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SEED UNIT

ANNUAL REPORT 1983

Special recognition goes to the Swiss Development Cooperation the agency that financially supported most of these activities and made the Seed Unit a reality with its agreement to support this five year project starting in 1979

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CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL CIAT

CALI COLOMBIA

SEED UNIT
ANNUAL REPORT 1983

The fifth year of operation of the Seed Unit has resulted in continued progress toward the achievement of program objectives. The objectives of the Unit continue a focus on Latin America and the Caribbean to

- 1 Increase the number and competence of seed technologists
- 2 Strengthen the seed programs and seed enterprises through technical collaboration
- 3 Stimulate seed production and accelerate use of the most promising varieties and hybrids
- 4 Help solve problems limiting seed production and distribution through research
- 5 Disseminate information on seed activities, advances in seed technology and the availability of promising materials in the region

The Seed Unit both supports the commodity programs of CIAT and assists in development oriented activities to accelerate the growth of in-country seed programs and enterprises

Training and Conferences

The Seed Unit's first priority continues to be to increase the number and competence of seed technologists in the Latin American and Caribbean

region. An emphasis is placed on intensive multidisciplinary short courses, advanced intensive courses, in-service training, degree thesis programs, in-country training and workshops.

The highlights of the training and conference activities during 1983 are

- A postgraduate course on Seed Production and Technology
- An advanced postgraduate course on Breeder and Basic Seed Production
- Assistance to the commodity courses of CIAT and CIMMYT
- Assistance to a subregional course and in-country training and seminars
- A workshop on Development of the Latin American and Caribbean Seed Sector and Projected Needs
- Assistance to a workshop organized by the Andean Pact countries on the Technical and Commercial Integration of the Seed Sector in the Andean Subregion

Short Courses

The VII Postgraduate Course in Seed Technology of nine weeks duration covered the different aspects of seed production, conditioning, quality control at the field and laboratory level, legislation and marketing. These subjects combined with discussions on seed program and enterprise development and management provided an over-all view for the basic understanding needed by seed technologists. Lectures, field and laboratory exercises, round tables, case studies and visits

to seed enterprises and production fields were used as educational methods. Beans, rice, tropical pastures, maize and sorghum were the main crops for teaching purposes. Benefiting from this course were 23 participants from 11 Latin American countries.

The Advanced Postgraduate Course on Breeder and Basic Seed Production included 30 participants from 14 countries. The course focused on developing good variety descriptions, purification methodologies, field roguing and inspection, organizing and operating a basic seed program and the resources required. A special feature of the course was projects developed and presented by the participants on the development or improvement of a basic seed program for their country.

Assistance to commodity courses included participation of the Seed Unit staff in the short courses offered by the bean and rice programs. In addition, two staff members cooperated with the CIMMYT maize and wheat programs on two different occasions during the year to provide a one-week seed production and technology section in the regular international production and breeding courses in Mexico. This cooperative effort in training between CIMMYT and CIAT proved to be quite successful and it is expected that this joint effort in training will continue.

A subregional course was organized in Costa Rica by a new association of seed technologists Asociación Regional de Tecnólogos en Semillas de Centro América Panamá y el Caribe (ARTES) in cooperation with the Seed Unit. This first regional course on seed quality was supported financially by the German Foundation for International Development (DSE) and included 27 participants from the subregion. CIMMYT assisted with the transportation for 7 trainees and their staff contributed to the course. Seed Unit staff members contributed to the planning and were present throughout the course.

On an in-country basis the Seed Unit contributed to training activities in Panamá, Costa Rica, México and Colombia with the assistance of its staff and consultants. These programs were on the topics of rice and bean variety description and identification, seed conditioning and improved teaching of seed technology. (See Table 1)

In-service

Although three short course trainees remained after the courses for a few days, they cannot be considered in-service trainees since CIAT normally requires at least a month of time to have a significant in-service experience. Extremely limited interest seems to exist for this kind of training in seed. As countries develop their own seed training strategies, more attention needs to be given to this aspect. It appears that the Seed Unit also must develop a more defined series of options for in-service training that can be offered to the region.

Table 1 Participation of the Seed Unit in training activities away from CIAT during 1983

Country	Activity	Number of Participants	Date
Colombia	Short Course	30	June 20 - 24
Costa Rica	Short Course	27	October 3-21
	Varietal Description Workshop	15	November 14-18
Mexico (CIMMYT)	Short Course	30	February 13-18
	Short Course	90	August 7 - 13
Mexico (Saltillo)	Short Course	30	September 5-10
Panama	Short Course	26	March 21 - 26
	Varietal Description Workshop	19	October 3 - 9

Degree-related training

Two master candidates from the Universidad Nacional de Colombia PEG and the Universidad Federal de Pelotas of Brazil completed their research with the Seed Unit in cooperation with the Rice and Bean Programs on varietal description of rice and beans after concluding their course work

Two new candidates started research work. One is doing research toward a Ph D degree on bean seed quality especially with respect to seeds of smaller farmers. He is guided and assisted by the Bean Program and the Seed Unit. He also has support through a university strengthening program between Ohio State University where he has done his course work and USAID. The other candidate is working on pasture seed quality in the Tropical Pasture Program and supported through the Seed Unit. His course work has been done at the Universidad Federal de Pelotas of Brazil. (See Table 2)

Review of training at CIAT

Figure 1 summarizes the number of people trained by country of origin for 1983. Course participants came from 40 national institutions and seed enterprises located in 17 countries in 1983. Table 3 lists the organizations and countries. Table 4 summarizes the number of professionals trained by the different sectors and types of employing organizations. It shows 74 percent of the participants came from public research and seed development and quality control programs with 15 percent from seed enterprises.

