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AGENCY FOR INTERNATIONAL DEVELOPMENT
 PROJECT PAPER FACESHEET

1. TRANSACTION CODE
 A ADD
 C CHANGE
 D DELETE

2. DOCUMENT CODE
 3

3. COUNTRY ENTITY DS/AGR/FCP RDA-2
 Type C. Field Service

4. DOCUMENT REVISION NUMBER
 2

5. PROJECT NUMBER (7 digits)
 931-0203.11

6. BUREAU/OFFICE
 A. SYMBOL DSB B. CODE 0

7. PROJECT TITLE (Maximum 40 characters)
 Seed Program and Industry Development

8. ESTIMATED FY OF PROJECT COMPLETION
 84

9. ESTIMATED DATE OF OBLIGATION (for 5 year Exten.)
 A. INITIAL FY 79 B. QUARTER 2
 C. FINAL FY 83 (Enter 1, 2, 3, or 4)

10. ESTIMATED COSTS (\$5000 OR EQUIVALENT \$) - (For 5 year extension)

A. FUNDING SOURCE	FIRST FY 1979			LIFE OF PROJECT		
	B. FY	C. --	D. TOTAL	E. FY	F. --	G. TOTAL
AID APPROPRIATED TOTAL	250	--	250	1,395	--	1,395
GRANTS	250	--	250	1,395	--	1,395
LOANS	0	--	0	--	0	--
OTHER U.S.						
OTHER COUNTRY						
OTHER DONORS						
TOTALS	250	--	250	1,395	--	1,395

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		1st FY 79		2nd FY 80	
		C. GRANT	D. LOAN	E. GRANT	F. LOAN	G. GRANT	H. LOAN
11 FN	1121	011	--	2,017	--	250	--
21							
31							
41							
TOTALS				2,017	--	250	--

12. MONTHLY EVALUATION SCHEDULE

A. APPROPRIATION	4. 3rd FY 82		LIFE OF PROJECT	
	C. GRANT	D. LOAN	E. GRANT	F. LOAN
11 FN	280	--	590	--
21				
31				
41				
TOTALS	280	--	590	--

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE P10 FACESHEET DATA BLOCKS 12, 13, 14, OR 15 OR IN P10 FACESHEET DATA BLOCK 12? IF YES, ATTACH CHANGED P10 FACESHEET.

1 NO
 2 YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: *Dean F. Peterson*

TITLE: Dean F. Peterson, Director, Office of Agriculture, DSB

DATE SIGNED: 01/22/79

15. DATE DOCUMENT RECEIVED IN AIC/4 OR FOR AIC/4 DOCUMENTS. DATE OF DISTRIBUTION

PROJECT PAPER

<u>Project Title</u>	Seed Program and Industry Development
<u>New or Extension</u>	New Five-Year Contract for Existing Services with Funding Requested for One-Year
<u>Duration</u>	Five Years - From April 1, 1979 through March 31, 1984
<u>Estimated Cost</u>	FY 1979 \$250,000 FY 1980 275,000 FY 1981 280,000 FY 1982 290,000 FY 1983 300,000 TOTAL <u>\$1,395,000</u>
<u>Contractor</u>	Mississippi State University
<u>A.I.D. Project Manager</u>	G. F. Warren, DSB/AGR/FCP
<u>Current Contract No.</u>	AID/ta-c-1219

PART I - SUMMARY AND RECOMMENDATIONS

A. RECOMMENDATION.

It is recommended that \$1,395,000 in grant funds be approved to finance a new five-year contract for existing technical services to provide technical assistance and services to the Agency, Bureaus, Missions, and cooperating LDCs in all phases of seed program/industry planning, implementation, and evaluation of seed multiplication-production projects. The obligation schedule would be as follows: FY 79 - \$250,000 for the first year; FY 80 - \$275,000 for the second year; FY 81 - \$280,000 for the third year; FY 82 - \$290,000 for the fourth year; and FY 83 - \$300,000 for the fifth year. Subject to the availability of funds the project will start in FY 79.

B. SUMMARY DESCRIPTION.

This project responds to the need for suggestions, materials, techniques, methodologies, and technical assistance required to design and implement responsible, responsive seed production and supply systems capable of meeting the LDC farmers' needs for improved seed.

This five-year project is designed to provide A.I.D. and the LDCs with useful development tools. The elements of the project have been perfected through a series of technical assistance contracts with Mississippi State University since 1958. The product of this project will be technical assistance and services to the Regional Bureaus, Missions, and LDCs in the area of seed improvement and seed technology.

Despite substantial accomplishments and progress, much work remains to be done to establish seed programs adequate to support current and projected agricultural development programs in the LDCs. In many African countries, sound, well-supported agricultural development programs are only now getting well under way. As these programs progress and adapted, superior crop varieties are identified, seed production and supply will become increasingly important. Unless adequate arrangements are made for the production and supply of seed to farmers in these countries, improvements in agricultural production will be severely impeded because of inadequate seed supplies. The same situation exists for several countries in Latin America and South Asia.

Countries which have taken some of the steps necessary to establish a seed program/industry, and are making reasonable progress require additional, periodic assistance to sustain progress and achieve the "adequate" status. Among these countries are Paraguay, Dominican Republic, Bolivia, Guatemala, El Salvador, Ghana, Nigeria, Tanzania, Morocco, Indonesia, Philippines, Thailand, Sri Lanka and Pakistan.

Additional and periodic assistance will also be required by many of the countries that have established "reasonably effective" seed programs, e.g., Peru, Ecuador, Colombia, Costa Rica, Honduras, Panama, India. Assistance is and will be needed to increase the capacity of the seed program, to develop appropriate seed quality control procedures and regulations, to develop a better in-country training capability, and to resolve difficult technical problems that arise in connection with the introduction of new kinds and varieties of seed into the production program.

The demand and technical level of assistance and services required in seed program development in the LDCs has risen sharply in the past 5-6 years and it will continue to rise. In many countries the "easy steps" have been taken, the "easy tasks" have been accomplished. The next level of tasks that are required for successful implementation of seed programs will have to be on a higher technical-managerial plane, and will require highly competent, experienced technical assistance and services.

