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CHEMONICS
INTERNATIONAL CONSULTING DIVISION

END OF TOUR REPORT
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SUBMITTED TO
THE REGIONAL SEED COUNCIL - GRAN CHACO,
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END OF TOUR REPORT

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I. BACKGROUND

In 1983 the Ministry of Rural Affairs and Agriculture (MACA) requested that USAID expand technical assistance services for seed production to the Gran Chaco Province of the Department of Tarija. In April 1983, Dr. Juan A. Landívar was hired as advisor for the Chaco region. In May 1985, the Chemonics contracted the services of Inq. Diógenes Chávez as Seed Advisor to the Gran Chaco due to the transfer of Dr. Landívar to Santa Cruz.

This report discusses the progress achieved in the development of the seed program during the period the advisors worked in the Gran Chaco, from April 1983 to present. Recommendations are given to the leaders of the seed program and also to national authorities.

The sequence of activities presented herein has not resulted from a detailed plan of work, but is the result of continuous evaluation and consultations between Chemonics advisors and leaders of the region.

The experience gained in Santa Cruz from 1980-1983 was very useful to the development of a work strategy for the Chaco. The Santa Cruz Program had already passed through the stages of creation and strengthening of an essential component in seed production of a "lead" crop. The concept of a "lead" crop is very important in the organization of a seed development program. The crop should have a strong market inside or outside the region, and processes of production, certification and conditioning should be relatively simple. This allows the advisor to demonstrate the concepts of seed production, which are then applied to the production of other crops. In Yacuiba the "lead" crop for the seed development program was soybean, as had been the case in Santa Cruz.

Initially an evaluation was made on conditions in the Chaco for soybean seed production. The evaluation showed that:

- 1) An experiment station existed with the capability to introduce and test varieties and produce genetic and foundation seeds.
- 2) Climatic conditions favored the production and storage of seed.

3) There was an approximate production of 3,500-4,000 hectares of commercial soybeans in the region.

4) There was a market outlet for commercial soybean.

5) Soybean producers were organized in an association (APOGRA, Association of Oil Seed and Grain Producers) and cooperatives.

6) There was an office with legal authority for seed quality control.

The points mentioned above indicated the feasibility of initiating a seed production program. Work plans were based on the following observations:

1) Even though the components of a seed development program already existed, each institution was working independently.

2) The IBTA experiment station did not have an organized system for production of genetic and foundation seed.

3) The Regional Certification Service did not have the necessary technicians to perform field and laboratory work.

4) The farmers did not have confidence in the Certification Service and were reluctant to participate in the seed production program.

5) Infrastructure was not available for conditioning of seed.

II. ANALYSIS OF PROGRAM DEVELOPMENT BY COMPONENT

A. Varietal Improvement Research

The existence of an IBTA experiment station in the Gran Chaco expedited the introduction of several varieties to the area. In 1983 the station had a researcher in soybean, as well as the equipment needed to meet the regional demand of genetic and foundation seeds. Varieties recommended by the researcher were Bossier and UFV-1, which were very well accepted by local producers. The main problem observed was the lack of coordination between the research component and production of foundation seed. Technicians in each component were working independently of each other. In addition, it was discovered that foundation seed planted in the experiment station contained varietal mixtures. Field observation on the distribution of mixtures led to the conclusion that these resulted from the use of seed having low genetic purity. Later it was verified that fields were not planted with genetic seed.

Progress achieved in this component was slow. In 1984, IBTA introduced the Cristalina variety. At the time it was recommended adequate supplies of the seed were available to be distributed to seed growers. However, due to the lack of coordination between IBTA, the Regional Council and Certification, the Cristalina variety did not reach the farmer.

Slow progress was due primarily to the Regional Director of IBTA. Local producers and the advisor reported this situation to IBTA and MACA

authorities. During the agricultural campaign 85/86, the Regional Director was transferred to another IBTA unit. As a direct result of this action, IBTA will have genetic seed of UFV-1, Cristalina and IAC-8 soybeans varieties, plus Swan in corn for the 86/87 campaign, and has already initiated the production of genetic wheat seed of the Saquayo variety.

Genetic purity of soybean and corn varieties have improved considerably. The system used for this purpose employs methods of mass selection and selection of plants by row.

