES

At the request of CIAT, the Adviser contacted the PL-480 Project on two occasions to speed up authorization and disbursement of funds.

According to recent information from Ing. Carlos Roca, Executive Director of CIAT, the purchase of most of the required material has already been carried out. However, construction has not been initiated in spite of the fact that a contract has been awarded to a private contractor. This was done with technical support from CORDECruz. The Adviser occupied only a small amount of time in this activity.

4. Project: FOUNDATION SEED PROCESSING PLANT  
Location: CIAT EXPERIMENT STATION. SAAVEDRA

Also in this area, the role of the Adviser was minimum. At the end of October he was called by CIAT in order to provide orientation to the new Director, Ing. Roca, about the details and current status of this project. In meetings held with CIAT officials in mid-November it was verified that the project was at a standstill. Documentation relating to the design, submitted to PL-480 by the previous Director of CIAT to obtain approval and financing, had been lost. As a result, misunderstandings had arisen.

The Adviser was able to establish that evidently an important part of the design had been misplaced in offices of PL-480. However, after the missing materials had been recovered and documentation was reviewed with technicians of PL-480, it was found to lack the required detail. Completing designs and submitting the project to PL-480 is now the sole responsibility of CIAT.

5. Project: COMPLETION OF CONSTRUCTIONS  
Location: IBTA EXPERIMENT STATION. TORALAPA, COCHABAMBA

At the end of July, Dr. Juan Hidalgo, legal adviser of IBTA, submitted a proposal in order to achieve the reinitiation of construction by the same company which had partially executed the project in 1980. This was based on another technical-administrative proposal prepared earlier by Ing. Decormis. Both proposals were based on recommendations already given by IBTA at the end of 1983 and which apparently had the tacit approval of USAID.

Nevertheless, in August, USAID objected to the proposed scheme, pointing out that the construction company CASEM Ltda. had failed to comply with various contracts. However, USAID couldn't certify this assertion in an official manner. USAID proposed to liquidate the contract with CASEM, having in this manner moved back to the original position of September 1983.

The Adviser was commended to begin new dealings with the construction company on this basis. Since September negotiations started with CASEM, frequently facing an apparent lack of interest on the part of the construction company. Finally at the end of the year, an overall agreement was achieved. The basis and mechanism with which to proceed with the liquidation were tentatively defined. Preparation of the final, detailed proposal to USAID remained as a task for the next period.

6. Project: SEED PROCESSING PLANT  
Location: EL PALMAR, GRAN CHACO OF TARIJA

Delays were experienced in obtaining a special decree in favor of CODETAR which would permit the latter to award its public works by means of direct invitations. Hence, it was decided to proceed in the traditional manner of public bidding. CODETAR announced that its Tarija offices would carry out this task in July.

However, during a trip made by the Adviser to Yacuiba in mid-July, he found that the designs and other documents needed to put the project up for bids were still in the Regional Office of Yacuiba. Corrections, which the Adviser had indicated in February, had not been made, despite the fact that for months CODETAR had given assurance that the designs had already been corrected.

The Adviser himself corrected the documents with CODETAR personnel in Yacuiba. Also, he performed a land survey of the proposed terrain. Again CODETAR promised that the final documentation would be sent to Tarija in order to proceed with public bidding by early August.

At the end of August, the Adviser was convened to go to Tarija with the purpose of launching the bidding. In meetings held with Ing. Aldo Forti, Director of Project Execution in CODETAR, and other technicians of that office, final revisions of the documents were made. CODETAR again made a commitment to comply with a very ambitious work plan, as noted by the Adviser. This included termination of the facilities by March 1985.

During the following months little or nothing was known about the project, not even with the help of the President of CODETAR, Ing. René Navajas. During another visit by the Adviser to Yacuiba at the end of November, it was discovered that the process had just reached the stage of opening envelopes containing bids. However the process was at a standstill because of a national strike. A climate of discontent with CODETAR in regional organizations of Yacuiba arose as a result.

On November 22 during an extended meeting of the Regional Seed Council and the Civic Committee of Yacuiba, a resolution was hastily prepared demanding that management of the project be reverted to the Regional Office of CODETAR in Yacuiba. This Office would carry out the construction by direct administration. Full support of the Provincial Planning and Execution Office (OPPEJ) was promised. However, the last communication from the Regional Seed Council with USAID in early December indicates that the project was awarded to the Construction Company COLTA of Tarija.

7. Project: COMPUTERIZED ANALYSIS OF UNIT PRICES AND CONSTRUCTION SPECIFICATIONS  
Location: OFFICE OF CHEMONICS INTERNATIONAL, LA PAZ

Regarding unit price analysis, the Adviser studied appropriate ways of transcription of data available in different offices. He attended courses on operation of the Wang computer and its utility packages. Material corresponding to technical, legal and administrative specifications was prepared for its subsequent transcription.

In November, the Coordination Office and the Adviser agreed on the possibility of transferring the results of this job to the PL 480 Project to assist with the various construction projects financed by this institution. Early contacts with PL-480 were made by the Adviser. Technicians of this institution showed great interest in the idea. Consequently, Lic. Canedo took responsibility for making official contacts and agreements with PL-480.

8. Projects: SEED PROCESSING PLANTS  
Location: ZUDAÑEZ, BETANZOS, LAS BARRANCAS

At the end of November, Dr. Edgar Cabrera sent plans for a seed processing plant in Chuquisaca. The Adviser prepared preliminary architectural designs, an approximate budget and requested a series of complementary data with the purpose of arriving at more accurate specifications. Later however, Dr. Cabrera indicated that the presupposed conditions for construction of the plant had suffered considerable change. Therefore, it was necessary to await the new basis for the design in order to continue.

At the same time, he sent plans for metallic hoppers for the plants in Betanzos (Potosí) and Las Barrancas (Tarija). The Adviser is currently obtaining quotations from construction companies for these facilities.

9. Project: FLOUR MILL  
Location: TARABUCO, CHUQUISACA

During December the Adviser obtained information on aspects related to the flour milling industry and cooperated with Lic. Gover Barja in the feasibility study being carried out by Chemonics. Information obtained includes identification of machinery suppliers and other inputs of milling infrastructure. Quotations were also obtained in order to prepare budgets.

### C. Summary and Suggestions

Throughout the year 1984, the T-059 Project has experienced a re-orientation in the sense that financing of construction projects has been transferred to other institutions. This transition process, as well as the liquidation of projects already underway, have implied increasing amounts of administrative and legal work for the Adviser. This has characterized the activity of the Adviser in Civil Engineering during the previous period.

Objectives in terms of liquidation of on-going projects--light constructions in Warnes and buildings at Toralapa--have been met. The peculiar conditions of the legal-administrative order in Bolivia, aggravated by accelerated inflation and instability of the country, made it necessary to devote large amounts of time to this activity.

The possibility of carrying out a strictly technical role in design, budgeting, supervision of construction, etc. appears diminished since the new projects have been gradually transferred to other institutions, for example: access roads in the Warnes seed plant and construction of the foundation seed plant in Saavedra to PL-480; processing plant of El Palmar to CODETAR. The technical contribution of the Adviser has been gradually passing to a role of complementary support. Objectives are in terms of orienting and encouraging institutions outside the T-059 Project to proceed with construction projects. Objectives in this area have only partially been met.

Technical support in the area of Civil Engineering is scheduled to terminate at the end of March, 1985. Hence, it is important to conclude

activities for which the T-059 Project has primary responsibility, including pending administrative matters involving on-going construction projects. This strategy was set forth in the evaluation meeting in Santa Cruz in mid-December in which representatives of MACA and USAID participated.

