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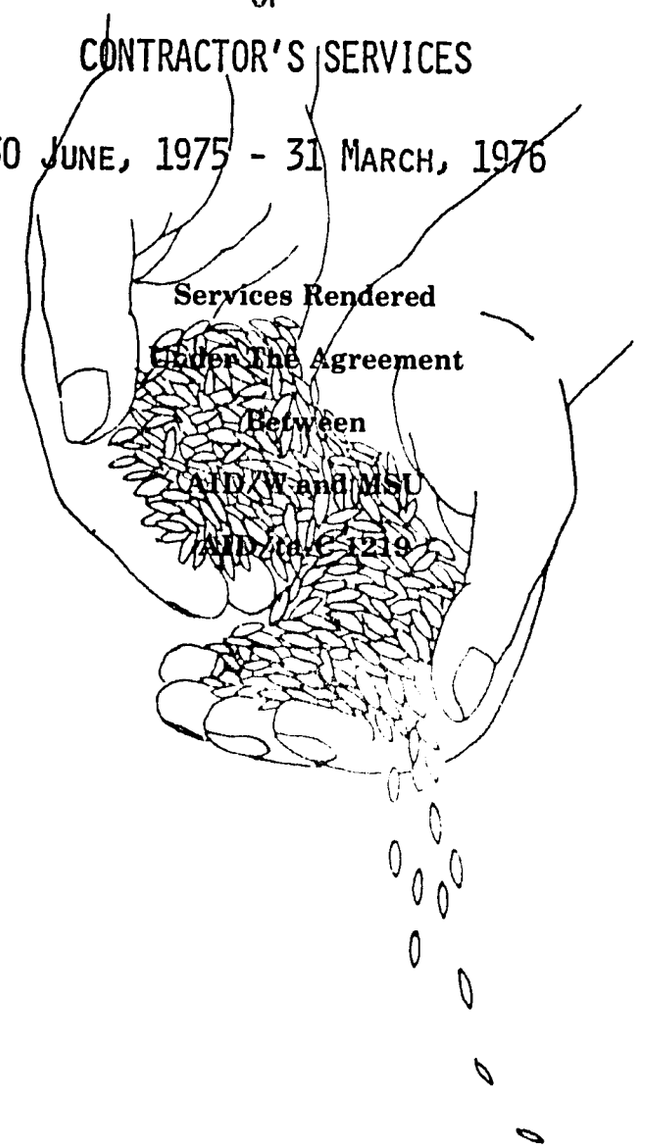
TO: TECHNICAL ASSISTANCE BUREAU

"ANNUAL" REPORT
OF
CONTRACTOR'S SERVICES

30 JUNE, 1975 - 31 MARCH, 1976



Services Rendered
Under The Agreement
Between
AID/W and MSU
(AID/ta-C-1219)

SEED TECHNOLOGY LABORATORY
MISSISSIPPI STATE UNIVERSITY
MISSISSIPPI STATE, MISSISSIPPI

ANNUAL REPORT TO TAB/AID

CONTRACT

AID/ta-C-1219

"Seed Program and Industry Development"

May, 1976

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CONTRACT AID/ta-C-1219
Period: 6/30/75 - 3/31/76

SUMMARY OF ACTIVITIES

	Professional Man Days 1/ With Missions	Professional Man Days 1/ Home Station
I. Services performed at request of Missions and AID/W.		
A. Latin America (Bolivia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Panama, CIAT, EAP-Honduras)	185	152
B. Africa (Ghana, Ivory Coast, Niger, Nigeria, Upper Volta)	74	53
C. East Asia (Thailand)	32	26
D. World Wide (FAO-Rome, AID/W)	11	9
Sub-totals	302	240
II. Responses to Technical Inquiries and Visits		
A. Latin America (One or more inquiries from 10 countries; seven separate visitations)		37
B. Africa (One or more inquiries from 8 countries; three separate visitations)		13.5
C. Near East and South Asia (One or more inquiries from 5 countries; one visitation)		7
D. East Asia (One or more inquiries from 4 countries; four visitations)		16

1/ Man days reported includes only professional staff time spent on designated activities unless otherwise specified. Twenty (2) man-days of work equal one (1) man-month.

E. World-Wide (One or more inquiries from eight agencies; five visitations)			24
Sub-total			97.5
III. Preparation and dissemination of training and information materials (four major publications nearing completion or in progress)			53
Sub-total			53
IV. Adaptive Research-Technical and Economic			
A. Technological Developments (Two major works; one completed)			37
B. Economic-Management Studies (Three major studies; one completed)			52
Sub-total			89
TOTALS	302		479.5
GRAND TOTAL		781.5	

V. Other related AID, Country or Regional Bureau Activities

A. Fifty international students from 15 countries were enrolled in B.S. (2); M.S. (39); and Ph.D. (9) programs in Seed Technology during 6/30/75 - 3/31/76 period. During period 3 graduated with Ph.D. degrees and 11 earned M.S. degrees.

B. Three students from 3 countries were enrolled as special students for period of 4-6 months.

C. Twenty trainees from 9 countries participated in Special Course on Seed Improvement (103-2) from 6/2-7/11, 1975.

"ANNUAL" REPORT

AID/ta-C-1219

"Seed Program and Industry Development"

30 June, 1975 - 31 March, 1976

INTRODUCTION

The transition from Contract AID/CM/TA-73-34, terminated June 29, 1975 to AID/ta-C-1219 proceeded so smoothly as to be essentially unnoticeable. TAB/AID and the AID Contract Office deserve most of the credit for this achievement.

A number of projects originated under the previous contract were carried over and continued into the scope of AID/ta-C-1219. These included specific technical assistance activities in Costa Rica, Panama, Thailand, Honduras, and Ghana, as well as adaptive research, developmental work, training and informational services.

The types of activities under AID/ta-C-1219 have not been substantially different from those under the previous contract except for differences in emphasis. Cooperating countries and the USAID/Missions requested much more assistance in "seed program development" than formerly. This continuing trend is encouraging because it suggests less reliance on "stopgap" measures and more attention and thought on development of a viable seed industry with sound public-private linkeages to serve the development needs of the whole agricultural sector. Despite this desirable shift in emphasis and concern, however, there is still insufficient (and inconsistent) attention to seed industry development in many Missions and LDC's, and relatively little forward planning. Thus, there is still the tendency to forget or overlook the seed production and supply system until its de-

ficiencies and inefficiencies become the major constraint to continued progress in the agricultural sector. Very often at this stage, some "stop-gap" measures have to be installed because the urgency of the situation precludes other alternatives.

A significant portion of services under the contract continues to be of a technical and bio-engineering nature. This is as expected considering the very limited industrial and institutional experience and expertise available in the area of seed technology in all countries - developing and developed. Our group for many years now has been the principal reference on the technical and bio-engineering aspects of seed production-marketing not only to the LDC's served under the AID/Contracts but also to the seed industry in the U.S. and other developed countries as part of our University's total mission of education, research, and service to agriculture.

Training activities have also increased, especially in-depth training (for advanced degrees) at our University. In our opinion, however, in-country and in-service training needs to be stepped up and intensified because lack of trained, resourceful workers, supervisors and managers continues to be a major impediment to progress in seed program-industry development in all too many countries.

Informational services continue as a major activity and they increase each year as more and more workers in the LDC's, advisers, and analysts come into contact with the AID contract group at MSU. The Seed Technology Laboratory has prepared almost 200 informational pamplets, bulletins and handbooks, since beginning with Contract AID-W-607 in March of 1958, and thousands of these handouts have been distributed to specialists, institutions and private companies throughout the world, usually along with

more specific and personal advice and assistance. These handouts and other informational resources are slowly being organized and condensed into definitive references in the seed technology area. This task has not been and is not easy as there are no references and no established patterns in the various technical subject areas as there are, for example, in marketing, irrigation, land reclamation, etc.

While services under AID/ta-C-1219 are predominantly of a technical, organizational and program development nature, we try as best we can under the limits imposed by the terms of reference under Mission requests and the political realities in the cooperating countries, to assist with managerial problems, and promote better management in all components of a seed program-industry. Our economic oriented work at MSU is directed toward development of better base data on the management dimension.

Adaptive research activities were continued. In many ways, the phrase "adaptive research" does not properly define the type of work carried on. Perhaps, "development of essential technology" would be a more descriptive appelation, for basically, we are concerned in this area with the development of certain technology that does not exist but which is crucial for resolution of technical problems in the seed sub sector in the LDC's, especially those with humid, tropical or sub-tropical climates.

In retrospect, one can easily discern a gradual evolution in the type and scope of our activities beginning with AID-W-607 in 1958. At first, activities and services were mainly confined to assistance in seed processing and seed testing including training in these areas. Gradually, beginning in about 1962 but accelerating after 1967-68, facility development came in focus. Then, beginning in 1971 and continuing to the present, seed program development *in toto* based in part on economic considerations

has been emphasized. Presently, therefore, technical assistance activities involve all the major aspects of agri-business viz., technology-investment-management-training-marketing. It seems to us that these aspects must continue to be taken into account in rationalizing past, present, and future committments to seed program-industry development in the LDC's by both AID and MSU.

I. SERVICES PERFORMED AT REQUEST OF MISSIONS AND AID/W

A. Statistical Summary

Period: 30 June, 1975 - 31 March, 1976

	Professional Man Days[1/] With Missions	Professional Man Days[1/] Home Station
Services performed at request of AID Missions and AID/W normally involving overseas field trips; inc. trip preparation, formulating and writing of reports; follow-thru and after-actions from home station.	302	240
TOTAL		
A. Latin America		
1. Bolivia (Dougherty, Delouche)[2/]	21	23
2. Costa Rica (Boyd, Delouche, Welch)	6	13
3. Dominican Republic (Delouche, Couvillion, Potts)	14	11
4. Ecuador (Andrews, Bunch, Potts, Delouche, Vaughan)	63	28
5. El Salvador (Delouche, Welch, Dougherty, Vaughan)	26	21
6. Guatemala (Andrews, Delouche, Potts)	3	5
7. Honduras (Andrews, Boyd, Vaughan, Delouche, Potts.	27	21
8. Panama (Boyd, Delouche, Couvillion)	20	12

1/ Man days reported includes only professional staff time spent on designated activities unless otherwise specified. It does not include: (a) administrative time spent coordinating contract activities with AID/W and University Administration and preparing administrative and fiscal reports; (b) annual leave taken by contract staff; (c) sick leave taken by staff; and (d) official holidays as designated by the University. Twenty (20) man-days of work equal one (1) man-month.

