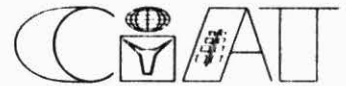


20 MAR. 1985



Internal Program Review 1982

① // **ANNUAL REPORT**

② // **SEED UNIT**

December 1982

Centro Internacional de Agricultura Tropical



SEED UNIT

ANNUAL REPORT 1982

The fourth year of operation of the Seed Unit has resulted in the highest level of activity to date as program objectives have been achieved. The objectives of the Unit continue to be :

1. Increase the number and competence of seed technologists
2. Strengthen the seed programs and seed enterprises within countries 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.

In its operations the Seed Unit works both as a service unit to support of the commodity programs of CIAT as well as a development oriented activity to accelerate the growth of seed programs and enterprises in the region.

Training and Conferences

Since 1978, when the first Seed Technology Course was offered by CIAT, training through multidisciplinary and advanced courses, in-service training, M.Sc. degree thesis programs, in-country training and workshops have been

increasing progressively. Fig. 1 illustrates this progress for training. 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. The highlights of the training and conference activities during 1982 are :

Two postgraduate courses on Seed Technology including one given in English (for the first time) .

An Advanced Postgraduate Course on Seed Conditioning.

Two Workshops with one on Strategies for Seed Technology Training and another on Improved Seed for the Small Farmer.

Assistance to in-country training to meet needs that are not feasible to undertake at CIAT.

Short courses

The V and VI postgraduate Courses in Seed Technology, of nine and seven weeks duration respectively, covered the different aspects of seed production, conditioning, quality control at the field and laboratory level, and marketing. These subjects combine with discussions on seed program and enterprise development and management provided an over-all view and understanding of the basic topics needed by seed technologists. Lectures, field and laboratory exercises, round tables and case studies were used as educational methods. Beans, rice, tropical pastures, maize and sorghum were the main crops for teaching purposes.

For the V Postgraduate Course (Spanish), 27 participants from 14 countries of Latin America participated. The VI Postgraduate Course (English) was the result

of requests for training from the Caribbean region and other English speaking areas. This course utilized help from the CIAT's commodity programs, the Caribbean Food Corporation (CFC), Caribbean Agricultural Research and Development Institute (CARDI), Mississippi State University and the Instituto Colombiano Agropecuario (ICA). The 22 participants from 13 countries maintained a high level of interest throughout the course as has been true for all of the Spanish language courses. The CFC through assistance from the European Development Fund supported 10 participants from the Caribbean region and the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), International Development Research Center (IDRC) and International Agricultural Development Service (IADS) provided the major financial support for the other participants.

For the first time, a Postgraduate Course in Seed Conditioning was offered that covered seed drying, conditioning and storage for plant managers. The 29 participants from 13 countries dedicated one and one half of the four weeks to an analysis of seven conditioning plants located in the Tolima Valley of Colombia. This teaching method proved to be an excellent application of the concepts taught. Their analyses were presented to the seed enterprise managers and ultimately it is expected that the trainees will make similar applications in their own plants. The Seed Unit is indebted to the Colombian seed enterprises that contributed time and effort to make this course the success it was.

In-service

In-service training has increased with respect to the previous years with six postgraduate interns in 1982. A modest interest on the part of countries and

limitations of the time available by the senior staff continue to curtail this aspect of the program. The Seed Unit assisted with in-service training for three Bean Program trainees on seed production .

Degree-related training

Two master candidates are currently completing their research at the Seed Unit in varietal description of rice and beans, after concluding their course work at the Universidad Nacional de Colombia PEG and the Universidad Federal de Pelotas of Brazil.

Review of training at CIAT

Table 1 indicates the number of professionals trained, by categories, during 1982 and Fig. 2 shows the number of professionals trained by country of origin. From Fig. 2 it can be seen that Colombia and Brazil had the largest number of participants. The higher number for these countries reflects both level of interest and size of the program. However, training six participants from the Dominican Republic is a much heavier input to that program than is having 12 trainees from Brazil because of the vast differences in numbers of people needed.

Through training, the Seed Unit collaborated with national institutions and seed enterprises in 27 countries in 1982. Table 2 lists the organizations and number of participants by countries.