CHARACTERISTICS OF CIVIL CONSTRUCTIONS AND/OR PROJECTS UNDER ASSISTANCE OF THE ADVISER IN CIVIL ENGINEERING

IDENTIFICATION		LOCATION	BENEFICIARY INSTITUTION	FINANCE ENTITY	QUANTITY OF WORK TO BE CARRIED OUT	ORIGINAL BUDGET		ESTIMATED DURATION (Cal. days)	PERCENTAGE OF WORK PROGRESS BY DEC. 1984	EXECUTING COMPANY	PRESENT STATUS
No.	PROJECT					AMOUNT (\$b)	DATE				
1.	Seed Processing Plant Extension	Warnes Santa Cruz	CIAT - MACA	Proj. T-059	182 m2 constructed	4379858.00	May 83	60 days	100 %	CINDECO LTDA. Constructors	Fully liquidated
2.	Seed Drying Bins	Yacuiba Tarija	IBTA	Proj. T-059	67 m2 covered	4164813.60	Aug 83	80 days	75 %	CODETAR	Works in process of Yacuiba Office termination
3.	Access Roads - Seed Processing Plant	Warnes Santa Cruz	CIAT - MACA	Proj. PL-480	1460 m2 paving	64221084.00	Mar 84	70 days		CORDECRUZ Rafael Herran Sub-contractor	Works in the initial stage of construction
4.	Foundation Seed Processing Plant	Saavedra Santa Cruz	CIAT	Proj. PL-480	816 m2 covered 704 m2 graveled (+106 m2 covered)*	374825000.00 (+73656000.00)*	May 84	200 days	0 %	GALINDO Consultors	In the stage of final design
5.	Completion of Civil Constructions-Extension	Toralapa Cochabamba	IBTA	****	1186 m2 constructed	2742579.84 (58153000.00)**	Aug 78 (Dec 83)**	365 days (150 days)**	50-60 %	CASEM LTDA. Constructors	In process of liquidation of contract w/CASEM LTDA.
6.	Seed Processing Plant	Yacuiba Tarija	CODETAR	CODETAR	534 m2 covered	78452335.00	Jan 84	180 days	5-10 %	COLTA Constructors	In initial stage of execution
7.	Seed Processing Plant	Zudanez Chuquisaca	MACA CORDECH	Proj. T-059	296 m2 constructed (net processing area)	658152000.00	Dec 84	110 days	0 %	CHEMONICS	Awarding of contract
8.	Seed Processing Plant	Betanzos Potosí	MACA	Proj. T-059	****	****	****	****	0 %	CHEMONICS	Awarding of contract
9.	Seed Processing Plant	Las barrancas Tarija	MACA	Proj. T-059	****	****	****	****	0 %	CHEMONICS	Awarding of contract
10.	Milling Industry	Tarabuco Chuquisaca	CARITAS	World Bank	****	****	****	****	0 %	CARITAS CHEMONICS	In feasibility study stage
11.	Air-conditioned warehouses	Okinawa Santa Cruz	Farm Cooperative	Self-financing	****	****	****	****	0 %	CHEMONICS	In feasibility study stage

\* Budget corresponding to the second stage proposed in the feasibility study

\*\* Up to date budget at Dec-83 corresponding to the remaining part of works to be executed

\*\*\* All data on basis of assumptions of the feasibility study

\*\*\*\* To be defined

30

## SECTION IV

### SOIL CONSERVATION

#### A. Background and Objectives

The second semester of the year corresponds to the dry season in which terrace construction is the main objective. The Adviser in this area works with a principal counterpart from IBTA, Ing. Jorge Balderrama. However, because of the need to train Bolivian technicians in this area, and also the heavy work-load in the field, three trainees were given scholarships by the Project with the idea that they would help in executing field work.

Objectives in the soil conservation program were:

- \* Survey and construct terraces on 400 hectares in the Yacuiba valley, Caraparí and Villamontes.

- \* Carry out aerial flights with small plane in August-September to take photos and video tapes of existing terraces and of the areas in the Gran chaco where the greatest damages exist in the various small watersheds from the unprecedented rains of the past two years.

- \* Provide in-service training in soil conservation to two persons from CODETAR, IBTA or the University Juan Misael Saracho of Tarija.

- \* Guide and assist trainees in preparing their theses for university credit, and also for pursuing the field of soil erosion control for future careers.

- \* Prepare educational materials in soil conservation for television and radio.

Technical assistance from the T-059 Project is scheduled to be completed for the Gran Chaco in January of 1985. An end of tour report is being prepared by the Adviser with more detail than is contained in this Progress Report.

#### B. Progress

##### 1. Weather Data

During the first semester of 1984 a summary was made of weather data from December 1983 through June 1984. It revealed that rains during these months totaled 1,754.9 millimeters. In seven months the total was 500 millimeters more than the average of the same months over the last 34 years. March was an unusual month with a total of 724.9 millimeters, being an occurrence with a probability of once in 50 years or more.

The intense and heavy rains which occurred during this time caused a great deal of damage in the lower watershed areas near the middle of the valley and especially where the principal drainage ways crossed the railroad and the main highway between Yacuiba, Palmar Chico and Villamontes.

Damages were especially heavy in the watershed areas of south San Isidro, north San Isidro, Caipitandi and Límites, Campo Pajoso, and near El Algarrobal.

A summary of rainfall data was completed in December for the past 35 years based on data from AASANA at the Yacuiba airport. The year 1984 was a record year for rainfall in this area with the total of 2,622.5 millimeters. This is more than twice the average annual rainfall for the past 35 years. Damage continued in the watershed areas mentioned above with even greater damages in November and December in the Caipitandi watershed area on the railroad and highway. A new large gullied area has been formed with tremendous outwashes of sand, soil and debris south of Campo Pajoso. (See Table 1, Rainfall Data Summary for 35 years 1950-1984.)

Terraces constructed in the dry season of 1983 were put to a real test during the early part of the year and later during November and December of 1984. These terraces performed well in almost all cases except where terraces were not cleared of weeds and trash or where waterways which served as drainageways were not well constructed or established. In these cases some damage occurred and several meters of terrace were washed away by the unprecedented rains.

## 2. Terrace Construction

During the dry season and the initial part of the present rainy season in November and December, 242 hectares of terraces were constructed by roadgrader and Caterpillar tractor. The interested reader should refer to the Adviser's End of Tour Report for technical detail regarding terrace construction. Table 2 summarizes costs of building terraces.

## 3. Training of Students with Scholarships in Soil Conservation

Initially two students were to be given scholarships by the Project to be incorporated into the technical team and thereby gain experience and an appreciation of conservation methods. However, due to the intense interest expressed by several candidates, the number of scholarships was increased to three. Two university students and one recent graduate were provided scholarships. They are:

- Egresado René Padilla, Universidad Juan Misael Saracho of Tarija
- Egresado Adhemar Soliz, Universidad Juan Misael Saracho of Tarija
- Ing. Walter Vildoso

In addition, a young Argentine agronomist, Ing. Arturo Pechuan, learned of the program from relatives in Bolivia, and on his own initiative, participated for several months as a trainee without scholarship.

All four trainees were given practical experience in the techniques of survey in location of terraces by level and in mapping fields of cooperating farmers with a plane table. They also were given experience in supervision of actual terrace construction by roadgrader and Caterpillar bulldozer.

The Soil Conservation Adviser is helping René Padilla with his thesis in erosion control. Chemonics' Chief of Party is providing guidance to

Table 1

RAINFALL DATA SUMMARY IN MILLIMETERS, FOR 35 YEARS FROM 1950 - 1984AASANA - YACUIBA AIRPORT(S22°01' - W63°43', Height: 530 mts.asl)

Year	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	130.6	260.5	202.2	18.1	24.8	30.8	2.2	0	18.4	46.6	28.2	52.9	815.3
1951	125.9	245.2	192.8	60.0	8.3	0.7	3.8	0	1.3	77.6	105.4	491.0	1313.0
1952	200.3	181.0	130.2	19.1	13.9	9.7	0	4.4	12.5	83.6	126.8	156.0	937.5
1953	253.1	157.5	168.7	130.1	57.9	22.6	8.6	0	0	124.6	98.8	133.3	1155.2
1954	145.1	218.9	233.3	59.3	22.6	23.2	22.6	5.9	18.9	108.6	91.3	47.3	997.0
1955	154.0	189.9	338.1	2.4	25.3	7.2	0	0	0	20.0	156.0	94.4	987.3
1956	210.3	170.0	21.0	58.0	1.5	26.0	8.0	79.0	5.0	74.0	141.0	98.8	894.3
1957	200.0	220.0	68.0	81.4	36.2	2.0	0	52.2	36.0	67.0	164.6	186.8	1114.2
1958	275.0	243.0	111.0	40.6	37.0	9.0	0	2.0	0	111.4	63.0	210.6	1102.6
1959	292.0	168.0	163.0	81.5	17.0	23.2	0	10.8	2.0	27.0	208.0	137.0	1129.5
1960	424.1	260.0	386.5	75.0	24.7	6.0	12.6	0	0	47.5	135.0	289.5	1660.9
1961	210.5	300.0	208.0	311.0	115.2	4.0	5.0	0	8.0	96.0	180.0	96.0	1533.9
1962	94.0	105.0	80.6	118.0	18.8	0	6.0	0	11.2	36.0	105.0	78.0	652.6
1963	197.0	97.6	159.6	151.0	38.6	40.0	23.7	0	1.8	2.8	52.7	87.7	852.5
1964	105.0	175.2	254.0	66.8	18.6	0	0.8	0	10.0	42.0	103.0	109.0	884.4
1965	260.6	181.0	39.5	55.0	23.3	6.0	1.0	1.0	25.0	22.7	71.0	181.0	867.1
1966	285.0	121.6	159.8	121.5	65.2	22.7	0	0	0	152.1	56.5	98.0	1082.4
1967	95.0	95.9	166.4	19.5	45.0	5.0	3.5	4.8	22.5	109.0	208.0	104.0	878.6
1968	93.5	223.5	60.0	25.0	0	16.5	4.0	55.7	4.0	92.6	157.0	77.0	808.8
1969	93.8	191.2	18.0	108.0	49.3	11.0	0	0	2.0	19.8	105.5	169.0	767.6
1970	88.1	177.0	274.5	107.2	43.8	15.3	4.0	0	19.8	39.0	35.0	124.3	928.1
1971	126.8	168.0	257.4	74.8	6.0	3.1	0	0	6.0	38.3	64.0	191.0	935.4
1972	188.1	73.5	95.9	69.2	21.7	32.4	4.9	10.5	9.0	3.8	41.6	232.6	783.2
1973	157.7	128.5	300.5	90.6	55.4	40.2	11.1	1.4	2.0	14.5	198.1	124.6	1124.6
1974	179.5	147.1	177.5	247.2	15.0	18.0	13.5	1.5	10.0	56.5	82.0	153.0	1100.8
1975	95.0	61.5	89.0	54.6	18.1	34.8	3.0	6.5	10.5	26.0	80.0	128.5	607.5
1976	170.8	142.8	155.5	4.5	11.9	0	3.5	2.5	6.0	31.6	35.5	158.5	723.1
1977	203.0	31.0	216.5	44.4	45.8	37.0	11.0	11.0	18.0	22.0	164.0	306.8	1110.5
1978	151.0	242.0	127.4	124.5	11.5	0	0	0	0	38.8	53.5	172.0	920.7
1979	361.0	239.0	539.0	153.0	26.0	16.0	17.0	47.7	11.2	34.5	162.8	278.6	1885.8
1980	358.0	226.0	309.2	79.2	11.0	16.0	1.0	10.5	0	115.0	155.6	134.2	1415.7
1981	470.4	373.2	142.7	266.9	66.7	1.0	1.0	16.4	2.5	0	94.8	157.1	1592.7
1982	263.3	220.9	478.2	311.5	9.0	27.3	34.5	6.5	10.0	11.0	125.8	180.5	1678.5
1983	497.1	287.0	103.8	175.2	175.0	17.8	33.6	4.2	5.1	37.0	91.0	255.0	1681.8
1984	460.0	330.0	724.9	148.3	8.0	84.0	5.8	129.0	0	68.0	153.0	511.5	2622.5
Average	217.6	190.1	204.4	101.5	33.4	17.4	7.0	13.2	8.2	54.2	111.2	171.6	1129.9

