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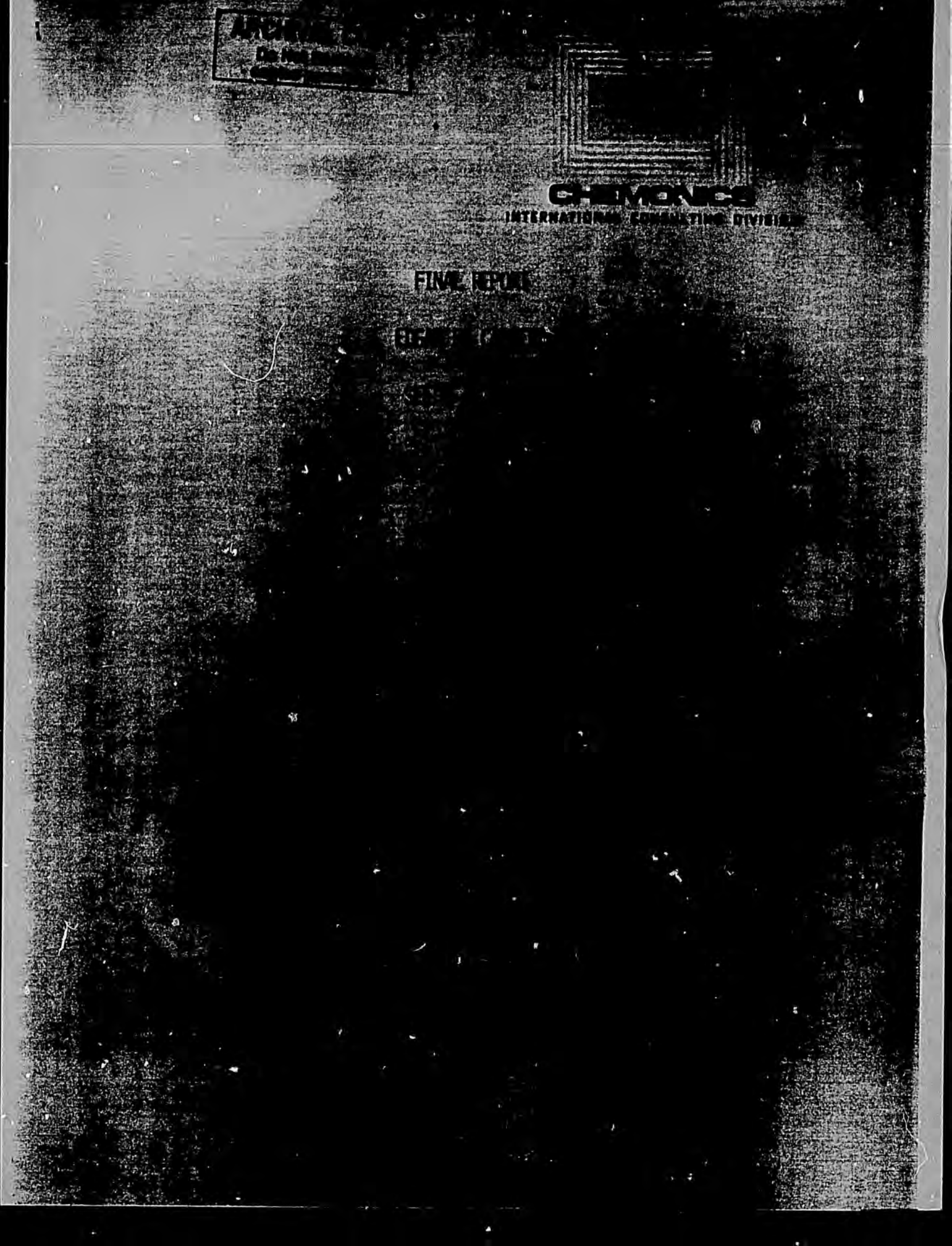
CHEMONICS
INTERNATIONAL CONSULTING DIVISION

END OF TOUR REPORT

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AUGUST 1983 - AUGUST 1985

A. Background

Early in 1983 Chemonics reached an agreement with MACA and USAID to expand the team of seed specialists and thereby provide technical assistance to more regions of the country. In August, Chemonics contracted the services of Dr. Edgar R. Cabrera to provide technical assistance in the area of seed production and in the design of conditioning plants. Initially, the Adviser was to be posted in Cochabamba, where he would help develop a seed production program in coordination with personnel of the MACA Seed Unit. In addition, one-third of his time would be dedicated to providing assistance in seed drying, conditioning, and storage in any region of Bolivia where his services were needed.