This project proposal provides for a continuation of the technical assistance and services to the Bureaus, Missions, and LDCs in the area of seed improvement and seed technology that are presently available under Contract AID/ta-c-1219. The type and scope of services to be provided and related activities will include but not necessarily be limited to the following:

- (1) Assistance in planning, organization or reorganization, and implementation of seed production and supply programs or projects and their integration into the over-all LDC strategy for agricultural development.
- (2) Identification, analysis and recommendations for the resolution of technical and operational problems in seed production, harvesting, drying, processing, quality control and testing, storage and distribution.
- (3) Technical and economic studies and analyses to determine the need for and feasibility of seed facilities, and when needed and feasible, determination of the most efficient types, capacity and location, to include: suitable sites for seed production; drying and storage units; processing and packaging plants; quality control and research laboratories; certification agencies; foundation seed programs; capital investment requirements and operational costs.
- (4) Designs and technical specifications for the physical facilities and equipment required for on-going seed production and supply operations, and assistance in installation and operational checks of equipment, taking into account the specific climatic pattern(s) of the assisted LDC to include: seed handling and drying systems; normal and long-term storage units; processing (cleaning, treating, packaging) plants; quality control and research laboratories; and seed production units.

(5) Adaptive, technical and economic studies to develop essential methodology, establish technical design and operational criteria, identify and characterize economic-management requisites vital for efficient and effective seed production and supply operations in the LDCs, especially those in the extremely arid or humid sub-tropics and tropics where adverse climatic conditions prevail.

(6) Planning and execution of training programs of varying intensity, depth, duration and emphasis on the technical, operational and managerial phases of a seed industry program. Training programs will be U.S., regional, (third-country), and in-country, and range from graduate degree programs in Agronomy-Seed Technology at MSU to in-service or on-the-job training for workers at the operational level. Special attention will be given to assisting agricultural educational institutions in the LDCs (i.e., colleges, universities, institutes) with the establishment of educational training programs in seed technology or up-grading of such programs that are already established.

(7) Functioning as an information, resource, and advisory center, on all aspects of seed program/industry development and operations to AID personnel, nationals in cooperating countries, other AID contractors, and other International lending, technical assistance, research and support agencies and institutions.

C. ISSUES.

Few, if any, of the LDCs have sufficient experience in the technical, managerial, and economic dimensions of a seed production and supply program to fulfill the requirements outlined above without external technical assistance and services. Therefore, timely and competent technical assistance and services are crucial. At the same time, however, the issue is raised on the evaluation of field consultancies as to the tendency and ability of recipient countries to implement consultant recommendations.

PART II - PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. RATIONALE.

The development of more adaptable, efficient, productive, pest resistant, and nutritious crop varieties, and their introduction into the agricultural systems of the LDCs along with the "package" of essential practices and inputs, continues to be a major tactic of the current strategy for increasing world food and feed supplies. In accord with this strategy, very substantial crop breeding and improvement programs are underway in the developed countries, the international research centers, and the LDCs.

The socio-economic benefits to the LDCs of the enormous efforts in crop breeding and improvement are directly proportional to the quantities of improved seed (seed of superior varieties) multiplied, distributed and planted by their farmers. Although the dependence of benefits from crop breeding and improvement programs on a timely and adequate supply of seed to farmers is better understood and more widely appreciated now than even a few years ago, seed multiplication-production and supply - a crucial step in translating research developments into improved production - is neglected, or not adequately provided for in many of the LDCs. The results are much reduced and slow "pay-offs" from efforts and resources expended on crop breeding and improvement research and development programs.

In traditional agriculture as practiced for hundreds of generations and still the pattern in many LDCs, the farmer sets aside a part of each harvest for planting the next crop. Beyond this "seed saving" practice, little distinction is made between the edible grain and the seed needed to propagate the succeeding crop. While the traditional "seed saving" practice suffices for a static, relatively primitive agriculture, it is one of the most serious impediments to agricultural development in all countries. A progressive agriculture based on extensive monocultures of crop kinds and varieties requires the rapid and effective multiplication and dissemination of the essentially continuous genetic improvements in crop varieties arising out of research.

Seed are the major mechanism through which plant populations are distributed over time and space. They are also the only practical means of multiplying and transmitting into succeeding generations of crops the superior qualities genetically engineered into small plant populations by modern plant breeders.

The quality and orientation of a country's agriculture are closely related to the availability and use of improved seed. No country or society in our time has developed or can develop a productive, progressive and market-oriented agriculture without an effective seed production and supply system. An organized, effective seed production and supply system is as important - and really more basic - for agricultural development as are supply programs for fertilizers, pesticides, water, and credit.

Seed production and supply systems are notably ineffective or totally lacking in the less progressive LDCs, except, significantly, in some cases for highly commercialized export crops such as cotton and groundnuts. Small to medium sized farmers who mainly produce basic food and feed crops have only limited access to supplies of improved seed. Improvement of their socio-economic position will require far greater access to and usage of research and development "outputs" including an adequate and timely supply of improved seed at reasonable prices.

Responsible, responsive and effective seed production and supply program/industries are vital for any sustained progress in food and feed production in the LDCs. And, these program/industries will have to be established in a relatively short period of time in contrast to the nearly 100 year "evolutionary period" of the seed industries in the developed countries of North America and Western Europe. As an additional complication, these development will have to take place under climatic conditions decidedly less favorable for seed production and supply than those prevailing in the developed, temperate climate countries.

Although the need for and justification of an effective and efficient seed program/industry would appear to be implicit in any strategy for accelerated agricultural production based on the development and use of improved crop varieties, the specific benefits deriving from the use of high quality seed of improved varieties are as follows:

- (1) Seed of most major crops are a reproducible, multiplying input (exceptions: seed of hybrids and possibly some vegetable and forage crops). A specific acreage of the immediate crop is benefited by the level of primary input (quantity of new seed planted), while geometrically progressing acreages of succeeding crops are (or can be) benefited by the progeny (seed that are saved) of the primary input. In this manner, seed are unique among production inputs in crop husbandry.
- (2) An efficient seed industry serves not only in agricultural development but also as a mechanism for the rapid rehabilitation of agriculture in the wake of natural disasters such as floods, drought, epiphytotics of plant diseases, etc. Witness, the marvelous efficiency of the U.S. seed industry in replacing southern corn leaf blight susceptible TMS corn hybrids with blight tolerant hybrids in less than two years, the urgent need for seed following flooding in Thailand and Bangladesh in the early 1970s, the Sahelian drought, etc. Thus, the potential of a seed program/industry as a sort of disaster insurance cannot be overlooked in computing its benefits.
- (3) An increase in total yield resulting from the introduction and distribution of superior varieties or hybrids into the cropping pattern of the country or sub-division thereof.
- (4) An increase in "recoverable yield" as a result of greater varietal purity, more uniform maturation, and so on.
- (5) An increase in yield resulting from higher physiological quality of planting seed. This increase in yield is distinct from the "genetic" component and is derived from better stands and individually more productive plants. Experiments have shown that high germinating, high vigor seed can produce 5-15% higher yields than low quality seed of the same variety in equivalent populations.