Table 2 List of Degree Program Candidates in 1983

Name	University of Study	Country	Discipline
Irastorza M H	Universidad Federal de Pelotas	Argentina	Seed Prod Beans
Muñoz G	Universidad Nacional	Costa Rica	Seed Prod Rice
Carmona R	Universidad Federal de Pelotas	Brazil	Seed Quality Trop Pastures
Wilson D	Ohio State University	U S A	Seed Prod Beans

Figure 1 Number of Participants by Country Trained during 1983

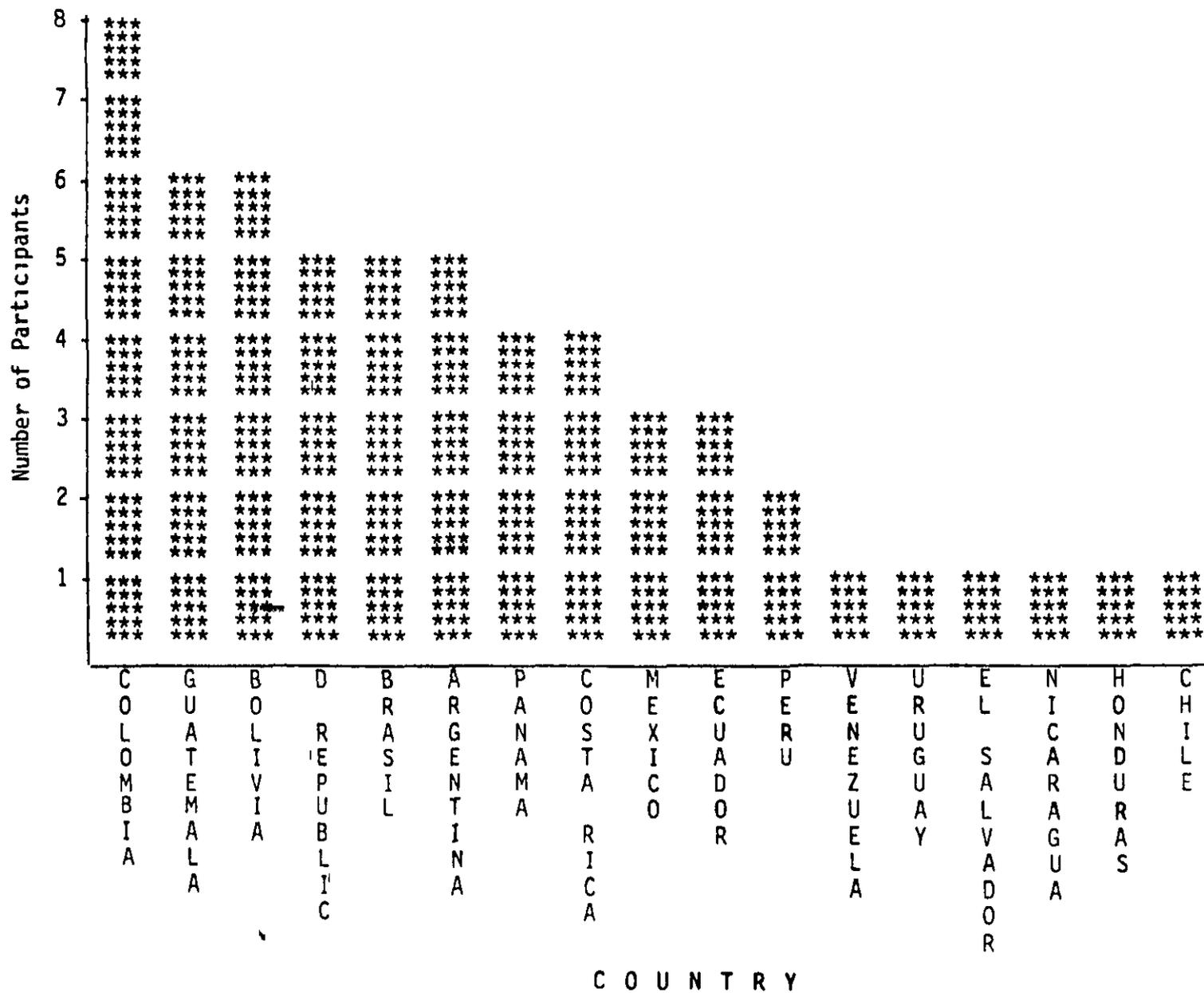


Table 3 National Institutions and Private Enterprises from which course participants came in 1983

Country	I n s t i t u t i o n
Argentina	Instituto Nacional de Tecnología Agropecuaria (INTA) Universidad Nacional de Córdoba Estación Experimental Agro-Industrial Obispo Colombes' Dirección de Estaciones Experimentales
Bolivia	Ministerio de Asuntos Campesinos y Agropecuarios Universidad Boliviana Gabriel Rene Moreno' Instituto Boliviano de Tecnología Agropecuaria (IBTA) Centro de Investigación Agrícola Tropical (CIAT) Empresa Universitaria de Semillas Forrajeras SEFO-SAM'
Brazil	Coordenadoria de Assistência Técnica Integral (CATI) Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA) Empresa Catarinense de Pesquisa Agropecuaria (EMPASC) Instituto Agronômico do Paraná (IAPAR)
Colombia	Centro Internacional de Agricultura Tropical (CIAT) Instituto Colombiano Agropecuario (ICA) Compañía Colombiana de Semillas (COLSEMILLAS) PROSEMILLAS Semillas del Llano (SEMILLANO LTDA)
Costa Rica	Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) Consejo Nacional de Producción Comisión Nacional de Semillas Ministerio de Agricultura y Ganadería
Chile	Servicio Agrícola y Ganadero (SAG)
Dominican Republic	Secretaría de Estado de Agricultura
Ecuador	Instituto Nacional de Investigaciones Agropecuarias (INIAP) Programa Nacional de Semillas

Table 3 Continued

El Salvador	Centro Nacional de Tecnología Agrícola (CENTA)
Guatemala	Agropecuaria La Virgen Dirección General de Servicios Agrícolas (DIGESA) Instituto de Ciencia y Tecnología Agrícolas (ICTA)
Honduras	Ministerio de Recursos Naturales
Mexico	Universidad Autónoma de Chapingo Universidad Autónoma Agraria "Antonio Narro"
Nicaragua	Ministerio de Desarrollo Agropecuario y Reforma Agraria (MIDA-INRA)
Panama	Comite Nacional de Semillas Instituto de Investigación Agropecuaria de Panamá (IDIAP) Universidad de Panama
Perú	Ministerio de Agricultura y Alimentación
Uruguay	Centro Cooperativista Uruguayo
Venezuela	Fondo Nacional de Investigaciones Agropecuarias (FONAIAP)

