

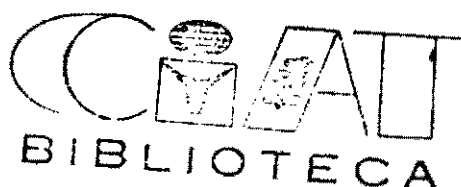
~~THE CIAT SEED UNIT - ACHIEVEMENTS AND EXPECTATIONS~~

The Seed Unit was started at CIAT with support from the Swiss Development Cooperation in January 1979. A combination of intensive seed production and technology courses, advanced courses, in-service training, M.S. thesis programs and in-country training have furthered the training of 424 people. Four workshops at CIAT and two in Central America in collaboration with IICA have met specific objectives to further seed improvement in the region. Technical collaboration has provided the means to follow-up on former trainees, to assist national seed programs in clarifying goals and strategies, to collaborate with seed associations and to relate to other bilateral and international efforts. In cooperation with the Station Operations Unit and the Bean, Rice and Tropical Pasture programs, the Seed Unit has sold 138 tons of basic seed of 27 different cultivars to various organizations in the region.

Through thesis candidates four research projects have been undertaken in cooperation with the commodity programs and collaborating universities. Four visiting scientists have contributed to development work by adapting existing temperate technology for application to the seed problems of the region.

The Unit has prepared publications and audiotutorial units designed to instruct and inform people in seed activities of ongoing research and new methodologies.

*S. Johnson*



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In the future, training will continue to be a major emphasis of the program with increased effort on advanced, specialized courses. More sub-regional and in-country training will be emphasized. Assistance will be provided to universities developing and improving seed technology courses. Specialized workshops will be continued.

The emphasis in technical collaboration will be at the country level. However, opportunities exist at the sub-regional level and with other international and bilateral agencies. The seed production and supply activities will continue on newer and more promising material.

Research work will continue largely through theses at the M.S. level. Special attention will be given to identifying research priorities and collaborative efforts with others in the region. The continuation of the Newsletter plus the publication of various handbooks, manual and training materials is expected during the coming three years. As work on seed for small farmers continues various materials will be prepared to assist people working with them. The Unit's program is focused on helping seed activities at the country level advance more rapidly and, thus, on causing more good seed of better varieties reach all farmers.

The CIAT Seed Unit  
Achievements and Expectations<sup>1</sup>

Background

In November 1978, the Swiss Development Cooperation (SDC) and CIAT agreed to form a Seed Training, Outreach and Research Unit to help strengthen the national seed programs and industries and to assist the commodity programs of CIAT through its seed production and technology activities. The Seed Unit was started in January 1979 and has pursued the following objectives:

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.

Before the initiation of the Seed Unit, it was recognized that the investment in agricultural research by many national governments of the

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<sup>1</sup> Johnson E. Douglas, Head, Seed Unit, CIAT, A. Aéreo 6713, Cali, Colombia. July 1983

region and the contributions to international research by developed countries and funding agencies have greatly increased during the last 15 years. As a consequence, a large number of new, improved varieties have been developed and released. Nevertheless, the actual increases in food production have not been concomitant with the magnitude of these research efforts. One important reason for this was that the seed supply was inadequate and varieties were not used. Several weaknesses in the seed sector were identified at that time.

Upon the initiation of the Seed Unit a more systematic effort was made to develop country profiles or status reports. Some of the main constraints identified through an analysis of these reports of the country seed programs<sup>1</sup> include:

- a. The greatest deficiency uncovered in most country studies was a lack of clear and consistent policies for seed program development. Country situation profiles prepared for this analysis illustrated that 15 of the 22 Latin America and Caribbean countries studied do not have available a clearly defined set of seed policies.
- b. The next most limiting factor uncovered was an inadequate number of properly trained and experienced seed professionals. People with some training have not had the opportunity to further upgrade their training and to relate to other professionals with similar interests and problems.

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<sup>1</sup> Country Seed Profile Reports. Internal Reviews, Seed Unit, 1978-80.

- c. Seed quality control programs were found to be very weak in the majority of the countries. Although most of the countries have some kind of legislation on paper, implementation of quality control programs was found to be poor. These conditions have often resulted in seed of questionable quality being supplied to farmers and a loss of confidence in the materials available from both the private and public sectors.
- d. Limited breeder and basic seed supplies for further multiplication by local seed enterprises were found to be an additional major limiting factor. In many instances improved cultivars have been released by national programs with no accompanying basic seed available for subsequent multiplication.
- e. Seed drying, conditioning, and storage was also found to be inadequate in most of the countries in the region.
- f. Marketing systems, particularly for farmers with small holdings, were found to be weak and limited.