Table 3 summarizes the number of professionals trained by the different sectors and types of employing organizations. It shows 47 percent of the participants came from public research and seed development and quality

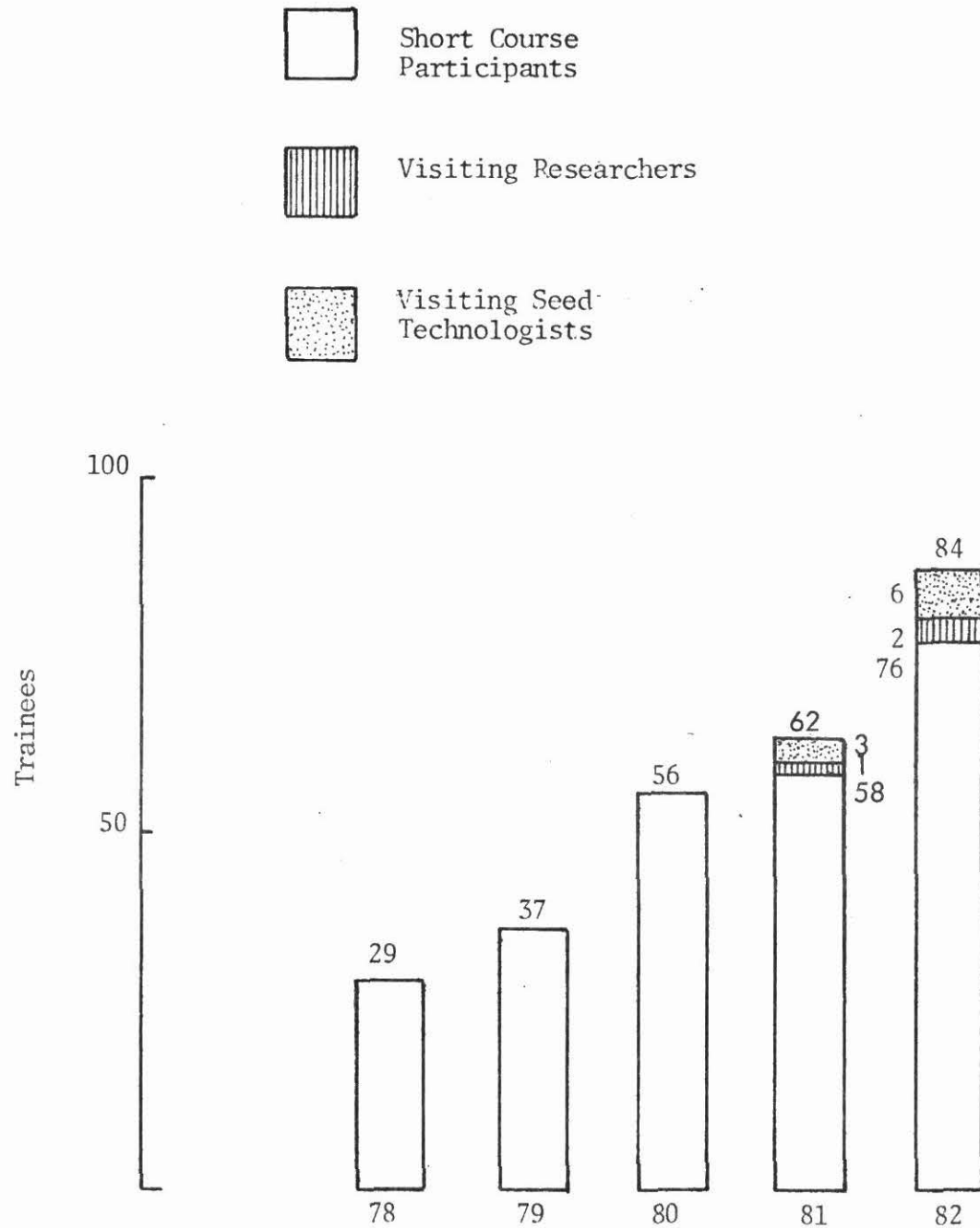
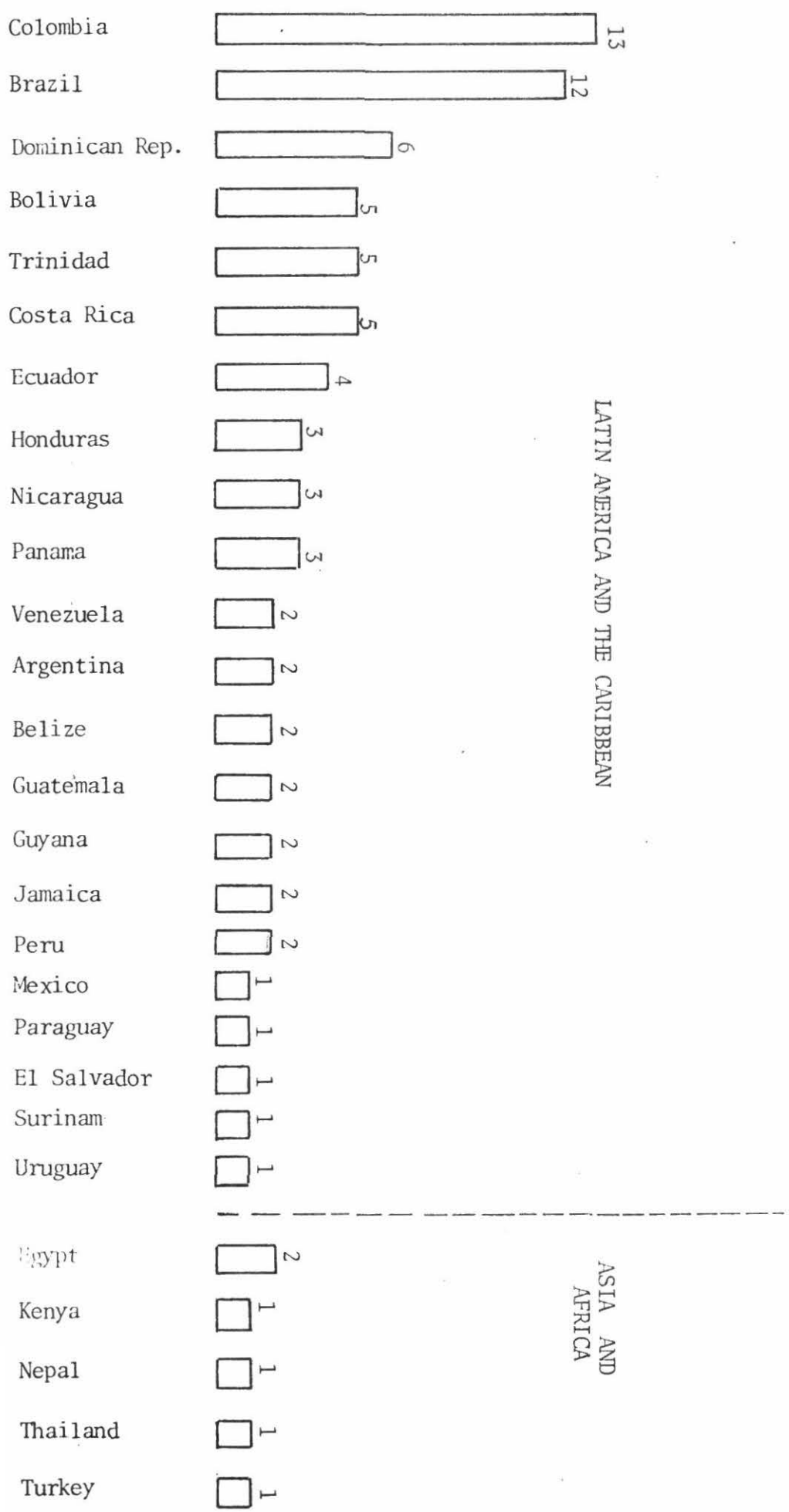