To consolidate the efficiency of this component it is necessary to coordinate the researchers' work with the objectives of the regional seed program. Serious commitment on the part of the executives and directors of the experiment station is required in order to work on behalf of the region, and not on the basis of plans developed in La Paz.

Since the amount of genetic seed of different crops required in the region is small, and in view of the fact that there are other sources of genetic seed of improved varieties in the country (mainly in soybean, corn and wheat), the weakness of this activity does not affect the general progress of the program in the short or medium run.

It is important however, to strengthen this component to assure long-term progress. For instance, research has the responsibility to identify improved varieties of crops like safflower and sorghum (besides wheat). Specific recommendations relating to this component are as follows:

- 1) At present IBTA does not have research personnel. Many have recently resigned due to low salaries. Therefore, new technicians must be hired, and they should receive some kind of training in order to establish adequate procedures related to the production of genetic seed.
- 2) The research unit for variety improvement must work in coordination with the Seed Council, in order to receive information regarding needs of the farmers and objectives of the seed production program.
- 3) Researchers in the Gran Chaco should maintain close contact with their colleagues in Santa Cruz, trying to obtain compatibility among the varieties in both regions. The success of the regional seed program depends on the Santa Cruz market.
- 4) Since research and production of genetic seed are the basis for the production seed program, IBTA executives must support this activity in all its stages.
- 5) The directors and executives of the experiment station must incorporate the researchers of the different crops into a program of foundation seed production. Researchers should insist in quality control of foundation seed.
- 6) Research on species for winter crops should be intensified, in order to offer to the farmers alternatives for use of land during winter, and therefore spread their fixed costs.

B. Foundation Seed Production

Even though the IBTA experiment station "El Algarrobal" had a research program in various crops, it did not have a system for foundation seed production. Instead IBTA counted on the commercial production unit. This unit received seeds of varieties recommended by the researchers, multiplied and sold them--part of the grain as seed and the rest as commercial grain. This unit could be reorganized for foundation seed production. In this respect, the following was observed:

* The researcher was working independently of the production unit. There was not a close relation with quality control of foundation seed produced in the station.

* The technician of the production unit was not trained in seed production.

* There was no coordination between the experiment station and Certification. Fields planted with foundation seed were not registered in the Regional Certification Service.

* Foundation seed production was small and seed was distributed to any farmer who requested it.

* Although there was a small dryer and air-screen cleaner in IBTA, this equipment was not used for conditioning of foundation seed.

The weaknesses of this component were compensated through the procurement of foundation seed of soybean, corn and wheat from CIAT in Santa Cruz.

As with research in varietal improvement, progress in organizing the Regional Unit for Foundation Seed Production was slow. Although the technicians of the experiment station were willing to cooperate in the formation of this component, their Regional Director would not allow them to do so.

Despite the difficulties in establishing this Unit, work was carried out with the technicians to set up drying equipment and condition already existing seed. This small plant was used to condition seed produced by IBTA, seed produced by local farmers, and also seed marketed by the Seed Department of MACA.

Quality control in the Chaco Experiment Station showed several deficiencies due to lack of knowledge of seed technology on the part of the personnel assigned to this task. IBTA researchers as well as the technicians of the Foundation Seed Unit participated in several courses conducted by Chemonics regionally and nationally. This kind of training was strengthened with in-service training on quality control. At present internal quality control is being done during the pre and post-harvest stages, obtaining seed with low percentage of varietal mixtures and an average germination of 93 percent in soybean and 95 percent in corn.

Due to lack of liquidity of IBTA, in 1985 a project was developed in order to obtain financing for the production of foundation seed. This project was approved and enough funds were obtained from the CHACO-PIL-103

to cover operational costs for the production of soybean and corn seed. For unknown reasons, the IBTA Director did not accept these funds. Fortunately for the region, during the 85/86 campaign the Director was replaced. This facilitated coordination between the experiment station and the work performed in other components of the program.

The resources generated by the foundation seed program are administered by the Regional Seed Council. Planning of seed production is done by the Regional Council and the Certification Service. The total volume of foundation seed is procured by the Regional Council under contract. In this way the Council is sure that foundation seed is adequately distributed among local seed growers.

During the last campaign sufficient amounts of foundation seed of recommended varieties of soybean and corn were obtained. Also during the winter of 1986 production of wheat foundation seed of the Saquayo variety was initiated.