(6) More efficient utilization of fertilizers, irrigation and pesticides because of greater uniformity of emergence and growth, better stands, and more vigorous plants.

(7) Reduction in planting rate. When high quality seed are available, seeding rate can generally be reduced by about one-half, thus, reducing production costs and effectively adding a like amount to the food supply.

(8) Higher quality of produce because of less contamination with other varieties, and more uniform maturation, thus, fewer immature and/or weathered seed. For example: hulling and milling turnout of rice is much higher for uniform grain (same variety) than mixed grain.

(9) Less reinfestation of the land with weed seed.

The establishment of a seed production and supply program or industry adequate to support an LDC's current and projected food and feed production program represents an investment in the infrastructure requisite for agricultural development. It is not a simple task and the effort required is considerable. The task, however, must be accomplished to provide an essential base for sustained agricultural development.

Accomplishment of the task, i.e., establishment of an adequate seed production and supply system, requires:

- (1) An enlightened national policy on seed production and supply.
- (2) Informed, careful planning.
- (3) Effective organization of the several operational elements of a seed program.
- (4) Close cooperation and coordination among the several operational elements and the public and private sectors.
- (5) Trained managers, technicians and workers.
- (6) Adequate facilities and equipment.
- (7) A satisfactory quality control program.
- (8) A continuous flow of technical information.
- (9) An adaptive research capability to resolve the technical problems that arise.

- (10) Effective and continuous promotion.
- (11) An adequate demand assessment and marketing intelligence capability.
- (12) An effective distribution and marketing system.
- (13) A commitment of adequate support over a long enough period to permit establishment of the seed program/industry.

Few, if any, of the LDC's have sufficient experience in the technical, managerial and economic dimensions of a seed production and supply program to fulfill the requirements outlined above without external technical assistance and services. Therefore, timely and competent technical assistance and services are crucial. This proposal provides for the technical assistance and services needed in the continuing effort to establish seed production and supply systems in the cooperating LDCs.

3. BACKGROUND.

In 1949-50 Mississippi State University (MSU) established a Southern Regional Seed Research Laboratory to serve the research, training and technical assistance needs of seed producers, suppliers and users (farmers) in Mississippi and the Southern Region. The program of the laboratory was unique - and remains so - in its involvement in all aspects of seed production, supply and usage: from the initial multiplication of breeder seed, through marketing and distribution, to the successful establishment of crop stands in farmers' fields.

The laboratory developed rapidly so that by 1955-56 it was recognized throughout the U.S. seed industry as the center of information and expertise on seed in the country. In line with the national reputation and scope of the laboratory, the University changed its name to the "Seed Technology Laboratory" in 1956 to eliminate the regional connotation.

The laboratory's services and concern were further extended internationally in 1956. Agronomists in AID (then ICA) and the Foreign Agricultural Service, USDA, recognizing the need to initiate seed program development efforts in selected LDCs asked MSU to organize and conduct a 6-weeks "Special Training Course in Seed Improvement" for participant-trainees from cooperating countries. The first course was held in June-July 1956 and it has been continued as an annual basis to the present. Through the 1977 course, 323 participants from 56 countries have received training in the course.

Previous AID Contracts

After the first two "Seed Improvement Courses" in 1956 and 1957, it became apparent that some mechanism was needed for "follow-up" and more direct technical assistance in the seed area. Trainees on return to

their home countries were literally besieging MSU's Seed Technology Laboratory with requests for technical information, advice, facility designs, equipment specifications, consultative visits, and so on. Since most of these requests for assistance arose out of AID-Mission sponsored or financed programs in the LDCs, and MSU could not provide the assistance requested wholly from its own resources, MSU and AID (then ICA) entered into a contractual arrangement on March 18, 1957 under terms of which MSU agreed to provide technical assistance and services in the area of seed program development to the LDCs receiving U.S. technical assistance. The Seed Technology Laboratory (STL) was charged by the University with carrying out its responsibilities under the contract.

The contractual agreement between MSU and AID in 1958 has continued to the present under several "arrangements", bases, and documents as follows:

<u>Contract No.</u>	<u>Basis</u>	<u>Total Period</u>
AID-W-607	Annual	3/18/58-3/31/71
AID/csd-2976	Annual	4/1/71-3/31/73
AID/CM/TA-C-73-34	Annual	4/1/73-5/29/75
AID/TA-C-1219	3-year +1	6/30/75-3/31/79

A partial statistical summary of the MSU/AID technical assistance contract activities from 18 March 1958 through March, 1977 is given in ANNEX B. During the period 18 March 1958 through 31 March 1973, 159 consultative visits were made to 43 countries; 19 formal training courses or seminars (regional or individual country) were organized and conducted; and several thousand more days were spent responding to technical inquiries, on programs for visitors from AID and the LDCs, preparing and disseminating information and materials, and on technical and economic adaptive research.

In order to accommodate more specific and greater demands for services than possible under the TA contract, several additional technical assistance contracts were entered into:

(1) AID/1a-165. At the request of the Brazilian Government, MSU and AID entered into an agreement in 1964 for assistance to the GOB in developing its seed industry. Two to four MSU seed specialists were stationed in Brazil from 1964 until the work was terminated in 1974. In 1973, MSU, at the request of the GOB and with encouragement from USAID/Brazil, entered into a separate agreement with the GOB to assist with the final phase of seed industry development financed under a IDB loan. This work was terminated at the end of 1976.

(2) AID/nesa-379. At the request of AID/W and the Government of India, MSU entered into a four year contract with AID in 1968 to provide technical assistance to the GOI's National Seed Corporation. Three to four MSU specialists were stationed in India until 1972 when the GOI requested termination of most AID-University contracts.