Table 4 Distribution of training participants by sector or types of employing organizations

Sector of origin of participants	Number of Participants	%
Public Research and Seed Development and Production Programs	39	74
Public National Seed Enterprises	3	6
Private National Seed Enterprises	5	9
Transnationals	-	-
Universities	6	11
Regional Research - Development Organizations	-	-
	<u>53</u> =====	<u>100</u> ===

Assistance to training has been provided by staff members of the commodity programs Mississippi State University ICA the Colombian seed industry, specialists in the region and visiting scientists Without this help the training effort could not have been as effective as it was

Conferences

Workshops have been used by the Seed Unit to concentrate on specific areas that require attention and to assist in initiating action in the region to achieve special objectives The 1983 workshop on the Development of the Latin American and Caribbean Seed Sector and Projected Needs had three main objectives

- 1 To review the stage of development of the seed sector at the national and regional levels
- 2 To identify priorities and project needs for the next five years related to the development of financial physical and human resources
- 3 To help improve the inter-relation of the donors and technical international agencies with those of the seed sector of the region as needs are met in the future

The 88 participants included representation from the leadership of national programs the commercial seed industry universities the World Bank the Interamerican Development Bank, the Swiss Development Cooperation the Instituto Interamericano de Cooperacion para la Agricultura (IICA) the Industry Council for Development Mississippi State University CIMMYT CIP and ICRISAT From the working sessions came several extremely helpful recommendations that will be useful for the future development of the seed sector A proceedings is to be published

The Seed Unit assisted a workshop on the Technical and Commercial Integration of the Seed Sector in the Andean Subregion held at CIAT The 48 participants in this workshop concentrated on steps needed to help the five countries develop a higher level of cooperation in the application of more uniform seed standards and procedures in the region to facilitate trade They also considered the technical and financial support available to help them achieve their objectives At the conclusion of the meeting proposals were discussed for the development of stronger mechanisms to continue to work together in the technical and policy development areas

The National Seed Service of the Ministry of Agriculture of Paraguay organized a seminar on Strategies for the Improvement of the National Seed Industry with the assistance and participation of the Seed Unit From the 40 participants were selected a small working group to continue to refine and follow-up with the Ministry of Agriculture on recommendations made

Similarly the University of Cordoba organized a national seminar on the Control of Seed Quality in Production. This meeting was organized in part to focus attention on the development of a Master of Science program on seed at the University. CIAT has signed an agreement with that University to collaborate in training and through an exchange of staff for special activities to assist the development of that program. The Seminar was attended by 124 people from all segments of the seed sector in Argentina. The 30 presentations and working sessions were quite effective in focusing renewed attention on producing better quality seed.

The Ministry of Agriculture in Honduras organized a seminar with the Seed Unit, USAID and FAO participation and support to concentrate on strategies for helping the seed program develop more rapidly. This seminar resulted in a policy statement by the government to more actively encourage the development of the private sector and give the program a fresh orientation. A grain marketing cooperative assisted by the GTZ is now beginning to consider adding seed production to their activities and others in the country are starting to take a new look at the seed business.

Interest in these workshops and seminars was excellent. Their ultimate value will show in future activities developed and actions taken by the institutions involved and through the follow-up done by the Seed Unit.

The evaluations from participants in training activities have shown a very positive response to the knowledge and skills gained. A systematic evaluation of trainees is now underway to more accurately assess the impact being made by them. However, the follow-up of people associated with training and conferences in previous years indicates an increased motivation and application of technical skills. These reactions help to reassure the Seed Unit staff that they are fulfilling their first priority of increasing the capability and quantity of seed technologists in the region.

Technical Collaboration

Technical collaboration includes personal contacts with leaders in national seed programs, seed enterprises, universities, subregional groups plus coworkers in sister international centers and development agencies active in the region. The Unit works as a catalyst to help the total seed effort be as successful as possible. Visits were made to 17 countries in the region during the year by the Seed Unit staff.

Work with national programs has concentrated on reviewing alternative policies and strategies and encouraging the development of long-term training plans. The examples of Honduras and Paraguay previously mentioned illustrate positive steps on these kinds of developments.

Former trainees in several countries are beginning to make an impact in programs in their countries. A list has been started which now includes 25 names of former trainees who are making a significant impact on their

sphere of activity Continued contacts with course participants through the newsletter, personal correspondence and visits will provide opportunities to encourage and assist them and add names to the 'best achiever' list

The work on a sub-regional level has continued to focus on the Central American and Andean Zones Direct and positive results in Central America include the printing of the manual on Methods for Obtaining Seed of Good Quality of Beans Rice Maize and Sorghum Work has been completed through the Technical Seed Committee for that region on 'Guidelines for Post-harvest Management of the Seed' The group is currently working on "Guidelines for the Maintenance and Production of Breeder and Basic Seed" Through work with IICA the Seed Advisory Committee for the region continues to work on a plan to help meet seed training needs for Central America In response to a request for the Seed Unit to assist the region further through the positioning of an outposted seed specialist in the area consideration is now being given to how this need can be met The seed section of the Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios (PCCMCA) meeting in 1983 generated 21 papers and considerable participation in the seed portion of the meeting Out of this meeting developed the formation of the Regional Association of Seed Technologists for Central America Panama and the Caribbean (ARTES)

Work in the Andean Region and with Junta Acuerdo de Cartagena (JUNAC) has resulted in an agreement signed between CIAT and JUNAC for cooperation in the region Specifically this agreement provides for JUNAC support to

training provided by the Seed Unit in 1984 and 1985. The Unit is to conduct two courses especially for participants from the region. In addition JUNAC is to support 30 trainees from the subregion in courses at CIAT during the two years. This linkage plus the proposals that developed in the 1983 workshop, referred to previously to form ongoing working committees will provide the means for the Unit to collaborate closely with this subregion. The possibility of having an outreach seed specialist for the Andean Zone is being explored.