Upon arrival of the Adviser in August of 1983, the First National Round Table on Seeds was held in Cochabamba. As a result of the discussions in the Round Table, it became evident that the possibilities for developing a program for seed production in Cochabamba were more limited than expected when the position for the Adviser was planned. This was due mainly to the lack of local organizations interested in becoming involved in seed production of major cereal crops, such as barley and wheat. Production of seed potatoes was being carried out, but it was agreed that the Swiss Mission would be continuing support in that area. It was suggested that the Chuquisaca/Potosí region provided a greater potential for establishing an efficient seed program, emphasizing wheat as the lead crop.

Following a visit to the wheat and barley producing areas of Chuquisaca and Potosí, the need for a change in strategy was confirmed. In a matter of two weeks, the Adviser moved to Sucre and Chemonics opened a new office. The first few months were spent in evaluating the institutional structure of the region and the level of participation of local institutions in the seed business. This procedure was carried out with the idea of utilizing local resources as much as possible.

The following Section reports on the status of the regional seed program in Chuquisaca and Potosí at the beginning of the Adviser's assignment in Bolivia. Section C reports on progress made in this program. Section D then reports on progress made in reference to seed conditioning facilities design and installation in support of regional seed programs around Bolivia, including Santa Cruz and the Gran Chaco. The final section presents conclusions and recommendations.

B. Status of the Seed Program at the Beginning of the Adviser's Assignment

1. Varietal Development and Release

Varietal testing for the region has, for the last few years, been conducted by the Bolivian Institute for Agricultural Technology (IBTA) at the Chinoli Experiment Station in the Department of Potosí. Chinoli receives genetic material from CIMMYT in Mexico and evaluates it at the station. The promising lines are then evaluated in other areas of Potosí and Chuquisaca. In the past few years, two varieties of wheat, Chinoli-70 and Chinoli-65, were released.

Unfortunately, the improved varieties released by the station were not channeled through a seed multiplication program. Instead, breeder seed, after one multiplication, was distributed to farmers. As a consequence, the improved material reached only a few farmers and became contaminated in a matter of a few years. It was observed that varietal mixtures were common even in the evaluation trials. Breeder seed multiplication fields were also contaminated with other varieties.

2. Foundation Seed

A foundation seed program was non-existent in the area. Even though some people understood the importance of such a program, no efforts had been made towards its establishment.

3. Commercial Seed

Commercial seed multiplication, mostly wheat, was carried out mainly by the MACA Seed Units in Chuquisaca and Potosí through contract farmers. The Seed Unit in Potosí also multiplied seed on its own land. Both units have a machinery pool, most of which was not in use due to lack of parts and funds to repair equipment.

In the private sector, the La Paz Brewery (Cervecería Boliviana Nacional or CBN) operates a large program of barley production through contract growers. They select lots of grain from among the barley purchased from their growers each year. This grain, after being conditioned and bagged, is then redistributed to contract growers as seed.

4. Seed Conditioning

A previous project, T-053, contemplated the construction and installation of seed conditioning plants in all regions of the country. Two plants were to be implemented in the area: one in Zudáñez-Chuquisaca and the other one in Betanzos-Potosí. In Betanzos, an excellent infrastructure had been built, but the installation of equipment was incomplete. In Zudáñez no infrastructure existed. A warehouse belonging to a railroad company was used to house the plant, which also consisted of partially-installed equipment. In essence, both plants consisted of a Clipper No. 27 cleaner with an odd and insufficient set of screens and an electric sewing machine. MACA did not offer conditioning services to other interested parties, instead the plants were used only for their own seed.

In 1983, the CBN completed the installation of a very properly equipped barley seed conditioning plant, parallel to the grain cleaning line, with a 1.5 ton/hour capacity.