2/ Staff members undertaking overseas travel portions of assignments are underlined. Other staff listed assisted in formulation and preparation of report and with after-actions.

9. CIAT (Bunch, Delouche)	3	3
10. Central America and Caribbean (Boyd, Delouche, Vaughan))	2	15
Subtotals	185	152
B. Africa		
11. Ghana (Vaughan, Dougherty, Welch, Couvillion) (Consultive visit was from June 17-July 21, 1975, straddling two contract periods; only portion from June 30, 1975 reported here)	42	18
12. Ivory Coast (Dougherty, Potts) (Follow-up to previous consultation).	-	4
13. Niger (Potts) (Follow-up to previous consultation)	-	2
14. Nigeria (Boyd, Welch, Delouche) (Consultive visit from 9 June-1 July, 1975, straddling two contract periods; only portion from June 30 reported here).	2	13
15. Upper Volta (Dougherty, Delouche, Welch)	30	16
Subtotals	74	53
C. Near East and South Asia		
None		
D. East Asia		
16. Thailand (Dougherty, Welch, Potts, Delouche) (Also includes follow-up and after-actions to April-June, 1975 consultation)	32	26
E. World Wide		
17. FAO-Rome (Delouche represented AID at 2nd Expert Consultation on Seed Prgram Development; paper presented).	7	9
18. U.S. (Washington, D.C.) AID/Request (Bunch, Delouche)	4	

B. Nature of Work

The background, situation and nature of activities given above are summarized below by country, except for cases where work was continued from previous period, thus, was summarized in previous report.

A. LATIN AMERICA

1. BOLIVIA

TDY Period: 24 January - 13 February, 1976

1. USAID/Bolivia requested services of a consultant to assist the Department de Semillas (GOB) with installation of seed processing equipment and in planning of expansion of seed program facilities.

2. The Government of Bolivia and the United States have signed an agricultural project loan agreement. Project goal is to increase production of basic food crops. To meet project goals the Departmento de Semillas must double the volume of seed currently handled.

3. Observations and Recommendations:

a. Seed produced under the supervision of seed personnel is processed and stored at Departmento de Semillas seed facilities. Facilities for cleaning and storage are located in Chuquisaca, Tarija, Potosi, Cochabamba and Santa Cruz. With the exception of Santa Cruz, all are considered permanent installations. Operations at Santa Cruz are presently housed in temporary quarters. The official seed testing laboratory is located at the Cochabamba seed facility.

b. Doubling seed production will require expansion of seed handling operations at most seed facilities and relocation of the Santa Cruz facility into permanent quarters. Cost of equipment and construction required for the period 1976-1980 is estimated at $221,900. Equipment recommended for purchase is estimated at $123,300; building construction costs are estimated at $98,560.

c. Seed facilities at Chuquisaca, Tarija and Potosi are alike. Wheat is the principal crop seed handled. Each has a 270 MT capacity seed storage warehouse and a processing plant building. Processing equipment consists of a 1.0 MT per hour capacity basic seed cleaner. All three facilities require additional equipment. Equipment and supplies recommended for purchase are estimated to cost $41,370.

d. The Cochabamba seed facility consists of a seed testing laboratory, a 450 MT capacity seed storage warehouse and a well equipped seed processing plant. Seed of all crop kinds presently produced by the seed program can be processed. This facility should be in full operation for the first time during the 1976 seed processing season.

e. A new seed facility is recommended for construction in the Santa Cruz area. Quarters presently being utilized are not adequate to house seed operations needed in this region of Bolivia. Santa Cruz is situated in the principal rice and soybean production area.

Construction and equipment costs of the facility recommended for establishment in Santa Cruz are estimated as follows:

(1)	Site preparation and utility hookup	$ 60,000
(2)	Building construction	$111,000
(3)	Drying equipment and installation	$ 59,600
(4)	Processing equipment and installation	$100,290
(5)	Storage equipment and installation	$ 14,420
(6)	Testing laboratory equipment	$ 3,710
	Total	$349,020
	10% Contingency	34,900
	Grand Total	$383,920

f. Funds presently available will not permit establishment of this facility in its entirety. Construction and equipment recommended for immediate consideration is estimated to cost approximately $177,000. It is believed this level of funding is available. Equipment specifications were given.

4. Report TA 76-2 was prepared and submitted.

2. COSTA RICA

TDY Period: July 20-25, 1975

1. Consultation was requested in continuation of assistance provided USAID/Costa Rica and the GOCR in implementation of seed program component of an AID sector loan.

2. Primary purpose of visit was to assist architect in modifying specifications of Barranca facility to include a "scalping" or "pre-cleaning" component. Drawings and specs were prepared.

3. Conferences were also held with USAID/Comptroller and the CNP management in an attempt to resolve tender problem.

4. Backstopping assistance was provided from MSU campus before TDY and will be continued after TDY.

5. Report (TA 75-10) was prepared and submitted.

3. DOMINICAN REPUBLIC

TDY Period: 29 February-13 March, 1976

1. Services available under AID-ta-C-1219 were requested to assist the GODR and USAID/DR with preparation of an improved seed and plant materials component for proposed Agricultural Loan II.

2. It was determined that improvements in seed production and supply were needed to support development of agriculure in the D.R., especially small farmer agriculture.

3. A sub-project was developed for a three-year time frame to bring the quality and quantity of seed produced up to level needed to adequately support agricultural development. The project concentrates on improvements in existing operations, and emphasizes rice, bean and maize seed, and yuca and plantain propagules.

4. The need for improved seed of rice, maize and beans by the end of the project was projected as follows:

Rice	2880 MT
Beans.....	1069 MT
Maize.....	270 MT

These projections were based on seed replacement factors of 50% for rice and maize and 33% for beans.

5. In view of existing private operations in seed production and supply and projected expansion, it was recommended that the public sector (government) plan to produce and market about 50% of projected seed needs of rice and maize and 75% for beans. The other 50% of rice and maize seed and 25% of bean seed can be produced by the private sector.

6. The essentiality of cooperation and coordination of the seed production units with government agencies involved in agricultural improvement programs was stressed.

7. It was further recommended that:

a. Reasonable, workable regulations be formulated and adopted to implement the 1971 Seed Law.

b. Training at several levels - including on-the-job training - be programmed so that trained personnel for expanded program would be available as needed.

c. Technical assistance be used to help in developing designs for improvement of facilities and with training program.

d. Rational price policies be adopted for maize and bean seed as is already in place for rice seed.

e. Re-organization of seed program be undertaken along the lines recommended to increase its responsiveness and efficiency, and to separate the seed inspection/control function from production.

8. The total financing needed for the sub-project was estimated at RD$ 2,890,543 for the three year period. Revenues from project operations over the same period are projected at RD$3,282,089.

9. Report No. TA 76-03 was prepared and submitted.

4. ECUADOR

USAID/Ecuador requested periodic assistance on certain aspects of seed program development in Ecuador. Three TDY consultations were completed. They are considered separately below.

TDY Period: 9-19 August, 1975

1. Assistance was requested:

   a. To provide technical assistance to the GOE in evaluating plans and specifications of a 500 ton seed processing and storage facility and making appropriate recommendation to the Project Director of Loan 518-L-033.

   b. These plans and specifications are currently being developed by a local engineering firm. Once approved for financing the Ministry of Agriculture intends to construct these facilities in the Guayas Basin near Guayaquil.

   c. Soybean is the primary commodity, but peanut and sesame will represent about 20% of total processing and storage requirements. Mission and GOE concern is that design presented and eventually approved upon will be adequate to prevent deterioration of seed before planting periods, that the facility is appropriate to the environmental conditions and that the GOE has the capacity and capability to maintain and manage it.

2. In addition to the specific terms of reference, the consultant took the opportunity to learn something about the current situation in the country in reference to the present seed program and future development plans.

3. Current Situation:

   a. The principle organizations concerned with seed production and distribution are the Instituto Nacional de Investigaciones (INIAP), which is the national governmental research organization; the Departmento de Certificaciones de Semillas, the seed certification department of the Ministry of Agriculture; and various other crop programs of the Ministry. Only a small amount of seed is produced in the private sector, other than farmers saving their own seed for planting.

   b. Through its several experiment stations, INIAP has developed several new varieties of most of the important crops. Further, it produces Foundation and Registered seed for some of the government commercial seed programs and in some instances sells directly to farmers. In addition to its work in crop varietal development and basic seed production, INIAP is engaged in an extensive research program in crops, livestock, and agricultural economics, and conducts a number of training courses at various levels of instruction and practical training.

c. The responsibility of quality control in an official manner lies with the Seed Certification Department of the Ministry which consists principally of field inspection and laboratory seed testing. One testing laboratory is in Quito and the other in Guayquil. Both laboratories are well-equipped but lack well-trained personnel. The Certification Department is also responsible for the preparation and administration of a seed law. A draft of a proposed law has been prepared but additional study and work need to be given to its preparation before requesting enactment.

d. In 1974 a seed company, Empressa Mixta de Semillas, was formed to produce and distribute certified seed. This is a mixed company-public and private shareholders - with national government agencies owning over 99.5% of the shares. Through use of contact growers, Empressa Mixta produced and distributed last year 3,000 tons of Certified seed of wheat, barley, hard (flint) corn, rice, and oats.

e. For the past several months key members of appropriate government agencies and organizations and a team representing the FAO and the World Bank have been developing a national seed plan, which, if approved by all involved entities, should contribute significantly toward the development of a seed industry, primarily in the public sector. The project would provide funding and technical assistance in seed research and varietal developmental, basic seed multiplication, certified seed production, seed processing and storage, seed promotion and distribution, and overall quality control and regulation. Training of personnel, both within the country and outside, would be included in the program.

f. The administration of the project would be done by a National Seed Board, but work would be performed through existing organizations viz. INIAP, Empressa Mixta de Semillas, contract growers, Seed Certification Department, and the Banco National de Fomento. Processing and storage facilities would be provided to maintain an annual production program in Certified Seed at about the level of 12,000 metric tons. Production targets in relation to national seed needs are rice and soybeans, 50%; wheat and hard corn, 40%; barley, soft (flour) corn, peanuts, and sesame, 25%; and beans, 15%.