(3) AID/ta-488 (ROCAP). MSU and AID entered into a 2-year agreement in 1967 to assist the Escuela Agricola Panamericana, Tegucigalpa, Honduras, in its development as a seed training center for the ROCAP region and to conduct two regional training courses.

(4) Thailand. MSU is presently negotiating with the RTG on a technical assistance contract that would provide 6 man years of expert assistance during implementation of an AID-loan financed seed development project.

The Activities under the contracts listed above essentially continued work that was begun under the long-term MSU-AID/TA agreement.

Contract AID/ta-C-1219

The present TA contract "Seed Program and Industry Development" began 30 June 1975 and is scheduled to terminate on 31 March 1979. The transition from the previous contract AID/CA-TA-73-34, terminated June 29, 1975 proceeded so smoothly as to be essentially unnoticeable. Work originated under the previous contract was carried over and continued under AID/ta-C-1219. This work included specific technical assistance activities in Costa Rica, Panama, Thailand, Honduras, and Ghana, as well as training and informational services, and some adaptive and development work. A summary of activities under AID/ta-C-1219 thru 31 March 1977 is given in ANNEX A.

Accomplishments

AID and MSU have been involved for more than 20 years in technical assistance activities in the LDCs aimed at establishing and/or improving seed production and supply systems. Although the level-of-effort has been very small relative to the magnitude of the task, the accomplishments have been very substantial. These can be summarized under several broad categories.

1. Seed Programs Assisted

MSU has assisted the establishment of seed production and supply programs in Brazil, Colombia, Taiwan, Honduras, Peru, Panama, India, Costa Rica, Ecuador, Philippines, Ghana, Nigeria, and El Salvador. Assistance has been and is being provided Thailand, Bolivia, Dominican Republic, Niger, Upper Volta, Cameroon, and Guyana in their initial efforts to establish seed programs.

2. Facilities Established

In addition to facilities in the countries listed above, seed facilities (e.g. processing plants, seed laboratories) based on MSU-AID designs, and specifications have been established in Argentina, Chile, Nicaragua, Paraguay, Venezuela, WARDA (Liberia), Morocco, Indonesia, and Laos. Facility designs and specifications are currently under development or have been prepared for Bolivia, Ethiopia, Central Africa Republic, Chad, and Guyana.

3. Studies and Reviews

Major studies of seed production and supply has been done for the Central American Region. Seed legislation has been reviewed and/or recommended for Tunisia, Indonesia, Panama, and Costa Rica. Studies and reviews of the "seed situation" along with appropriate recommendations have been made for Zaire, Haiti, Togo, in addition to countries listed above.

4. Training (1956 - 1977)

- (1) 128 participants from 25 countries have earned B.S. (6), M.S. or M.Agr. (107), or Ph.D. (13) degrees in Agronomy-Seed Technology at MSU. (Some earned more than one degree.)
- (2) 54 participants from 18 countries received at least one semester's training and instruction in Seed Technology at MSU.
- (3) 323 participants from 56 countries received 5 to 6 weeks training on the MSU campus in the annual Seed Improvement Course.
- (4) 585+ participants received training and orientation in seed program development in 19 regional and in-country seminars, workshops and short courses.
- (5) In addition to the above, at least 210 additional persons received one to five days' training on a one-to-one basis during special visits to MSU, or in connection with consultation assignments in the various countries.

MSU trained seed specialists hold important positions in the "seed programs" of about 20 of the LDCs; six are currently assisting other countries in seed program development in various FAO projects.

5. Technology Development

Much of the technology presently used for seed conditioning, drying, and storage in the humid tropics and subtropics was first conceptualized, developed and field tested under the MSU-AID contract in connection with technical assistance activities in Latin America, the Far East and South Asia. The concepts, procedures and facilities designs

developed were (and are) freely available and have been used by many other international technical assistance agencies, e.g., Rockefeller and Ford Foundations, UNDP, FAO, SIDA, World Bank.

6. World-Wide Resource Center

MSU's Seed Technology Laboratory was the major center of seed expertise, training and research in the U.S. at the time it entered into its first TA agreement with AID (1958). The AID-TA agreement provided the additional resources and experience needed by the laboratory to become a world-wide center of seed technology, a status achieved by MSU in the early 1960s and enhanced since then. In a sense, therefore, a major accomplishment of the successive AID contracts with MSU was the development of MSU as a world-wide resource center for seed production and supply, an important aspect of agricultural development. It must be stated, however, that this would not have happened without a deep and continuing commitment on the part of the University to international agricultural development. Since 1972 the University and other agencies of the state have invested more than \$1 million in state appropriated funds on a complex of seed training, service, and operational facilities. These include the Seed Technology Laboratory, the State Seed Testing and Regulatory Laboratory, the Foundation Seed Stocks project, and the State Seed Certification Agency. This complex provides modern facilities unequalled elsewhere for theoretical, practical, and operational training in seed technology, applied seed research, and as a base for technical assistance and advisory services. Additional investments are being made.

The laboratory serves now and has for many years as an informational and resource center for seed technology. In this capacity it provides information and advice on seed and seed problems to individuals, agencies, and institutions around the world, including many other AID contractors.

7. Food and Feed Production

It is not possible to quantify the impact of the MSU-AID TA contract activities on food and feed production in the cooperating countries. It has been well established, however, that major advances in food and feed production have been achieved through the use of improved seed - seed of superior varieties - in combination with fertilizers, pesticides, improved water supply, and improved agronomic practices. The seed production and supply arrangements utilized in these advances were assisted directly, or at the very least, strongly influenced, by MSU-AID technical assistance, adaptive research, and information services.

8. Investments Made

The MSU/AID TA agreement provides only technical assistance and advisory services. The investments required to construct facilities, purchase equipment and finance operations were funded largely through AID grants in the earlier years, but in recent years funding arrange-

ments have mostly shifted to loans from a variety of sources: AID (e.g., Honduras, Costa Rica, Thailand, Dominican Republic, Ghana); World Bank (e.g., Ecuador, India, Indonesia, Bangladesh), IDB (e.g., Brazil, Paraguay).