In July collaborative agreements were signed between the Centro de Estudos e Treinamento em Tecnologia de Sementes e Mudanças (CETREISEM) Brazil, the University of Cordoba Argentina and CIAT. These agreements will provide a mechanism for the Seed Unit to assist countries in the Southern Cone and Brazil through training activities in conjunction with these two centers. In addition the assistance of their staff members in CIAT training and the acceptance of researchers from these centers for thesis work at CIAT will further strengthen all programs.

At the Panamerican Seed Seminar held in Quito three papers from the Seed Unit were presented. A significant development at the Seminar was the decision to form the Latin American Association of Seed Experts (ALAES). Through this new group comes the possibility of all seed associations in the region to work jointly toward common goals. The Seed Unit was requested to act as the Secretariat for the group. This request opens many opportunities for linking the work of the Association with the strengths of the Seed Unit so the total impact through this developing network could be quite significant.

The Seed Liaison Committee composed of representation from CIMMYT CIP ICRISAT IICA, CETREISEM Mississippi State University and representatives from the region, met to share information and work on ways to improve collaborative efforts in seed development and training in the region. The Seed Unit staff members assistance to training at CIMMYT is an outgrowth of previous meetings. Other kinds of cooperation are under review. The World Bank the Interamerican Development Bank and the Industry Council for Development have reviewed with the Seed Unit ways in which collaborative work could be undertaken. A seminar was given at the World Bank on seed development strategies. Contact is maintained with FAO in its seed development plans and announcements of special courses sponsored by FAO are included in the Unit's newsletter when the information is available in advance.

Plans have been developed in cooperation with the International Seed Testing Association (ISTA) and the Tropical Pasture Program to hold a two week workshop in 1984 on the Testing of Tropical Pasture Species. This workshop represents the first collaborative activity between ISTA and an international center.

Seed Production

Seed production is a joint activity involving the Farm Operations Unit the commodity programs and the Seed Unit. Thus seed production includes growing drying conditioning storage quality control and distribution of seed for further multiplication. The seed may be grown by

the Farm Operations Unit at Palmira or Quilichao on land on the CIAT farm utilized by the Seed Unit for training or on land under the control of one of the programs. The Seed Unit normally dries, conditions, stores and arranges for the dispatch of the seed in cooperation with the Supplies Office. Seed of named varieties or promising lines are multiplied and sold at prices above the normal price for Certified Seed when the quantities needed exceed 50 kg or the amount needed to plant one hectare in the case of pasture seed. Smaller quantities of seed continue to be supplied by the programs without cost or with only the payment of transportation costs. The objective in seed production is to help facilitate the introduction and use of new varieties. The seed production activity attempts to operate on a self-financing basis.

Seed multiplied in 1983 is shown in Table 5. Basic seed or its equivalent sold in 1983 is shown in Table 6. The seed not sold is held in the warehouse to meet future requests. Plantings of tropical pastures made at the request of the Tropical Pasture Program are shown in Table 7. Potentially useful in-bred lines of publicly developed material of maize and sorghum are held in storage to respond to requests from seed enterprises and institutions interested in utilizing them in their own hybrid development programs. Requests were received from three organizations in 1983. Many of the materials are also used in training activities.

The seed drying and conditioning facility has been utilized for training, handling the above production and to provide a service to the commodity programs, ICA and local seed enterprises. Income for this

Table 5 Seed multiplied in 1983

Kind of Seed and Variety		Quantity of seed multiplied (kg)
Beans¹		
A-480		66
A-485		41
A-489		75
BAC-43		189
BAT-41		79
BAT-1230		49
BAT-1276		35
BAT-1295		64
BAT-1413		91
BAT-1676		51
Carioca		96
Diacol-Calima		69
ICA-Llanogrande		434
ICA-Pijao		109
ICTA-Quetzal		102
-L-23		93
L-24		98
P-402		57
	Total	1 798
Pasture²		
Grasses		
Andropogon gayanus		1 384
Legumes		
Centrosema pubescens	438	2 3
Stylosanthes capitata		
- First harvest		
Stylosanthes capitata	1315	28 0
	1318	36 0
	1342	41 0
	1693	16 0
	1728	29 0
- Second harvest ³		
Stylosanthes capitata	1315	50 0
	1318	18 0
	1342	35 0
	1693	30 0
	1728	13 0
	Total	298 3

Table 5 Continued

Rice ⁴		
IR-22	16 427	
Oryzica 1	38 118	
	Total	54 545

Notes

- 1 Produced in cooperation with the Bean Program
- 2 Produced in cooperation with the Farm Operations Unit and Pasture Program
- 3 Estimated since the lot still is to be scarified and further conditioned
- 4 Produced in cooperation with the Farm Operations Unit

Table 6 Seed sold in 1983

Kind of Seed and Variety	Quantity of seed sold (kg)	Seed Consignee
Beans		Bean Program
A-179	103	
BAC-41	48	
BAC-43	59	
BAT-76	1	
BAT-271	1	
BAT-561	1	
BAT-896	1	
BAT-1230	2 5	
BAT-1235	8	
BAT-1295	71	
BAT-1297	485	
BAT-1367	87 5	
BAT-1370	121 5	
BAT-1676	25	
Calima	14 5	
Carioca	8	
ICA-Llanogrande	358	
ICA-Pijao	5	
ICTA-Quetzal	28	
L-23	38	
L-24	31	
P-402	5	
Total	1 502	
Pasture		
Grasses		
Andropogon gayanus	7	Pasture Program
	2 5	ICA Colombia
	200	IDIAP Panamá
	100	INIAP Peru
	1 000	FONAIAP, Venezuela
Legumes		
Capica	116	Pasture Program
	20	ICA Colombia
Stylosanthes capitata		
Line 1315	95	Pasture Program
Line 1318	65	
1342	2 95	
1693	95	
1728	95	
Rice		
CICA 8	120	Ministry of Agriculture Belice
IR-22	16 400	ICA-Colombia
Line 5709	14	Rice Program
Oryzica 1	38 100	ICA-Colombia