4. Evaluation of plans for drying, processing and storage facilities.

a. The plans which were to have been evaluated were to have been developed by the engineering firm CIBO PRO AGRO, but since the Ecuadoran Ministry of Agriculture had not yet given the company a contract for preparing the plans, there were none to evaluate. The writer spent an hour or so with Mr. Jack Dee Traywick, of CIBO PRO AGRO examining a general floor plan and discussing with him the characteristics of the proposed facility. The observation which follow are a result of this meeting with Mr. Traywick.

b. The drying system is to consist of a continuous dryer (probably an Alvan Blanch) for receiving the beans directly from the field and drying down to 12 to 14% moisture after which the beans would be conveyed to one of three steel bins equipped with perforated false floors and fan and heater (oil-fired) in which the beans would be dried to approximately 8% moisture after which they would be processed (cleaned, treated and bagged) and transported to the bagged-storage warehouse.

c. The planned equipment for the processing plant include an air-screen cleaner (Clipper 69-D or Crippen NW-354) a seed treater (Gustafson), automatic bagger-weigher, elevators, and a small quality control laboratory.

d. The seed storage warehouse is to cover approximately 650 square meters. One-fourth of the space is insulated and provided with a vapor barrier to be refrigerated and dehumidified (about 40°F and 50% RH) and will be used to store imported stocks of cotton seed, sesame, perhaps small amounts of soybeans and other material which may be stored a year or more. The building will be constructed of concrete. The final decision on the type storage for the non-refrigerated has not been made. The seed will either be (1) dried to 8% moisture and placed in 6 mil polyethlene bags (inside of jute bags) and the storage area ventilated or (2) dried to 10% moisture and placed in mesh bags for storage. In the latter instance, the storage room would have a vapor barrier, and 2" of styrafoam (or equivalent) insulation applied to the walls and ceiling. The storage space would then be controlled at 45-50% relative humidity with either a desicant or a condensor-type dehumidifier and at 20°C with an air conditioning system. The writer tends to favor the second method, although either is a satisfactory way to control seed moisture and thereby maintaining seed viability until the following planting season.

e. Factors which the engineering firm appear to have considered and satisfactorily resolved.

(1) Provisions made for receiving seed either in bag or in bulk.

(2) Recognition of the danger in mechanically damaging soybean seed during handling.

(3) Recognition of the importance of a natural flow of the product from drying to processing to storage.

(4) Provision of covered areas for unloading seed at receiving station, and transport from processing to storage warehouse.

(5) Recognition of seed storage environment and its effect upon the vigor and viability of the seed.

f. Suggestions which the engineering firm may wish to consider in preparing final design.

(1) The use of a single screen scalper at the receiving pit.

(2) Placing the processing plant in the same building as the warehouse storage.

(3) The use of a forklift in stacking and unstacking bags in the warehouse.

(4) In constructing the warehouse, an attempt to use clear-span construction or at least use a minimum number of support columns (consistent with safe construction), to allow efficient stacking bags from floor to near ceiling with wide aisles for easy movement of seed in and out of the warehouse.

(5) Consideration of the use of an increased numbers of bins in the drying system instead of the two-stage system as planned. More bins would permit complete drying of the seed in shallow layers in several bins. When the seed has reached the final desired moisture content, some of the bins can be completely filled with the dried seed for storage until processing.

5. It is recommended that a staff member(s) of Mississippi State University Seed Technology Laboratory will again be asked to evaluate the preliminary engineering drawings upon their completion.

6. Memo covering consultation (TA-75 Misc-3) was prepared and submitted.

TDY Period: 21 October - 5 November, 1975

1. The USAID/E requested and the Project moniter approved an approximately three week assignment for one seed technology program development specialist from Contract AID/ta-C-1219. The terms of reference, developed fully after the consultant's arrival in Ecuador were to make a general review of Ecuador's existing seed program; to study and make recommendations concerning the technical training needs of Ecuadorian personnel working with seed, and evaluate the proposed plans for a seed processing facility to be constructed by the PDDA which will be partially funded by USAID loan 518-L-033.

2. The general infrastructure for the development of a comprehensive seed program to serve Ecuador's agricultural sector is well established. On the other hand, the lack of a definitive national policy concerning seed and several other interdependent agricultural sector activities i.e., price support, small farmer credit, extension activities and programs, etc. are major impediments to a coordinated national seed program.

3. The INIAP is responsible for varietal development and testing and has released several improved varieties of Ecuador's basic crops; maize, beans, potatoes, rice, wheat and miscellaneous crops. The INIAP is also responsible for a major portion of the in-country technical training for Ecuador's agricultural technicians and farmers.

4. Three separate semi-autonomous Programs under the MAG are involved in seed production-distribution activities. The rice and corn program; the

cotton program; and the Diversification program which handles seed of soybeans, peanuts, sesame and castorbean. Technically, these programs have been plagued by inconsistencies primarily related to a lack of technically trained personnel and facilities specialized for seed.

5. Seed certification and regulation is the responsibility of the Department of Seed Certification, MAG. This program has been influential in shaping the existing infrastructure, but presently is suffering most from the lack of a definitive seed policy and official authority to implement its designated responsibilities. The DSC also lacks sufficient trained personnel but has definite plans to resolve this deficiency.

6. The EM Semillas, a mixed private-public sector seed company, was initiated in 1973 and has thus far made a major contribution toward establishing an effective production-marketing system for the basic crops produced in Ecuador's highlands. The general trend for the MAG programs involved in seed activities has been to shift these responsibilities to EM Semillas. This trend is viewed as favorable. The major impediment to an expansion of the EM semillas operation is the lack of facilities.

7. The specific recommendations in the report are given below. Additionally, technical information concerning seed legislation is included and other information has been sent to various technicians listed in the report.

8. It was recommended that:

a. The Ministry of Agriculture and Ganaderia develop and encourage issue of the appropriate decree setting forth a National Seed Policy for Ecuador.

b. The MAG, INIAP, EM semillas and USAID/E organize and sponsor two, short term, in-country training programs in seed production and technology to be presented during the first six months of 1976.

c. The MAG give active support to out-of-country training opportunities presented to employees of the Ministry which support development of Ecuador's seed program.

d. The GOE undertake responsibility for and implementation of the Seed Production and Distribution Project proposed by the FAO/World Bank Mission.

e. The MAG not attempt to develop seed marketing regulatory legislation until after a National Seed Policy has been decreed and at least two of the DSC technicians have successfully completed their post-graduate studies in seed technology.

f. The USAID/E request the short term services of a seed processing engineer from the AID/ta-C-1219 contract to assist the USAID/E Engineering Officer in the final evaluation of the plans and specifications of the PDDA seed processing facility.

g. The seed drying-processing-storage facility to be constructed by the PDDA be located near Portoviejo.

h. The Executive Director of the PDDA select and make arrangements for post-graduate training of two Ing. Agronomos in seed technology at one of the locations indicated.

9. Report TA 75-18 was prepared and submitted.

TDY Period: 7-24 January, 1976

1. The USAID/E requested and the Project Manager approved the services of two senior seed technologists from MSU's Seed Technology Laboratory to prepare and present a training course on seed production and technology in cooperation with the cognizant Ecuadorian organizations. Drs. C. Hunter Andrews and Howard C. Potts were nominated by MSU. The consultants departed their home station on January 7 and returned January 24.

2. The course was presented to 30 Ecuadorian technicians who had been selected from eight organizations and/or programs. Twenty-seven of the participants were certified as having passed the course requirements. Eighteen of the participants are currently working in seed production, processing or marketing and they should be able to apply the information learned immediately.

3. In addition to teaching the training course the consultants assisted the RDO by examining and approving the available preliminary engineering drawings of the proposed seed drying-processing-storage facility to be constructed with funds from USAID loan 518-L-033 by the PDDA (Diversification Program). Several suggestions for employee training and consultant assistance were given to the Executive Director of the PDDA.

The specific recommendations are as follows:

4. That a second course, similar in content to the one completed, be presented to the Ecuadorian technicians who work in the highland region, May 10-21, 1976.

5. That every effort be made to secure the services are recommended.

6. That the person or persons soliciting participants for the second course place a greater emphasis upon the course objectives and content.

7. That the Directors of the various institutions and programs which sponsored participants to this course make every effort to place those certified graduates in positions which will permit them to utilize their training.

8. That the Sub-secretary/MAG, Director of the Agriculture Development Division/MAG and the Director of INIAP assert their leadership toward unifying the seed activities of the various Production Programs, thereby,

eliminating many current duplicative activities and concentrating the personnel trained in seed technology into more effective operational groups.

9. That the INIAP, DCS/MAG coordinators, USAID/E-RDO and MSU consultants be responsible for providing the supplies and equipment indicated for the recommended second course.

10. Report No. TA 76-1 was prepared and submitted.

Related Reports: TA 75-18

5. EL SALVADOR

TDY Period: 20 July-1 August, 1975

1. The GOES (CENTA) requested services of two Mississippi State University seed specialists through USAID/El Salvador.

2. Seed facility plans under development were based on MSU/STL plans presented 1968-1970, but not implemented until recently.

3. Due to expanded seed program and more favorable funding the original plans needed to be revised and expanded as per recommendations.

4. Observations and Recommendations:

a. The conditioned storerooms were well designed. Several suggestions were made to architects regarding installation of insulation.

In our view the capacity of the conditioned storerooms is somewhat greater than needed. Since drying capacity is not as flexible as desirable, we propose modification of portion (about 1/3) of one of the conditioned storerooms into a sack dryer. This dryer would provide great flexibility for drying small lots of breeder and foundation seed with minimal risk of varietal mixture.

RECOMMENDATION 1. Approximately one-third of one conditioned storeroom should be modified into sack-dryer. (Drawings provided).

Modification proposed will involve only deletion of walls on dryer portion and construction of plenum and drying ports. It will not affect the basic architectural design of storeroom, or its location.

b. The drying-shelling as originally designed and slightly modified by CENTA architects is generally adequate, but not well arranged *vis a vis* the processing plant and facility site. Sufficient room was not provided for loading and unloading, and the maize sheller was positioned between the drying system and processing plant which will clog vital service area with cobs and other refuse. Also, the handling system for loading and unloading the drying bins was not adequate for the quantities of seed projected.

We propose rearrangement of the drying system and processing plant on the site, reversal of the maize shelling unit, and a better loading, unloading and conveying system.

RECOMMENDATION 2. Rearrange drying system on site *vis a vis* the processing plant, reposition maize sheller unit, and substitute more modern, flexible loading, unloading and conveying system. (Drawings provided).

c. The processing plant as presently designed is generally adequate. However, we propose some rearrangement of equipment, and addition of an adequate, modern, receiving area. This receiving area should be equipped with a vibro-dump pit, high capacity scalper, and necessary elevators. It should also be enclosed with roof and side wall to provide for all-weather operation. The dimensions of the processing room are unchanged. We also propose the incorporation of a small quality control laboratory in the unconditioned storage unit adjacent to the processing room, in addition to offices already provided for.