To help overcome these weakness the Seed Unit concentrated on training, workshops, technical collaboration, seed production and supply, communication, research, and facility and staff development. Some of the achievements of the Unit are outlined.

### Achievements

#### Training

The first priority of the Seed Unit has been to increase the number and competence of individuals capable of helping to accelerate national

seed program development. A combination of intensive seed production and technology courses (7-9 weeks), advanced short-courses (4-week duration), in-service training, M.S. thesis programs, and in-country training have been used to achieve this objective. Table 1 shows the number of participants in each category (through mid 1983).

Table 1. Number of training participants in five categories

Category *	No. of Participants
Intensive Courses (7)	199
Advanced Courses (3)	86
In-service Training (Individualized)	15
M.S. Thesis Programs	4
In-country Training Courses (6) **	<u>120</u>
	424

\* Numbers in parentheses are the number of courses given.

\*\* Organized by national programs and assisted by the Seed Unit in various degrees.

Approximately 60 percent of the trainees' time was spent doing practical exercises in the field, laboratory or conditioning facilities. Post-course evaluations and later follow-up show substantial gains in knowledge and skills on the part of training participants, as well as

increased motivation and levels of interest in contributing to the further development of incipient seed programs and to pass on their newly gained competencies to others. A systematic review of the location and work of former trainees is currently underway.

Participants in the training courses have come from a number of kinds of organizations and from 23 countries in Latin America and the Caribbean region. Although 57 percent of the participants come from public seed development, production and research programs, the public and private sector seed enterprises accounted for 29 percent of those trained. Ten percent came from universities in the region.

#### Workshops

Four workshops were held at CIAT, and two regional workshops in Central America were co-sponsored. The workshops held at CIAT and participation are given in Table 2.

Table 2. Types of workshops held at CIAT and number of participants (1978-1982).

Workshop title	No. of Participants
Seed Strategies, Planning and Implementation	37
Seed Enterprise Management and Marketing	81
Strategies for Seed Training	49
Improved Seed for the Small Farmer	<u>65</u>
	232

These workshops have provided a forum for professionals with similar interests to exchange views and work together in developing plans, recommendations, and fresh approaches to help seed activities advance more rapidly. Several of the alternative schemes worked out in these workshops are in the process of being implemented at the national level. For example, working groups are now preparing training materials based upon plans developed in the Seed Training Strategies Workshop. Several national programs are taking a fresh look at in-country training. A number of seed enterprises are considering new marketing methods, especially to reach small farmers.

Two workshops in Central America have resulted in new mechanisms for the countries in the region to cooperate in seed program planning and related seed production activities. The combined efforts of IICA and the Seed Unit have resulted in a Seed Advisory Council and a Technical Committee with representatives from throughout the region. Training plans for the region are being developed. The Seed Unit will also collaborate with the Andean Pact countries in October, 1983 on a sub-regional workshop on ways to implement Andean proposals on the increased production and sale of seed within the area.

#### Technical Collaboration

Technical collaboration has provided the means to follow up on former trainees, to assist national seed programs in clarifying goals and strategies, to collaborate with seed associations, and to relate to other bilateral and international efforts. Visits have been made to



practically every country in the region. The enthusiasm and interest of former trainees has remained with those visited, and many of them are becoming visibly more effective in contributing to program goals. Assistance has been given to several countries through direct discussions and by participating in meetings arranged to help review options and resolve specific problems. New seed associations have been formed, and the Seed Unit staff has participated in association meetings and symposia to help them develop.

A Seed Liaison Committee, which includes representatives from seed programs in the region and from the international centers with program activities in the area - Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Centro Internacional de la Papa (CIP) - as well as CIAT, works to improve cooperation among agencies in the region. The Seed Unit has increased collaboration with IDB, IBRD, and with bilateral donor agencies. The Seed Unit keeps FAO informed about all of its various activities and former Seed Unit trainees are now contributing to FAO in-country training courses as instructors.

Through the special Central American effort, guidelines for seed production and variety descriptors for beans, rice, maize and sorghum have been developed, and a special seed section has been initiated in the annual crops meetings sponsored by the PCCMCA. Efforts are being made to improve the supply of basic seed of newer varieties in the area, in part through the use of seed from the Seed Unit. A cooperative

effort on training has been developed with the Andean Pact group and a joint training course is programmed with the Federal University of Pelotas.

As referred to earlier, information on the status of seed programs in each country in the region has been gathered and organized into "Country Profiles". These situation reports are used in conjunction with visits to help identify future needs and assess progress.