C. DETAILED DESCRIPTION.

This project proposal provides for a continuation of the technical assistance and services to the Bureaus, Missions and LDCs in the area of seed improvement and seed technology that are presently available under Contract AID/ta-C-1219. Some modification in emphasis and the scope of services were made to bring the project in line with current and projected developments and needs.

A. Scope of Services and Activities

The type and scope of services to be provided and related activities will include but not necessarily be limited to the following:

(1) Assistance in planning, organization or reorganization, and implementation of seed production and supply programs or projects and their integration into the overall LDC strategy for agricultural development.

(2) Identification, analysis and recommendations for the resolution of technical and operational problems in seed production, harvesting, drying, processing, quality control and testing, storage and distribution.

(3) Technical and economic studies and analyses to determine the need for and feasibility of seed facilities, and when needed and feasible, determination of the most efficient types, capacity and location, to include: suitable sites for seed production; drying and storage units; processing and packaging plants; quality control and research laboratories; certification agencies; foundation seed programs; capital investment requirements and operational costs.

(4) Designs and technical specifications for the physical facilities and equipment required for on-going seed production and supply operations, and assistance in installation and operational checks of equipment, taking into account the specific climatic pattern(s) of the assisted LDC to include: seed handling and drying systems; normal and long-term storage units; processing (cleaning, treating, packaging) plants; quality control and research laboratories; and seed production units.

(5) Adaptive, technical and economic studies to develop essential methodology, establish technical design and operational criteria, identify and characterize economic-management requisites vital for efficient and effective seed production and supply operations in the LDCs, especially those in the extremely arid or humid sub-tropics and tropics where adverse climatic conditions prevail.

(6) Planning and execution of training programs of varying intensity, depth, duration and emphasis on the technical, operational and managerial phases of a seed industry program. Training programs will be U.S., regional, (third-country), and in-country, and range from graduate degree programs in Agronomy-Seed Technology at MSU to in-service or on-the-job training for workers at the operational level. Special attention will be given to assisting agricultural educational institutions in the LDCs (i.e., colleges, universities, institutes) with the establishment of educational training programs in seed technology or upgrading of such programs that are already established.

(7) Functioning as an information, resource, and advisory center, on all aspects of seed program/industry development and operations to AID personnel, nationals in cooperating countries, other AID contractors, and other international lending, technical assistance, research and support agencies and institutions.

PART III - PROJECT ANALYSES

A. TECHNICAL ANALYSIS.

1. Timeliness - A.I.D. has, for almost 20 years, been financing a technical service contract in seed multiplication programs.

During the early years, i.e., 1958 to the late 1960s, major emphasis was on establishing selected elements of a seed program/industry such as certification systems, seed testing laboratories, seed processing plants, and seed drying facilities. Despite substantial accomplishments, MSU recognized the inherent deficiencies in this sort of "piece-meal" approach and began a campaign to persuade AID, the Missions, the cooperating LDCs and other organizations such as FAO, UNDP, etc., that a more comprehensive and longer-term approach to seed program development was needed. In 1968, MSU with the approval and authorization of AID/W, published a handbook on "Seed Program Development". This handbook presented a rationale and justification for seed program development in the LDCs, described the elements or components of a seed program, outlined the steps that needed to be taken, and emphasized that seed program development must be integrated in the over-all agricultural development strategy of a country. The concepts and ideas advanced in this handbook had great influence and are responsible in a major way for the current widespread recognition that an organized seed production and supply system is essential for sustained agricultural growth, that comprehensive planning and programming are needed to establish a seed program, and that a committed, long term support for such development is essential.

Since about 1970 there has been an increasing awareness in the USAID Missions and cooperating countries of the need for development of the "total" seed program rather than the fragmented, "piece-meal" approach of the late 1950s and the 1960s. This continuing trend is most encouraging because it suggests less reliance on "stopgap" measures and more attention and thought on development of a viable seed program/industry with sound public-private sector linkages to serve the development needs of the whole agricultural sector.

A significant portion of services under the present and previous contracts continues to be of a technical and bio-engineering nature, but with increasing emphasis on economic considerations. 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 LDCs 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 (see ANNEX C). There has also been an increase in the number of requests for in-country and in-service training. These trends are gratifying 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 LDCs, advisors, and analysts come into contact with the AID contract group at MSU. The Seed Technology Laboratory has prepared more than 200 informational pamphlets, 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 (see ANNEX D). 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, plant breeding, etc.

While services under AID/ta-C-1219 and previous contracts have been predominantly of a technical, organizational, and program development nature, we have tried as best we could under the limits imposed by the terms of reference of 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 continues to be an important aspect of contract services. In many ways, the phrase "adaptive research" does not properly define the type of work carried on. Perhaps, "development of essential technology" would be more descriptive, 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 LDCs, especially those with humid or extremely arid tropical or sub-tropical climates.

In retrospect, one can easily discern a gradual evolution in the emphasis and scope of 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 in 1970 and continuing to the present, seed program development in total based in part on economic considerations has been emphasized. Presently, therefore, technical assistance activities involve all the major aspects of agribusiness, viz., production technology, investment, management, training, and marketing. It seems to us that these aspects must continue to be taken into account in rationalizing past, present, and future commitments to seed program-industry development in the LDCs by both AID and MSU.

2. Initial Environmental Examination - The activities of this project fall into the area described in environmental procedure regulations, paragraph 216.2 (c) "Analyses, studies, academic or investigative research, workshops and meetings." These classes of activities will not normally require the filing of an Environmental Impact Statement or the preparation of an Environmental Assessment. It is possible that an output of this project will be a set of procedures, guidelines or research results which when used would require such an assessment. However, the project itself only proposes analyses and studies and directly supportive activities. Under these guidelines, this activity clearly qualifies for a negative determination at the time when the threshold decision is determined.

3. Design - The project was designed to provide technical assistance and services to the Regional Bureaus, Missions, and LDCs in the area of seed improvement. MSU's Seed Technology Laboratory serves as a major informational and resource center. In this capacity, it provides information and advice on seed and seed problems which is the major source of up-to-date technology available for dissemination. The laboratory complex provides modern facilities unequalled elsewhere for theoretical, practical, and operational training in seed technology, applied seed research, and as a base for technical assistance and advisory services.