Table 2

COST OF TERRACE CONSTRUCTION IN DEMONSTRATION AREAS, 1984

Place	Cooperator <sup>b</sup>	Area Has.	Slope %	Terra- ces N°	Lenght Meters	Machinery Hours		Machinery Cost		Total Cost \$b	Cost per Hectare \$b
						Road- grader	D-7 Tractor	Road- grader	D-7 Tractor		
1. Lapachal Bajo	René Pantoja	10	1-3	4	645	3	1	450,000	1,000,000	1,450,000	145,000
2. Lapachal Alto	Alberto Quiroga	37	3-5	9	3,900	32.2	4.5	4,830,000	1,125,000	5,955,000	160,946
3. Campo Grande	Arcil Vásquez	20	3-5	5	1,680	12.5	-	1,875,000	-	1,875,000	62,500
4. Campo Grande	Rufino Vallejos	15	1-3	3	875	5	2.8	750,000	700,000	1,450,000	96,666
5. Fananti	Marcelo Pantoja	100	1-3	3	2,430	22.41	-	3,361,500	-	3,361,500	33,615
6. Yaguacua	Jorge Palacios <sup>a</sup>	60	3-5	12	1,250	34.25	10.23	17,125,000	10,230,000	27,355,000	455,916
		242	1-5	36	10,860	109.36	17.53	28,391,500	12,055,000	41,446,500	171,266

\$us 20.00

a New price at December 1984: D-7 Tractor 1,000,000/Hour  
Roadgrader 500,000/Hour

b Each Cooperator pays 50% of the cost  
Chemonics-IBTA-MACA pay 50% of the cost

Adhemar Soliz on his thesis regarding farmer adoption of conservation methods in the Gran Chaco. For this purpose, a study design was developed including a survey methodology. The methodology contemplates a survey of about 40 farmers in the Gran Chaco, including about 20 farmers who have carried out conservation practices, and about 20 who have not. Mr. Soliz will apply the survey in the Chaco in January.

During April to August of 1985 these three graduate students will be given the opportunity to attend the National University of Agriculture at La Molina, Lima, Perú in a special graduate course in "The Management and Conservation of Soils". Upon their return they will be given employment in IBTA and CODETAR in the soil conservation program in the Gran Chaco.

#### 4. Video-Filming of the Soil Conservation Program in Yacuiba

This was one of the chief items of progress during the latter part of the semester. Omar Serritella, a visual-aids expert of Chemonics, arrived in Yacuiba and completed the filming of the Soil Conservation Program, which will be entitled "Soil Erosion in Bolivia". There are scenes which depict the damage of erosion in this area, as well as the steps in erosion control, from survey of terraces to actual construction of terraces with roadgrader and Caterpillar tractor. The result will be a 20-30 minute documentary video presentation.

The ultimate goal will be the distribution and showing in various sectors of Bolivia to educate the general public and campesinos of the importance of erosion control in their communities and farms. Secondary school and university showings will help to orient students regarding the importance of erosion control. In the future, Bolivia must create more awareness among its technicians as well as future farmers for participating in all facets of erosion control in watershed areas and in appropriate farms.

#### 5. Training of Technical Personnel

A course on erosion control was presented by Chemonics in Yacuiba during the early part of November. The course was of intensive duration of two weeks. Two special instructors gave theoretical presentations during the first week: Julio Luna, erosion control specialist of INTA, Metán, Argentina; and Fred Tracy, Chemonics erosion control specialist of Tegucigalpa, Honduras. A great deal of interest was evidenced by participants. Practical experience in the field during the second week of the course was guided by the Adviser with his IBTA counterpart. (See the following section on Training in Natural Resources for further details.)

#### C. Summary and Suggestions

Only 242 hectares received terrace construction during this period out of the possible projected 400 hectares. Reasons for this short-fall was because of innumerable strikes, more than normal rainfall during the period, and the inability of CODETAR to supply the service of the roadgrader and Caterpillar tractor when the program required them. A large amount of repairs of the roadgrader contributed to make it unavailable.

Scheduling of the equipment of CODETAR will continue to have high

priority for the soil conservation work. It has been proposed that the D-4 Caterpillar tractor of CODETAR be repaired and used exclusively for assistance in terrace construction. Repair parts have been purchased and it is planned to have this tractor ready to assist in terrace construction during the dry season of 1985. In addition it has been suggested to purchase a roadgrader for the soil conservation program, which is available in the heavy equipment company, INTERMACO, in La Paz.

Training which three individuals have received in Yacuiha and the ensuing training at La Molina in Perú should assist greatly in placing each of them in a responsible position in erosion control with IBTA, MACA or CODETAR.

Final plans have not yet materialized to introduce the principle of minimum tillage and direct seeding for supplementing terrace construction. However it is hoped that funds will eventually be made available for purchase of a chisel plow and direct seeding drill for initial demonstrations.

It is also proposed in the budget this year to purchase from Argentina 50 or more kilograms of grass seed of Rhodes (*Chloris gayana*) for seeding in grass waterways. These waterways serve as the principal drainageways for terraces to protect them from erosion. This should be given high priority in the near future.

The prime goal of extending knowledge of the importance of conservation of natural resources throughout the country and to organize effective programs in each area to conserve soils, forests and other renewable natural resources, should remain of principal importance. The video filming, distribution of materials, and wide viewing is one step in this direction.

## SECTION V

### TRAINING IN NATURAL RESOURCES

#### A. Background and Objectives

This area of work came about in 1983 as a result of initiatives taken by institutions in Tarija with USAID. The original idea for this component of the Project was to present a series of at least five graduate courses for Bolivian technicians in areas such as land use classification, reforestation, soil conservation, irrigation, watershed management, and others. The first course on land classification was given in 1983. Chemonics assisted with the employment of a foreign adviser from Costa Rica, Dr. Joseph Tosi.

However subsequent courses were not organized as initially planned. In July Chemonics offered to present a course in Soil Conservation in conjunction with our on-going work in the Gran Chaco. Later, USAID organized a course in irrigation engineering for Tarija.

Consequently, the objectives for this new area of work were:

- \* To prepare and present a two-week intensive course on soil conservation in the Gran Chaco.

- \* Assist USAID and local institutions in Tarija with a local instructor for the presentation of a course in irrigation engineering in Tarija.

#### B. Progress

The Soil Conservation Course was scheduled for November in order to avoid conflicts with field work in construction of terraces. Because of the heavy schedule of the soils Adviser and his counterpart, it was seen that a special local instructor would be needed to help organize and prepare the course. Ing. Juan Arandia was hired for this purpose for a period of about two months.

Initial tasks were to prepare a preliminary outline for the course in cooperation with the soils Adviser. An invitation pamphlet was prepared and distributed throughout the country. Selection criteria were defined to chose 18 participants. Then Ing. Arandia assisted in selection of foreign advisers to help present theoretical aspects of soil conservation and soil science. Care was taken to include foreign instructors who would bring different experiences from other Latin American countries.

The two specialists who came to Bolivia for the course were:

- 1) Mr. Fred C. Tracy, erosion control specialist working with a Chemonics Project in Tegucigalpa, Honduras. Mr. Tracy was hired as a short-term adviser for a period of two weeks.

- 2) Ing. Julio Luna, who was loaned to Chemonics from INTA, Argentina for two weeks. The T-059 Project paid only travel costs for Ing. Luna.