#### Seed Production and Supply

The Seed Unit has given CIAT and the region extra capability for the production, drying, conditioning, and supply of basic seed of promising material and released varieties. Thus, in cooperation with Station Operations and the Bean, Rice, and Tropical Pastures Programs, the Seed Unit has sold 138 tons of seed of 27 different cultivars to various organizations in the region. Basic seed of beans (Phaseolus vulgaris), rice (Oryza sativa) and selected tropical pasture species (Andropogon gayanus, Stylosanthes capitata, and Stylosanthes guianensis) has been sent to 13 countries in Latin America and the Caribbean during the past two years. The seed production activity is being handled with the objective of making this aspect totally self-supporting. These seed supplies have made possible a more rapid increase of new lines and have helped to support national efforts to multiply established varieties. It is this kind of collaborative effort between a regional center and national programs that helps assure the introduction and use of new lines and brings the agricultural research process to its logical fruition.

The seed production and supply has helped met not only an urgent need for basic seed supplies but also contributed to the training value of the Unit's program. The in-service trainees contribute actively to field production, seed drying and conditioning, and quality evaluation and gain from the hands-on experience.

#### Research and Development

Through the contributions of thesis candidates, four research projects have been undertaken. Collaborative projects with the CIAT Bean, Rice, and Tropical Pasture Programs have dealt with varietal description that included a quantitative measurement of the variability in bean and rice varieties and with seed quality in selected pasture species. A fourth MS candidate worked on seed conditioning from the standpoint of agricultural economics.

Four visiting scientists from North America and Europe have contributed to development work by adapting existing temperate technology for application to the seed problems of the region. They have worked especially in the areas of seed quality control and conditioning. With their help specific pieces of seed conditioning and laboratory equipment have been fabricated at CIAT for use in the Unit and as models for further duplication in the region.

These research and development activities provide an important mechanism for the transfer of technology into the region to accelerate the use of the most relevant technologies. The location of both

post-graduates from the region and visiting scientists from the developed world at the Seed Unit also promotes an important scientific interchange that is valuable to all parties concerned.

### Communication

The Unit has prepared publications and audiotutorial units designed to instruct and inform the technicians and the leaders in national programs and seed enterprises of ongoing research, new methodologies, and planning and management techniques necessary to implement the technologies. With the support of the Rockefeller Foundation and CIAT, the Communication Section a Spanish language version of Successful Seed Programs: A Planning and Management Guide was published and distributed to national programs and used with development and training activities. A technical manual, Methods for Varietal Description and Guidelines for Seed Production on Bean, Maize, Rice and Sorghum, published in Spanish, was the result of the Unit's work with seed programs in Central America. Additionally, proceedings of the four CIAT-based workshops are in publication and those of two Central American workshops have been published jointly by their sponsors. A four-to eight-page newsletter on seed technology was produced quarterly and sent to 1,500 interested seed program leaders and technologists, maintaining the flow of information among the Seed Unit staff, national program staff, and industry people in the region. This newsletter serves as a valuable vehicle for communication and exchange of ideas among the area's seed technologists and contributes to the fostering of the seed network.

For training purposes, six audiovisual, audiotutorial units have been produced. Three others are in an advanced stage of preparation, and the Unit has cooperated in production of Bean and Rice Program units that contained seed related information. Scientists within and outside the region have contributed to the development of these units as well as the staff at CIAT. The units are for individual study, and allow the student to acquire basic concepts of seed technology at his own pace, testing himself as he proceeds to see that the concepts have been thoroughly integrated. They have been very well received by training participants at CIAT and national program staff. The units can not only be used at formally organized courses but also be taken back to the home organization to expand the teaching base of qualified technologists in the national program.

#### Facilities and Staff Development

CIAT contributed two inadequately utilized buildings, formerly a part of the Beef Field Unit, which were remodelled to provide office, laboratory, training, seed storage and bag drying space. Seed storage bins, existing at CIAT, were relocated and linked with a new seed conditioning facility built under the project. This shift and related modifications also improved the grain handling capability of the Farm Operations' Unit. Some equipment suppliers from North America loaned equipment and discounted some items to help stretch project dollars for equipment as far as possible. The combined value of facilities and equipment of the Unit is approximately US\$500,000.

The Unit was staffed according to plans. It is led by a senior seed specialist as head of the Unit. An experienced seed production and industry development specialist has filled the second senior staff position. Five Colombian university graduates have been responsible for the work in training, production, drying and conditioning, quality control and communication. Two full-time experienced secretaries and a part-time secretary have carried the clerical responsibilities. One field supervisor plus part-time help and three laborers, have carried most of the field work. In addition, a technician and one-half have been added to the staff to meet special needs in seed health testing and seed production. Staff members funded under a special rotating account to cover the reimbursable costs of seed drying, conditioning, storage and testing include two technicians - one in conditioning equipment operation and one in seed testing. Three laborers are also supported from this source - two on seed conditioning and one on field activities.