5. Seed Quality Control

The MACA Seed Unit was also responsible for quality control of the seed produced in the area. Both plants--Zudáñez and Betanzos--had some laboratory equipment which was, for the most part, unused. MACA's personnel inspected the fields under production by their contract growers and drew samples of the seed conditioned in their plants. They did not inspect fields other than their own, nor did they draw samples or perform analysis of other seed than their own. The seed produced in the Chinoli Experiment Station was not inspected nor analyzed nor even conditioned by MACA personnel and facilities in Betanzos, which is just 15 kilometers from Chinoli. In fact, MACA was not multiplying the varieties recently released by the station.

6. Seed Marketing

Under contract with MACA, the grower had to turn over a certain amount of wheat seed in return for the seed provided to him to produce his crop. Typically he would turn in 1.5 hundredweight of unprocessed seed for each hundredweight of clean seed received at the beginning of the season. MACA would then have the option of purchasing the remaining production at a price usually about 15 percent above that of grain. Though the intention of MACA was to purchase the entire production, this was often not the case. Instead only a portion of available seed was purchased depending on availability of funds. Because of the small amounts recovered from each farmer, seed lots were extremely small -- 100 to 150 kilograms each.

The CBN distributed treated barley seed-grain to their farmers close to the time of planting; as payment, the farmer would return part of his production to the CBN.

7. Seed Program Orientation

Up to the middle of 1983, a strong conviction of the need for a seed program in the region was not evident. There was a misunderstanding of what a seed program was all about and of the elements that would compose it. The idea of a National Seed Company prevailed in the minds of many persons, and was still being planned for by MACA. A Regional Seed Council had not yet been formed.

C. Progress on Seed Programs

1. Varietal Development and Release

Chinoli continues to investigate new genetic material at the station and is close to releasing one wheat and one barley variety. This time, however, the Chuquisaca wheat seed program and the CBN have been consulted and the Chuquisaca Seed Council has approved the entrance of both

varieties into the seed multiplication program. At the same time, three wheat varieties--two of which are just being tested at the station but were released by the San Benito Experiment Station in Cochabamba--have been introduced in the program because of their potential in the area.

2. Foundation Seed

The need for a foundation seed program was identified from the very beginning. A foundation seed project was designed in 1984. In this project, the Chinoli Experiment Station would create a Foundation Seed Unit that would multiply the breeder wheat and barley seed produced at the station. The project was presented by IBTA to PL-480 in order to obtain financing. PL-480 did not approve the financing because they determined that, at the time, the station did not have capable personnel to carry out the project. In spite of the lack of external financing, Chinoli produced 7 tons of barley and 2 tons of wheat foundation seed. The fields in the station were properly rogued and later inspected by MACA Seed Unit in Potosí.

Without the financing of the foundation seed project in Chinoli, Chuquisaca's wheat seed program was in jeopardy. In order to protect it, the Seed Certification Service (SCS) and CARE jointly took the responsibility of producing the foundation seed in 1985. As sources they used foundation seed of the Saquayo variety obtained from Santa Cruz and of the Totora and Tarata varieties obtained from Cochabamba. Seven tons of foundation seed were produced through this improvised program.

3. Commercial Seed Multiplication

The year 1983 was characterized by a very severe drought which threatened the survival of the peasant population. Some farmers had to eat the grains and tubers they were saving for use as seed. Because of the lack of an efficient seed program, there was not enough seed for the farmers in 1983/84. MACA, CORDECH, CARE and CARITAS organized emergency programs to multiply seed for the next year's planting. It was then that the production of wheat seed by institutions other than MACA was started. These emergency programs utilized seed produced by MACA, Chinoli and ANAPO in Santa Cruz. The different seed lots were highly contaminated with other varieties, weed seed and seed of other crops. However, these were essentially the only sources of seed. Twentyseven tons of fiscalized wheat seed, Saquayo variety, were introduced. It produced higher yields, and the variety was widely accepted by the farmers. Some fields of Saguayo were rogued intensively and were used as a source for production of commercial seed the next year. The volumes of seed produced in 1984 are shown in Table No. 1.