In addition, Chemonics' Chief of Party took part by presenting institutional alternatives for organization of soil conservation programs in Bolivia. Field practice was guided by the soils Adviser, his local counterpart from IBTA, and the four trainees who were participating in the Soil Conservation Program in the Gran Chaco. (See the previous section for details.)

Advertising for the course was done through national and local newspapers initially, and then through the CICTAR professional Bulletin for the agriculture sector. About 60 applications were received. Roughly half of these were generated by announcements in newspapers and half from the CICTAR Bulletin. Selection was done in order to ensure representation from all regions of the country and among public and private institutions. Though the original limit of participants was set at 18, the final number turned out to be 22. Some persons traveled to Yacuiba on their own initiative before being granted a scholarship to pay expenses.

The instructors spent one week together in Yacuiba preparing for the course. The first week of the course covered theoretical aspects of soil conservation. The second week was used in field practice. Based on the experience and presentations in the course, a technical manual will be prepared for widespread distribution in Bolivia.

The irrigation course was given in Tarija from November 26 to December 14. The main responsibility for the course was with experts from U. S. Universities: Dr. Kern Stutler and Dr. Leroy Salazar. In addition, Chemonics employed Dr. Edgar Ortiz Lema to present topics geared to the local environment. These included an orientation on the Department of Tarija and Farmer Organization and Participation.

### C. Summary and Suggestions

Objectives in this area were entirely met. Interest in having more soil conservation courses next year runs very high. Besides interest expressed by individuals, the Association of Rural Teachers from La Paz, a group which is 300 strong, is formulating an official request for one or two courses. This could imply one course in the Altiplano and another in the Yungas of La Paz.

A second irrigation engineering course is being tentatively planned for May of 1985. Chemonics' role is expected to be similar as in the past course.

## SECTION VI

### COTTON PRODUCTION

#### A. Background and Objectives

At the end of last semester harvest, collection and ginning of 124 hectares of cotton produced by 46 farmers was just being completed. In early June many farmers were already asking the Guidance Committee to be included in next year's program. Therefore, the Adviser began to develop a program for next campaign based on the 600 hectare target set by the Committee for the 1984/85 crop year. The Committee delegated the Integral Cooperative to take responsibility for importing inputs for the entire program.

The following objectives were outlined for this semester:

- \* Follow up with the Integral Cooperative and growers during the period of post-harvest, including incorporation of aftermath. Orient and cooperate with the Integral Cooperative to control cotton ginning and in marketing the fiber and seed produced.

- \* Prepare a technical and economic evaluation of the cotton program for the 1983/84 crop year.

- \* Help the Integral Cooperative in obtaining inputs through ADEPA in Santa Cruz.

- \* Provide support to the Guidance Committee in contracting a third cotton technician.

- \* Continue with in-service training for extension agents of the program, especially the new one who has no experience in cotton.

- \* Request cooperation from CIAT in Santa Cruz for ginning of the four varieties of cotton multiplied by farmers in Yacuiba. Provide IBTA in Yacuiba with samples of these and four other varieties introduced from the United States.

- \* Carry out meetings in order to inform farmers about the results of the cotton campaign of 1983/84, providing them with technical and financial orientation.

- \* Cooperate with cotton program technicians in the registration and selection of producers for 1984/85.

- \* Coordinate and cooperate with farmers and the Integral Cooperative in carrying out meetings both in Santa Cruz and in the Chaco with officials of Hilandería Santa Cruz and from the Banco Hipotecario with the purpose of obtaining credit for the production of 600 hectares.

- \* From October to December broadcast three radio programs on soil preparation, planting and insect control. Each program will last half an hour during 4 days.

\* Teach small farmers of 4 communities the way to calibrate the manual fumigator in order to apply pre-emergence herbicides.

\* During the period of planting provide in-service training to technicians of the program and machinery operators in calibration of grain drills and fumigation equipment for herbicides.

## B. Progress

### 1. Orientation and Support to Local Institutions in Cotton Production

During harvest orientation was given to producers to determine the best moment to begin this operation. Tests were made to detect moisture content of harvested cotton in order to prevent spoiling. Again this year heavy rainfall affected production of all crops in the region, along with the 124 hectares of cotton. Still an average yield of 12.5 hundred-weight of fiber per hectare of fiber was obtained. This is considered very good for these weather conditions.

The Integral Cooperative and farmers made several efforts with the University and CODETAR in Tarija in order to obtain the services of the cotton gin of Campo Pajoso. The Cooperative administered the plant during cotton harvest last year and financed the operation expenses. However, the **service was poor due to the condition of the machinery. The electronic system which controls humidity did not function. For this reason, the fiber and seed suffered serious damages in quality, with the resulting reduction in value.**

Help was provided to the Cooperative in pursuing the order of inputs for the 1984/85 crop year. This was presented to ADEPA and CIBA GEIGY in Santa Cruz. Also help was given to the Cooperative and the Guidance Committee to seek out credit channels in Santa Cruz for the production of 600 hectares. In this regard, field inspections were made with officials of Hilandería Santa Cruz and from Banco Hipotecario and meetings were held in Yacuiba and Santa Cruz.

### 2. Recovery of Cotton Varieties for Delivery to CIAT and IBTA

Four American varieties of cotton were multiplied by farmers participating in the program last year. Part of the seed originating from these varieties was taken to Santa Cruz for ginning at the CIAT Experiment Station. These are: GUMBO 500, Deltapine 41, 61 and 90. CIAT was provided with a portion of these materials for testing. These varieties, along with the ones mentioned below, were delivered to IBTA in Yacuiba: DES 422, Stoneville 56, TAMCOT CAND-E and Deltapine 70.

Additionally, the Adviser cooperated with Ing. Juan Carlos Covarrubias from IBTA in planning and designing herbicide tests in cotton.

### 3. Information of Results to Producers in the Field

From September 15 to 21, nine meetings were held in different communities in cooperation with the Technical Manager and the person in charge of credit in the Integral Cooperative and with the cotton technicians of the program. One hundred and eighty-three farmers, most of them pertaining to associated groups, attended those meetings. The following describes the topics discussed:

1) Results obtained during the past crop year were informed by cotton producers.

2) Background of the program was considered, as well as production objectives, organization of the Guidance Committee and the need and importance of a cotton producers' organization in the Gran Chaco.

3) Information was provided about credit provided through the Cooperative and the Agricultural Bank for the next campaign.

During these meetings a registry of interested farmers was set up.

### 4. Preparation of the Report on Results of the 1983/84 Agricultural Year

The final report on results of last year was submitted to the Guidance Committee in August. This document contains an analysis of the climatic factors more important for cotton production and its characteristics in the region. It also contains an analysis of the agronomic conditions which affected crop development.

### 5. Registry of Producers and Selection of Areas Planted in 1984/85

The Registry of Producers was started in June. By October there were 185 farmers registered with 718 hectares. Under the leadership of the Adviser and the Guidance Committee, producers were selected to reach the 600 hectare target. Selection was programmed according to the following factors: 1) human resources in the family group and in the zone, 2) the zone in regard to climate, 3) type of soil, 4) physical infrastructure for storage, 5) financial resources and 6) attendance at short courses and/or experience in farming. It is worth noting that all these factors were not applied rigidly. Many farmers did not comply with all requisites. However, farmers showing less probability of success were removed to reduce the area programmed to 600 hectares.

Area planted was affected due to the excessively heavy rains during planting season, especially during December. Continuous and prolonged strikes decreed by the COB interrupted transportation, causing fuel shortage during part of the land preparation period. Also the Agricultural Bank's closing delayed issuance of credit.

In spite of these problems the area finally planted practically reached the 600 hectares programmed, as shown in the following table. It can be observed that 96 percent are small producers with 0.5 to 10 hectares and represent 65 percent of the total planted area.

This year, cotton is also found in areas which are considered half-humid and half-dry in three sections of the region. These crops are pilot parcels for demonstration, which are being totally financed by their owners. The geographic expansion of the program will help in identifying the zones more appropriate for cultivation.

Table No. 1 NUMBER OF COTTON PRODUCERS AND RELATION OF THE PLANTED AREA BY STRATA, GRAN CHACO OF TARIJA, 1984/85

Planted Area by Strata (Hectares)	Number of Farmers	Total Hectares	Percentage
0.5 - 10	143	376	65
11 - 20	4	64	11
21 - 80	3	137	24
TOTAL	156	577	100

#### 6. Technical Assistance to Cotton Producers and Training of Technicians

From August to November, technical orientation through radio programs was provided to cotton producers on practices of weed control, incorporation of aftermath, land preparation and planting. Help was provided by the IPC (Instituto Politécnico Campesino) and from the OPPEJ (Oficina de Planificación y Ejecución de CODETAR). Five radio programs were carried out with a total of 20 transmissions each one and with a duration from 20 to 30 minutes.

Seven field meetings in different communities were carried out. In these meetings, 91 farmers learned practices for calibrating manual fumigators to apply herbicides.

During planting assistance was provided to six farmers and/or tractor operators in calibrating grain drills and tractor-mounted fumigators.

From October to December 60 weekly field demonstrations were carried out. A total of 344 farmers attended. Emphasis was on determination of insect populations and control. During this period 94 technical visits were made to farmers' properties, especially during the planting period.