#### Summary of Achievements Compared with Plans

##### Training

To date the project has achieved a great deal more than planned in several aspects of the program and only slightly less in other components. In training five intensive 8-weeks courses were planned, but six were conducted. Two advanced short courses were planned and three have been conducted. (One more will be completed in November 1983). Support was planned for four in-country courses, but seven have been assisted.

Three workshops were planned and five will have been held including the July 1983 workshop. Table 1 summarizes the number of participants involved in courses and workshops and shows the project already has exceeded the planned 402 people.

Table 3. Summary of Number of Participants in Courses and Workshops as of June 1983.

Activity	Planned	Achieved
Short Courses at CIAT	227	304
In-Country Courses	100	120
Workshops	75	232
Total	402	656

These extra achievements were possible because of support received from other sources for several participants and through modifications within the planned budget. Fewer postgraduate interns could be accommodated than planned and plans for postdoctoral fellows had to be reduced because of the unavailability of candidates.

The enthusiasm and level of interest of former trainees has continued strong and many trainees are finding that it is indeed possible to achieve their program goals.

The work started with a few universities exceeds the plans outlined in the project.

### Technical Collaboration

Increasingly, national seed program leaders are focusing on developing and implementing coherent national seed programs. Interaction has grown especially in the Central America, Caribbean and Andean region for collaborating with the Seed Unit in joint activities. The formation of new seed associations indicates a growing desire to work with others within countries and among countries.

The workshops and training courses have brought seed technologists and seedsmen together to start the process of greater horizontal transfer of information and cooperation.

### Seed Production and Supply

The project had as an objective to "cooperate with commodity programs in the multiplication, drying processing, storage and distribution of seeds of selected cultivars or species when requirements exceed the amount needed for experimental trials". The 138 tons of seed of 2/ varieties and species distributed attests to the achievement of this project objective.

### Research and Development

The project proposal included cooperation with the commodity programs and other institutions on specific research projects. This cooperation has been achieved with the bean, rice and tropical pasture programs. Collaboration with ICA has been close in work on variety descriptions.



The fabrication of equipment referred to previously represents a start in achieving the third objective related to limited work on equipment development. The initiative started on improved seed for small farmers exceeds earlier project objectives.

#### Communication

A newsletter was proposed and is now published regularly. Although specific details on the preparation on training materials were not listed in the original project, the development of six audiotutorial units, the preparation of training course materials, the publishing of a technical manual on varietal description and guidelines for production represent solid achievements in this area.

#### Facilities and Equipment

The project called for 800 m<sup>2</sup> of space to be built. By remodeling existing CIAT buildings along with new construction it was possible to develop 1,164 m<sup>2</sup> of quite functional space. By utilizing equipment at CIAT and through grants and discounts from equipment suppliers the essential equipment proposed in the project was obtained even with unanticipated inflation which raised costs above estimates.

#### Support from Additional Sources

Support to the project from sources beyond the SCD grant have helped to achieve and exceed objectives. The utilization of existing facilities, equipment and staff of CIAT contributed greatly to achievements. Assistance from organizations in Colombia and equipment suppliers helped achieve objectives.

The participation of the staff of Mississippi State University through USAID support has been the equivalent of one man year of time. Assistance from the CIMMYT, CIP and ICRISAT staff members has contributed to objectives. Various organizations in the region and bilateral and other international agencies have paid staff salaries and travel costs for people contributing to courses and workshops. The Rockefeller Foundation's support of a staff member seconded to CIAT to help initiate the project and a small initial supplemental grant, made it possible for activities to move ahead more rapidly than would have been possible otherwise. Appendix I details the nature of this supplemental support.

### Conclusions

In 4½ years , the Seed Unit has changed from an idea to an active and dynamic tool for seed program and industry development in the region. It represents a valuable step to assure that the results from crop research programs do move onto farms. The achievements through the first 4½ years of the Seed Unit's work reinforce the basic concept that a Unit of this kind is a valuable addition to the total agricultural research and development effort in the region. The Unit is the first and only effort in any developing region with the seed development objectives, facilities, and staff that now exist at CIAT. The strong and highly positive response from collaborating national seed programs in the region and their continued requests for further assistance and support has been most encouraging.