4. Summary - The project is technically sound and will provide needed technical assistance and services which have excellent potential for improving farmer practices, and increasing his income while increasing food production at a low expense. With careful project management, its probability of success is high.

B. FINANCIAL PLAN.

This proposal provides for five-years of funding. No personnel will be stationed outside the U.S., although considerable travel will be necessary. The level of effort proposed for the project is based on the trends in utilization of services and other activities under the present contract AID/ta-c-1219, previous contracts, availability of MSU staff, the number of LDCs previously and currently assisted which will require additional periodic assistance, and other LDCs that will need to begin seed program development efforts within the next five-year period.

The projected budget for the first year (4/1/79 - 3/31/80) is FY 79 = \$249,340. The second year budget amounts to FY - \$265,292. The third years budget is FY 81 - \$281,225. The fourth year budget is FY 82 - \$290,000 and the fifth year budget is FY 83 - \$300,000. Present PIC/T obligation FY 79 funds available will be for the first year only. The complete line item budget is shown in Table A.

TABLE A - PROJECTED BUDGETS

Line Item	4/1/79-3/31/80		4/1/80-3/31/81		4/1/81-3/31/82		4/1/82-3/31/83		4/1/83-3/31/84	
	m/m	\$								
1. Salaries ^{1/}										
A. Professional										
(1) Agronomists	18	47,200	18	50,500	18	54,000	18	57,240	18	59,530
(2) Assoc. Agronomist	4	8,800	4	9,400	4	10,100	4	10,706	4	11,135
(3) Agr. Engineer	4	10,400	4	11,100	4	11,900	4	12,615	4	13,150
(4) Agr. Economist	5	11,100	5	11,900	5	12,700	5	13,460	5	14,000
(5) Res. Associate	4	6,800	4	7,270	4	7,800	4	8,270	4	8,600
Subtotals	35	84,300	35	90,170	35	96,500	35	102,291	35	106,415
B. Support Staff										
(1) Jr. Seed Tech- gists ^{1/}	12	19,000	12	20,300	12	21,700		23,000		23,920
(2) Secretary	12	9,600	12	10,300	12	11,000		11,670		12,135
(3) Lab. Technician	4	2,900	4	3,100	4	3,300		3,500		3,640
Subtotals	28	31,500	28	33,700	28	36,000		38,170		39,695
Totals		115,800		123,870		132,500		140,461		146,110
2. Employees fringe Bene- fits (13% of salaries)		15,050		16,100		17,225		18,260		18,990
3. Travel and Transportation		41,000		42,000		43,000		44,250		45,000
A. Domestic (to AID/W and other necessary U.S. travel including allowable per diem).		(1,000)		(1,000)		(1,200)		(1,250)		(1,300)
B. International										
-Transportation		(20,000)		(20,000)		(20,800)		(21,000)		(21,700)
-Per Diem		(20,000)		(21,000)		(21,000)		(22,000)		(22,000)
4. Other Direct Costs		8,000		9,000		9,000		9,500		9,500
A. Communications: postage, cables, telephone, etc.		(1,500)		(2,000)		(2,000)		(2,200)		(2,200)
B. Reproduction & Printing: reports, training materials, references, manuals, blueprints, illustrations, photographs, etc.		(5,000)		(5,500)		(5,500)		(5,800)		(5,800)

TABLE A (Cont'd) - PROJECTED BUDGETS

<u>Line Item</u>	<u>4/1/79-3/31/80</u>		<u>4/1/80-3/31/81</u>		<u>4/1/81-3/31/82</u>		<u>4/1/82-3/31/83</u>		<u>4/1/83-3/31/84</u>	
	<u>m/m</u>	<u>\$</u>	<u>m/m</u>	<u>\$</u>	<u>m/m</u>	<u>\$</u>	<u>m/m</u>	<u>\$</u>	<u>m/m</u>	<u>\$</u>
C. Expendable supplies: stationary, photocopy paper, envelopes, packaging materials, seed, film, chem- icals, miscellaneous office and drafting supplies.		(1,500)		(1,500)		(1,500)				
5. Indirect Costs (overhead) (60% of salaries)		<u>69,480</u>		<u>74,322</u>		<u>79,500</u>				
GRAND TOTALS		249,340		265,292		281,225				

^{1/} Salaries projected to increase an average of 7% each year for professional and supporting staff.

^{2/} Two "Jr. Seed Technologists" with French and Spanish language capability are under active recruitment.

Note: Key personnel are: Drs. H. D. Bunch, James C. Delouche, C. Hunter Andrews, Howard C. Potts and Charles E. Vaughan, Agronomists; Dr. A. H. Boyd, Associate Agronomist; Dr. G. Burns Welch, Agricultural Engineer; Dr. Warren Couvillion, Assoc. Agr. Economist; Mr. James M. Beck, Research Associate; and Jr. Seed Technologists under active recruitment.

C. SOCIAL ANALYSIS.

The initial beneficiaries of this project are those institutions and agencies involved in designing and implementing seed production and supply programs. The program goal and purpose of this project are aimed at poor farm families that are the major producers of grains in LDCs where responsive seed production and supply systems capable of meeting farmer's needs are nonexistent. The project's purpose is to provide technical assistance and services to A.I.D., Regional Bureaus, Missions, and cooperating LDCs in all phases of seed program/industry planning implementation, and evaluation leading to the establishment of responsible seed production and supply systems.

The social impact of this project, then is manifest in its influence on LDC seed production and supply systems which makes them socially acceptable through their objectives of reaching the ultimate project beneficiaries with appropriate improved seed supplies.

D. ECONOMIC ANALYSIS.

This program has been designed as a cost effective means of implementing the project. The principal reason for the favorable cost effectiveness is because of the relationship to existing capabilities and activities and the historical experience of working in the field. This principle of building on existing strengths or predominant capability means that the activities to be undertaken with this program will not have to be initiated from the very beginning and can benefit from installed capacity and in-depth experience.

This project will provide technical assistance and services to assist Bureaus, Missions, and LDCs in making more efficient inputs into seed production/delivery systems. Economic benefits will be high where LDCs can implement recommendations for improved seed multiplication and delivery to the small farmers. This will translate directly to increased food production.

PART IV - IMPLEMENTATION ARRANGEMENTS

A. IMPLEMENTATION PLAN.

The Bureaus, Missions and LDCs will utilize the experience and expertise of MSU to assist with the establishment of an operational, responsive and responsible seed production and supply program, or selected components thereof, adequate for the needs of agricultural development in cooperating countries.