#### 7. Other Activities

An additional activity which was not programmed for this semester was a trip in October to the Experiment Station Abapó Izozog, "Cnel. Armando Gómez". This trip was made at the request of the Guidance Committee to obtain information regarding experience in cotton production in a region with similar climatic conditions to those of the project area. The delegation was formed by one technician of IBTA, one of the Integral



Upper Photo:     Ing. José Luis Humérez and Agronomist Enrique Calizaya teaching farmers of the community of Caiza the appropriate use of tips to apply herbicides and insecticides.

Lower Photo:     Group of farmers and technicians who made a tour of exchange and training in cotton, to the Experimental Station "Cnel. Armando Gómez", receiving information from the Director of that center.

Cooperative, one technician of the program, the Vice-president of the Guidance Committee and three producers.

C. Summary and Suggestions

All the objectives established for this semester were achieved successfully. The agricultural component of the program is achieving considerable progress. The area programmed by the Guidance Committee for this year was practically achieved despite the climatic problems and strikes. It is flattering to hear favorable comments regarding the economic success experienced by many producers during the past harvest. However, concerns are noted on the part of local people regarding the physical condition and deficient service provided by the cotton gin.

This year cotton producers, under the leadership of the Integral Cooperative, have taken steps with the University of Tarija to secure the services of the Campo Pajoso cotton gin. In October, the Cooperative developed and submitted to the University a proposal in draft to rent the plant for 10 years. We recommend that the University seriously consider this request. The University has demonstrated a lack of technical and financial capacity to provide ginning services.

Formation of the local technical group is unfortunately not progressing as rapidly as hoped. Mr. Calizaya advised that he will leave the program in January. The new technician which had been recruited in Santa Cruz is from Gran Chaco, as is Inq. Ramón Gareca, who joined the program in October. This increases possibilities of maintaining a stable group of personnel.

In October producers formed the Cotton Producers Association, which is affiliated to ADEPA (Asociación Nacional de Productores de Algodón). It is now hoped that the executives which were named, will seek out the channels of financial support to strengthen and consolidate their new institution.

SECTION VII  
INFORMATION SYSTEMS

A. Background and Objectives

Last semester it was noted that participation of trainees from MACA and IBTA was not satisfactory in comparison with the performance of student trainees. It was decided to carry out a new selection of trainees/workers based upon individual qualifications, rather than assigning scholarships by institutions. Also at the end of each academic semester student workers would interrupt their work, since their scholarships only covered the time in which they were studying. A decision was taken to provide trainees with a stipend that would allow them to work during recesses between semesters.

Original objectives set for the semester were:

- \* Reach the target of 250 subscriptions to the Bulletin by the time 10 editions have been published.
- \* Increase the capacity of presenting articles with greater technical content and improve presentation and format.
- \* Register information existing in several institutions to prepare an annotated bibliography on water resources.
- \* Collect questionnaires and prepare the second edition of the Registry of Professionals.
- \* Organize bimonthly meetings of the Guidance Committee with the purpose of adopting general resolutions. Establish that specific technical decisions are adopted by the Technical Group.
- \* Change the system for selection of trainees to one of free competition instead of the selection according to the institution in which they work.
- \* Continue carrying out workshops on documentation techniques in Chuquisaca, Tarija and Oruro.
- \* Create more awareness among persons related to the agricultural sector about activities of CICTAR.

At the beginning of the semester it was recognized that the reduced number of subscriptions to the Bulletin was probably due to irregularity in publishing and distributing. It was seen that users had little confidence that CICTAR could provide an adequate service. Hence, the objectives dealing with the Bulletin were given more importance. Also another objective dealing with the Bulletin was identified:

- \* Establish a systematic approach for publication and distribution of the Bulletin that assures delivery to regional representatives on regular intervals.

## B. Progress

### 1. Information Bulletin

Editions of the Bulletin were to have been biweekly. However, this schedule surpassed the capacity of the technical team and systems for distribution and reception of information. Hence, it was decided that the frequency would be every three weeks.

A detailed, systematic plan was prepared in regard to publication and distribution of the Bulletin. Sending of bulletins is confirmed by telegram to Regional Delegates and they acknowledge receipt, also by telegram. Definite time limits in calendar days are established for each phase of the process. A labelling system by computer was initiated in order to address individual Bulletins to each subscriber.

Since the preparation of this work schedule, publication and distribution of bulletins improved greatly. This led to a dramatic increase in the number of subscriptions received. According to the target, we had hoped to reach 250 subscribers up to Bulletin No. 10. However, by that time we had 450. As of Bulletin 12, the total was up to 612 subscriptions. From Bulletin No. 6 forward, the increase in subscriptions has been nearly 100 every three weeks.

Additionally, it is evident that the number of persons who actually read the Bulletin is greater than the number of subscribers. Often in an office with several professional persons, only one will subscribe, but many persons may read the Bulletin. We believe the number of people actually reached may be around 1000.

One of the main functions of the Bulletin is to provide an alert system to inform interested persons of new publications in Bolivia. However, due to the limited information received from other departments it has been necessary to depend on abstracts or bibliographic references prepared by the Technical Group in La Paz. The organization of Honorary Committees in the different regions would permit the inclusion of specialized summaries of documents from other parts of the country.

Editing of articles is under responsibility of the members of the technical group. Starting with Bulletin No. 9 publication was made with a new format which allows better use of space and also pictures and graphics. In this regard support received from Mr. Omar Serritella, Audio-visual Aids Adviser of Chemonics/Washington, was essential.

Under responsibility of Ing. Jorge Rosales, Regional Director of Seed Certification in Santa Cruz, a publication of a separate and specialized section on seeds was organized. The first "Separate" will be published as part of the first publication in 1985. Likewise, there is considerable interest from several organizations which would like to have specialized sections.

### 2. Annotated Bibliography

A large number of references have been gathered for publication of annotated bibliographies in areas such as irrigation. However, with the

idea of developing more complete bibliographies, the strategy of implementation of this activity was changed to one of identifying all potential sources of information.

A general inventory of institutions was developed including: public institutions in the central administration, decentralized administration, commissions depending on legislative power, national organizations, instruction centers at the university level, as well as the different projects related to most of these institutions. Two hundred ten sources of information at the national level were registered. The inventory is more complete for the Department of La Paz than for other places within Bolivia. It is important to have a program for each region and with the presence of the Technical Group to carry out work in the field.

It is important to have elements which allow a uniform organization of information related to the sector. A guide related to bibliographic references was prepared. Mrs. Carmen Salazar has the responsibility to correct it and demarcate some examples.

### 3. Registry of Professionals

Communication with Regional Delegates was brought up to date in order to follow up on distribution, both for the first edition of the Registry as well as questionnaires for the second. Additional quantities of questionnaires were distributed because of new requirements of different institutions and technicians who wish to be included.

The content of the Registry was reorganized in order to offer more information to users. In this sense it was decided to name the publication "Directory of Resources for the Agricultural Sector in Bolivia". Its contents are:

- 1) Human Resources with Professional or Technical Training,
- 2) Information Needs,
- 3) Development Projects,
- 4) Registry of Public and Private Institutions Related with the Sector, and
- 5) Commercial Enterprises Related with the Sector.

### 4. Participation of the Committee and Regional Delegates

In August the Committee received the report of activities carried out to date. The report included: 1) status of the annotated bibliography on water resources, 2) distribution of the first number of the Registry, 3) distribution of questionnaires for the second edition, 4) current situation and projections for the Bulletin, 5) results of training in documentation techniques, 6) performance of the Technical Group and secretary, 7) conclusions of the first meeting of regional delegates. Also in August, the Committee enacted resolutions for the different activities of the project. On September 20, MACA approved all the Committee's resolutions.

A technical report was prepared covering the last quarter of 1984. This will be presented to Committee members in January. This report considers activities that will be performed during the next semester.

Identification of institutions allowed us to establish the participation of several institutions which already have documentation centers as specialized information units. These include the Documentation Center of INFOL (Sudamerican Camelidae), Documentation Center and Library of Hydrobiology of Universidad Mayor de San Andrés, the Library at the Rural Development Division of USAID, the Library at the Ministry of Planning and Coordination, and several others. The Adviser's counterpart from MACA (Mrs. Carmen Salazar) did not participate actively in the program, despite a previous agreement with MACA in which she would devote half time.

#### 5. Trainees

Selection of eight student workers, six technical and two secretarial, was carried out in September. Announcements regarding the opportunity for scholarships were placed in the Catholic University (UCB), MACA, IBTA and related institutions. No special qualifications were required of applicants. The new trainees started work on October 1st.

By resolution the Committee decided to pay a stipend to trainee/workers which will allow them to provide continuous services. For this, the stipend of technicians of IBTA was taken as the basis, dividing the daily stipend by two since CICTAR students work half-time.

To comply with the objectives the work of the Technical Group was divided in the following manner:

- CICTAR Bulletin: Guillermo Valencia and Boris Crespo
- Organization of the Information System: Carlos Brañez, Adalid Corini and Javier Hurtado
- Registry of Professionals: René Zeballos.

With the purpose of supporting the work of Regional Delegates, members of the Technical Group should make domestic trips at least once a month.