## Future Plans

### Major Emphasis

#### A. Scope of commodities

As stressed in the Seed Unit Position Paper approved by the CIAT Board of Trustees, "From the start of the CIAT project it has been clearly stated that the Seed Unit would place emphasis on the CIAT commodities but that its work would not be limited to them. This continues to be the management position. The emphasis on CIAT commodities means that training, seed production and research work will place a special priority on beans, rice, and tropical pastures. Experience has shown that cassava has such unique seed production requirements that the effort on this crop must be dealt with separately. Among crops not in the mandate of CIAT, priority will be placed on maize and sorghum. These two crops provide an opportunity to teach hybrid seed production technology and are extremely important to seed enterprises in the region". Further details related to scope of commodities are in Position Paper and will be the general guideline for this phase of the seed work.

#### B. Development of Human Resources

Training at various levels at CIAT will continue to be a major emphasis of the program. More emphasis will start to be placed on production training. For these reasons the 8-9 weeks, intensive, seed production and technology courses and the 3-4 weeks, advanced and

specialized course will continue to be offered at CIAT. Three intensive seed production and technology courses and five advanced and specialized courses are planned, during the coming three years.

Four categories of in-service training are planned - visiting postdoctorals, visiting associates, visiting researchers (thesis) and visiting post-graduate interns. The visiting postdoctoral position may include some research work, but it would concentrate more on preparing people for seed program development work within countries or at other centers. The visiting associate position would be primarily to help provide further practical training for a recent M.S. in seed technology or to offer refresher training for a person who has been in the field for some time. Latin American students and universities within and outside the region, are interested in collaborating on thesis work. Visiting researcher positions provide this chance. These researchers frequently will work with joint guidance from a Seed Unit and a CIAT commodity program staff member. Post-graduate interns may be participants from courses who stay on for specialized training or people who come to the Unit for a period of a month or more for in-service training. These kinds of training opportunities are non-existent in Latin America and the Caribbean. The CIAT and Seed Unit staff, facilities and location provide an ideal situation for in-service training and can contribute much to the development of key individuals and leaders.

In-country courses are needed for meeting specific country needs and for reaching larger numbers of people for shorter periods of time. For example, courses for seed conditioning plant operators, seed certification field inspectors, seed sellers, seed production advanced, specialized courses. Greater stress will be placed on in-service training.

With the number of people now trained it is expected that more sub-regional and in-country training can be achieved. With a view to the long-term a growing emphasis will be placed on the development and improvement of seed education and research technology at a few selected universities.

#### C. Developments at the country Level

Although countries differ considerably in their overall stage of development in the seed sector, it is clear that equally great differences exist within parts of countries, among crops and for different elements of the seed program. Thus, the emphasis at the country level must be geared to each country's greatest needs. The major points of focus will be:

1. Clarifying national seed program goals and strategies to meet the goals.
2. Improving the capability for breeder and basic seed production and the continued availability of this seed.
3. Increasing the production and supply of good seed of improved varieties at the commercial level.

4. Strengthening seed quality control systems.
5. Improving the seed used by small farmers.

### Components

#### A. Development of Human Resources

##### Training at CIAT

The Seed technology training facilities developed at CIAT during the first five year project represent a unique resource. Comparable training facilities do not exist in the region. The scientific and technical staff of CIAT and the Seed Unit are also a great asset. The capability for preparing preplanted field exercises is also seldom available in other locations. The availability of seed enterprises near CIAT is an advantage for training purposes. Thus, the CIAT location has many comparative advantages for certain kinds of seed technology and agronomists, seed law enforcement people and extension personnel are possible depending upon a country's need. The Seed Unit expects to provide more assistance to this kind of training, but in cooperation with national seed programs, universities or seed associations. As a result of the 1981 workshop and a continued emphasis on the need for a long-term seed technology personnel development and a training strategy, the Seed Unit staff also expects to be of greater service to national programs as they evolve these plans.

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##### Sub-regional

Opportunities now exist to conduct a series of short courses on a sub-regional basis. In Central America the Regional Consultative Commission for Seed and the Regional Technical Committee provide

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#### Courses away from CIAT

##### In-country

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mechanisms to initiate planned training on a sub-regional basis. The Junta del Acuerdo de Cartagena (JUNAC) has developed an agreement with CIAT for the Seed Unit and JUNAC to collaborate in training. With the formation of CETREISEM at Pelotas, Brazil, an agreement has been reached to collaborate in various training activities including sub-regional courses.

Training at this level offers opportunities to concentrate on issues of special interest to countries with common needs. For example, the production and exchange of breeder and basic seed, the development of similar seed quality standards, ways to facilitate seed movement across national boundaries, the management and marketing of seed, the development and growth of seed producers and enterprises, and the development of similar seed legislation are topics to be stressed in such training.