Figure 1

Number of participants who have completed training at the Seed Unit from 1978 to 1982.

Figure 2. Number of professionals trained at the Seed Unit in 1982, by country of origin



control programs with 34 percent from seed enterprises. Of the seed enterprises only about 20 percent of them were totally private organizations. The others were totally or partially government owned. All seed enterprises are expected to pay the cost for training. A questionnaire was sent to all seed associations asking for information from their members about the kind of training desired and their anticipated needs during the next three years. In an attempt to strengthen seed technology education participation from universities was encouraged and 13 percent of the trainees came from this group.

Assistance to training has been provided by staff members of all of the commodity programs. The Seed Unit has assisted the bean and rice training efforts by providing a seed segment in their courses.

In-country courses

In-country courses have been assisted for many years by FAO and Mississippi State University. FAO continues to support in-country training independent of Seed Unit activities. Although the Seed Unit's greatest comparative advantage is in regional training at CIAT, countries are requesting varying kinds of help from the Seed Unit in their in-country training. For example, the Seed Unit cooperated with ICA, ACOSEMILLAS and CRESEMILLAS in Colombian courses in 1980 and 81. The Colombian organizations handled their own training in 1982.

During 1982 the Seed Unit assisted in the organization and successful completion of a course on Seed Technology in Cuba from March 3 to 20,

attended by 25 participants from the Ministry of Agriculture. Prior to the course a seed participant of the Ministry of Agriculture of Cuba received training at CIAT in seed and in organizing training courses.

In 1981 a seed specialist of the Ministry of Agriculture and Development of Panama was trained at CIAT for the purpose of organizing a training course in Panama in the following year. This course took place in March 24 to April 2. When the request for assistance in seed conditioning reached the Seed Unit, the staff was previously committed and support was provided for an experienced Colombian to help with Seed Unit assistance. Thus, the horizontal transfer of knowledge was possible through the Unit.