It is recognized that establishment of an adequate seed program/industry in most LDCs will require a long term effort, firm commitment on the part of all parties concerned, and the necessary resources. Favorable policies for seed program development will have to be adopted. The several diverse but inter-dependent components of a seed production and supply system in both the public and private sectors will have to be developed and integrated so that a viable seed program/industry - the ultimate "output" of this project - can and will emerge.

It is also recognized and appreciated that the enormous task of seed program/industry development in the LDCs will - in most cases - have to be accomplished under climatic conditions (hot, humid) which are relatively unfavorable for the production, drying and storage of seed. The available technology which has mostly been developed for temperate climates, therefore, will have to be appropriately modified and/or developed to fit the specific prevailing conditions in the LDCs.

The project purpose and outputs will be generally accomplished through the following methods and approaches:

(1) To the extent of funds made available, Mississippi State University will respond to Bureau and Mission requests for specified in-country services. The period of in-country consulting services will be limited to 30 days per consultant/ specialist per request unless a longer period is specifically justified and authorized by AID/OS/AGR.

The purposes of in-country visits will generally be to: (a) thoroughly review with Mission, LDC and other concerned personnel the on-going or planned projects in which a seed production and supply capability and system is or should be integrated; (b) permit on-site analysis of the status and needs relating to seed production and supply; (c) collect the technical, climatic and economic data need to formulate recommendations and develop designs and specifications; (d) determine the specific requirements for establishing a seed program, or improving existing programs; (e) assist LDC personnel with installation and operational checks of technical facilities and equipment; (f) conduct on-the-job training in the various operations of a seed program; and (g) conduct in-country or regional workshops and training courses in seed production and technology. The development of visual and training aids, development and preparation of facility designs, layouts and equipment specifications, formulation of recommendations and writing of comprehensive reports will generally be done (or completed) after return of specialist(s) to the MSU campus. The completed reports and other documents prepared will be transmitted to the Mission through the pertinent Bureaus, or direct as specified by the Mission and Bureau.

(2) Services and technical assistance provided will generally be on a "first-come, first-served" basis. However, in the event requests for services exceed the programmed level-of-effort or MSU's capacity during certain periods, priorities will be established in consultation with OS/AGR, the Bureaus and relevant Missions.

(3) Available references and other informational materials on the organizational, technical, economic, and management aspects and features of a seed program, specific components thereof, and for specific crops, will be maintained for distribution on request to personnel and agencies in the LDCs, the Bureaus, Missions, other AID-contractors, and other international technical assistance and lending agencies and institutions. In most cases more specific advice and information than available in prepared informational materials will be required. MSU as an

informational and resource center for seed technology will locate, collect, and/or develop and transmit the information requested. In addition to maintaining informational and reference materials already developed and available for distribution, MSU will develop new or revised informational/reference articles on timely subjects related to the managerial, technical, and economic-financial aspects of seed program development.

(4) Training of personnel for all levels in a seed industry will continue to be given high priority. MSU will maintain a minimum of fifteen (15) "slots" in its graduate training program in Agronomy-Seed Technology for participant-trainees from the LDCs, and an unlimited number of undergraduate slots. Participants, of course, will have to meet MSU's requirements for admission. Up to five additional special non-degree student slots will be available as needed. The annual Seed Improvement Course will be continued under its present arrangement.

In addition, MSU will coordinate with the Bureaus, Missions and LDCs to organize and conduct in-country or regional training courses or workshops.

(5) Technical and economic problems - actual or potential - will be anticipated or identified as soon as possible so that work can be undertaken to resolve them before they severely impede agricultural development programs. The problems will be resolved to the extent possible through adaptive research and/or technical innovations. During the next three years major emphasis will be given to: (a) developing "appropriate technology" for drying and testing seed; (b) developing procedures for separation of noxious weed seed and seed from other varieties of "good" seed; (c) developing management and quality control procedures that are better adapted to operational conditions in the LDCs; and (d) development of better procedures for the economic and financial analysis of seed programs or seed program proposals in the LDCs.

The foregoing are problems encountered in previous and current technical assistance activities in the LDCs which require attention. Other problems that surface in connection with specific technical assistance assignments or are brought to MSU's attention by AID, will be analyzed, worked on, and resolved to the extent possible.

3. THREE-YEAR WORK PLAN.

During the 3-year period of this project MSU will provide the following services and undertake the following activities (see also Section VII, LEVEL OF EFFORT (BUDGET)).

1. Advisory consultant services and technical assistance in categories (1), (2), (3), (4), and (6) under "A. Scope of Services and Activities", above and in other areas as may be mutually agreed to by MSU and AID/DSB/AGR.

% TOTAL LEVEL OF EFFORT ----- Approx. 60%

2. Maintenance, operation and continued development of informational/ resource center on seed technology to include responses to inquiries and visitors and preparation and publication of three (3) new or revised informational/reference articles each year on timely subjects related to the managerial, technical, and economic/ financial aspects of a seed industry (Category 7 under "A. Scope of Services and Activities" above).

% TOTAL LEVEL OF EFFORT ----- Approx. 25%.

3. Adaptive, technical and economic studies to develop essential and/or appropriate technology, establish technical design and operational criteria, identify and characterize economic-management requisites vital for efficient and effective seed production and supply operations in the LDCs. (Category 5 in "A. Scope of Services and Activities" above). Specific studies to be undertaken include: (a) an evaluation of the use of desiccants for drying seed (years 1 and 2); (b) mechanical separation of red rice from seed of cultivated rice varieties (years 1 and 2); (c) economic analysis of conditioned storage for seed - study in progress (year 1), (d) an evaluation of materials available in LDCs for use in making germination tests of seed in place of imported materials (year 1); (e) identification of better procedures and criteria for the economic and financial analyses of seed programs and seed program proposals in the LDCs (years 1, 2, 3, continuing studies); (f) studies on other problems that arise in connection with specific technical assistance and service assignments, or as requested by AID/W, the Bureaus, or Missions (each year as needed).

% TOTAL LEVEL OF EFFORT ----- Approx. 15%.