RECOMMENDATION 3. A modern, adequate receiving area (enclosed for all-weather operation) should be provided for between drying system and processing room. Receiving area should be equipped with vibro-dump pit, high capacity scalper, and necessary elevators. Small quality control laboratory should be provided for in storage unit connected to processing room. (Drawings provided).

d. The recommendations above as well as the plans already implemented require the procurement of necessary equipment. The equipment recommended for the facilities was specified and costed (estimated).

RECOMMENDATION 4. The equipment specified should be procured for the new seed facilities in El Salvador.

In addition to equipment specified and design modifications suggested, CENTA will also want to procure various miscellaneous items, as needed, such as seed moisture tester, small balance and gram scale, weight per hectoliter (or pounds per bushel) tester, magnifying glasses on stand, dockage sieve set, seed sample pans, etc. for use in quality control section of the seed operation.

5. In view of the extensive changes proposed in layout and design of seed drying, shelling and processing plant portions of facility and extensive list of equipment, we believe that follow-up consultation is needed to explain over-all concept and clarify details. This consultation can be made under terms of Contract AID/ta-C-1219 (Seed Program Development) between AID/W/TAB and Mississippi State University. About 2-3 days discussions with CENTA officials and architects should be sufficient. Dr. G. Burns Welch of our staff made most of design changes and is logical person to undertake follow-up consultation visit to El Salvador.

6. Report TA 75-09 was prepared and submitted.

TDY Period: 3-7 November, 1975

1. Consultation was requested under the MSU-AID/ta-C-1219 contract in follow-up on previous consultation.

2. Main purpose of consultation was to clarify certain details of revised and expanded designs and in equipment specifications.

3. Discussions with the CENTA architect, engineers and seed specialists resulted in clarification of the design details and equipment specifications.

4. Brief report (TA 75-Misc. 4) was prepared covering consultation.

6. GUATEMALA

TDY Period: 3-6 November, 1975

1. Since an MSU consultant was terminating a 2-week assignment in Honduras, an en-route stop-over in Guatemala was requested by USAID/Guatemala for the purpose of briefly reviewing the seed program (cable from Guatemala, 5704, received in AID/W, 17 October, 1975). The consultant arrived in Guatemala City on November 3, and departed on November 6.

2. The Instituo de Ciencia y Technologia Agricolas (ICTA) desires to contribute to the development of the seed industry in Guatemala. Although their program is not well developed at this time, they wish to collaborate with DIGESA, the production agency for the Ministry of Agriculture in establishing a seed program.

3. At present (ICTA) is producing small quantities of basic seed and commercial lots of some of the better varieties. These seed are subsequently used in ICTA and DIGESA programs and sold to private farmers in some instances.

4. Upon arrival in Guatemala, a general meeting with personnel from ICTA, DIGESA and Rockefeller briefly outlined the projected role of each in seed program development. Thereafter, a 2-day field trip to strategic locations provided information on production and processing facilities. A final summary enabled this consultant to gain a better understanding as to the type of assistance desired from the MSU/AID contract personnel.

5. The proposed program as viewed by this consultant during the brief visit to Guatemala is generally as follows:

a. ICTA will be the research agency for varietal improvement and development. In addition to producing basic seeds of their improved varieties, they intend to produce commercially, seeds of some of the better varieties for distribution to private consumers.

To implement this program, ICTA plans to build at least one seed processing facility (drying, processing and storage) near Guatemala City. The proposed site was visited with Mr. Roland Harwood, and a diagram of the area and existing buildings was obtained for initial study and analysis. The major question raised was whether the MSU Staff could provide assistance in designing this facility and providing equipment specifications.

b. A cooperative project between ICTA and BID has already been written and approved in February, 1975 for the purpose of developing a seed production program. This project specifies equipment for production of seed as well as equipment and construction proposals for a seed processing plant. A detailed analysis of this project is available in the approved document which was made available for the MSU staff.

c. The DIGESA program will assume production responsibilities on a country-wide scale. Existing seed facilities will be re-modeled and up-graded for this purpose. A few of these existing facilities were visited and further assistance will be desirable as this program developed.

6. Final discussions centered around the possibility of the MSU staff participating in the seed development program in Guatemala. It was explained that participation in such programs by the MSU staff is accomplished by requests through regular AID channels and approval by AID. Since this appears to be a GOG/ICTA - BID project, alternative administrative channels might have to be explored.

7. Contact with Mr. Carl Koone, USAID/Guatemala, indicated that a brief visit from the MSU staff could be supported by USAID/Guatemala; however, extended visits for assistance should be supported by the ICTA/BID project. The ICTA representatives were in total agreement with this approach.

8. Brief report (TA 75-Misc-2) was prepared and submitted.

7. HONDURAS

TDY Period: 25-27 July, 1975

1. Stop-over in Honduras was arranged in connection with consultative visit to Costa Rica. The stop-over visit had two purposes:

a. Main purpose of short visit was to confer with officials of the Escuela Agricola Panamericana, Zamorano (EAP) regarding cooperative seed training workshop scheduled for Oct-Nov, 1975, or Feb., 1976.

b. At request of USAID/Honduras and GOH, trip was made from Tegucigalpa to San Pedro Sula to review problem encountered in expanded seed operation.

2. During conference with EAP officials, it was decided to schedule Central American seed training course for February, 1976 (see more detailed report under Central America and Carribbean Area Seed Training Course, this report.

3. Following conferences with GOH officials, decision was made to request two TDY consultive visits by MSU seed specialists under term of the AID/ta-C-1219 contract. One consultation to be concerned with the immediate operational problems confronting the seed program, with the other focussed on completion of draft for a national seed law with regulations.

4. Brief report (TA 75-11) was prepared on consultation.

TDY Period: 22 September-3 October, 1975

1. USAID/Honduras requested the services of a consultant on seed legislation under terms of the AID/ta-C-1219 contract between AID/W and Mississippi State University to assist the Government of Honduras with the drafting of seed legislation.

2. Consultant arrived in Tegucigalpa on 22 September, 1975. After an initial briefing by USAID, a preliminary draft of seed legislation prepared by personnel of the Ministry of Natural Resources was made available for study.

3. On September 23 a working committee was organized and began consideration of the various components of the draft of the seed law. Various parts of the proposed law were under consideration for approximately one week. Agreement was reached and a final draft prepared on October 2.

4. The following recommendations were made:

a. Establish a Central Seed Testing Laboratory for Honduras. As soon as seed legislation is finalized and passed, evaluation of seed quality to determine compliance with the law will be necessary. Although there are small seed laboratories in connection with the seed centers

in Tegucigalpa and San Pedro Sula, these laboratories should function as internal laboratories and used mainly to control quality of seed handled by the centers.

b. As soon as the law becomes effective, specifications for seed testing, sampling and other related equipment that will be needed to fully implement the seed legislation should be prepared and purchases made. The present consultant and other staff of the Seed Technology Laboratory of Mississippi State University are willing to asist in selection of suitable equipment needed for seed testing, seed sampling, and other activities, and preparation of equipment specifications as soon as the loan becomes final and a determination is made as to the level of funds that will be allocated for implementation of the Seed Certification Department.

c. Priority for technical equipment should be given to the Central Seed Testing Laboratory. Equipment that is already available in Honduras and other equipment that might be purchased with funds available in excess of the real needs of the Central Seed Testing Laboratory should be collected and used to further strengthen the laboratories of the seed centers.

d. One of the best controls available to the seed certification service is control of the distinctive certification tags or labels. Thus, the seed certification service should be prepared to issue distinctive labels in the number needed to label each container of each seed lot certified.

e. Successful implementation of the provisions of the seed legislation will depend in large measure on the training and competence of the inspectors and analysts responsible for its implementation. Training, therefore, should receive high priority in the overall development of the Seed Certification Department.

f. Implementation of the seed marketing control regulations of seed declared as regulated will probably be the most difficult. Our advice on control of seed marketing is to proceed slowly, to take one step at a time, but to take that step firmly if it is in the best interests of overall agricultural development in Honduras. Seed marketing should be restricted to those kinds of seeds whose control is in the best interests of agriculture in Honduras. At present marketing controls might be justified for rice, corn, beans and sorghum.

g. Good, dependable transportation should be provided to both the seed certification and seed control inspectors. They cannot be expected to do their transportation.

h. Initially, the support of the Department of Seed Certification will have to be provided from funds deriving from the loan and direct appropriations. As the program advances, however, fees for certification inspections and certified seed tags, and charges for seed testing should be assessed to generate a sizeable portion of support funds needed.

i. After the program is established for 1 year, the services of a seed control and certification consultant should be obtained for a review of the organization and operations. Thirty days consultation services should be sufficient.

5, Report TA 75-17 was prepared and submitted.

TDY Period: 21 October - 3 November, 1975

1. The loan agreement of 1974 between AID/GOH included a section on seed program development for the purpose of increasing agricultural production through the production and utilization of improved seed. In implementing the "step-wise" phases of this agreement, the GOH requested technical assistance from MSU through the USAID/Honduras.

2. The assistance provided during this consultation period consisted of thoroughly reviewing the operational aspects of the Seed Processing Centers in Tegucigalpa and San Pedro Sula. The period of consultation was quite timely in that both seed centers were actively receiving and processing seed. In addition to confirming the need for supplemental equipment listed for purchase in MSU Report TA 75-04, recommendations for production and operation are made.

3. Recommendations:

Tegucigalpa

a. Schedule the production of bean seed during the dry season to eliminate the necessity of hand-picking the weathered seed from wet-season crops.

b. Reduce the number of bean seed contract producers by securing larger production from the more efficient producers.

c. Coordinate and consolidate bean seed production to reduce the excessive small "bag-lot" contracts.

d. Modify record-keeping so that "clean-out" (grain and inert matter) components can be tabulated by variety rather than by separate lots.

e. Eliminate the aspirators from the processing line when cleaning beans. Germination and quality tests should be performed to evaluate the "hand-picked" component.

f. Improve logistical support by providing adequate sacks on a timely schedule and by maintaining vehicles for rapid transport of seed.

g. Continue the "Revolving Fund" with the BNF for timely payment for contract seed and for purchase of supplies and repairs.

h. Extend operational time, probably to a 24 hour schedule, during time of peak seed production.

i. Remove the air and screen machine (NW 342) from the processing plant to allow more flexibility of movement. NOTE: This machine could be sent to San Pedro Sula to facilitate rice processing.

j. Emphasize strict cleanliness with exterior of jute sacks where rice seed adheres to exterior surface. This will minimize varietal contamination.

k. Additional equipment must be acquired immediately. Rapid approval and procurement of all equipment recommended in MSU report, TA 75-4 (March, 1975) is urgent.

l. Continue to stress repair and maintenance of all equipment as necessary.

m. Remove the mass of empty potato boxes from the drying shed in order to provide adequate storage space for incoming seed.