Another kind of assistance to training from CIAT was by helping a regional seed testing course conducted in Costa Rica and cosponsored by the International Seed Testing Association and the University of Costa Rica. The head of the *Quality Control activities* of the Seed Unit was also a participant in that course.

It is expected that more countries will develop a total seed training plan and incorporate increased in-county training into their programs. As this happens, the Seed Unit will provide the kind of assistance desired ranging from helping with *training materials* to organizing and conducting a course in cooperation with national leaders. The Unit also cooperates with other international and bilateral agencies interested in seed training at the country level.

Table 1 Number of man-months of professionals trained during 1982.

COMMODITY/DISCIPLINE OF SPECIALIZATION	VISITING RESEARCH ASSOCIATES		VISITING RESEARCHERS			MULTIDISCIPLINARY INTENSIVE COURSE PARTICIPANTS	SUB-TOTALS
	THESIS PhD	NON THESIS	THESIS MS	SPECIALIZATION	SPECIALIZATION WITH MULTIDISCI- PLINARY INTENSI- VE COURSE		
	<u>No. Months</u>	<u>No. Months</u>	<u>No. Months</u>	<u>No. Months</u>	<u>No. Months</u>	<u>No. Months</u>	<u>No. Months</u>
SEED UNIT							
Seed Technology *						47(73)	47(73)
Advanced Processing Course						29(29)	29(29)
Quality Control				2 (2)	1 (7)		3(9)
Seed Production			2(15)	1 (1)	1 (3)		4(19)
Planning and Management		4(7)**		1 (1)			1(1)
SEED UNIT TOTAL 1982		4(7)	2(15)	4 (4)	2(10)	76(102)	84(131)
TOTAL 1981			1(8)		3(9)	58(82)	59(96)

* Includes Spanish and English Course

** These four people worked as consultants for the Seed Unit and technically were not classified as Visiting Research Associates but a training element was involved in many of their activities.

Table 2 National Institutions and Seed Enterprises utilizing the Seed Unit Training in 1982.

Country	Institution / Enterprises	No. Participants
<u>Latin America and the Caribbean</u>		
Argentina	Universidad Nacional de Córdoba	1
	Universidad Nacional de Buenos Aires	1
Belize	Department of Agriculture	2
Bolivia	CIAT Bolivia	1
	Empresa de Semillas SEFO	1
	IBTA	1
	Ministerio de Asuntos Campesinos y Agrarios	2
Brazil	EMBRAPA	3
	Universidad de Pelotas	2
	Delegación Federal de Agricultura Bahía	1
	Cooperativa Regional Triticola	1
	AGROSEM	1
	SEMENTES AGROCERES	1
	CATI	1
	Maquinas Vitoria	1
	Instituto de Zootecnia	1
Colombia	ICA	6
	FEDEARROZ	2
	PROACOL	1
	Universidad del Valle	1
	Instituto Politécnico	1
	Universidad Nacional de Colombia	1

Table 2 Continuation

Country	Institution / Enterprises	No. Participants
Peru	Ministry of Agriculture	1
	Universidad Nacional de San Cristobal	1
El Salvador	ISLAP	1
Suriname	Ministry of Agriculture	1
Trinidad	Ministry of Agriculture	2
	CARDI	2
	University of West Indies	1
Uruguay	Cooperativa Agropecuaria La Dolores	1
Venezuela	FONAIAP	1
	Productora de Semillas Portuguesa	1
<u>Africa</u>		
Kenya	National Seed Quality Control Service	1
Egypt	Crop Research Institute	2
<u>Asia</u>		
Nepal	Agricultural Inputs Corporation	1
Turkey	Ministry of Agriculture	1
Thailand	Ministry of Agriculture	1

Table 2 Continuation

Country	Institution / Enterprises	No. Participants
Costa Rica	Consejo Nacional de Producción	3
	Comisión Nacional de Semillas	1
	CIGRAS	1
Dominican Rep.	Secretaría de Estado de Agricultura	4
	Productora de Semillas	1
	CEDIA	1
Ecuador	Compañía Mixta de Semillas	2
	INIAP	1
	Programa Nacional de Semillas	1
Guatemala	ICTA	1
	Universidad San Carlos	1
Guyana	Ministry of Agriculture	1
	Guyana Rice Board	1
Honduras	Ministry of Natural Resources	3
Jamaica	Ministry of Agriculture	2
Mexico	Escuela de Posgraduados de Chapingo	1
Nicaragua	EMPROSEM	2
	Comité Nacional de Semillas	1
	Universidad Nacional Autónoma	1
Panama	Comité Nacional de Semillas	1
	MIDA	1
Paraguay	AGRIEX Sucursal Paraguay	1

Table 3 Distribution of training participants by sector or types of employing organizations