#### 6. Training in Documentation Techniques

In accordance with the program established for training on documentation techniques, Regional Delegates in Chuquisaca and Tarija took responsibility for organization of courses and also the conformation of Regional Committees. Work developed by Juan Daza and Arturo Liebbers permitted the presentation of courses in Sucre and Tarija during August and October respectively.

The principal topics presented in the courses are: 1) preparation of bibliographic references, 2) logic-semantic methods of the information unit, 3) identification of descriptors (principal and related), 4) preparation of summaries, 5) index of information needs and 6) plans for informative dissemination.

The basis for the organization of specialized information units were defined. This has been done in regions where courses were presented. Likewise, the functions, activities, structure and organization of information centers were defined. Policies for selection, collection and information flow to be executed by such units were also developed. Trained personnel now has the basis in order to write bibliographic references and

identify descriptors.

#### 7. Administration

Procurements for the office were carried out with funds for technical assistance. AID/Washington approved in October the local purchase of the computer.

It was requested that a drawing board and light table imported by Chemonics for use in preparing audio-visual materials remain with CICTAR. There is the possibility of obtaining COPYPROOF equipment for publications which will allow use of offset.

It was agreed to grant scholarships to trainees for two secretaries could give support to the project on a half-time basis. Cynthia Lobo and Mónica Mendoza were selected. Mónica works during the mornings and Cynthia in the afternoons.

#### 8. Other Activities

Previous to the design of the new project an analysis was made regarding activities performed to date. This permitted the preparation of a profile. The new project is ready in draft and it will be presented soon.

Authorization was received from the Information Ministry by which we are allowed to utilize time on the national television, Channel 7. It would be advantageous for CICTAR to prepare materials during the next trip of Mr. Omar Serritella to Bolivia in April and May.

#### C. Conclusions and Recommendations

Objectives related to the Bulletin have been reached. This tool has served to promote professional activities and to maintain contact among technicians involved in research in the country. The registration of more than 600 subscribers is the principal indication of this success. The inclusion of pictures would allow better visual communication and improved presentation.

Sixty percent of the material for the Directory of Resources has been processed. The last date for reception of questionnaires is March 31. Tabulation of data has to begin in April for the edition to be ready in August.

Two of three planned courses were completed. This activity was momentarily postponed in order to place more emphasis on organization and edition of the Bulletin.

The support of all members of the Guidance Committee is greatly appreciated by members of the Technical Team. The Dean of the Bolivian Catholic University, Dr. Luis A. Boza, is one of the members who shows great interest in extending the agreement in order to consolidate the establishment and performance of CICTAR.

## SECTION VIII

### COORDINATION, ADMINISTRATION AND PROCUREMENT

#### A. Background and Objectives

In the last Progress Report, the employment of a Deputy Chief of Party (DCOP) was suggested. This person would handle project administration in order to leave the Chief of Party more time for technical backstopping of advisers in the field. Terms of reference for the new Deputy Chief of Party are two-fold: 1) contract administration, and 2) coordination of training activities in and out of Bolivia for the T-059 Project.

Original objectives were set forth as follows:

- \* Employ a Deputy Chief of Party who would be responsible for supervision of administrative staff, budgeting and contractual matters, and also for coordination of training activities.

- \* Complete a training plan by the end of October 1984.

- \* Manage special Project accounts for MACA in cases where these have direct relation to advisers' activities and when requested to do so by MACA.

- \* Develop a complete inventory system of equipment and furniture under Chemonics' responsibility.

- \* Present the Progress Report for the second half of 1983 to MACA. Prepare the Report for the first semester of 1984.

In addition to these, new objectives were set during the semester, particularly:

- \* Move Coordination and Chemonics office to a new location, outside of MACA.

- \* Prepare specifications for the purchase of computers for CICTAR, Seed Certification and PL-480.

- \* Carry out a meeting of all advisers in Bolivia in December with the Supervisor/Administrator from the Home Office and/or the Director of Chemonics/Washington.

Recruitment and hiring of the DCOP was carried out by the end of July 84. The position was defined as a short-term advisory position because the candidate, Dr. Bernard Delaine, was available only through March or April of 1985. However, it will be necessary to continue with this support in the future.

## B. Progress

### 1. Reporting

Publication of progress reports was one of the activities that was behind schedule at the beginning of the semester. This was mostly due to lack of time on the part of the Chief of Party. Hence, an objective during the semester was to catch up in reporting to MACA and USAID. Reports on progress of the team and technical reports completed and published during the semester are as follows:

1) Semi-annual Progress Report in Spanish for the second semester of 1983.

2) Semi-annual Progress Report in English for the first semester of 1984.

3) Evaluation of the cotton program in the Gran Chaco 1983/84.

4) Analysis of the market for wheat seed in Santa Cruz, plus a summary for presentation in the Second Annual Round Table on Seed Program Development.

5) Feasibility study for a processing plant for foundation seed in CIAT/Saavedra.

6) Analysis of the economic impacts of the soybean seed program in Santa Cruz.

7) A professional article by E. Don Hansen and Jorge Balderrama on the soils program in the Gran Chaco to be presented in a professional seminar in San Francisco, California in February 1985.

Also assistance was provided in preparing and publishing the proceedings for the National Round Table on Seeds.

### 2. Training

In cooperation with advisers, a preliminary training plan was developed for the period August 1984 through December 1985. A draft of the plan was returned to the advisers and was submitted to MACA and USAID. After receiving comments and making revisions, the complete training plan was presented to MACA and USAID for approval. This plan contemplates a series of courses in and out of Bolivia, including three scholarships in Yacuiba to work on-the-job in the soil conservation program for a period of four months. Fifteen courses in seeds are planned in Bolivia from August 84 to December 85. It is expected that more than 18 candidates will be sent outside of Bolivia for courses in seed production and soil conservation. Training outside of Bolivia varies from two weeks to four months as shown in the following table.

COURSE AND TRAINING PROGRAM SEPTEMBER 84 - DECEMBER 85

DATE	EVENT	PLACE
September 2 to 7	Second Round Table on Seeds	SCZ
September 3 to 7	Course-workshop on Documentation	SUCRE
September 10 to 21	Course on Seed Certification and Analysis	SCZ
October 24 to 26	Course on Seed Production	SCZ
November 5 to 9	Course-workshop on Documentation	TJA
November 4 to 16	Short-course on Soil Conservation	YACUIBA
November 26 to 14	First course on Irrigation	TJA
November 28 to 30	Course on Seed Production	YACUIBA
December 3 to 6	Training Course on Seed Field Inspection	SCZ
December 10 to 14	Course-workshop on Documentation	ORURO
December 19	Regional Seed Program Evaluation Meeting	SCZ
December 20	Course-workshop on Red Rice	SCZ
Sep. 1 to Dec. 31	Scholarships on Soil Conservation	YACUIBA
January 7 to 8	Advanced Course on Seed Certification and Technology	SCZ
January 15 to 20	Course-workshop on Documentation	POTOSI
February 6 to 8	Course for Seed Inspectors on Wheat Seed in Comarapa	COMARAPA
February 18 to 23	Advanced Course on Seed Conditioning and Internal Quality Control	SCZ
March 4 to 8	Course-workshop on Documentation	CBB
March 18 to 21	Course on Cereal Seed Production	SUCRE
April		
May	Second Course on Irrigation	TJA
May 20 to 24	Course-workshop on Documentation	LPB
July 31 to Aug. 2	Seminar on Foundation Seed	SCZ
August 27 to 30	Third Round Table on Seeds	SUCRE
September 24 to 27	Workshop on Certification Administration	SCZ
December 2 to 13	Advanced Course on Seed Analysis	SCZ

## TRAINING OUTSIDE THE COUNTRY

DATE	EVENT	PLACE
November 84	Analysis of Seed and Tropical Pastures	CIAT COLOMBIA
December-Jan.	Seed Analysis and Certification	Centreisem BRAZIL
April-June	Course on Seed Technology	CIAT COLOMBIA
To be determined	In Service Training	CIAT COLOMBIA
June-July	Summer Course on Seed Technology	UNIV. OF MISSISSIPPI
July-August	Certification of Wheat Seed	Centreisem BRAZIL
Jan.-July	In-Service Training on Seed Certification	UNIV. OF MISSISSIPPI
March-August	Course on Soil Conservation	La Molina, PERU
September 85	Analysis and Certification of Soybean Seed	UNIV. OF MISSISSIPPI
December 85	Seed Conditioning Yacuiba-Santa Cruz	Centreisem BRAZIL

With the intensive training planned throughout the year, technicians will be prepared to carry out work currently implemented with technical assistance of Chemonics. Only in this way can Project activities continue after technical assistance is completed.

Up to the end of December 1984, all courses planned had been carried out successfully despite constraints, such as delayed disbursements of funds from the T-059 Project, national strikes, and difficulties in transportation to remote areas such as Yacuiba. However, the course on seed production in Yacuiba was limited because instructors from Santa Cruz were not able to travel to the Chaco.

During this period, the most outstanding event was the Second National Round Table on Seed Program Development held in Santa Cruz the first week of September. It was postponed one week at the last moment due to a national strike. The conclusions of this Round Table have been published, and a third National Round Table has been planned for the last week of August 1985 in Sucre.