San Pedro Sula

n. Repair and maintain on-site equipment, especially air conditioners and dehumidifiers, until replacements are secured.

o. Replace the thermostat on the heater-fan unit for the corn drier. If this fails to remedy the problem, further repair from the local maintenance shop will be necessary.

p. Install the dust-house for the air and screen machine according to personal instructions with the staff.

q. Budget funds for necessary repair of the genetic-stock cold room, even if supplemental air conditioners and dehumidifiers are necessary.

r. Replace the corn sheller according to detailed specifications given.

s. Re-design the cob collecting system by elevating a dust collecting system so that trucks can pass beneath to collect the cobs.

t. Logistical support from the top administration must be improved to provide adequate vehicle repair and expendable supplies such as sacks and minor equipment repair parts.

u. Additional equipment recommended in MSU report TA 75-04 must be approved and ordered immediately.

4. Both Seed Centers are showing marked improvement in operational efficiency. However, as a result of increased samples on seed production within the last year, modifications in existing facilities and acquisitions of additional equipment will be necessary in order to maintain and support the desired development and implementation of all phases of the Seed Progr .

5. Report No. TA 75-19 was prepared and submitted.

8. PANAMA

TDY Period: 7-26 September, 1975

1. Under terms of the MSU-AID-ta-C-1219 contract, a consultant was requested by MIDA/Panama through USAID/Panama for consultation and on the job training of personnel for the seed program operated by the government of Panama.

2. Each of three existing facilities were reviewed with the respective managers and operating personnel.

3. Shortages of repair parts continue to present major problems in repair and maintenance.

4. The reader is referred to a similar report for 1974, No. TA 74-03 which is still applicable to the situation - especially concerning the need for a means of rapid response to repair needs.

5. Production of rice seed has increased more than five fold in three years; therefore, at least 5 times as much maintenance problems should be expected.

6. Items repairable by the plant personnel or by shops in Panama should be repaired immediately. This includes metal spouting, storage room doors, air conditioners, etc.

7. Specifications for drying bin unloading equipment for Alanje were prepared.

8. It is recommended that responsibility for production of foundation seed be given to the University of Panama, Department of Agronomy, with MIDA seed section continuing their commercial production.

9. Certified seed tags should not be issued for seeds not meeting Panama seed law standards. Good seeds that do not meet these standards could be sold under a label of "improved seeds" or some similar name.

10. It is recommended that some of the seed section staff takes advantage of the seed technology short course for Central America to be presented at Escuela Agricola Panamericana, Tegucigalpa Honduras, November 1-15, 1976.

11. At least two of the seed section staff should be given training to the MS level at MSU/STL or other facility which stresses the practical aspects of seed technology.

12. It is anticipated that assistance will be requested in development of plans and supporting data for a seed facility to serve the Panama-Bayano area.

13. Report No. TA 75-16 was prepared and submitted.

9. CIAT

TDY Period: 21-22 August, 1975

1. Dr. H. Dean Bunch spent the 21st and part of the 22nd of August at the CIAT Research Center in Cali, Colombia for the purpose of exploring possible areas in training, research, or service where the AID/Mississippi State University Seed Technology program might contribute to the program of CIAT, especially where the CIAT's program touches "seed" areas in which Mississippi State has international competence.

2. The discussion began with a general meeting of 12-15 staff members called together by Dr. Francis C. Byrnes, Director of Training and Conferences. At this meeting each person briefly described the particular research and/or training program for which he has responsibility, while Dr. Bunch described the AID/Mississippi State University Contract Program, including the services available to the lesser developed countries, as well as a summary of work which the Mississippi staff has done in Latin America in recent years.

3. The general conference was followed by visits with personnel in the rice, corn, bean, forage and training projects.

4. As a result of this short visit the following observations are offered for consideration. Dr. Bunch discussed these briefly with Dr. Byrnes.

a. The staff of CIAT appears willing to cooperate in any program which complements their research work.

b. Mississippi State Seed Technology staff members could contribute usefully in CIAT's active training program, especially in the crop production courses where training in seed production and related areas would be logical extensions of these production courses. In these countries, MSU staff could lead discussions of seed drying, storage, quality factors, foundation seed production and associated subjects in present training facilities. On the other hand, complete seed training courses would not be possible without access to an equipped seed testing laboratory and to more seed processing equipment than now available at CIAT. Until CIAT sets up a seed unit of some type (see C, below) on location, the organization perhaps could encourage and assist regional training courses now held on irregular schedules in the Escuela Agricola Pan Americano at Zamarano, Honduras; or in Ecuador, both with which the Mississippi State University has working relationship, or with appropriate organizations in Colombia.

Training courses concerned with seed industry development and the various areas of seed technology should be conducted on a regular schedule in order to enlarge the base of expertise in these areas. Research in varietal development cannot reach its full potential unless close attention is given to the multiplication and distribution of the seed stocks and the organization and technical

consideration required.

c. The Mississippi State University Seed Technology staff could be particularly useful in helping CIAT organize and develop a Foundation Seed Unit--developing the structure of the organization, designing the required installation, selecting and helping install equipment, and training personnel in the operation of the program and the facilities. Such a unit would include facilities and equipment for seed drying, processing (cleaning, sizing, treating, packaging) and storage. This would not be a commercial unit, but would be a management and facilities unit for handling all basic seed stocks produced on CIAT property prior to their release through normal distribution channels, consistent with policies of the several countries served. Such a unit, headed by a competent agronomist, could be of service not only to the seed distribution agencies but also to all of the plant breeders in CIAT. It would no longer be necessary for each breeder to increase his own varieties by whatever methods he can devise. With a small additional cost, such a unit would be designed and constructed to accommodate classes for training, enabling CIAT to become a seed technology training center, as well as a supplier of seed stocks of superior cultivars.

5. Further discussions should be held on the several points advanced above.

6. Report TA 75 Misc-4 was prepared and submitted.

10. CENTRAL AMERICA AND CARIBBEAN REGION

Seed Training Workshop

In late 1974 officials of the Escuela Agricola Panamericana, (EAP), Zamorano, Honduras expressed their interest in cooperating with MSU in the organization and execution of a seed training workshop for participants from the region. During the late 1960's, AID/ROCAP, MSU and EAP organized and held three seed training courses. These were held on the EAP campus utilizing EAP's facilities and they were very successful.

Following discussions with the contract manager in AID/TAB, tentative plans were made for a 4th Central American and Caribbean region seed workshop to be held at EAP in Oct-Nov., 1975. These tentative plans were discussed with USAID/ROCAP, USAID/Honduras and several other Missions in the region.

MSU prepared a budget and submitted to TAB for review and approval. A change in contract and contract provisions, however, obviated the need for supplemental funding for the training course. The new contract initiated June 30, 1975 for 3-yr. period provided travel and other funds that would be needed for a training course.

In any event, planning went forward rather vigorously after May-June, 1975. In the summer of 1975, EAP informed us that unanticipated programs would occupy all their dormitory space in Oct-Nov, 1975, and, thus, the course would have to be re-scheduled for the first two weeks in February of 1976. Planning was continued on this basis.

Both EAP and MSU contacted the USAID/Missions, other technical assistance programs, seed program workers, etc. throughout the region

advising them of the training course, its objectives and coverage, funds needed (registration and dormitory fees), and registration procedures. Somewhat later a course prospectus and enrollment forms were also distributed.

Two MSU specialists had been assigned as instructors and charged with responsibility for gathering together training materials and preparing additional materials needed. In late December of 1975, travel arrangements were made for the MSU instructors, and final preparations were completed.

In mid-January, EAP notified MSU that the training course would have to be postponed or cancelled because of lack of dormitory and classroom space. MSU and AID/TAB had no alternative but to accept EAP's decision.

Needless to say, these events were disheartening and unexpected. On all previous occasions, EAP had delivered on schedule with 100% effort and cooperation.

In response to a very direct inquiry from MSU as to the seriousness of its interest in hosting a training course for the region, EAP provided assurance of its interest and expressed regrets that circumstances did not permit it to hold its previous committment. New dates of Oct-Nov, 1976 were suggested for the course.

MSU informed the TAB project manager that it felt one of its staff should visit EAP for head-to-head discussions on the course and to expedite preparations and distribution of a prospectus and application forms. TAB has given approval, and visit will be made and plans finalized.

B. AFRICA

11. GHANA

TDY Period: 17 June - 21 July, 1975

1. USAID/Ghana requested the services of two consultants in continuation of periodic technical assistance provided the GOG since 1973 in seed program and facility development.

2. The Seed Technology Laboratory, MSU, had provided (Jan. 1975) the Ministry of Agriculture with building and equipment layout drawings for all seed facilities to be constructed. Copies of these drawings were subsequently submitted to the Department of Public Works and Housing by the Ministry for preparation of detailed construction blueprints. An architect was assigned to the project. To familiarize the architect with operations to be conducted in each type facility and desired building construction features, meetings were held with the architect both prior to, and following, visits to the site locations. Preparation of construction blueprints was started prior to the consultants departure. Drawings completed by departure time were reviewed and corrections made where necessary.

3. Tentative site locations were selected in the Winneba, Kumasi and Tamala areas for the construction of the Foundation and Certified Seed Facilities. Sites selected in Winneba, approximately 15 acres for the two facilities are in a region designated for industrial development. These sites are on the Winneba Road, off the Accra-Cape Coast Road. A parcel of land identified as "Tractor Block," within the confines of the Crops Research Institute at Kwadaso, was selected for the facilities to be constructed in the Kumasi area. This site is near the existing Seed Multiplication Farm. A site 5-8 acres in size on the Nyankpala Crops Research Station was selected for the installation to be constructed in the Tamale area.

4. In anticipation that the orders will be placed relatively soon, personnel of the Seed Multiplication Unit and the consultants analyzed the specifications for each item of equipment to be ordered. Exact wording of the specifications was determined for preparation of the indents (equipment orders). One of the major considerations was the determination of electrical requirements (Volts, HZ and Phase) for the various items of equipment.