Sector of origin of Participants	No. of Participants	Percent
Public Research and Seed Development and Quality Control Programs	40	47
Public National Seed Enterprises	15	19
Private National Seed Enterprises	5	6
Mixed Public-Private Seed Enterprises	7	8
Transnationals	1	1
Universities	11	13
Regional Research/Development Organizations	2	2
Other	3	4
TOTAL	84	100

Conferences

The two workshops focused attention on priority needs in the area of seed development . One of the identified priorities was on "Strategies for Seed Technology Training ".The 49 participants from universities and national training activities concentrated on the objectives of helping to identify a national strategy and priorities for the development of seed technology training, sharing information on training methodologies and materials and the designing of modules for teaching. Out of the workshop came a number of useful proposals including :

1. The need that a greater emphasis be placed on developing a training plan at the national level for seed personnel.
2. The value of requiring that universities include at least a course on seed production and technology.
3. The establishment of a group to follow-up on the recommendations made and another technical group to coordinate work on the preparation of the content of seed production and technology modules for use in teaching.

The other priority area resulted in the workshop on "Improved Seed for the Small Farmers". This workshop, the first of its kind, brought together 65 participants who focused on the mechanisms to help the small farmer improve the quality of the seed he plants, on better ways to promote improved varieties through appropriate

technology and the transfer of results to the small farmer , and on ways to increase the utilization of improved seed by the small farmer. The workshop brought forward many useful suggestions on how the small farmer could be more effective in saving his own seed of beans, rice, cassava, maize, sorghum and potato. The need for increased on-farm evaluation of varieties was stressed to help assure that only materials acceptable to small farmers were introduced. Because of the logistic problems of reaching small farmers, emphasis was placed on the need to initiate programs to encourage the development of seed production among selected small farmers or groups of them as a business.

The interest in both of these workshops was excellent. The *ultimate* value of the workshops will show in future activities developed by the institutions involved and the follow up done by the Seed Unit.

Through the year, the evaluations from participants in training activities have shown that they feel they have greatly benefited. Reactions to workshops have also been quite positive. 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 quantity and quality of seed technologists in the region.

Technical Collaboration

Technical collaboration takes the form of personal contacts with national seed programs and seed enterprises, universities, sub-regional groups , sister international

centers working in the region and development agencies. The Unit has worked 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 following up former trainees, reviewing alternative policies and strategies and encouraging the development of long-term training plans. The Dominican Republic, Panama, Guatemala and Bolivia are four countries with a great level of interest in giving their programs more clearly focused direction at this time. Former trainees in several countries are beginning to make an impact in programs in their countries. The continued contacts with many of them have been achieved through a newsletter, personal correspondence and visits.

The work on a sub-regional level has continued to focus on Central America and the Andean Zone. Direct and positive results in Central America include the preparation of a manual on "Methods for Varietal Description and Guidelines for Seed Production on Bean, Rice, Maize and Sorghum". Work has started through the Technical Seed Committee for that region on guidelines for post-harvest management of the seed. Through the combined work with IICA, the Seed Advisory Committee for the region is developing a plan to help meet seed training needs for Central America. A formal request has been received for the Seed Unit to assist the region further through the positioning of an outposted seed specialist in the area. The seed section of the Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios (PCCMCA) meeting in 1982 generated 25 papers and considerable participation in the seed portion of the meeting, leading to the expected formation of a Regional Seed Technology Association in 1983.

In cooperation with the Andean Pact group plans are being developed for joint work in training in 1983. Tentatively are included a seminar on the technical and commercial aspects of the integration of the seed sector in the sub-region, a short course on management and marketing for seed enterprise managers and support from the group for training of personnel from the region in CIAT courses. A suggestion to locate an outposted seed specialist in the area is being considered.

A proposal has been drafted for collaboration with the Centro de Estudos e Treinamento Em Tecnologia de Sementes e Mudas at Pelotas, Brazil in training, exchange of staff and the development of training materials.

The Seed Liaison Committee, composed of representation from CIMMYT, CIP, ICRISAT, IICA, CIGRAS, Mississippi State University and representatives from the region, met and continued work on ways to improve collaborative efforts in seed development and training in the region. CIMMYT sponsored three candidates in the last seed course at CIAT and plans are being developed for the Seed Unit staff members to assist training at CIMMYT. Other kinds of cooperation are under review. The Interamerican Development Bank and the Industry Council for Development have asked for help from the Seed Unit in support of their activities and close collaboration has developed between a World Bank assisted seed project in Ecuador, the Seed Unit and local leaders. 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.