Because the advisors worked for only a short time on this component, production of foundation seed is the weakest element of the production chain. In order to strengthen the Foundation Seed Unit, we recommend the following:

- 1) IBTA should contract the services of a well-trained technician (agronomist with or without a complete degree) who would take responsibility for supervision and administration of this Unit. This person should receive training in production and quality control.
- 2) The person in charge of this Unit should coordinate work on quality control in the field with researchers and with the Regional Certification Service during harvest, conditioning, and storage stages.
- 3) Distribution of foundation seed must be performed in coordination with the Regional Council to assure that all seed producers registered in Certification have priority for obtaining this seed.
- 4) IBTA executives should seek financing sources for the procurement of a small conditioning plant and for the construction of warehouse facilities. In the meantime they should request to the Regional Council the rental of air-screen cleaners and storage space belonging to MACA in Campo Grande.
- 5) Due to lack of funds in IBTA, the Regional Council should continue its financial support to the Foundation Seed Unit. The Council should continue supervising the use of these funds.

C. Multiplication of Commercial Seed

In 1983 this component practically did not exist. The MACA Seed Department was producing some seed through local growers, but fields were chosen during harvest. Selection was done according to degree of damage perceived at first sight. Upon the arrival of the advisor there were no farmers or private companies independently involved in seed production.

Creation of this component constituted the principal task of the advisor at the beginning of the program. The most progressive farmers were visited in order to explain the approach of the program, the possible economic benefits, and offer technical assistance. Farmers that participated in production received periodic visits from the advisor and the technicians of Seed Certification. These visits were useful in order to give in-service training to Certification technicians and to orient farmers in seed production techniques.

In a short time the region had three seed companies--the Integral Cooperative, COSSEY and CASSAR--and also two independent seed growers. These have the capacity to meet area requirements and provide the Department of Santa Cruz with significant amounts of seed. In 1985 the region obtained a production of 385 metric tons of soybean seed of "fiscalized" category. This production exceeded the requirements of the Chaco by an excess of 285 metric tons. This was marketed in Santa Cruz.

The production system used by the enterprises, with the exception of private producers, is through farmer/cooperators. They receive foundation or registered seed and other inputs in the form of credit and have a commitment to sell their production to the company, if it is approved by Certification. The enterprises establish incentives above the value of grain, which now are 25 percent for registered seed, 20 percent for certified and 15 percent for fiscalized seed.

With the advise of Certification and Chemonics the seed companies initiated a more progressive program in 1986, attempting to improve seed quality. It became possible to substitute 80 percent of the fiscalized category with certified seed. In order to reach this objective, 20 metric tons of registered seed and 1.0 metric ton of foundation seed were obtained from Santa Cruz. During 1986 a volume of 350 metric tons of soybean seed was produced. Although the volume was similar to that of 1985, seed obtained was of better genetic and physiological quality. This allows the region to compete in markets in other areas of the country.

It can be seen that seed growers of the Gran Chaco are gaining experience and have the capacity to produce high quality seed. From a total of 350 tons of seed, germination was above 89 percent. However, more emphasis should be placed on harvest, since this stage presents the most serious problems. Cotton seed has been introduced to the program with a production of 1.0 ton of seed and 1.3 tons of corn.

At present multiplication of commercial seed constitutes the strongest link of the production chain. This can be attributed to the rapid acceptance on the part of seed growers, to the availability of seed markets, inside and outside the region, to the creation of the local services such as the Regional Certification Service, and to the conditioning service. In order to maintain this progress we recommend the following:

- 1) Producers in the second section (Caraparí and Saladillo) should install seed dryers. This recommendation is also valid for seed growers in the first section, because of the small drying capacity at El Palmar.
- 2) Seed companies must have a technician in order to provide technical assistance and orientation to their cooperators with respect to quality

control techniques.

3) Companies or seed groups must register their coperators' fields as early as possible, because production of certified seed requires three inspections during the development of the crop. By registering their fields, they will receive timely attention from Certification technicians.

4) Harvest must be programmed with enough time, being sure of the availability of labor, harvest equipment, transportation and enough bags. The poor planning of harvest is the main reason for the delays during this stage and for the deterioration of seed in the field.