Table 1 VOLUMES OF SEED OF THREE WHEAT VARIETIES PRODUCED IN CHUQUISACA IN 1984

Variety	Seed Class	Volume Cwt.	Tons
Jaral	Fiscalized	839	38
Ouimori	Fiscalized	200	9
Saquayo	Fiscalized	1100	50
Total:		2139	97

In 1984/85, MACA-Chuquisaca did not produce seed with contract farmers. CARE-CORDECH initiated a seed multiplication project through which farmers received seed, fertilizer and herbicides. The project intended to produce wheat seed of improved varieties and eventually provide it to all wheat farmers in the Chuquisaca region. Projected production for the next 10 years is shown in Table No. 2.

Through this project, CORDECH intended to replace farmers' wheat seed every three years. The project contemplated an average production of 18,000 hectares per year. A wheat mill to be installed by the CHARCAS Coop would stimulate local production of wheat and the seed program was projected with this in mind. Despite the fact that the financing of the CHARCAS mill has not yet been obtained, the projected needs of improved seed during the first four years remain unaltered. The highest volume of improved seed needed by the year 1987 is 545 tons. At the beginning of 1985, CARE abandoned the project. CORDECH continued, but without the financial support of CARE. Recuperation of seed from seed producers was slow and incomplete. It is estimated that in 1985, only 65 percent of the expected volume of seed was being recovered (100 tons), even though there was enough seed in the farmers' hands to reach the projected goal of 157 tons.

Just as in the past, the CBN continues to select the best lots of barley for seed. They also contract some farmers who multiply seed, but this is done on a very small scale. It is expected that in 1985/86, the CBN will register about 100 hectares for the production of registered seed under the Certification Program. This could be the foundation for the seed program in Potosí. If the CBN reaches the goals set forth, their seed program would involve a minimum of 1000 hectares by 1990.

4. Seed Conditioning

In 1984/85, a feasibility study for the construction of a seed conditioning plant in Chuquisaca was prepared and presented to the Regional Seed Council (RSC). The study pointed out that the construction of a one-ton/hour plant would be feasible when a volume of 500 tons is produced in

Table 2 DEMAND FOR IMPROVED WHEAT SEED FOR THE NEXT TEN YEARS

	CROP YEAR									
	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94
Area to be planted in hectares	18,000	18,000	18,000	18,000	18,000	18,000	19,397	21,551	25,862	25,862
Area to be planted with improved seed in hectares	6,000	6,000	6,000	6,000	6,000	6,000	6,466	7,184	8,620	8,620
Required volume of improved seed (MT)	545.45	545.45	545.45	545.45	545.45	545.45	587.82	653.09	783.64	783.64

the area. The study also suggested that until this volume of seed is reached, the small plant in Zudáñez could, with some slight remodeling (adding holding bins, installing a steel crated bagger and a gravity table), condition the seed produced until then. The RSC suggested that a company comprised of CORDECH, CARITAS and the Association of Vegetable and Legume Producers (ASOPROHL) be formed and that this company be the one to take charge of seed conditioning. It also suggested that before the seed conditioning plant be built, the company could rent MACA's seed conditioning facilities in Zudáñez. At the author's time of departure, this company had not yet been formed.

5. Seed Quality Control

After the formation of the RSC in June of 1984, one of the first actions taken by the council was to request that MACA's regional office concentrate its efforts exclusively in seed certification. The Seed Certification Service (SCS) was thereby formed and MACA discontinued its production and marketing of seed.

The seed testing equipment was moved from Zudáñez to Sucre and a new office was opened. Seed samples from conditioned lots are now taken by the SCS's inspectors and purity and germination analyses are conducted in Sucre. The laboratory results of wheat seed lots produced in the regional seed program in 1984 are shown in Table No. 3.

Table 3 SUMMARY OF LABORATORY RESULTS OF THREE VARIETIES OF WHEAT SEED PRODUCED IN CHUQUISACA IN 1984

Variety	Pure Seed (%)	Other Crops (Seed/Kg)	Weed Seed (Seed/Kg)	Germ. (%)
Jaral	99.04	13	2	98.7
Quimori	98.91	68	0	98.9
Saquayo	99.65	1	9	98.8

One of the most critical problems faced by the SCS is the lack of sufficient personnel. For the most part, there has been only one technician and an administrator in the regional office. During an eighteen-month period, there have been three agronomists hired at different times and each one stayed only a few months. The extremely low salary set for this position makes it impossible to retain personnel. To overcome this problem, the RSC requested funds from PIL-103 (a special fund of the T-059 Project) at the beginning of 1985. These funds have been granted and have helped to partially finance the SCS: purchase gasoline for the vehicles, print needed forms, purchase working tables and pay per diems. Unfortunately, frequent devaluations and the high inflation rate prevailing in the country

do not allow for efficient use of these peso funds.