Seed Production

For the purpose of this report seed production includes the growing , drying , conditioning , storage , quality control and distribution of seed through the Unit. A rotating fund has been established to cover the expenditure and receive income for these activities with the objective that seed production can operate on a self-financed basis. Seed growing is arranged through the Farm Operations Unit at Palmira or Quilichao , on land on the CIAT farm utilized by the Seed Unit for training , on land utilized by a program , or in the case of one bean variety with a grower outside CIAT. The seed produced and sold is shown in Table 4 . The seed not sold is stored in the warehouse and available to meet future requests. In addition plantings have been made of tropical legumes at the request of the Tropical Pasture Program as shown in Table 5 .

The new production of the tropical legumes was possible through the use of a visiting scientist who could concentrate on this aspect of the program. The number of in-bred lines available of maize and sorghum have been increased and supplies maintained to answer requests for this publically available material.

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 service has amounted to about \$47 ,000 and covered the operational costs including the cost of the extra laborers and technicians needed to handle the production , drying , conditioning and quality control work.

Table 4 Quantity of seed produced and sold in 1982

Kind of Seed and Varieties	Quantity Produced (Kg)	Quantity Sold (Kg) ²	Country Receiving Seed
Beans	14.126 ¹	4.146	
BAT-58 ,BAT-271 ,DOR-41, BAT-304, A-235 , A-231, A-211			Argentina
ICA-Llano Grande			Colombia
Chorotega, Huetar, BAT-41, BAT-76, BAT-304			Costa Rica
Copan			Honduras
Rice	108.650 ³	59.450	
CICA 7, CICA 8, CICA 9, CICA 4, IR 22, Oryzica 1			Colombia
Andropogon gayanus	3.209 ⁴	1.525	Venezuela
Stylosanthes guianensis	110	83	Peru

1/ Received with moisture and uncleaned weight, includes seed planned for Argentina (6.5 Tons)

2/ Seed dried to 12% and cleaned

3/ Held for ICA (24.8 tons) and planned for Panama (4 Tons)

4/ 2.796 Kgs conditioned and 413 Kgs without conditioning

Table 5 Area planted for basic seed production of forage legume species both in Palmira (P) and Quilichao (Q) during 1982.

Species	Area(ha)	Location
1. <u>Centrosema</u> sp CIAT 438	1.00	P
2. <u>Desmodium ovalifolium</u> CIAT 350	4.50	P
3. <u>Pueraria phaseoloides</u> CIAT 9900	1.00	P
4. <u>Stylosanthes guianensis</u> CIAT 184	0.50	P
5. <u>Stylosanthes guianensis</u> CIAT 136	1.70	P
6. <u>Stylosanthes capitata</u> CIAT 1342	0.30	Q
7. <u>Stylosanthes capitata</u> CIAT 1693	0.25	Q
8. <u>Stylosanthes capitata</u> CIAT 1742	0.25	Q
9. <u>Stylosanthes capitata</u> CIAT 1315	0.25	Q
10. <u>Stylosanthes capitata</u> CIAT 1318	0.25	Q
	10.00	
Total	10.00	

and training activities. As a result of the Unit's work a manual on Methods for Varietal Description and Guidelines for Seed Production on Bean, Rice, Maize and Sorghum is being published. The proceedings of the four workshops at CIAT are being published by CIAT.

Research

The research activities of the Unit are limited to the thesis projects mentioned under training. The theses are a study of the environmental-variety interaction with respect to characters to use in describing a variety. One project is on rice with the varieties CICA 8, CICA 7, BG 90-2 and Juma 58 planted at Villavicencio, Espinal and Palmira. The other is on beans with the varieties ICTA Quetzal, ICA Pijao, BAT 41 (Revolucion 79), Carioca, Calima and P 402 (Brazil 2) planted at Palmira, Quilichao and Popayan. These theses are done jointly with the respective programs and the Seed Unit.

A study of the amount of mechanical damage caused at different points in the seed conditioning operation of the Seed Unit facility has been initiated.

Considerations of research needs and priorities continue to be reviewed with consultants, at workshops and in private discussions with seed program leaders in the region.

Related Activities

Since the Seed Unit staff is small, it was planned from the start to use visiting scientists and consultants extensively 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 cost associated with senior staff positions. During the year 25 man months of time were provided by the following visiting scientists and consultants :

Dr. Pedro Argel, Pasture Seed Specialist, Colombia, 10 months. Dr. Argel worked to strengthen the Seed Unit's capability in tropical pasture seed production by directing the plantings of several species at Palmira and Quilichao. He also contributed to training courses and workshops and became involved in and assisted all aspects of the Seed Unit's activities.