Another important course conducted successfully was the First National Course on Soil Conservation held in Yacuiba from November 4 to 11. Twenty two candidates from all over the country, representing public and private institutions, attended the course. It was given under the direction of a local soil scientist, Ing. Juan Arandia, and two expatriates, Fred Tracy from the United States and Julio Luna from Argentina. The participants asked that such a course be repeated in 1985. More than 50 candidates

had applied. A detailed report on this course is being reviewed by the DCOP, and will be published soon.

At the end of this course, a strike interfered with transportation from the Chaco to other parts of the country. Participants and instructors were forced to use various combinations of light planes. Chemonics vehicles and other means to return to their places of residence. This factor greatly complicates the logistics of giving courses in Bolivia and increases costs.

Another important event was the irrigation course under the responsibility of Utah State University. This course was carried out in Tarija from November 26 to December 14. Chemonics contracted a Rural Sociologist from Tarija, Dr. E. Ortiz Lema, to complete the team of instructors.

As to training outside the country, four technicians were sent to CIAT/Colombia last July for the First Advanced Course on Administration of Seed Companies. In November another technician was sent to CIAT for a course on Analysis of Tropical Pasture Seed.

Regarding preparation of training materials, Mr. Omar Serritella from the Home Office spent two months in Bolivia to prepare video tapes on soil conservation and seed production. He is expected to return to Bolivia around March to complete filming on seed production.

### 3. Project Administration

#### a. Management of Special Funds

Due to constraints regarding the functioning of Coordination Office outside of the city of La Paz, Chemonics was asked to manage four special funds: Counterparts, Terraces, Courses, and Interchanges. The management of these funds by Chemonics was opportune and beneficial to the Project since the budget for the second semester was approved only in December. Had not these funds been managed by Chemonics, training activities programmed for the last semester would have been cancelled for lack of funds. In order not to postpone these activities, Chemonics was obliged to advance to the Project nearly 10,000 dollars. The Chemonics accountant is completing the accounting of these disbursements so that the Coordination Office can request reimbursement of these funds. At the suggestion of the Controllers Office of the Government of Bolivia, the Coordination Office of MACA will again take over these accounts.

#### b. Computerization of Accounting System

With the delivery of the computer for CICTAR, it is expected that one of the Chemonics microcomputers will be available to the accounting department. A Systems Engineer is currently working to program a full accounting system which responds to our specific needs. The accounting department has been overloaded in the last few months, and it is expected that computerization of the accounting system will avoid the hiring of more personnel in La Paz. Part of the accounting is already computerized, which allows the preparation of telexes of expenses for the home office within just a few hours. Unfortunately, the Osborne 1 is small for this size of job. The process of sorting data and printing results is rather slow, but still faster and more accurate than by hand.

c. Supervision of Local Staff

During the semester, the DCOP traveled to each field office where Chemonics is working to become acquainted with all personnel working in the project. This enabled him to learn of and solve many individual problems.

Due to high inflation rate in Bolivia, a new policy regarding salaries for local staff has been adopted following AID policies in Bolivia. Some points which were still pending have been defined: local short-term advisers are entitled to one and a quarter days vacation per month worked. Only short-term advisers with a contract of less than three months are not entitled to vacation.

d. Office Space

In early November, MACA, USAID and Chemonics reached an agreement to provide new office space for the Project outside the MACA offices in La Paz. New office space was located on the eleventh floor of the Crystal Building. During the first month in the new offices, work was partially interrupted due to lack of electricity, telephones and telex services. Now however, the new space offers everyone a convenient and comfortable place to work. The help of Ramiro Díaz from USAID in preparing the contract for the new office is particularly appreciated.

In addition, new offices were required in Santa Cruz at the end of December. The landlord was not willing to extend the rental agreement on the building occupied by Chemonics and Certification during the last year. Again, Ramiro Díaz was of a great help for getting new offices. They will be more convenient for holding meetings and courses, having a large conference room.

e. Advisers' Meeting

The meeting of Chemonics Advisers was held in Santa Cruz in early December. Chemonics' Director from Washington D.C. also participated. The purpose of the meeting was to plan advisers' activities through the end of the Technical Assistance Contract. The last day, Robert Thurston (USAID), Raúl Salas (MACA), David Morales (Semillas) and Isabel Canedo (Coordination) attended the meeting. The major conclusions can be summarized as follows:

\* Soil conservation activities should be expanded at the national level under a new project.

\* In 1986, technical assistance regarding cotton production in the Gran Chaco will no longer be necessary. The program will reach a phase where it can be self-sustained.

\* Efforts regarding seed production and certification had very positive economic impacts within a short time span. This activity should therefore be expanded at the national level where opportunities exist. USAID should design a new project for this activity.

\* The T-059 Project and technical assistance under Chemonics should be

a bridge to the new project, providing continuity of efforts, particularly in Chuquisaca, Potosí and the Gran Chaco. The new project should encompass the entire country, including a wide range of crops.

\* The Technical-Scientific Information System (CICTAR) will not reach self-sufficiency in the near future. Chemonics has many advantages in providing support to this program. Hence, Chemonics should continue supporting this program until a new project or institution takes over.

At the end of the meeting, Chemonics was asked to prepare a plan for a possible extension of services. This is to be completed by January 20, 1985.

#### 4. Procurement

One of the first tasks of the DCOP was to prepare specifications for computer equipment required by CICTAR, Seed Certification in Santa Cruz and PL-480. After an analysis of the needs of each institution and of local capabilities for maintenance, two Wang microcomputers with 30 megabyte hard-disks were selected for CICTAR and Seed Certification. A more powerful computer was selected for PL-480 with three terminals. This is due to the number of projects they have to monitor. Although the requirements with their specifications were forwarded to USAID in mid-August, it was not until the end of December that paper work for the purchase was completed by USAID. It is expected that these computers will be delivered in February.

Regarding other procurements being carried out for the Project by USAID, the target delivery date was December 1984. Later the deadline was changed to March 1985. However, it appears as if most seed equipment will not be on hand until later in the year after harvest in May.

#### C. Summary and Suggestions

Activities programmed for the semester have been carried out successfully. However, some of the training activities were affected due to national strikes and social unrest. This caused the postponement of some events, limited the scope of others, and increased costs. The events effected were the Round Table on Seeds, the Soil Conservation Course, and the seeds course in the Gran Chaco.

Supervision of administrative staff by the Deputy Chief of Party has allowed the COP to dedicate himself much more to technical aspects of the Project, along with reporting. Hence, it is considered important for this position to be continued, even after Dr. Delaine leaves the Project in early 1985.

## SECTION IX

### CONCLUSIONS AND PROJECTIONS

Objectives in most areas of work were met satisfactorily during the second semester of 1984. We experienced some frustration in the areas of constructions because of delays experienced with local institutions and also in procurements which is under the responsibility of USAID.

A Plan of Activities for 1985/86 was in preparation at the end of the year to be presented to MACA and USAID. After review it will be distributed to client institutions around the country. This is an important document in that it includes the current status of work in each component of the Project, the philosophy of work developed by the advisers over the life of the Project, major conclusions from the meeting of advisers with MACA and USAID in Santa Cruz in December, and projections for completing assistance of the Project in each component of work.

Projected goals and objectives for each technical area that receives support of Chemonics for the period January through June of 1985 are described below:

#### Seed Improvement, General

- \* Coordinate with Regional Seed Councils and MACA to establish the National Seed Commission and help it carry out its tasks.
- \* Prepare for the third annual National Round Table on Seed Program Development.
- \* Complete audio-visual materials on seed programs. Specifically, this consists of a 20 to 30 minute video tape for public television.
- \* Carry out the training schedule developed for 1985.

#### Seed Improvement, Santa Cruz

In early January 1985 it was learned that the Adviser in this area may accept another position with CIAT/Colombia. Therefore, objectives were defined only for the period January through March.

- \* Hold a regional evaluation meeting on the 1984 campaign in Santa Cruz among interested local institutions and participants from La Paz.
- \* Provide orientation on equipment specifications and installation of a new private seed plant, I.A.S.A.
- \* Help in selection of candidates from the region for the April-June seed course in CIAT/Colombia.
- \* Carry out an advanced seed certification and technology course in one-day per week sessions. This was originally scheduled to be a national

course, but due to delays in disbursements of funds, it had to be limited to participants from the region.

#### Seed Improvement, Gran Chaco

\* Provide assistance to the certification personnel in field inspections, record keeping and testing of seed lots of locally produced seed.

\* Assist growers with the production of 400 hectares of soybean seed. Assistance at harvest will be oriented toward reducing varietal mixture and mechanical and weather damage.

\* Help growers and Seed Certification personnel in the purification of seed fields planted with foundation seed.

\* Assist CODETAR in the construction and installation of the seed conditioning facility of El Palmar.

\* Help in the installation and management of a temporary seed drying and conditioning facility.

\* Prepare a monthly newsletter with information about the regional and national seed program for distribution to local seed producers and to regional leaders.

\* Conduct courses in the region and participate in preparation of courses on seed technology to be offered at the national level.