#### Cooperation with Universities

A few universities have started to incorporate seed technology and production courses into their curricula. Only the Universidade Federal de Pelotas offers a post-graduate program in seed technology in Latin America. In the interest of improving the long-term capability in the region to carry forward in the training of seed technologists special attention will be given to a few selected locations especially where post-graduate programs are developing.

A letter of agreement has also been signed with the Universidad Nacional de Cordoba in Argentina to assist in the development of a

post-graduate degree program in seed technology at that university. This agreement includes assistance in curricula development, training of personnel and direct involvement in specific courses and workshops.

Other possibilities for the development of post-graduate programs exist.

#### Workshops and Conferences

Workshops proved to be an effective way to achieve specific objectives on topics that are common for the region during the first five years of the Seed Unit's work. Four proposed workshops or conferences for the coming period are projected for the next three years.

The International Seed Testing Association, the Tropical Pasture Program and the Seed Unit recognize a need to achieve greater uniformity in the evaluation of pasture seed--especially tropical pasture seed. Since this is not a problem only unique to Latin America and a need exists for greater international agreement, discussions have been held with the International Seed Testing Association (ISTA) about the problem. CIAT and ISTA have reached a tentative agreement to jointly sponsor a workshop on Tropical Pasture Seed Testing. ISTA would assist with the help of two or three experts and use its good offices to promote the workshop. The Seed Unit proposes to support several of the Latin American and Caribbean participants.

As indicated earlier, the multiplication of propagating material for cassava and the system for doing this needs special attention. The

Seed Unit in cooperation with the Cassava Program proposes to bring together a few people who can initiate action programs and develop strategies for applying known technology in selected locations.

People from national seed programs and universities require an opportunity to meet to share information on seed technology research results, research methodology and seed technology research priorities. Linked with this is a need to follow-up on actions initiated in 1982. A workshop is planned for 1985 to provide these opportunities.

As a result of the 1982 workshop and program plans during the coming two years, it is expected that a few good examples of actions to assist small farmers with their seed problems will have emerged. It is proposed to have a traveling workshop for a few key people. These people, who are active in this work or who have the potential for initiating action, would see examples and discuss future actions needed to further improve and spread work to help meet the small farmer's seed needs.

#### B. Technical Collaboration

The emphasis in technical collaboration is at the country level. However, as previously stressed opportunities exist at the sub-regional level and with other international and bilateral agencies.

##### Country Level Collaboration.

The difficulty in many countries is the lack of good cooperation among the many public and private sector organizations that must work

together if the seed program is to advance rapidly. The staff of the Seed Unit can only work as a catalyst to help achieve this objective. Through contacts with former trainees in many organizations it is expected that ultimately the former Seed Unit "alumni" will be able to start to achieve a degree of cooperation not possible previously in many programs. This network of people within countries will be encouraged through visits and their continued contact with the Seed Unit. National and regional seed technology associations can assist this process and the building of a regional network. The Unit will work with and encourage such groups. The points of emphasis mentioned previously will be on national seed program goals and strategies, breeder and basic seed production, local seed production and supply, quality control systems, and improved seed for small farmers.

#### Sub-regional Collaboration

The past 4½ years have clearly shown a strong desire throughout the region to accelerate the improvement of seed programs and industries. As pointed out earlier, the country profiles show some countries with greater needs than others. These countries can be grouped into the Central America and Caribbean area and the countries of the Andean Pact. To more rapidly achieve the objectives outlined at the country level and to help these countries develop the interrelationships sought at the sub-regional level, an increased concentration of technical assistance and leadership is required. The existing Seed Unit with two senior scientists cannot provide the manpower needed to accomplish all that is presently expected of the Unit.

The strides being made in bean research, the developing interest and research in upland rice, the possibilities for pasture improvement, the need to spread improved cassava germplasm and advances with the commodities of sister international centers working in the region are exciting. But the seed production and distribution capability in most of the countries in these two regions are far from adequate to handle this growing stream of new germplasm. Now is the time to make a major effort to lift the seed programs in these two regions from their present level to a stage that they are able to move seed of improved varieties to farmers on a regular basis.

An outreach person in each region is needed to relate closely not only with the in-country and sub-regional leadership in seed activities, but also with the research specialists in national programs and the international centers working in the area. In addition the sub-regional seed specialists would provide some of the needed technical and advisory help to international and bilateral donors developing and implementing seed projects in the area.