The Seed Certification Service charges three percent of the value of the seed for the services they provide. These services consist of: inspection of fields, sample drawing, laboratory testing (purity and germination tests), and labelling. Another source of funds for the SCS has been that which is obtained for transporting and conditioning seed in Zudáñez.

During the Second National Seed Round Table in Santa Cruz, it was suggested that MACA's Seed Units in Chuquisaca and Potosí be combined into one Seed Certification Office. The suggestion was not well received by the Central Seed Office in La Paz, and in 1984/85, MACA's Seed Unit in Potosí continued to produce seed with contract growers. However, for the first time, the seed technicians inspected Chinoli's foundation seed fields and some of the CBN barley fields with contract growers. It is hoped that during the 1985/86 production cycle, MACA's Seed Unit will become another Seed Certification Service and will inspect foundation and commercial barley seed production fields in Pampas de Lequezana in Potosí.

6. Seed Marketing

The agriculture in the wheat and barley growing areas of Chuquisaca and Potosí is characterized for the most part by minifundio --small sections of land of 1-2 hectares divided between several farmers. The farmers practice a rudimentary agriculture in which seed is saved from year to year. A farmer will seldom purchase seed, unless he is unable to save part of his crop, or has to eat it because of lack of food.

CORDECH and CARITAS have individually developed programs to provide farmers with improved seed. In each program, seed is given to a farmer and the farmer, instead of paying with cash as he receives the seed, returns one and a half times the volume of seed he was given. Unfortunately, for economical reasons, CORDECH and CARITAS have been very slow in recovering the seed farmers owed them through indexed credits, and have not purchased a great deal of the seed produced by the farmers. They have lost the opportunity to sell wheat seed in Santa Cruz because of this slow recovery of seed from farmers. It is believed that 500 tons of wheat seed could easily be marketed in Santa Cruz annually, but it requires a timely delivery during the months of April-May.

The CBN distributes barley seed to farmers prior to planting time. In 1984, the CBN distributed around 800 tons of barley seed-grain and, according to their projections, would have to market around 1800 tons of seed by 1990.

7. Seed Program Orientation

In June 1984, the Regional Seed Council was created with the participation of thirteen institutions. It was soon evident that such a large number of institutions made it difficult to set meetings. To overcome this problem, an executive committee was elected and meetings were then held more regularly. During these two years, the Seed Certification Service was created and MACA no longer entered into seed production. A Foundation Seed Project was designed, and Chinoli produced barley and wheat

foundation seed, despite lack of external financing. Multiplication of commercial seed was started by CARE-CORDECH in 1984/85. A feasibility study for the construction of a seed conditioning plant in Chuquisaca was prepared and presented to the RSC. 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 facilities in Tomina. The MICT responded negatively and the facilities continue in disuse. A study to provide technical assistance to wheat producers in Chuquisaca for the CHARCAS mill was prepared and presented to CARITAS. The mill project has not yet obtained financing from BID.

D. Progress on Seed Conditioning Facilities in Various Regions

One of the writer's responsibilities was to provide technical assistance in the implementation of seed facilities in Bolivia. During the period of duty, the following facilities were designed:

a. Seed drying, conditioning and storage facilities for Yacuiba.

b. Seed conditioning and storage facilities for the Maize Improvement Center in Muyupampa, Chuquisaca.

c. Seed conditioning and storage facilities for wheat seed in Chuquisaca.

d. Seed drying, conditioning and storage facilities for the Saavedra Experiment Station, CIAT-Santa Cruz.

e. Conditioned storage facilities for the CAICO Seed Company in Santa Cruz.

f. Conditioned storage facilities for the Cordillera Seed Company in Santa Cruz.

g. Conditioned storage facilities for La Libertad Seed Company in Santa Cruz.