D. Seed Conditioning

When the advisor began his work, the region had two air-screen cleaners "Clipper 27" belonging to MACA and continuous-flow dryer belonging to IBTA. This equipment constituted the first facility for seed conditioning in the region. Once the first production campaign was finished, a feasibility study was prepared for the construction of a seed plant in the province. This document was presented in September 1983.

In 1986, the new plant at El Palmar conditioned 350 metric tons of seed under the administration of the Integral Cooperative. Conditioning services were provided to all seed growers. Training of personnel in plant management was conducted through in-service training by Chemonics. However, this kind of training requires follow-up, especially for the plant manager.

Besides the plant at El Palmar, the Project financed the installation of a drier at the IBTA experiment station. These facilities have a capacity of 12 metric tons per day, enough to cover the station needs, and also render drying services for seed growers.

Because there is only one conditioning plant available in the area, it is important that it render efficient services for all seed growers in the region. To accomplish this objective the following is recommended:

1) Administration of the new seed conditioning plant must be performed through the formation of a mixed entity formed by CODETAR, the Integral Cooperative Gran Chaco and APOGRA. This to ensure that all farmers, without exception, be represented in the company. In the event that this enterprise is not formed, the Regional Council should form a special unit for conditioning services, separate from the Certification Service.

2) The institution which takes the responsibility for administering this plant must contract qualified personnel and procure materials needed for efficient and continuous functioning. It is recommended that in-service training be conducted for personnel in seed plants in Santa Cruz.

3) The seed conditioning plant should condition only seed which fulfills all standards for certification.

E. Seed Marketing

Initially, the small quantity of seed produced in the region was marketed by the MACA Seed Department. That institution used to buy seed according to the quality observed during the harvest stage. Seed was certified by the same entity and sold to the farmer. Imported seed was marketed through the Integral Cooperative. It was estimated that the effective demand was approximately 100 metric tons. This quantity was provided by MACA (local production) and by the Cooperative (imported) during most recent years. Since there was no excess seed, there was no system for marketing to regions outside the province.

The First National Round Table on Seeds determined that the MACA Seed Department would work only on seed certification and would not do any production or marketing. This eliminated one of the marketing channels for local seed. The gap left by MACA was covered by the Integral Cooperative. In coordination with the advisor, alternative systems were developed related to the service rendered by the Cooperative to its associates. The alternatives proposed were the following:

1) The Cooperative would pay the seed grower the price of the grain plus an incentive during harvest. The Cooperative would cover costs of conditioning, storage and certification. Any net earnings obtained after marketing the seed would be for the Cooperative.

2) The seed grower would deliver its crop to the Cooperative, and at that moment would receive the price of grain. The Cooperative would cover costs of conditioning, storage, certification and marketing. In this alternative the earnings (or losses) would be shared between the Cooperative and the producer.

3) The farmer would cover costs for conditioning, storage and certification. The cooperative would be in charge of marketing, collecting from the farmer the operational costs.

Due to lack of information regarding these alternatives, most growers chose the first option. Only one seed producer opted for marketing his own seed.

With some deficiencies, the marketing system at the local level was effective with regard to the distribution of local production. Since the success of the Gran Chaco program depends upon the sale of seeds outside the region, the advisor dedicated a great deal of his time to the development of marketing channels outside this area. Contacts were made with ANAPO, seed companies and other buyers in Santa Cruz. This information was transferred to seed companies in the Chaco. Although excess production of the region was successfully marketed in Santa Cruz, the lack of experience of the Chaco companies resulted in some breach of contracts and certain misunderstandings among buyers and sellers.

The objective to introduce Chaco seed into the Santa Cruz market has been very successful. The strategy of offering only high quality seed for sale outside the province brought good results. Seed was well accepted by Santa Cruz farmers, wholesale buyers obtained confidence in "Chaqueña" seed and are interested in procuring this seed again. It is very important

to maintain such confidence. Therefore, we recommend the following:

1) Since utilization of improved seed in the province is low, seed companies should create promotional programs in order to stimulate use of local seed.

2) With enough lead time (June or July) seed companies should inform buyers in Santa Cruz regarding seed availability. Sale contracts should be prepared when information regarding seed availability is complete, and when prices are already defined.

3) Companies must continue the strategy of offering only high quality seed. Also they should continue using bags which easily can identify the region of origin of the seed.