Mr. Joseph K. Park, retired, Seed Harvesting and Conditioning Specialist, Agriculture Research Service, USDA, Oregon, USA, four months. Mr. Park assisted the Advanced Course on Seed Conditioning, guided the construction of two friction separators, assessed current seed conditioning methods of pasture seeds and contributed suggestions on ways to improve present methods.

Dr. Leroy Everson, retired, Seed Specialist, Iowa State University, Iowa, USA, three months. Dr. Everson assisted the Strategies for Seed Training Workshop, prepared standardized samples for seed blowing, initiated three audiotutorial units and contributed advice and leadership to the seed testing laboratory.

Mr. Fabio Polanía, Seed Specialist (Formerly Head of the Seed Division of ICA), Colombia three months. Mr. Polanía reviewed, consolidated and edited seed certification material for training, assisted with the workshops on Strategies for Seed Training and Improved Seed for the Small Farmer and contributed to other activities of the Unit.

Mr. Rene Velasquez, Seed Development and Production Specialist, Guatemala, two and one-half months. Mr. Velasquez cooperated with ICA and other Colombian organizations in an assessment of ways to improve seed supplies to small farmers in two locations in Colombia.

Mr. Robert Griffiths, Seed Specialist, United Kingdom, two months. Mr. Griffiths assisted the English Language Course on Seed Technology with lectures and as an external evaluator of the course for the Seed Unit. He also reviewed seed and bean development information in relation to East Africa with the Bean Program.

Dr. Robert K. Waugh, retired, The Rockefeller Foundation, Colorado, USA, six weeks. Dr. Waugh assisted preparation for the workshop on Improved Seed for the Small Farmer, contributed to the Workshop and prepared the first draft for the workshop proceedings.

Mr. Fernando Gomez, Seed Specialist, Colombia (now Director of ICA) one month. Mr. Gomez represented the Seed Unit in a training course in Panama, and assisted with the workshops on Strategies for Seed Training and Improved Seed for the Small Farmer.

Mr. Juan Carlos Garcia, Chief of Production Management of Seeds University of Chapingo, Mexico, one month. Mr. Garcia assisted the Seed Unit in a training course in Cuba, in preparations for the workshop on Strategies for Seed Training and prepared a draft of the workshop proceedings.

Mrs. Clovis Wetzel, Researcher, CENARGEN/EMBRAPA, Brazil, one week. Mrs. Wetzel reviewed seed pathology work with the bean, rice and tropical pasture programs and the work in the Genetic Resources Unit. She prepared a report for the Seed Unit on steps that could be taken to strengthen the linkages of the various activities with a special emphasis on what the Seed Unit could do to improve its application of current seed health testing methodologies through the help of the programs. Her report also included suggestions for strengthening training in seed health testing.

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. Among these are ICA, Colombia; many seed firms in Colombia; and Mississippi State University with assistance from USAID. The administration, the commodity programs and all of the service and support groups in CIAT have contributed immeasurably to the achievement of program objectives. Special recognition also goes to the Swiss Development Cooperation 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. A complete listing of individuals and their organizations outside CIAT who assisted the Seed Unit during 1982 is given in Appendix 1.

Seed Unit Staff

The full-time staff of the Seed Unit increased by three persons in 1982 to provide the means to adequately handle the seed production activity. The salary for these people comes from the seed production and conditioning rotating fund.

The heavy use of visiting scientists, consultants, and guest lecturers plus the interdependence that exists with the other programs and 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 carried the major responsibility in achieving the project's objectives.

Each staff member has developed during the year and contributed to the successful completion of the heavy schedule of activities. The staff list with the major area of responsibility for each person is given in Appendix 2.

Conclusions

The achievements of the Seed Unit through 1982 can be quantitatively measured by 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. Although much more difficult to measure, those changes that are occurring gradually and that are less obvious are equally important. In this group would fall the clarification of seed program policies and strategies, the increased motivation of people, the interest in seed activities, and the strengthened conviction that more and better seed of improved varieties can be produced and supplies 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 project's original goals for the Seed Unit to play a development role as well as to carry service responsibilities to the programs is a proper function at this stage of development of the seed programs and enterprises in the region. Although much remains to be done, the Seed Unit is in an excellent position to cooperate with the commodity programs, national and international agencies, seed association and seed enterprises and to continue to play a catalytic role in accelerating the use of good seed of better varieties in the region.