#### Seed Improvement, Chuquisaca/Potosi

\* Plant 11 hectares of foundation wheat and produce 12 tons of foundation seed.

\* Produce 250 tons of fiscalized wheat seed through the CARE-CORDECH and CARITAS seed programs.

\* Present the feasibility study of the seed conditioning plant in Chuquisaca to the Regional Seed Council.

\* Present a market study and agricultural project for the Charcas flour mill to CARITAS.

\* Install holding bins and framing for seed equipment in the Zudáñez plant.

\* Initiate the conditioning of foundation and commercial seed produced in the area.

\* Conduct a short-course on seed production of cereal crops in Chuquisaca.

### Constructions

Technical assistance in this area is scheduled to end March 31, 1985. Hence objectives set for this activity correspond to a three-month period.

- \* Help MACA with the final reception of drying bins in El Algarrobal.
- \* Liquidate final payments related to the constructions at Toralapa.
- \* Complete computerized analyses of unit prices and construction specifications for PL 480. Completion of this task depends upon the immediate purchase of a computer for that institution.
- \* Obtain quotes and proceed with contracts for installation of equipment and building of hoppers for seed plants in Zudáñez, Betanzos and Las Barrancas.

### Soil Conservation, Gran Chaco

The Adviser in this area is scheduled to depart from Bolivia on January 31, 1985, at which time his tour in Bolivia is completed. However, it is foreseen that he will return later in 1985 to evaluate progress made and provide additional guidance. The Project will also continue support in this area by way of training funds.

- \* Provide orientation to the three trainees during the month of January.
- \* Carry out a field survey of farmers regarding factors that caused them to adopt soil conservation practices.
- \* Send the three trainees to Perú for further training, especially to provide them with a more solid theoretical background.
- \* Promote the soil conservation activity among local institutions to ensure continuity of the program.

### Training in Natural Resources

- \* Provide technical assistance to help teach a course in irrigation engineering in May, if this assistance is requested by USAID and MACA.
- \* Begin preparation for the Second National Soil Conservation Course to be given later in the year.

### Cotton Production, Gran Chaco

- \* Carry out short-courses in different communities to teach producers about handling of the UBV fumigator.
- \* Visit the cotton producing region of Resistencia, Argentina for purposes of training and exchange of ideas. This would be made with farmers

of the region and one of the cotton technicians of the program.

- \* Carry out a three-day short-course with Dr. Juan Landívar on cotton physiology and pest control. This will be oriented toward technicians of the region.

- \* Provide support to the Integral Cooperative and to producers in planning cotton harvest, storing of fiber, and marketing fiber and seed.

- \* Program and order inputs for the 1985/86 crop year in coordination with the institution which handles the importation.

- \* Search out possibilities for training of one cotton technician of the program outside of Bolivia.

- \* Support technicians in weekly field demonstrations and in supervision of demonstration parcels in the Villamontes area.

- \* Provide in-service training to the group of technicians of the program.

#### Information Systems

- \* Elaborate plans for the regional offices to establish information networks.

- \* Carry out training courses in Oruro, Potosí and Cochabamba with relation to documentation techniques.

- \* Reach 800 subscriptions to the CICTAR Bulletin by June, 1985.

- \* Organize the Bulletin in specialized sections.

- \* Complete the collection of questionnaires, tabulate data, and prepare the Second Edition of the Directory of Resources.

#### Coordination, Administration and Procurements

- \* Prepare a Plan of Activities 1985/86 by January 20 for submission to MACA and USAID.

- \* Enter into discussions with client institutions, MACA and USAID to prepare for extension or closing of the technical assistance Contract.

- \* Present the Progress Report for the second semester of 1984 in English and Spanish.

- \* Complete installation of new offices in La Paz for Chemonics and the Office of Coordination of MACA. Obtain prompt reimbursement of funds advanced to the Project by Chemonics for this purpose.

- \* Publish the administrative report by Ing. Arandia on the First Soil Conservation Course. Edit and publish a second technical report--also a

product of the course.

\* Close out special MACA training accounts and request reimbursement for MACA and USAID for funds advanced by Chemonics.

\* Publish an End of Tour Report by E. Don Hansen on the Soil Conservation Program.

\* Complete and deliver a report to CARITAS regarding their project to build a flour mill. Publish and distribute a feasibility study for a seed processing plant in Chuquisaca for wheat seed.

\* Strengthen the accounting/administration division of Chemonics in La Paz to catch up on work accumulated over the last year.

\* Carry out the training schedule as near as possible to what has been planned. This requires prompt disbursements from USAID and adept management of funds and logistics by the Coordination Office.

\* Encourage USAID to speed up procurements of Project equipment, especially seed drying equipment for the Gran Chaco.

\* Begin recruitment of a new Deputy Chief of Party who would take over this position upon the departure of Dr. Bernard Delaine, scheduled for April 1985.

\* Purchase two radios for direct communication between the offices in Santa Cruz and Yacuiba.

TABLE I

WORK-DAYS PAID DIRECTLY BY THE CONTRACT BYTECHNICAL AREAMAY 1979-DECEMBER 1984

Technical Area	Long-term Advisers	COP and <sup>a</sup> DCOP	Short-term Advisers and Procurement	Home Office	TOTAL
(Work-Days)					
<u>Field Programs</u>					
Seeds	1956.5	303.5	503.0	27.9	2790.9
Land Clearing and Machinery Maintenance	1512.0	166.5	-	15.3	1693.8
Soils	769.0	58.3	-	5.4	832.7
Cotton	339.0	38.3	232.0	3.5	612.8
Production and Marketing Studies	-	51.8	197.5	7.8	257.1
Construction	-	11.0	411.0	1.0	423.0
Special Courses	-	39.3	155.8	3.6	198.7
Sub-Total	4576.5	668.7	1499.3	64.5	6808.9
<u>Institutional Strengthening</u>					
Planning	-	150.1	567.5	13.8	731.4
Data Processing	-	16.4	36.0	1.5	53.9
Institutional Reform	541.0	83.3	143.3	7.7	775.3
Sub-Total	541.0	249.8	746.8	23.0	1560.6
<u>Support</u>					
Administration	-	575.3	9.0	52.9	637.2
Procurement	-	83.2	57.5	72.5	213.2
Sub-Total	0.0	658.5	66.5	125.4	850.4
<b>TOTAL</b>	<b>5117.5</b>	<b>1577.0</b>	<b>2312.6</b>	<b>212.8</b>	<b>9219.9</b>

a - The Chief of Party is a long-term position while the Deputy is a short-term position.

TABLE II

WORK-DAYS PAID DIRECTLY BY THE CONTRACT BYTECHNICAL AREAJULY 1984-DECEMBER 1984

Technical Area	Long-term Advisers	COP and <sup>a</sup> DCOP	Short-term Advisers and Procure- ment	Home Office	TOTAL
(Work-Days)					
<u>Field Programs</u>					
Seeds	393.0	60.4	176.0	2.2	631.6
Land Clearing and Machinery Maintenance	-	1.2	-	-	1.2
Soils	131.0	15.1	-	.6	146.7
Cotton	131.0	8.2	-	.3	139.5
Production and Marketing Studies	-	-	-	-	0.0
Construction	-	2.9	131.0	.1	134.0
Special Courses	-	27.4	131.8	1.0	160.2
<b>Sub-Total</b>	<b>655.0</b>	<b>115.2</b>	<b>438.8</b>	<b>4.2</b>	<b>1213.2</b>
<u>Institutional Strength- ening</u>					
Planning	-	7.6	131.0	0.3	138.9
Data Processing	-	-	-	-	0.0
Institutional Reform	-	-	-	-	0.0
<b>Sub-Total</b>	<b>0.0</b>	<b>7.6</b>	<b>131.0</b>	<b>0.3</b>	<b>138.9</b>
<u>Support</u>					
Administration	-	115.4	-	4.2	119.6
Procurement	-	8.8	-	6.3	15.1
<b>Sub-Total</b>	<b>0.0</b>	<b>124.2</b>	<b>0.0</b>	<b>10.5</b>	<b>134.7</b>
<b>TOTAL</b>	<b>655.0</b>	<b>247.0</b>	<b>569.8</b>	<b>15.0</b>	<b>1486.8</b>

a - The Chief of Party is a long-term position while the Deputy is a short-term position.

TABLE III

LEVEL OF EFFORT OF THE ADVISORY GROUP BY SEMESTER

## IN WORK-DAYS

Year	1979 <sup>a</sup>		1980		1981		1982		1983		1984		TOTAL
Semester	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	
(Work-Days paid by the Project)													
Long-Term	81	493	517	526	499	482	615	609	506	685	780	786	6579
Short-Term	9	0	164	88	50	86	247	288	151	259	401.5	686	2429
Home Office	22	39	18	29	10	9	10	11	5	20	26	15	213
<b>TOTAL</b>	<b>112</b>	<b>532</b>	<b>699</b>	<b>642</b>	<b>559</b>	<b>577</b>	<b>872</b>	<b>908</b>	<b>662</b>	<b>964</b>	<b>1208</b>	<b>1487</b>	<b>9220</b>

a - The first semester of 1979 includes the months of May and June only.