5. Cost factor determinations were made relative to building construction, equipment and operational costs for each facility for the five year period 1975-76 to 1979-80.

6. It was agreed that additional assistance needed during the remainder of 1975 and early 1976 could be provided by the MSU staff from home station. An additional consultative visit, however, should be scheduled for mid-1976.

7. Report No. TA 75-08 covering consultation was prepared and submitted.

Previous Work:	Report TA	73-12,	Nov., 1973
	Report TA	74-15,	Sep., 1974
	Report TA	74-15a,	Dec., 1974

14. NIGERIA

TDY PERIOD: 9 June - 2 July, 1975

1. At the request of Joint Cereals Project 26, USAID/Lagos requested assistance in developing facilities for a foundation seed project at IAR/ABU.

2. Current facilities were recognized as totally inadequate to support the expanded food production effort and supply the new varieties now available through the research projects.

3. Specifications for equipment and buildings were prepared. The design drawings attached to the report are preliminary and should be used only for planning purposes. They are not construction drawings. All final construction should be specified by a local engineer who has knowledge of local construction capabilities, materials, soil bearing characteristics, etc.

4. Building recommendations are:

Building Area	Approximate Area (sq. ft.)
a. Processing	1440
b. Storage	2880
c. Office, Quality Control, Genetic Bank	750
d. Drying Shed	800

5. Processing equipment to process corn, millet, sorghum, or rice at an average capacity of at least 1 ton per hour was specified. This facility is not suitable for processing peanuts or cottonseed.

6. Equipment for a small seed testing and quality control laboratory were also specified. This laboratory can do service work to a limited extent but should not be considered for expansion into a regional service and regulatory facility.

7. Coordination with the Federal Ministry of Agriculture and UNDP seed improvement project is advised. It is strongly recommended that the UNDP project take advantage of the lead time gained by ABU/IAR and support this facility as a part of their production effort. The climate at Samaru also favors production and storage of cereal grains over Ibadan.

8. A vigorous sales and promotion effort for distributing seeds at a price which reflects production costs and true seed value is important. Maximum utilization of the private sector in sales and distribution is advised.

9. Provisions for further training at Mississippi State University Summer Seed Improvement Short Course should be made for Mr. B. A. Alimi, Training to occur summer of 1976. Mr. I. A. Usman should be considered for further training to the B.S. degree in Seed Technology.

10. Report TA 75-14 was prepared and submitted along with layout design and drawings for the facility and equipment specifications.

15. UPPER VOLTA

TDY Period: 21 September - 20 October, 1975

1. Assistance was requested by AID/W and the GOUV to follow-up recommendations of the U.S. Sahel mid-term planning committee (Apr. 1974) for an expanded seed production and supply program in Upper Volta.

2. A modest seed multiplication project has been undertaken by the U.S. in Upper Volta. U.S. assistance to the Government of Upper Volta in addition to organizing training programs, provides for minimum essential facilities and equipment for a Seed Testing Laboratory and equipment and storage facilities to four major seed multiplication stations and selected Regional Development Organizations responsible for seed multiplication activities.

3. Some of the equipment recommended for purchase, as a U.S. input into the project, has been supplied by other sources. Additional equipment items are being considered for contribution. To eliminate duplication of equipment, USAID/Upper Volta requested technical assistance to: re-evaluate existing equipment procurement lists; prepare specifications for equipment requiring purchase and to prepare layout drawings for structures requiring construction.

4. Specifications of equipment and supplies needed are included in the report. These items are estimated to cost $126,731 FOB, Suppliers. Should an equipment contribution by the Austrian Government be accepted by the Government of Upper Volta the cost of equipment to the U.S. project would be reduced to $89,731. Over-all savings to the U.S. project, including equipment and building construction, if the contribution is accepted is estimated at $77,800.

5. Building layout plans for structures requiring construction are included as part of the report. Construction costs are estimated at $279, 070 if the Austrian Government contribution is accepted.

6. It is recommended that USAID/Upper Volta encourage the Government of Upper Volta to accept the Austrian equipment contribution.

7. Details of recommendations and actions follow:

a. Seed Service Headquarters -- Establishment of a Seed Service Headquarters complex consisting of an office - Laboratory building (360 M^2) and a seed storage warehouse (160 M^2) was included as a U.S. project input.

(1) The office-laboratory building is provided to accomodate principal offices of the Seed Service i.e. Director; Chief, Technical Service; Chief, Quality Control; their supporting staff and a seed testing laboratory workroom. A recommended building layout was prepared. The structure is estimated to cost $56,270. Seed Testing Laboratory equipment and

supplies recommended for purchase are estimated to cost (FOB Supplier) $9,935.00

(2) The seed storage warehouse is provided to accomodate a central storage area for seed to be distributed to farmers and ORD's from Ouagadougou. A recommended building layout plan, based on a building design previously prepared by the Direction de L' Hydraulique de L' Amenagement et de L' Espace Rural was prepared. This structure, 168 M^2 in size is estimated to cost $16,800.

Equipment and supplies for use in the seed storage warehouse are recommended for purchase at a cost estimated at $11,531 (FOB Supplier).

b. Major Seed Multiplication Centers -- U.S. inputs in terms of building construction, equipment and supplies to support seed multiplication activities at four major seed centers, namely Kamboinese, Vallee du Kou, Niangoloko and Saria, are called for in the project paper. The facilities for each center are considered independently in the report. The centers are:

(1) Kamboinese -- A Ministry Directorate for Agricultural Services (DSA) Station at which seed of rice and maize will be produced and stored.

(2) Vallee du Kou -- A station controlled by the Bobo-Dioulasso ORD and assisted by CERCI, at which rice will be produced, processed and stored.

(3) Niangoloko -- An IRHO station at which peanuts will be the principal crop for the immediate future.

(4) Saria -- An IRAT station with responsibility to multiply, process and store seed of millet, maize and sorghum.

c. Austrian Government Offer -- Six seed installations, for the processing of sorghum and millet, are being offered to the GOUV. Items included in the offer (Heid) include threshers, seed cleaner, seed treater, bagging scales, bag closer, elevators, a generator and a 784 M^3 prefabricated steel building. Additionally, Heid will supervise erection of the building and installation of the equipment including training (30 days maximum) at one of the installations. It is recommended that the USAID/UV encourage the GOUV to accept the GOA offer.

d. Regional Development Organizations -- Within the scope of the project assistance is designated for ORD's in which R_2 and R_3 generation seed will be produced. ORD's selected for support are: Ouagadougou (Mogtedo), Bobo-Dioulasso, Banfora and Fada N'Gourma. Seed storage warehouses will be constructed at all four ORD's; equipment is to be purchased only for Mogtedo.

A seed storage warehouse building plan was prepared. Identical structures are recommended for all four locations. Each structure, 235 M^2 in size, is estimated to cost $23,500.

Some equipment items recommended in the project paper for purchase and installation at Mogtedo have been provided by other sources. Cost of supporting equipment and supplies still required is estimated at $8,150, FOB, Supplier.

8. Report No. TA 75-15 was prepared and submitted.

D. EAST ASIA

16. THAILAND

Continued assistance has been provided USOM/Thailand and the RTG since 1973 in the area of seed program development. This assistance cultimated during April-June, 1975 with the completion of a project paper for the Thailand Seed Project.

During the period July 1, 1975 until present, substantial assistance has continued to be provided to USOM/Thailand and the RTG on negotiation of the loan and pre-project implementation activities. With the exception of the TDY below, all of this assistance has been in the form of backstopping from the MSU campus.

TDY Period: 16 November-17 December, 1975

1. The assignment was arranged in conjunction with a U.S. AID/Royal Thailand Government (RTG) Seed Development Loan Project. Purpose of the project is to stimulate the use of improved seed on Thai farms with the expected result being an increase in the productivity and income of Thai farmers. Project objectives, in terms of the seed operation's component, is to provide certain inputs involved in the production, processing and marketing of 8,650 MT seed of improved varieties of Thailand's six basic crops by 1980.

2. Recommendations identifying inputs to be provided under the project were formulated by a project analysis team of Mississippi State University (MSU) seed specialists that visited Thailand in April-May, 1975 (Report TA 75-07).

3. In October, the RTG requested services of a seed specialist, under contract AID/CM/ta-C1219 between AID and Mississippi State University, to prepare designs and equipment specifications for the seed facilities recommended by the project analysis team. George M. Dougherty, Seed Technology Laboratory, MSU, was nominated for the assignment and authorized by TAB/AGR to provide the service requested.

4. Terms of reference were:

   a. Preparation of facility layout designs and equipment specifications for corn shelling, seed drying and seed storage facilities needed at Phitsanulok.

   b. Preparation of facility layout designs and equipment specifications for a seed facility to be established in Khon Kaen.

   c. To obtain information needed to design and provide equipment specifications for seed facilities to be constructed in Chieng Mai and Chai Nat.

5. Preliminary designs and equipment specification lists for the Phitsanulok and Khon Kaen Seed Centers were prepared and discussed in detail with representatives of the RTG prior to departure from Thailand.

a. Phitsanulok:

Located 500Km north of Bangkok, construction of this facility was started in 1972 by the RTG. Technical assistance and equipment was provided by USOM to increase the capacity and operational efficiency of the processing facility in 1973 and 1974. Under the current Seed Development Project additional storage warehousing and facilities needed to dry and shell ear corn are to be provided.

Layout plans and equipment specifications for a corn shelling and drying facility and two seed storage warehouses were prepared.

b. Khon Kaen:

Located 500Km northeast of Bangkok, Khon Kaen is the center of the 16 Northeast Province. The Khon Kaen Seed Center will be the first complete facility constructed under the Seed Development Project. It is anticipated this Seed Center will be operational by September, 1977.

Layout plans and equipment specifications were prepared for two flat-storage warehouses, a workshop and implement storage shed, an office-seed testing laboratory building, a processing plant, a bin-type drying and corn shelling facility and a sack (bag) type seed dryer.

c. Chieng Mai:

Located 780Kms. north of Bangkok and 400Kms. northwest of Phitsanulok. This Seed Center will be the second constructed under the project. Construction is not scheduled to start before early 1977.

Preparation of layout drawings and equipment specifications were not requested as an objective of the assignment. However, preliminary designs are being developed.

d. Chai Nat:

Located 200Kms. north of Bangkok near the eastern edge of the Central Plain. This will be the last facility built under the Seed Development Project. Construction is not scheduled to start until the end of 1977.

The Chai Nat and Khon Kaen facilities will be identical. Drawings and equipment specifications prepared for the Khon Kaen Seed Facility can be used at Chai Nat.