Table 7 Areas currently planted with Tropical Pasture Species

Kind and Variety	Line	Area (Ha)	Location
Grasses			
<i>Andropogon gayanus</i>	621	0 25	Palmira
Legumes			
<i>Centrosema pubescens</i>	438	96	Palmira
	438	0 10	Quilichao
<i>Desmodium ovalifolium</i>	350	1 90	Palmira
<i>Pueraria phaseoloides</i>	9900	0 20	Palmira
<i>Stylosanthes capitata</i>	1315	20	Quilichao
	1318	21	Quilichao
	1342	23	Quilichao
	1693	20	Quilichao
	1728	20	Quilichao
<i>Stylosanthes guianensis</i>	136	50	Quilichao
	184	30	Quilichao

service has covered the operational costs including the cost of the extra laborers and technicians needed to handle the production drying conditioning and quality control work

Improvements have continued to be made in the facility including the installation of an exhaust system. The bag drying unit is operational and available for the use of CIAT programs as well as the Seed Unit.

The seed testing laboratory has offered a service to the commodity programs for seed quality evaluations. The Tropical Pasture Program is utilizing the laboratory extensively with a seed analyst working in the laboratory to handle research and routine testing from their seed research and production activities. The facilities and efficiency of the laboratory have continued to be improved during the year. A regular system of field inspections and testing of samples is conducted on all seed produced, stored and sold as a part of the internal quality assurance program of the Seed Unit.

A rotating fund for seed marketing is operative and is the fund that reimburses seed growers the seed production and conditioning work of the Seed Unit and receives revenue from sales. Ultimately, income from the fund is transferred to the CIAT core budget to help meet general operating costs.

Communications

The quarterly newsletter has been sent to a mailing of 1,500 interested individuals and organizations. Through it, seed technologists

receive information on activities and developments both inside and outside the region. Response to the newsletter has been excellent and requests continue to be received from people wanting to be added to the mailing list.

Work has continued on audiotutorials. Through the effort of Communications Services, the Bean Program, the Rice Program, the Cassava Program and the Seed Unit eleven seed and propagating material units are now available in Spanish. English versions are becoming available on several of these units and four other units are in various stages of completion.

Based upon the work of the Regional Technical Committee of Central America and the Seed Unit a publication on Metodología para Obtener Semillas de Calidad - Arroz Frijol Maiz Sorgo was published. Proceedings for the four workshops held in 1981 and 1982 were published in Spanish. The proceedings for the Workshop on Improved Seed for Small Farmers is ready to be published in English. The titles of these workshop proceedings, a few of which are still available from the Publications Distribution Office, are:

- Estrategias Planeacion y Ejecucion de un Programa de Semillas
Enero 19-23 1981
- Administracion y Mercadeo en Empresas de Semillas Mayo 18-22
1981
- Estrategias para la Capacitacion en Tecnologia de Semillas
Junio 14-17 1982
- Semilla Mejorada para el Pequeño Agricultor Agosto 9-13 1982

Copies of Programas de Semillas - Guía de Planeación y Manejo published in 1982 were used extensively in the region and in courses

Work has started on a book based upon the teaching modules agreed to in the workshop on Strategies for Training in Seed Technology. The most competent seed specialists in Latin America are authoring chapters for this book which is planned for training at the country level and teaching in universities.

Research

The research activities of the Unit saw the completion of two thesis projects mentioned under training. The theses were a study of the environmental-variety interaction with respect to characters to use in describing a variety.

The study on rice had three fundamental objectives: 1) evaluate morphological and statistical criteria to be used in the varietal description; 2) identify the minimal sample size; and 3) evaluate the environmental-genetic interaction of the descriptors. Four improved varieties - CICA-7, BG90-2, CICA-8, and JUMA-58 - were planted with three levels of nitrogen: 0, 75, and 150 kg/ha with four replications in three locations: ICA-Nataima, CIAT-Palmira, and ICA-La Libertad. A total of 1800 observations were evaluated for most of the 47 descriptors used in each of the varieties. The evaluations were carried out at seedling, flowering, and maturity plant stages and the descriptors were treated as qualitative, qualifying, or quantitative, according to the way the observations were reported.

The work on common beans (Phaseolus vulgaris L) (to evaluate a varietal description model that includes a measurement of the variability) was made through experiments carried out at CIAT in Palmira Santander de Quilichao and Popayán. Three plant densities (265 000 132 000 and 83 000 plants/ha) were considered as main blocks and six varieties ICTA Quetzal ICA Pijao Bat-41 (Revolution 79) P-402 (Brasil 2) Diacol Calima and Carioca as split blocks. Plant density was used to modify the environment. 25 plants were selected at random in each sub-plot to evaluate 52 descriptors at seedling flowering physiological maturity and harvest stages.

Both studies have helped to demonstrate anew that 1) a variety is not uniform morphologically on all characteristics 2) the environment may change some morphological characters 3) statistics can be applied in utilizing descriptors for properly indicating the standard deviation and coefficient of variation to expect on characters described 4) some characters are superior to others as descriptors of a variety 5) a small carefully selected group of characters can be used for differentiating varieties studies in the field for seed production purposes, 6) each character used need not be uniform but may show variation if the original description has clearly indicated the amount of variability acceptable by the breeder.

By the application of the principles involved in both studies plant breeders can greatly facilitate seed production and make certification field inspection work more objective and thus minimize friction that often results when inadequate descriptions are prepared. ICA the Rice Program and the Seed Unit have continued this work through a carefully

conducted program to study the morphological characters of 7 existing rice varieties and 4 experimental lines in 6 locations. This study and the thesis on rice variety description should result in accurate descriptions of all varieties studied and a simplified key for use in training and in field inspection activities in Colombia and the region.