4) In the future seed distribution through exclusive distributors should be considered. Then it might be possible to open a retail sales branch.

F. Utilization of Seed

As a result of the introduction of improved soybean varieties, farmers began to use improved seed. Initially, use of certified seed was low. Principally, this was because of lack of confidence regarding local production, high cost and the mediocre quality of the imported seed.

Distrust of the quality of local seed still limits progress in regard to its use. This component must continue receiving support to improve utilization of seed. According to Table No. 1, progress achieved has been moderate.

Table 1 REGIONAL UTILIZATION AND SALE OF NATIONAL AND IMPORTED SEED
IN THE GRAN CHACO PROVINCE
YEARS 1984 - 1986 AND ESTIMATES FOR 1987

Year	Use of Local Seed (TM)	Use of Imported Seed (TM)	Total Sales (TM)	Planted Hectares	Utilization Percentage**
1983/4	40	50	90	4,500	28
1984/5	80	76	166	4,500	53
1985/6	100	0	100	3,500	41
1986/7*	150	0	150	4,000	53

* Estimated

** It is supposed an utilization of 70 kg/ha.

It is estimated that progress in this component will be slow, but with a little more effort, 70 percent utilization can be reached in the near future. In order to increase use of improved regional seed, we recommend the following:

1) The Council, in conjunction with the IBTA experiment station and Certification, should encourage farmers to organize demonstration plots and field days.

2) Seed companies should develop distribution channels for local seed in the second and third sections of the Province.

G. Certification

The Seed Department of MACA is the official institution for certification. Since there was no commercial production, this institution was dedicated to the production, certification and marketing of seeds. After the First National Seed Round Table it was agreed that MACA should concentrate its efforts only in seed Certification and encourage private farmers toward commercial production.

The work performed by the advisor focused on conducting in-service training for Certification technicians, and render assistance directly to seed growers.

Throughout his assignment, the advisor attempted to get the Seed Department of MACA to carry out field inspections. This task was difficult in view of the fact that the Certification Director in La Paz demanded that MACA personnel concentrate their efforts in production. Despite this limitation, field inspection and support to conditioning services were achieved. Laboratory tests were carried out and all seed which met Certification standards was tagged.

Through the Regional Council it was possible to contract the services of another technician and an administrator, both contracted with financial support from CHACO-PIL-103 (special fund of T-059 Project). The Project also provided laboratory equipment and a vehicle. During the last two years, Certification technicians worked very professionally and efficiently. Mainly this component is responsible for the success achieved in the region.

At present this is one of the most effective and respected services in the region. The long term success of this component depends on its self-financing and training of the technicians. In order to reach these objectives we recommend the following:

1) The Regional Certification Service must have at least two high level technicians, making it possible to substitute one for the other so quality of services is not affected if one leaves.

2) Certification should prepare standards for local crops. These should be flexible to comply with technology available in the region, and at the same time maintain quality level. These should be approved by the Regional Council. In regard to inter-departmental marketing, standards must be compatible with other Regional Councils.

3) Certification should encourage seed production of winter crops such as wheat and sorghum.

H. Regional Seed Council

The contracting of an advisor for the Gran Chaco Province was the result of the interest demonstrated by the Regional Council in establishing a regional seed production program. Although the Regional Council existed its members did not have a clear concept regarding their specific functions.

Strengthening of this component is the result of the development of the program itself, and not the result of a preconceived work plan. As the program developed it was necessary to solve problems as they were confronted, in coordination with regional leaders. The solutions to these problems were discussed during Council meetings. The interest and participation of institutions and members of the Council was encouraged. At present, the Regional Seed Council of the Gran Chaco is one of the strongest in the country; however, on occasion its members act in favor of the institution they represent, rather than in favor of the consolidation of the regional seed program.

Given that the Council is the center for coordination of other components of the program, it should be strengthened even more. In order to reach this objective it is essential that its members act with personal integrity in favor of the regional program. During the coming years the Council will face typical problems related to the development of the program. Among them we can mention the following: i) system of administration of the seed conditioning plant, ii) self-financing of Certification, iii) introduction of other crops, iv) continuity of program development. Future progress of the program will depend on the right decisions taken with respect to these problems. Specific recommendations for the Regional Council are the following:

1) The Regional Council should take very seriously the responsibility to act as Board of Directors of the Regional Seed Certification Service. Unconditional support should be given to the development of Certification, since this is the institution that will execute decisions taken by the Council. Certification will not be able to execute these decisions without support.