Other specific responsibilities with respect to seed program development could include:

1. Help countries clarify their goals and strategies to meet them.
2. In cooperation with the countries in the region, assist in organizing and conducting in-country training courses and workshops.
3. Through work with sub-regional committees and groups to organize and conduct sub-regional courses and workshops.

4. Assist countries in the strengthening of their breeder and basic seed production programs especially for beans, rice, pasture, maize and sorghum.<sup>1</sup>
5. Assist in the formation and strengthening of seed production and marketing groups within countries for beans, rice, pastures, maize and sorghum, especially with and for smaller farmers.<sup>1</sup>
6. Help develop more effective quality control systems within countries that are compatible with other programs in the region.

It is proposed that these assignments would be for only three years since the need for regional outreach personnel will reduce as more and more locally trained people become available.

#### Within Colombia

Of the Andean Pact countries, the Colombian seed program is the strongest. Many aspects of the Colombian seed program are functioning well. However, especially close cooperation with the ICA Seed Division will be advisable in:

1. Basic seed production

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<sup>1</sup> A CIMMYT Seed Specialist working in the Central America and Caribbean region would carry the primary responsibility for maize, but it is expected that these specialists would work closely together on many activities of common interest.

2. A special project being developed by ICA to improve seed supplies for small farmers.
3. The development of a systematic cassava propagating material program in conjunction with the small industrial units.

In all three of these areas of work it is anticipated that the Colombian program will carry the primary responsibility for further development. However, the Seed Unit staff will assist with technical advice and through specialized training of staff in cooperation with ICA.

#### International and Bilateral Agencies

Within CIAT the Seed Unit will continue to collaborate in training, production and research activities with the commodity programs and work with the Farm Operations Unit. Improved mechanisms are needed to facilitate communications and planning especially in seed production and fresh attempts will be made to achieve this objective.

Many agencies have much to contribute to seed program development in the region. Because of contacts with many former trainees, information in country profiles, links with officials in national seed programs and ties with seed associations and seed enterprises, the Seed Unit has much to share with donor and technical assistance agencies interested in seed activities in the region. Mechanisms will be sought to improve the flow of information about the development of the seed sector with those interested. The Seed Liason Committee will be

continued and enlarged to facilitate this process. The Unit can help identify consultants and project leaders from among leading seed technologists in the region. Consultations to help identify meaningful seed projects and to supply information about people and resources in the region will be offered.

Continued support will be offered to seed training and production needs of sister international centers. Collaboration on the development of seed training materials may be possible.

#### C. Seed Production and Supply

The Unit will continue to operate the seed production, drying, conditioning, storage and seed supply activities with a priority in support of the newer and most promising material-lines and varieties - from the collaborative research of CIAT and national programs. If sister international centers operating in the region have material for use in the region and the Unit can play a useful role, these seed will also be considered.

In collaboration with the commodity programs consideration will be given to offering a breeder and basic seed grow-out/post control service to countries that are interested as a way to monitor the genetic purity and authenticity of material. Work will continue with the programs in the purification, maintenance and description of varieties.



Increased attention will be given to developing a capacity for basic seed production off the Palmira Station since it is clear that several of the pasture legume species and some bean varieties cannot be multiplied successfully at that location. This step will require some increased supervisory capacity and mobility.

#### D. Research and Development

The research work of the Unit will continue to be largely linked with theses at the M.S. level. One student from the Federal University of Pelotas will start a M.S. research program in August, 1983 in collaboration with the Seed Unit and the Tropical Pastures Program. One Ph.D. candidate from Ohio State University and supported by USAID will be with the Unit during 1984 and 1985. Some adaptive research and development work will be done by visiting scientists, specialists and consultants.

The several potential areas of work exist especially in the subdisciplines of production, drying and conditioning, quality control and economics. The Seed Unit can only investigate a few high priority topics. By working with others in the region and keeping informed on what is being done within and outside the region it is hoped that the Unit can play a catalytic role in identifying the most relevant research needs and in the application of research findings. Close links will be maintained with the commodity programs of CIAT especially in the area of seed technology and research.

## E. Communication

Communication activities are some of the most useful and appreciated work of the Unit. The Unit is rapidly becoming a primary source of practical seed production and technology information in Spanish. The existing training materials have opened the window to seed technology internationally for many trainees, but much sought after information needs to be made more readily and widely available. The Newsletter is helping to facilitate communication within the region and between the Unit and former trainees. It will continue. Efforts to further strengthen the seed technology section of the library are required to support the work of researchers, trainees, and the Seed Unit Staff.