Related Activities

The Seed Unit Position Paper was prepared for the CIAT Board of Trustees and approved by it in April 1983. The paper first outlines the rationale for the Unit and its achievement. It then deals with special issues related to the activities and strategies of the Seed Unit. Finally, it stresses the need for the continuation of the Unit while recognizing a dual role to be played. One role is that of direct support to the commodity research programs at CIAT. The second area of responsibility is that of promotion, development and strengthening of national seed programs and enterprises. During the 80's both roles are to be a part of the Seed Unit's activities. Ultimately the first role would be maintained on a long-term basis.

Results of the accumulated activities of the Seed Unit show a developing seed network in the region. The seed network takes several forms which need to be understood to comprehend the extent of the Unit's linkages throughout the region. The course participants are the start of the network which reaches into practically every country in the region. Those employed by Ministries of Agriculture and the National Seed Programs within Ministries are a major part of the network (Figure 2). The other broad network is with seed associations in the region. Some of these

associations have been formed as a result of Seed Unit stimulation. The development of ALES provides a further mechanism to help these isolated associations to gain strength and encouragement from one another (Figure 3)

On a subregional basis the developing networks include 1) The Regional Technical Committee for Central America and Panama 2) A planned Regional Technical Committee for the Andean Zone and 3) the working relationship with CETREISEM which can develop effective links in the Southern Cone (Figure 4)

The fourth network includes a few universities in the region that develop strong seed technology and production teaching and research programs. Most seed activities in Ministries of Agriculture do not include seed technology and production research thus selected universities provide the best opportunity for problem solving and for meeting the long-term personnel educational needs (Figure 5)

Personnel

Seed Unit Staff

The heavy use of visiting scientists, consultants and guest lecturers plus the interdependence that exists with the commodity programs and other units of CIAT requires a high level of cooperation and interface. The staff has diligently attempted to continually recognize the importance of these inter-relationships as they worked to achieve the Seed Unit's objectives. Each staff member has developed during the year and contributed to the successful completion of the heavy schedule of