2) The Council should evaluate all components of the program. Based on this general analysis, plans should be prepared for seed production campaigns.

I. Technical Training

Although the region had professional agronomists working for the public entities, capability related to seed technology was minimum. Technicians who had some training were not properly utilized, since there was no organized production program in this area. Training was needed in production of genetic and foundation seed, certification, and conditioning and also to make them aware of production techniques.

The attendance of four technicians to courses in seed technology in CIAT/Colombia was financed by the Project. This kind of training has been strengthened by in-service training. Seed Certification was the component most benefited by the training program. Technicians participated in courses conducted at the national and regional level. The objective of these courses was to discuss specific problems regarding production. At the regional level four courses were conducted in which approximately 100 technicians and farmers participated. At the national level seven courses were presented with the participation of approximately 30 technicians of the Gran Chaco.

We believe that in-service training is the most efficient method because it allows the advisor to demonstrate the concepts involved. In order to solve these problems in the future, it will be necessary to give training to technicians and leaders of the program at the Master and/or PhD levels in seed technology.

III. Summary and General Conclusions

Progress of the regional seed program can be measured in several ways:

Component	1983	1986
No. of available soybean varieties	2	3
No. of available corn varieties	1	2
No. of available wheat varieties	0	1
No. of varieties with availability of foundation seed		
Soybean	0	3
Corn	0	2
% of Demand covered by available foundation seed		
Soybean	0	100%
Corn	0	100%
No. of farmers participating in seed production	3	60
Local seed production (MT)	40	400
Imported Seed (MT)	50	0
Seed exported by the region	0	300
No. of private seed companies	0	3
No. of conditioning plants	0	1
No. of technicians working on seed production (long term)	2	7

Progress achieved is evident, but this only demonstrates the feasibility of the program. By this we mean that the work performed has taken the regional program from the first stage of development to stage "three". Consolidation of the program is obtained in the "fourth" stage. This takes place when:

- * research periodically releases new varieties;
- * foundation seed of new varieties is available;
- * the foundation seed unit is self-financed, has well trained technicians and is efficiently organized;
- * seed producers are trained in production of high quality seed;
- * certification is self-financed and has well trained technicians; and
- * Seed utilization is high.

It is highly recommended that a technical assistance project be developed, similar to the one that is ending, which should include technical support for the following:

- * Training at the post-graduate level for a researcher in genetic seed production, for the person in charge of foundation seed, and for Certification technicians.
- * Implementation of facilities for foundation seed conditioning.
- * Incorporation of winter crops to the Certification program.
- * Training seed growers in quality control techniques.
- * Design and assistance in the installation and management of dryers.
- * Promotion of use of certified seed.
- * Development of marketing channels.

The above recommendations on academic and in-service training and technical assistance should be seriously considered by MACA, USAID and the National Seed Council, because the region still has only a small number of personnel involved in the program. Continual changes in personnel in the area can weaken some components of the program.

IV. POSITIVE FACTORS AND ADVANTAGES OF THE PROJECT

From a personal point of view, the authors of this report consider that advising the seed improvement program has been one of the most effective technical assistance programs received in the country.

First: Despite the fact that Chemonics advisers were located in different regions of the country and had different problems to solve, they

worked as a team, collaborating with each other and supporting and orientating the leaders of the regional seed programs.

Second: The administration division in La Paz efficiently supported the needs of each adviser, allowing them to fulfill work plans established at the beginning of each semester.

Third: We received constant support as a consequence of continuous communication between advisers and the Chemonics Chief of Party, especially through his frequent visits to each region.

Fourth, the most important: Each advisor was located in the region where the program tasks were developed. This allowed rapid identification of problems regarding production and more efficient advisory service and orientation to leaders in the region.

We should indicate that some elements in favor of the advisory team are not typical of other projects. Among them we can mention the following:

- The Regional Seed Council: Its creation and strengthening provided impetus to the program, allowing the advisor to work through a center of coordination and planning in regard to seed production.

- Work with Local Counterparts: Another of the main supports in favor of the advisors. Coordinating work and sharing the same office facilitated progress.

- Logistical support received from Chemonics is one of the factors which influenced the success of the regional program.