Specific work on the development and reproduction of material for the seed sector follows:

1. Out of the 1982 workshop on training, working groups were formed to prepare material for training purposes based upon modules considered during the workshop. During the next three years much of this material will become available for publishing. Complementary audio tutorials and laboratory material will also be developed for those modules as the basic text is completed.
2. Various handbooks and manuals can be developed out of existing training material when it is combined with complementary material and properly organized. Four manuals of this kind are planned. They will deal with these topics: seed conditioning facility operation, internal quality control, seed certification and law enforcement procedures, and breeder and basic seed production and maintenance.

In addition, two publications from North America need to be translated and published in Spanish. They are a Seed Vigor Testing Handbook published by the Association of Official Seed Analysts and Seed Conditioning Principles to be published by Mississippi State University.

As work with small farmers develops and more information is accumulated, guidelines are to be prepared on "helping the small farmer save his own seed" and on "ways to initiate more systematic seed production and supply activities with and for small farmers".

#### Summary of Goals to be Achieved

The goal by the end of the decade when the major development work of the Seed Unit is expected to be reduced, is to have all countries in the region with clearly identifiable and functioning seed programs and industries. With the sub-regional concentration combined with the core Seed Unit activities every country in the region should move up on the country profile rating, but the countries in the two sub-regions should advance the most. As these changes occur, it is expected that more germplasm originating from CIAT and other international and national research will be found on farmers' fields. The emphasis on mechanisms to move the new germplasm to small farmers should start the establishment of systems within the small farming community and through established seed enterprises to help the small farmer obtain good seed of better varieties easier.

New small farmer seed producers are expected to be started in a few countries. Similarly, it is expected that new seed enterprises will be started and seed associations will be strengthened or developed depending upon need. Basic seed production is expected to be increased especially for new varieties and the systems for handling this aspect improved. The emphasis on quality control should result in improvements in the quality of seed sold to farmers.

In terms of numbers of people trained, the planned courses at CIAT during the next three years should increase the seed technology and production capability of 200 people. The in-country and sub-regional courses should benefit 300 people. The specialized workshops should be of value to 80 people. These people when added to those benefitted through the first phase of the Seed's Unit work should provide most countries with a critical mass on which the seed programs can start to move more rapidly.

Through the newsletter, visits, work with selected universities and seed technology associations, an improved network of seed technologists and seed connected institutions will be built. More clearly defined seed technology research priorities for the region will be developed. Seed technology research at CIAT will help train a few people and solve some of the most urgent problems related to CIAT's commodities.

An increased number of countries will have clarified their goals and strategies to meet them. More good seed of better varieties will be reaching farmers.

## Appendix I

## SUPPLEMENTARY SUPPORT TO THE SEED UNIT (1978-1983)

In addition to the support provided to the Seed Unit by the Swiss Development Cooperation, several other organizations as well as CIAT proper have contributed in various ways. The following is a statement summarizing supplementary help received:

CIAT Contributions

North and South Buildings that were renovated	150,000
6 Silos with drier units	24,000
1 Gravity separator	3,000
Misc. small equipment and furnishings	2,500
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Sub-total	\$179,500

Equipment Suppliers

Blount Agribusiness International	
1 Super 29-D	20,511
Air Screen cleaner and screens (Loaned)	
Value of discount on other equipment purchased	5,612
Gustafson International	
1 Mist-O-Matic Seed Treater (Loaned)	4,950

SECRET  
BIBLIOTECA

CEA Carter International

Value of discount on equipment purchased	3,854
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Seedburo Equipment Company

Value of discount on equipment purchased	2,022
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Sub-total	\$36,949
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Mississippi State University/USAID

23 Trips to CIAT for help in courses, design of processing plant and the preparation of audio-tutorial units	33,000
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1 man year of time	80,000
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Sub-total	\$113,000
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Rockefeller Foundation

Grant to initiate the seed activity, publication of Spanish edition of Successful Seed Programs: A Planning and Management Guide, and one man year of time	100,000
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TOTAL	\$432,449
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In addition to these items on which we can place a monetary value we have also benefited from the help to training courses from staff members of the Colombian research and seed program, the Colombian and Peruvian seed industry, the University of Costa Rica, the Brazilian Basic Seed Program, CIMMYT, ICRISAT, CIP and CIAT. We have paid travel and per diem cost where appropriate but in no case have these organizations charged for the time of their staff members because they, too, are interested in the potential benefits these activities can contribute to their programs. This statement does not include the value of complementary seed work at CIAT such as the seed production work in the Tropical Pastures Program and the Genetic Resources Unit. The salary and support costs provided by The Rockefeller Foundation for their senior scientist seconded to CIAT over a year before the project was funded by the Swiss Development Cooperation is not included.