6. Report No. TA 75-20 was prepared and submitted.

E. WORLD-WIDE

17. FAO-ROME

TDY Period: 29 November - 16 December, 1975

1. James C. Delouche, MSU, Seed Technology Laboratory was invited to participate in the 2nd Expert Consultation on Seed Industry Development, held at FAO-Rome, 1-5 December, 1975. AID/W designated Delouche as the AID delegate to the meeting.

2. Paper on "Development of Technology for Storage of Seeds under Adverse Climatic Conditions" was prepared for the conference, and presented at the conference.

3. Delouche was elected Chairman of the 2nd Expert Consultation on Seed Industry Development and Chopra (India) was elected as Vice-Chairman.

4. The conference discussed:

- Progress of FAO's Seed Industry Development Program (SIDP)
- Seed exchange services at FAO
- National and regional seed industry development program
- Man-power needs for seed industries in the developing countries
- Technology needed to overcome seed storage problems
- Certification of synthetic and composite varieties
- Cooperation of international financial institutions with SIDP
- Cooperation of private seed industry with SIDP
- Financial and budgetary implications of SIDP

5. Conference report was adopted.

18. U.S. - WASHINGTON, D.C.

TDY Period: 20-22 January, 1976

1. Delouche and Bunch traveled to Washington for review of contract activities.

2. Review was well attended by TAB, Bureau and Contract Officer personnel.

II. RESPONSES TO TECHNICAL INQUIRES AND VISITS

A. Statistical Summary

		Professional Man Days All Home Station
Responses to inquires from the LDCs and international evelopment agencies; visits from officials and other personnel from the LDCs.		
TOTAL		97.5
1. Latin America	37	
a. Brazil	18	
Visits: programs prepared and presented for one person for 1 day, 14 persons for 5 days, 10 persons for 4 days, one person for 2 days (15 days).		
Ltrs: requests for info and guidance (3 days)		
b. Costa Rica	3	
Visit: one person for 3 days (3 days)		
c. Colombia	1	
Ltrs: requests for info; exchange of views (1 day)		
d. Dominican Republic	2	
Visit: one official for two days (2 days)		
e. Guatemala	4	
Visit: one RF staffer for 3 days (4 days)		
f. Guyana	1	
Ltrs & Cable: Info requested by consulting firm in country (1 day)		
g. Honduras	3	
Visit: one person (EAP) for 3 days (3 days)		

h. Mexico	1	
Ltrs. & Phone: Technical assistance requested and given on seed training (1 day)		
i. Peru	1	
Ltrs & Phone: info requested by USAID/ Peru and INTSOY staffer (1 day)		
j. Uruguay	3	
Visit: one person for 3 days (3 days)		
2. Africa		13.5
a. Algeria	1	
Visit: specialist with consulting firm involved in Algeria (1 day)		
b. Cameroon		
Ltr: Infor requested (1 day)	1	
c. Liberia	1	
Ltrs: Info and advice requested (1 day)		
d. Kenya	1	
Ltrs: Info and assistance requested by Kenya Seed Co. (1 day)		
e. Morocco	.5	
Ltr: Info requested (½ day)		
f. Nigeria	2	
Ltrs: Info and advice requested; exchange of ideas (2)		
g. Tanzania	2	
Visit: program prepared for trainee from U. of Minn. en route home (2 days)		
h. Tunisia	5	
Visit: Prepared and presented 2 day program for five visiting Tunisian officials and two CIMMYT staffers (5 days)		

3. Near East and South Asia		7
a. Bangladesh	1	
Ltrs: MOA inquired about arranging training (1 day)		
b. India	2	
Ltrs: Info requested; guidance sought (2 days)		
c. Nepal	2	
Visit: UNDP/FAO staffer visited for 2 days (2 days)		
d. Pakistan	1	
Ltrs: USAID/P requested info on soybean seed production and supply (1 day)		
e. Saudia Arabia	1	
Ltrs: Info requested by consulting firm (1 day)		
4. East Asia		16
a. Indonesia	1	
Ltrs: Info requested (1 day)		
b. Korea	5	
Ltrs: Experience, Inc. requested technical info (1 day)		
Visit: Three MOA officials for 2 days (4 days)		
c. Philippines	2	
Ltrs: Info requested; exchange of ideas (2 days)		
d. Thailand	8	
Visits: Deputy DG,DOAE, for 2 days (4 days); Kasetsert Univ. breeder for 2 days (2 days); DOA breeder for 2 days (2 days)		

5. World-wide (International Technical Assistance Agencies, companies, consulting firms, and other organizations. 24

a. American Seed Trade Assoc. (International Executive Committee) 5

Visit: ASTA Int. Ex. Com. held meeting with MSU team to discuss U.S. Seed Industry's views on and interest in seed program development in the LDCs (5 days).

b. CIMMYT 4

Visit: CIMMYT-Ford Fdn. staffer from N. Africa; discussions on all aspects of seed program development (4 days)

c. FAO 3

Ltrs & Cables: Continuing exchange of news and info (3 days).

d. INTSOY 2

Visit: one day program arranged for INTSOY training course (2 days).

e. IITA 2

Visit: Scientist from IITA, discussion on soybean seed problems (2 days)

f. UNDP 1

Ltrs: review of project requested (1 day)

g. USDA 1

Ltrs: Info requested on seed program in Thailand (1 day)

h. World Bank 6

Visit: Seven man team from Bank (South Asia Division) visited 1½ days for briefings on seed program development (5 days)

Ltrs: Info requested (1 day)

B. Nature of Activity and Observations

The amount of time spent on technical inquiries and visitations holds fairly constant from year to year. A substantial amount of time is taken up in responding to inquiries we have termed "Contract-Wide." Actually, most of these are from bilateral, multi-lateral, and philanthropic organizations involved in technical assistance such as UNDP, FAO, Ford Foundation, Rockefeller Foundation, SIDA, Columbo Plan, IBRD, etc.

The nature and type of inquiries are not classified but generally fall in the following five categories (descending order): (1) general information - "Send me all available information on seed program development," (2) specific information - "How should I dry bean seed," (3) general information - "Our sorghum seed is consistently low in germination, what can we do?"; (4) specific problem - "How do you remove red rice from rice seed?"; (5) training aides - "We need references, course outlines, practical exercises, slides and other visual aides for our in-service training program."

In years past most of technical inquiries originated in some agency of the Government, usually the MOA. While a majority of inquiries are still from that source, an increasing number come from private seed companies, equipment manufacturers, and consulting firms involved in development activities in the LDCs. Similarly, personal visits - for discussions, briefings, quasi-formal programs, etc. - which are taking an increasing amount of time are usually from nationals from the LDCs, but also from personnel of international agencies and consulting firms engaged in work in the LDCs.

It is not surprising that the greater number of technical inquiries and personal visits are from persons we know, such as former students and trainees, nationals we've worked with on Mission assignments, etc. Quite a number of inquiries, however, come from persons we do not know, but who have heard about our work in some way. Some inquiries come to us second hand, i.e., received by some other University in U.S., company, or other institution, but directed to our attention for response.

Judging from the many, many repeat inquiries for additonal or related information (and their increasing sophistication over time) and the tangible benefits derived from our responses to them, which we have run across in many overseas consultations, these activities including personal visits are of inestimable value to the case of agricultural development in the LDCs. In the absence of any substantial Mission capability in seed program development, quite a few embryonic seed programs have sustained themselves - and a few flourish - mainly on the limited nurturing and encouragement possible through long and continued technical-personal correspondence.

III. PREPARATION AND DISSEMINATION OF TRAINING AND INFORMATIONAL MATERIALS

A. Statistical Summary

Activity	Prof. Man Days 6/30/75 - 3/31/76
Preparation of references, handbooks, and other informational, educational and training materials.	53

B. Nature of Work and Observations

The central mission of the Seed Technology Laboratory since its establishment in the 1950's has been to gather all relevant available information, develop that which was lacking, and to synthesize the whole into the concepts, principles, base data, operational procedures, etc., essential for effective, efficient seed production and usage.

Progress has necessarily been slow considering the magnitude of the task, the almost total voids that have to be filled, and the competition of other priorities under the contract as well as teaching, research, etc., and the number of professional involved (presently 7).

During the year a substantial amount of time was spent writing and revising on several references in progress:

(1) Handbook on Seed Drying -- Manuscript completed: needs to be edited and illustrations designated and prepared.

(2) Handbook on Seed Storage -- First draft manuscript completed; needs to be revised, edited and illustrated.

(3) Foundation Seed Programs -- Writing re-organized; study on analysis of foundation seed programs added; additional analyses in progress.

(4) Seed Inspection and Control -- First draft about 90% complete; little progress during last 6-8 months because of press of the work.

(5) Miscellaneous -- Several informational papers were prepared on specific subjects, printed, and added to materials available for distribution.

Hundreds of copies of available informational materials were distributed in response to requests from individuals in more than 31 countries. Additonally, complete packets of informational materials were given to all international visitors to the Seed Technology Laboratory during the year.

In our view this activity continues to be among the most important within the scope of services under the contract.

IV. ADAPTIVE RESEARCH - TECHNICAL AND ECONOMIC

A. Statistical Summary

Activity	Professional Man Days 6/30/75 - 3/31/76
1. Technological Developments	37
2. Economic-Management studies and analysis	52
TOTAL	89

B. Nature of Work and Observations

During the period of this report a number of adaptive research projects were continued, others were initiated, and several were completed. In nearly every case the project was undertaken in response to needs in the LDC's as indicated from work with Missions and/or technical inquiries.

The following projects received most attention:

(1) Costs of Seed Processing--Study was completed on costs of seed processing including capital investments required and operational costs. Three capacities of processing plants were considered (approx. 3500, 7000, and 14,000 MT per year) and analyzed by economic engineering or synthetic firm analysis methodology. Base data were taken from operational experiences in Mississippi for convenience. The results, however, are equally applicable to the LDC's. Technical bulletin on study is in press.

(2) Optimal Spatial Distribution of Seed Processing Centers--A pilot study was undertaken to explore analytical methodology which might be useful in determinations of optimum shipping patterns of seed from production areas to processing centers to consuming areas in a developing country so as to provide basis for location of seed facilities. As a test case the study used the States of Paraiba, Pernambuco and Alagoas in northern Brazil. Basic tools used were the transshipment model developed by Hurt and Tramel and the negative cost alternative formulation proposed by Stennis and Hurt. The test case was solved. Manuscript in form of M.S. thesis by Roberto Gilson da Costa Campos (Brazil) was prepared. Further exploration is needed to validate the methodology used and the solutions extracted.