Figure 2

National Seed Program and Training Participant Network



Figure 3

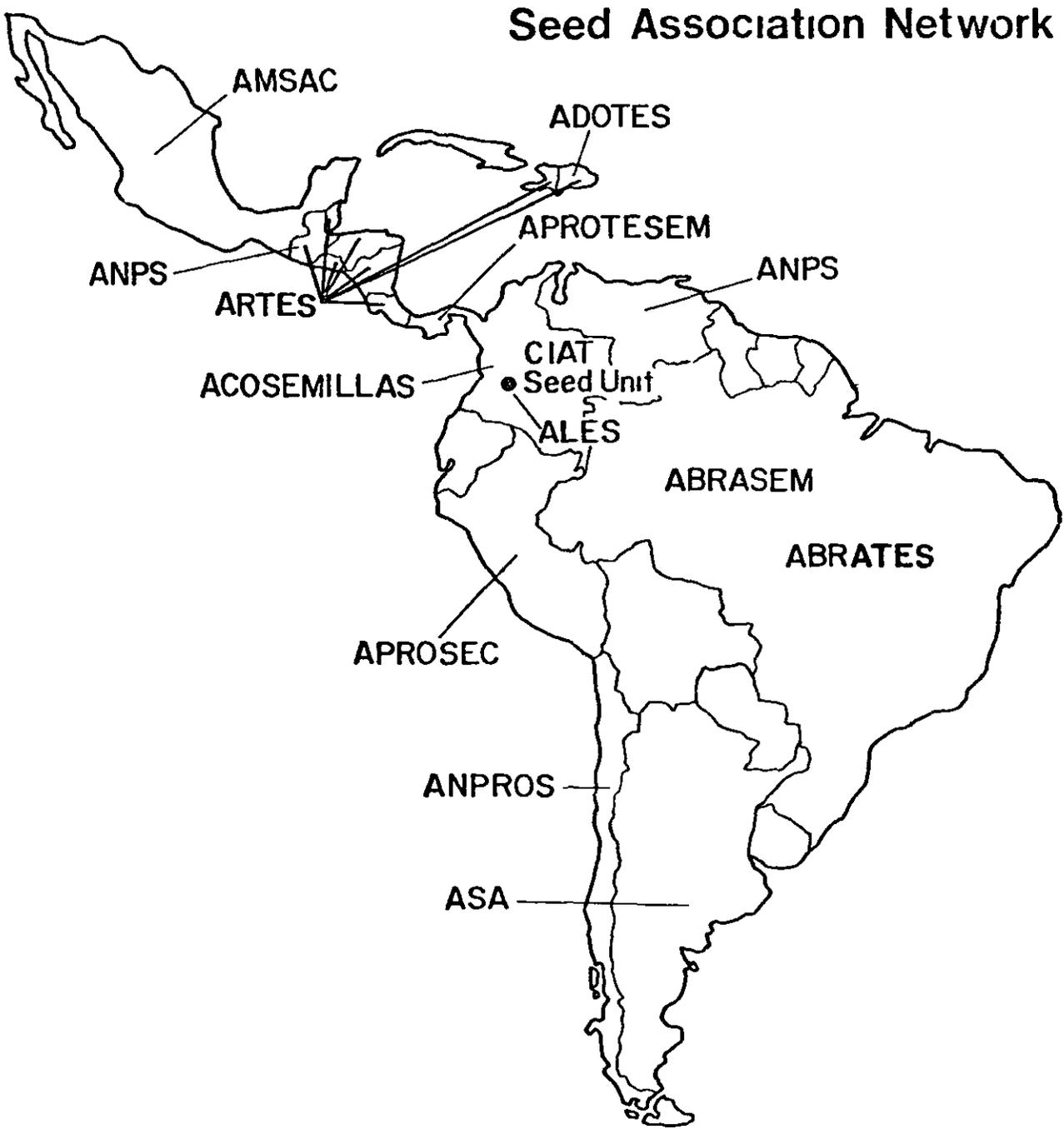


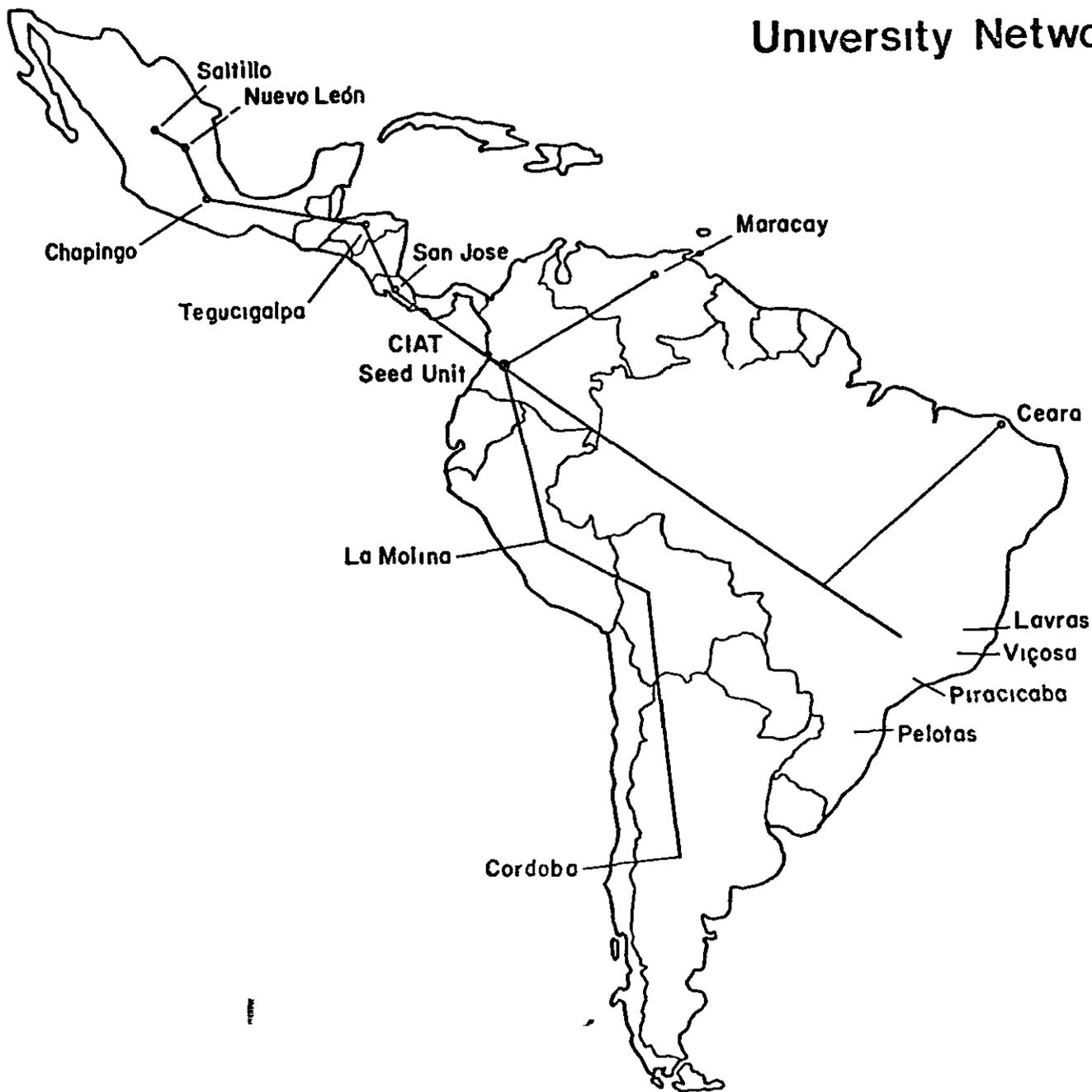
Figure 4

Subregional Network



Figure 5

University Network



activities The staff list with the major area of responsibility for each person is given in Appendix 1

Visiting Scientists Consultants and Other Support

Since the Seed Unit staff is small visiting scientists and consultants are used to help meet specific program objectives The approach makes it possible to utilize the abilities of the best people available without the long-term commitment and related costs associated with senior staff positions During the year 14 working months of time were provided by the following visiting scientists and consultants

Dr Don F Grabe Professor Seed Production Oregon State University, Oregon U S A , four months Dr Grabe spent a sabbatical with the Seed Unit to initiate work on a book to assist seed enterprises in developing and operating their own seed quality assurance programs In addition he worked on a chapter of another book on seed vigor testing conducted a short course for Seed Unit and ICA personnel on tetrazolium testing reviewed procedures on tetrazolium testing of selected tropical pasture species and assisted the Breeder and Basic Seed Production course

Mr Juan Carlos Garcia Chief of Production Management of Seeds, University of Chapingo Mexico six months Mr Garcia is spending a one year sabbatical with the Seed Unit to obtain more information on the content of seed technology curricula and courses in other universities in Latin America and to help initiate work on the preparation of teaching material for use in national programs and universities He helped lead the subregional course in Central America contributed to the short course for

professors in seed production in Mexico, the workshop on the Development and Projected Needs of the Seed Sector the Andean Pact Workshop the Panamerican Seed Seminar in Ecuador the Breeder and Basic Seed Course at CIAT and the National Seminar on Seed Quality in Argentina

Dr Federico Poey Seed Specialist Agridec Miami Florida three months Dr Poey continued to assist the Seed Unit on selected events during the last six months of the year following his resignation to start a private consulting business He contributed to the subregional short course in Costa Rica the seminar in Paraguay the national seminar on the Production of Good Quality Seed in Argentina the workshop on the Development and Projected Needs of the Seed Sector, the workshop on the Technical and Commercial Integration of the Seed Sector for the Andean Zone and the Breeder and Basic Seed Course He also participated in the Panamerican Seed Seminar as a representation from the Seed Unit and is preparing the proceedings for the workshop on the Development and Projected Needs of the Seed Sector

Mrs Maria Helena Irastorza Seed Technologist University of Cordoba Argentina five weeks As a follow-up to the work done as part of her thesis Mrs Irastorza contributed the bean variety description and identification sections to the course in Costa Rica and the Breeder and Basic Seed Production course at CIAT She also led a workshop in Costa Rica on this topic and has contributed to the development of proposed copy for an audiotutorial on variety description