The seed facilities in Yacuiba and CIAT-Santa Cruz are presently under construction. It is expected that construction will be completed by the end of 1985. The construction of Muyupampa's Maize Seed Plant has not yet been initiated by CORDECH. The design of the Chuquisaca wheat seed plant has been used to upgrade the Zudáñez plant. The same arrangement and equipment would be used in the new facilities. CAICO did not build the badly needed conditioned storage. The Cordillera and La Libertad seed companies have built facilities that provide around 900 tons of conditioned storage in Santa Cruz.

Training of personnel involved in seed conditioning in different plants in Bolivia was conducted through short courses or in-service training. Since some of the private seed companies installed seed conditioning plants during the last two years, assistance was provided in the installation and operation of equipment.

Technical specifications for seed conditioning and laboratory equipment were prepared for the implementation of five plants, as well as for the seed testing facilities of the regional seed certification services. About ninety-five percent of the equipment, purchased by the Project, had arrived by the time of writer's departure.

E. Conclusions and Recommendations

The regional seed program in Chuquisaca is still in a state of evolution, but the basic elements are identified below:

a. Chinoli is responsible for the evaluation and release of improved varieties.

b. Wheat foundation seed was produced by farmers under contract with MACA-CARE in 1985, as a result of the inability of Chinoli to obtain financing to set up a Foundation Seed Program.

c. The multiplication of commercial wheat seed has been made by CORDECH and CARITAS. Both institutions have produced "fiscalized" seed with small farmers. CORDECH hopes to produce up to 545 tons of improved wheat seed by 1988. CARITAS will continue to produce around 50 tons of wheat seed unless the CHARCAS mill project is financed. The CBN produces about 800 tons of barley seed-grain. Their demand for improved seed could climb to 1800 tons during the next five years.

d. Seed conditioning of wheat seed is still conducted in MACA's plant in Zudáñez. With the creation of a mixed public-private company, seed conditioning would be in the hands of seed producers.

e. Seed quality control is now the responsibility of MACA through the SCS. The SCS ensures the identity of lots and the quality of seed produced. Considering that the program is in its initial stages, seed certification standards have been set at easily achievable levels; otherwise, the program would not have produced any seed. The seed produced, however, is of higher quality than the seed saved by the farmers. The SCS receives very little economical support from the government; in 1985, the SCS was partially financed with funds from PIL-103 and charged fees for services rendered to seed producers.

f. Seed program orientation is accomplished through the RSC. The SCS reports their activities directly to the Council. This Council is made up of thirteen institutions directly related to the agricultural sector. An executive committee carries out the Council's activities and meets on a regular basis.

Chuquisaca and Potosí are markedly different from other regions in the country where seed programs are in effect. Therefore, it is not at all unusual that the seed program is also developing differently in order to effectively fulfill the needs of the region. Some differences have already been noted, but other changes still need to be implemented.

After a twenty-two months of working in the area, the author wishes to make the following recommendations:

1. Because of the inexperience of the technicians in the Chinoli Experiment Station--many are recent graduates of the University of Potosí--some training is needed to help them adequately conduct varietal evaluations. The station also needs to establish adequate procedures and facilities to maintain breeder seed without the risk of varietal mixtures.

2. A foundation seed program could be implemented in Chinoli, particularly with barley. In order for this program to work, it needs to be well-financed and autonomous. The study for the production of foundation seed written by Mr. Gover Barja and Dr. Edgar R. Cabrera should be again considered by PL-480 or the BID Seed Project. The personnel currently in Chinoli are not capable of carrying out a foundation seed project. Therefore, one of the primary requirements for the financing of such project should be the additional hiring of additional technically capable personnel.

3. The production of wheat production seed should be located in Chuquisaca, thereby making use of irrigated land. IBTA-Chuquisaca could easily obtain wheat breeder seed from Chinoli and produce foundation seed in cooperation with contract farmers. This program could be initiated under the BID Seed Project.

4. Certified wheat seed should be produced on a small scale, around 60-70 hectares in 1985/86. There is sufficient foundation seed produced in 1984/85 to plant this area. CORDECH should not try to produce more than 75 tons since it has been shown that they cannot supervise more than 50 farmers nor market a large volume of seed. The production of wheat seed should remain at this low level until there is a real commitment to market wheat seed in Santa Cruz, or until a better wheat price policy comes into effect, thereby making it a profitable crop to grow.