Appendix 1 . Non-CIAT specialists who contributed to Seed Unit Program Activities in 1982

<u>Name</u>	<u>Organization</u>	<u>Country</u>
Clovis Wetzel	EMBRA PA	Brazil
Mrs. Clovis Wetzel	CENARGEN/EMBRA PA	Brazil
Juan Carlos Bresciani	IICA-EMBRA PA	Brazil
Carlos de Queiroz	EMBRATER	Brazil
Danilo Bracini	Ministry of Agriculture	Brazil
Eugenio Hernández	Rockefeller Foundation	Brazil
Flavio Rocha	Universidad Federal de Pelotas	Brazil
Leopoldo Baudet	Universidad Federal de Pelotas	Brazil
Fernando Gómez	ICA	Colombia
Jaime Navas	ICA	Colombia
Manuel Torregroza	ICA	Colombia
Elkin Bustamante	ICA	Colombia
Carlos Silva	ICA	Colombia
Alejandro Mendoza	ICA	Colombia
Dorancé Muñoz	ICA	Colombia
Luis E. Chavez	ICA	Colombia
Gilberto Bastidas	ICA	Colombia
Arnulfo Díaz	ICA	Colombia
Alvaro Triana	ICA	Colombia
German Torres Torres	CRESEMILLAS	Colombia
Mario Giraldo	CRESEMILLAS	Colombia
Amparo Toro de Marroquín	CRESEMILLAS	Colombia
Gentil Vargas	FEDEARROZ	Colombia
Guillermo Jaramillo	FEDEARROZ	Colombia
Teodoro Daza	AGRITSA	Colombia
Enrique Holguín	PROACOL	Colombia
Luis Eduardo Manotas	PROACOL	Colombia
Enrique Rubio	PROACOL DEL TOLIMA	Colombia
German Uribe	PROSEMILLAS	Colombia
Luis Miguel Estrada	PROSEMILLAS	Colombia
Eduardo Villota	SEMILLANO	Colombia
Fernando Donado	Semillas del Tolima	Colombia
Alvaro Dimey	Semillas El Zorro	Colombia
Javier Bernal	Semillas La Pradera	Colombia
Jaime Barbosa	SEMIVALLE	Colombia
Christian Terrassa	SEMIVALLE	Colombia
Alvaro Gartner	ACOSEMILLAS	Colombia

Appendix 1
(Cont. 2)

Oscar Malamud	CIP	Colombia
Alvaro Castillo	EDIAGRO	Colombia
Martin Bueno	Kongskilde	Colombia
Luis Gabriel Villa	Private Consultant	Colombia
Fabio Polanía	Private Consultant	Colombia
Antonio Pinchinat	IICA	Costa Rica
Ronald Echandi	IICA/University of Costa Rica	Costa Rica
Jose Román Hernández	Secretaria de Recursos Naturales	Dominican Republic
Jaime Florez	Escuela Politécnica del Chimborazo	Ecuador
Napoleón Puentes	ISIAP	El Salvador
Rene Velasquez	Private Consultant	Guatemala
Ripusudan Paliwal	CIMMYT	Mexico
Valeriano Robles	AMEAS- ALEAS	Mexico
Vartan Guiragossian	ICRISAT	Mexico
Joel Arteaga	PRONASE	Mexico
Ricardo Dávila	Universidad "Antonio Narro"	Mexico
Juan Carlos Garcia	Universidad Autónoma Chapingo	Mexico
Anibal Monares	CIP	Peru
James Bryan	CIP	Peru
Carlos Herrera	HORTUS	Peru
Carlos Montes	INIPA	Peru
Hugo Soplín	Universidad Nacional Agraria	Peru
Laxman Singh	CARDI	Antigua
Peter Lavery	Caribbean Food Corp.	Trinidad
Leroy Everson	Iowa State University	USA
Joseph Park	Agricultural Research Service USDA	USA
Carlos Ampuero	Inter-American Bank for Development	USA
Don Grabe	Oregon State University	USA
James Delouche	Mississippi State University	USA

Appendix 1
(Contd. 3)

Howard Potts	Mississippi State University	USA
Hunter Andrews	Mississippi State University	USA
Albert Boyd	Mississippi State University	USA
Burns Welch	Mississippi State University	USA
Robert Waugh	Private Consultant	USA
Margaret Swisher	University of Florida	USA
Maxwell Brown	World Bank	USA
Robert Griffiths	Private Consultant	United Kingdom

Appendix 2

Seed Unit Staff

Johnson E. Douglas, Head

Federico Poey, Seed Specialist

Joseph Cortes, Training and Seed Conditioning

Guillermo Giraldo, Seed Production

Jose Fernandez De Soto, Seed Communications

Jose Fernando Aristizábal, Seed Quality

Napoleón Viveros, Seed Conditioning

Luz Marina Duque, Secretary

Martha Rivero, Secretary

Rodrigo Nuñez, Technician, Laboratory

Cesar Octavio Vasquez, Technician, Conditioning Plant

Mario Romero, Field Assistant

Gonzalo Monzon, Laborer

Rudecindo Palma, Laborer

Alberto Orozco, Laborer

Carlos Orlando Vivas, Laborer