(3) Design Criteria for a Basic Seed Processing Facility--Criteria essential for planning and design of a basic seed processing facility with alternative capabilities and capacities were established and drawings of alternative arrangements and designs were prepared.

Results of work are presently in form of a 90 page illustrated manuscript. Publication is planned after thorough technical review.

(4) Design Criteria for Seed Storage Facilities--This study which is in progress will establish design criteria for "open" seed storage warehouses (with and without ventilation) and for air-conditioned and "cold" seed store houses. Preliminary paper on "conditioned storage of seed" has already been prepared, printed and distributed as requested.

(5) Organization, Financing and Management of Foundation Seed Operations--In connection with efforts to prepare a "handbook" on foundation seed operation, several informational deficiencies were uncovered which pointed to need for study of characteristics of established and successful foundation seed programs. This study is in progress on selected foundation seed programs in U.S., which represent the several possible alternative organizational, financial and management arrangements. Results of study will be incorporated into reference work on foundation seed programs.

V. OTHER RELATED AID, COUNTRY OR REGIONAL BUREAU CONTRACTS

The on-campus training activity, which is largely performed under other contracts, but very closely related to and supporting of work under AID/ta-C-1219 continued to increase at a very rapid rate. A substantial portion of the increase in on-campus training of international particpants is the result of recommendations made in connection with services and technical assistance to the various missions.

International participants enrolled in academic or short course programs in seed technology at MSU are listed by name, country and sponsor in Annex 1.

ANNEX 1

INTERNATIONAL STUDENTS MAJORING IN SEED TECHNOLOGY
ENROLLED IN REGULAR UNIVERSITY PROGRAM

30 June, 1975 to 31 March, 1976

Name	Deg. Goal	Country	Sponsor	Ending Date
Faeth, J	Ph.D.	Costa Rica	Gov. of CA	Cont.
Desai, D.B.	Ph.D.	India	Independent	Aug.,'75
Duangpatra, J.	Ph.D.	Thailand	Gov. of Thailand	Cont.
Wetzel, C.	Ph.D.	Brazil	USDA/USAID	Aug.,'75
Aguiar, P.	Ph.D.	Brazil	USDA/USAID	Feb.,'75
Lassim, M.	Ph.D.	Malaysia	GOM	Cont.
Okundaye, J.	Ph.D.	Nigeria	GON	Cont.
Boonying, J.	Ph.D.	Thailand	Ky. Contract	Cont.
Calderon, C.	Ph.D.	Colombia	Independent	Cont.
Araujo, L.	M.S.	Brazil	MSU Contract	Cont.
Andrade, R.	M.S.	Brazil	MSU Contract	Cont.
Bohorquez, J.	M.S.	Ecuador	GOE	Cont.
Alvim, A.	M.S.	Brazil	MSU Contract	Aug.,'75
Azevedo, J.	M.S.	Brazil	MSU Contract	Aug.,'75
Barros, A.	M.S.	Brazil	MSU Contract	Aug.,'75
Chaves, J.	M.S.	Brazil	USDA/USAID	Aug.,'75
Lago, A.	M.S.	Brazil	USDA/USAID	Aug.,'75
Bonney, T.	M.S.	Ghana	USDA/USAID	Cont.
Pieta, C.	M.S.	Brazil	MSU Contract	Aug.,'75
Rocha, S.	M.S.	Brazil	MSU Contract	Aug.,'75
Rosal, C.	M.S.	Brazil	MSU Contract	Aug.,'75
Bragantini, C.	M.S.	Brazil	MSU Contract	Cont.
Tippayaruk, S.	M.S.	Thailand	Ky. Contract	Aug.,'75
Viera, E.	M.S.	Brazil	MSU Contract	Aug.,'75
Viera, N.	M.S.	Brazil	Wisc. Contract	Aug.,'75
Carvalho, G.	M.S.	Brazil	MSU Contract	Cont.
Daher, F.	M.S.	Brazil	USDA/USAID	Cont.
Basta, K.	M.S.	Sudan	Gov. of Sudan	Cont.
Ellas, N.	M.S.	Brazil	MSU Contract	Cont.
Lesqueves, E.	M.S.	Brazil	MSU Contract	Cont.
Pallangyo, E.	M.S.	Tanzania	USDA/USAID	Term.12/75
Martins, E.	M.S.	Brazil	USDA/USAID	Cont.
Manandhar, C.	M.S.	Nepal	FAO	Cont.
Fernandes, G.	M.S.	Brazil	MSU Contract	Cont.
Gomes, L.	M.S.	Brazil	MSU Contract	Cont.
Gressler, O.	M.S.	Brazil	MSU Contract	Cont.
Oropeza, F.	M.S.	Venezuela	Gov. of Venezuela	Cont.
Mmari, C.	B.S.	Tanzania	USDA/AID	Cont.
Ogidi, M.	M.S.	Nigeria	USDA/AID	Cont.
Ghanmi, M.	M.S.	Tunisia	USDA/AID	Cont.
Daher, F.	M.S.	Brazil	MSU Contract	Cont.
Peske, S.	M.S.	Brazil	USAID/Brazil	Cont.
Possamai, E.	M.S.	Brazil	USAID/Brazil	Cont.
Caceres, J.	B.S.	Honduras	USDA/USAID	Cont.

Continued:

Name	Deg. Goal	Country	Sponsor	Ending Date
Miranda, M.	M.S.	Venezuela	GOV	Cont.
Miranda, F.	M.S.	Venezuela	GOV	Cont.
Panta, B.	M.S.	Nepal	FAO	Cont.
Piyanan, S.	M.S.	Thailand	USDA/USAID	Cont.
Sopit, S.	M.S.	Thailand	USDA/USAID	Cont.
Vieira, R.	M.S.	Brazil	MSU Contract	Cont.

Special (Non-Degree) Students

Name	Country	Sponsor	Dates
Mishra, R.	Nepal	FAO	6/75-12/75
Orrantia, F.	Mexico	Private	8/75-12/75
Pava, H.	Philippines	USDA/USAID	8/75-12/75

1975 Seed Improvement Course (103-3)
June 2 - July 11, 1975

Name	Country	Sponsor
Julian Kacou	Ivory Coast	USDA/USAID
Kamal Khan	Pakistan	USDA/USAID
C.B. Bait	Philippines	"
C. Barba	Ecuador	"
R.B. Bersdmin	Philippines	"
J.P. Damo	Philippines	"
Diane Gaskell	Trinidad	"
C. Khong-Udnume	Thailand	"
W. Machado	Brazil	"
D.B. Manaligod	Philippines	"
W.S. Marasigan	Philippines	"
L.T. Mwakikosa	Tanzania	"
L.M. Mzee	Tanzania	"
R.K. Mishra	Nepal	"
J. Orellana	Ecuador	"
B.B. Panta	Nepal	"
L.F. Razera	Brazil	"
A.R. Da Silva	Brazil	"
G.R. Vergara	Philippines	"
C.M. Manandhar	Nepal	"

ANNEX 2

REPORTS AND TECHNICAL PUBLICATIONS

Period: 30 June, 1975 - 31 March, 1976

TA	75-08	Ghana National Seed Program Facilities. 61 pp.
TA	75-09	Consultation Visit with USAID/ES and CENTA, GOES. 19 pp. 11 blueprints.
TA	75-10	Consultative Visit with USAID/Costa Rica and GOCR. 10 pp.
TA	75-11	Consultative Visit with USAID/Honduras, Escuela Agricola Panamericana and the GOH. 8 pp.
R	75-12	Terminal Report, AID/CM/ta-C-73-34. 118 pp.
R	75-13	Periodic Report to AID (AID/CM/ta-C-73-34). 34 pp.
TA	75-14	Foundation Seed Project Facilities for ABU/IAR (Nigeria). 33 pp. 5 blueprints.
TA	75-15	Upper Volta Seed Multiplication Project. 46 pp. 2 blueprints.
TA	75-16	Consultation Visit with Panama Seed Project. 13 pp.
TA	75-17	Seed Legislation Consultation in Honduras. 50 pp.
TA	75-18	Seed Program/Industry Development in Ecuador. 53 pp.
TA	75-19	Seed Processing Center Evaluation in Honduras. 39 pp.
TA	75-20	Consultation Visit on the Thailand Seed Development Project. 36 pp., 13 blueprints.
TA	75-M-2	Seed Program Consultation in Guatemala. 7 pp.
TA	75-M-3	Preliminary Evaluation of Ecuador's Seed Facility Plans. 5 pp.
TA	75-M-4	Possible Areas of Cooperative Work with CIAT. 4 pp.
TA	76-01	Seed Production and Training Course. Boliche Exp. Station, Guayaquil, Ecuador. 11 pp.
TA	76-02	Republic of Bolivia Seed Program. 31 pp. 8 blueprints.
TA	76-03	Improved Seed and Plant Materials Program for the Dominican Republic. 75 pp.
R	76-07	"Annual" Report to AID/W on AID/ta-C-1219. Period: 30 June, 1975 - 31 March, 1976.

Technical Papers

Delouche, J. C. and G. B. Welch. 1975. Conditioned storage of seed. Proc. Sou. Seedsmen's Association. pp. 30-40.

Delouche, J. C. 1975. Development of technology for storage of seed under adverse conditions. Paper prepared for 2nd Expert Consultation on Seed Technology, FAO-Rome. 19 pp.

Boyd, A. H. and G. B. Welch. 1975. Heated air drying of soybeans. MAFES Circular.

Delouche, J. C. 1975. Planning seed program with developing countries. Agron. Abstr. 1975 Annual Meeting of ASA & CSSA. p. 92.

Vieira, N. 1975. Development and release of seed dormancy in rice as related to stage of maturity. M.S. Thesis (Brazilian graduate student advised by Dr. Delouche).

Duangpatra, J. 1975. Some characteristics of the impermeable seed coat in soybeans. Ph.D. Dissertation. (Thai graduate student advised by Dr. Potts).

Wetzel, C. 1975. Some effects of seed size on performance of soybeans. Ph.D. Dissertation. (Brazilian graduate student advised by Dr. Potts).

Vieira, E. 1975. Development of equation to predict the storability of soybean seed lots. M.S. Thesis (Brazilian graduate student advised by Dr. Baskin).

Lassim, M. 1975. Comparison of rates of field deterioration of different soybean varieties. M.S. thesis. (Malaysian graduate student advised by Dr. Delouche).