There is enough barley foundation seed to plant 60-70 hectares for the production of registered seed. It is therefore recommended that the CBN select farmers in Lequezana, Yamparáez, and Tarabuco to produce registered seed. In 1986/87, there should be enough certified seed to plant 775 hectares with improved seed.

5. Until a seed processing company is formed, it is recommended that MACA continue to condition seed in the Betanzos and Zudáñez plants. Additional equipment has been purchased to upgrade these plants and should be installed before the harvesting season in 1986. Since the cost of transportation has risen dramatically in the last twelve months, it would be desirable to condition the CBN barley seed in Zudáñez and Betanzos. Both plants also offer storage facilities and because they are close to the production areas, the seed can be distributed to farmers more easily.

6. The SCS should continue to be the hub of the regional program. Because of the deficiencies in the staff and the difficulties in inspecting fields of a large number of farmers, it is hereby recommended that the SCS concentrate efforts in the production of foundation and registered seed. Land and farmers should be carefully selected and technical assistance should be provided. Fields should be inspected at least during the boot stage and prior to harvest. Special attention should be placed on roguing and weed control. If good foundation and registered seed are produced,

free of weed seed and other varieties, the efforts of the SCS in certified seed production could be limited to land selection and a visit prior to harvest. All processed seed should be sampled and analyzed in the seed testing laboratory and tags of the different seed classes should be placed on the bags.

The little effort devoted to the production of certified seed may appear to be contrary to the procedures that are usually recommended. However, in the past two years, it has been shown that an inspector can only attend around 60 hectares under the conditions of the area. It has also been next to impossible to locate farmers who will follow directions for the control of weeds and the removal of off-type plants. By assuring a good source of foundation and registered seed, the problems encountered in certified seed production are minimized.

7. There is no doubt that the market for certified wheat seed in Santa Cruz will remain strong for years to come. It seems impossible for any government to be able to continue subsidizing wheat flour in Bolivia. Therefore, a new price policy should be put into effect in the near future. A favorable price for locally produced wheat will motivate production in several areas of the country. At present, the demand of wheat seed surpasses the supply; CIAT is reducing efforts in their wheat seed program in Vallegrande and Comarapa. Chuquisaca, therefore, will have an opportunity to market large volumes of wheat seed in the region and particularly in Santa Cruz.

The author wishes to recommend that the RSC contact the National Association of Oil Crop Producers (ANAPO), which also works with wheat farmers in Santa Cruz, to study possibilities in supplying Santa Cruz with Saquayo certified seed and possibly later with other varieties. If Chuquisaca is to supply Santa Cruz with certified wheat seed, planting should start in December and end no later than the end of January. Harvesting and conditioning should be carried out promptly, and this implies that the farmers should be able to sell their seed right after it is harvested. It has been observed that this is perhaps the greatest handicap of the program. Institutions such as CORDECH must provide the human, physical and financial resources to efficiently recover the produced seed from the farmers.

8. The Regional Seed Council should continue to be the entity which orients the program. During the Third National Seed Round Table, the RSC should set more realistic goals. The CBN needs to produce barley seed within the context of the regional program and it is believed that this will be the case. As the program grows, the RSC needs to focus on the need for a larger seed conditioning facility, but plans should always be based on production levels. It is expected that within the next few years, national seed policies will be established by the regional councils. The importance of a well-established and responsible regional board can not be over-emphasized.

9. The seed program in Chuquisaca/Potosí is still in its early stages of development. Technical assistance is expected to be provided until September of 1986. It is hoped that by that time, barley seed will have been produced under the certification scheme. If that is the case, a new stage will have just been started and the program will require more technical guidance than before.

No country which relies on its agriculture for a healthy economy should jeopardize it by relying on seed importation. Therefore, the author recommends that the Bolivian government and USAID consider very seriously the implementation of another project which will take into account the efforts of the regional seed councils, as well as the participation of the private sector, in order to build a strong Bolivian seed industry.

An effective seed program cannot be implemented without the participation of well-trained personnel. During the past two years, several technicians have been trained in several aspects of seed technology. This is by no means considered sufficient, and more training is necessary. Besides in-service training and short courses conducted in the region, overseas training in graduate schools should be implemented. The need for training is linked to the previously stated concern, that a project is needed, in order to have financial support to send people overseas.