Many other specialists and organizations within Latin America and the

Caribbean as well as outside have contributed to courses workshops and the achievement of the Unit's objectives Especially among these are ICA, Colombia, many seed enterprises in Colombia and Mississippi State University with assistance from USAID A complete listing of individuals and their organizations outside CIAT who assisted the Seed Unit during 1983 is given in Appendix 2

The administration the commodity programs and all of the service and support groups in CIAT have contributed immeasurably to the achievement of program objectives

Conclusions

The number of people trained the amount and value of seed produced the workshops held, the publications and audiotutorial units prepared the value of research activities and the physical improvements made at CIAT are measurable accomplishments of the Seed Unit in 1983 Although much more difficult to measure those less obvious changes that are occurring gradually are equally important These changes include the clarification of seed program policies and strategies the increased motivation of people the additional interest in seed activities and the strengthened conviction that more and better seed of improved varieties can be produced and supplies^d to all farmers Also included in this category is renewed interest in forming new seed enterprises seed associations and seed technology societies All of these developments are having a positive impact on seed program and industry development in the region

The mutual benefits that can be realized from the cooperative efforts of the Seed Unit and the commodity programs are becoming more evident. The value of close links between the Farm Operations Unit and the Seed Unit is continually reinforced. The benefits to the Seed Unit from the assistance of the communication, training and other support units of CIAT are clearly demonstrated. The original goals for the Seed Unit to assist the development of seed programs and industries in the region and support especially the commodity programs is a proper function at this stage. Through the networks that are being built, the Seed Unit is in an excellent position to play an increasingly catalytic role (with national and international agencies, seed associations and seed enterprises) to accelerate the use of good seed of better varieties in the region.

Appendix 1 Seed Unit Staff

Johnson E Douglas Head

Federico Poey Seed Specialist¹ (Six months)

Joseph Cortes Training and Seed Conditioning

Guillermo Giraldo Seed Production

Jose Fernández de Soto Seed Communications

Jose Fernando Aristizábal Seed Quality² (Five months)

Edgar Burbano Seed Laboratory and Production (Six months)

Napoleon Viveros Seed Conditioning

Luz Marina Duque Secretary

Martha E Rivero, Secretary³ (Three months)

Gloria S de García, Secretary (Five months)

Rodrigo Nuñez Technician Laboratory

Cesar Octavio Vásquez, Technician Conditioning Plant

German Oyuela Technician Production

Mario Romero Field Assistant

Gonzalo Monzon Laborer

Rudecindo Palma Laborer

Alberto Orozco Laborer

Gilberto Gonzalez Laborer

Carlos Orlando Vivas Laborer

Jorge Villegas Laborer

¹ Resigned to start private consulting business and is to be replaced

² Resigned to undertake a M S degree program in seed technology at Oregon State University and was replaced with Edgar Burbano

³ Resigned for marriage and was replaced with Gloria S de García

Appendix 2 Non-CIAT specialists who contributed to Seed Unit Program Activities in 1983

<u>Name</u>	<u>Organization</u>	<u>Country</u>
Antonio J Calvelo	Asociacion de Semilleros Argentinos	Argentina
María H Irastorza *	Universidad de Córdoba	Argentina
Roberto Maneiro	Secretaría de Agricultura y Ganadería	Argentina
Raul A Zegarra	Asociacion Nacional de Productores de Oleaginosas (ANAPO)	Bolivia
Daniel Blanc	Cooperacion Tecnica del Gobierno Suizo (COTESU)	Bolivia
Clovis T Wetzel	CETREISEM/Universidad Federal de Pelotas	Brazil
Flavio Farias Rocha	CETREISEM/Universidad Federal de Pelotas	Brazil
Flavio Popinogis*	Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA)	Brazil
Carlos Vechi *	EMBRAPA	Brazil
Jaime Duran	Asociación Colombiana de Productores de Semillas (ACOSEMILLAS)	Colombia
Oscar Malamud	Centro Internacional de la Papa (CIP)	Colombia
Mario Giraldo	CRESEMILLAS	Colombia
Amparo de Marroquín *	CRESEMILLAS	Colombia
German Torres T	CRESEMILLAS	Colombia
Guillermo Jaramillo	Federación Nacional de Arroceros (FEDEARROZ)	Colombia
Gentil Vargas	FEDEARROZ	Colombia
Edmundo García	Instituto Colombiano Agropecuario (ICA)	Colombia
Carlos Gómez	ICA	Colombia
Alejandro Mendoza *	ICA	Colombia
Dorancé Muñoz	ICA	Colombia
Alvaro Triana	ICA	Colombia
Enrique Holguin	PROACOL	Colombia
Luis E Manotas	PROACOL	Colombia
Enrique Rubio	PROACOL DEL TOLIMA	Colombia
Eduardo Villota	Semillas del LLano (SEMILLANO LTDA)	Colombia
Fernando Donado	Semillas del Tolima	Colombia
Javier Bernal	Semillas La Pradera	Colombia
Jaime Barbosa	Semillas Valle (SEMIVALLE)	Colombia
Christian Terrassa *	SEMIVALLE	Colombia
Alvaro Dimey	Semillas El Zorro	Colombia
Jorge Munoz	Central Agrícola de Cartago	Costa Rica
Antonio Pinchinat	Instituto Interamericano de Cooperacion para la Agricultura (IICA)	Costa Rica
Ronald Echandi	IICA/University of Costa Rica	Costa Rica
Jaime Flores	Consejo Nacional de Semillas	Ecuador
Jorge Chang	Escuela Agrícola Panamericana	Honduras
Rene Velasquez	GERMINAGUATE	Guatemala
Jorge Bustamante	Confederacion de Asociaciones Agricolas del Estado de Sinaloa	Mexico
Edwin Wellhausen	Rockefeller Foundation	Mexico
Byrd Curtis	Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT)	Mexico
Ripusudan Palwal	CIMMYT	Mexico