4. General Support - office and laboratory.

Level

Secretarial	12 person months/year.
Lab Technician/clerk	4 person months/year.

C. ASSUMPTIONS.

Realization of the project purpose and outputs is dependent on the following assumptions:

- a. Technical assistance and services available under this project will be requested by LDCs through Missions and Bureaus.
- b. Financial resources needed for development of seed program/ industries will be provided by assisted country, donors, and/or through loans.

- c. Manpower needed to implement, operate, and manage seed industry will be made available for training and employment.
- d. Commitment by LDCs to seed industry development will be of sufficient depth and duration to permit establishment of operational seed programs.
- e. Governments in assisted countries will approve organization of a seed industry program with sufficient flexibility to accomplish its purpose, i.e., along "commercial enterprise lines."
- f. Programs for development of other related inputs of the production improvement "package" will be adequately supported, i.e., extension, credit, varietal improvement and testing, plant protection, fertilizer, etc.
- g. The LDCs will implement plans and advice provided under this project.

D. REPORTS.

MSU will submit a complete activity report to OSB/AGR, the pertinent Bureau and the requesting mission on each consultation visit, training course or workshop, or other specific services/assistance requested within 60 days after return to home station (MSU Campus). Interim summary reports will be provided sooner - even prior to departure from the LDC, when necessary and requested. OSB/AGR will also be provided with a comprehensive annual report of all activities under the project within 60 days following the end of the budget year.

E. EVALUATION PLAN.

The project will be reviewed annually by OSB/AGR to assess the level of effort, processes being followed to deliver services, and magnitude and utilization of the output in each of the four areas of concentration (technical assistance, training, adaptive research, and information services) provided to assist requesting LDCs and USAID missions with seed program/industry development in the recipient countries. This will be accomplished through consultations analysis of contractor reports and visits to the contractor's campus.

In addition, an in-depth review of the project will be conducted during the second year of the extension period. The review and report of findings and recommendations should be completed prior to 31 December 79 in time for any needed modification of project design and the allocation of funds for the third year of project activity. The review will be conducted by a committee which is planned to include representatives of

DS/AGR, regional bureaus, and MSU plus one or more expert outside consultants. The purposes of the indepth review are to assess costs and benefits of project implementation; utilization of project outputs in programs undertaken by the requesting LDCs and/or USAIDs to achieve project purposes and goals; and to make recommendations for future project actions.

DS/AGR, and concerned regional bureaus will develop the scope of work for the indepth review and select members of the review committee 60 days in advance of undertaking the evaluation.

In order to assist with evaluation efforts, DS/AGR and the contractor, in consultation with concerned regional bureaus, will develop criteria and work out means to obtain baseline data needed to document results and utilization of services provided by the contractor for seed program/industry development in recipient countries, e.g., LDC utilization of technical assistance consulting services outputs as inputs for undertaking domestic seed programs; identification of the direct and indirect beneficiaries of contractor services and resulting programs with particular reference to involvement of the primary sector and the effects on "small" and "medium" farmers; utilization of training by participants in recipient country seed programs; LDC participation in development and application of adaptive technology; and analysis and use of project information services in LDCs. Such means may include development and use of brief questionnaires to obtain desired data from cooperating country institutions, participants, and USAID missions; Follow up visits by contractor and DS Bureau personnel to sites of previous consultancies enroute to and from current assignments; and incorporation of utilization data in contractor assessments contained in the trip and semiannual reports currently provided under the project.

REVISED BUDGET-FIVE YEARS

Project: Seed Program and Industry Development
 Project Number: 931-0203.11

<u>CATEGORY</u>	<u>First Year</u> FR:05-01-79 TO:04-30-80	<u>Second Year</u> FR:05-01-80 TO:04-30-81	<u>Third Year</u> FR:05-01-81 TO:04-30-82	<u>Fourth Year</u> FR:05-01-82 TO:04-30-83	<u>Fifth Year</u> FR:05-01-83 TO:04-30-84	<u>Total</u> <u>Five Years</u> FR: 05-01-79 TO: 04-30-84
1. Salaries	\$115,800	\$123,870	\$132,500	\$140,461	\$146,110	\$658,741
2. Fringe Benefits	15,050	16,100	17,225	18,260	18,990	85,625
3. Consultants	10,000	10,400	10,800	11,000	11,400	53,600
4. Travel	49,670	51,628	52,915	53,966	55,704	263,883
5. Other Direct Costs	8,500	9,000	9,200	9,500	10,000	46,200
6. Indirect Costs	73,980	79,002	84,360	89,813	92,796	419,951
(a. 65% of MSU : Salaries)	(69,480)	(74,322)	(79,500)	(84,863)	(87,666)	(395,831)
(b. 45% of consultant)	(4,500)	(4,680)	(4,860)	(4,950)	(5,130)	(24,120)
TOTAL	\$273,000	\$290,000	\$307,000	\$323,000	\$335,000	\$1,528,000

931020300 420.1

✓

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I		1. TRANSACTION CODE <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D	PAF 2. DOCUMENT CODE 5
3. COUNTRY ENTITY DS/AGR/FCP RDA-2 Type C. Field Service		4. DOCUMENT REVISION NUMBER 2	
5. PROJECT NUMBER (7 digits) 931-0203.11	6. BUREAU/OFFICE A. SYMBOL: DSB B. CODE: 10	7. PROJECT TITLE (Maximum 40 characters) Seed Program and Industry Development	
8. PROJECT APPROVAL DECISION <input type="checkbox"/> A APPROVED <input type="checkbox"/> B DISAPPROVED <input type="checkbox"/> C AUTHORIZED		9. EST. PERIOD OF IMPLEMENTATION (For 5-year extension) YRS. 0 5 QTRS 0	

10. APPROVED BUDGET AID APPROPRIATED FUNDS (\$000)									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. Thru 9/30/78		H. 1st FY 79		K. 2nd FY 80	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN	112 I	011	-	2,017	-	273	-	290	-
(2)									
(3)									
(4)									
TOTALS				2,017	-	273	-	290	-

A. APPROPRIATION	N. 3rd FY81		O. 485		FY 82 & 83		LIFE OF PROJECT		11. PROJECT FUNDING AUTHORIZED	
	C. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	ENTER APPROPRIATE CODE(S): 1 - LIFE OF PROJECT 2 - INCREMENTAL LIFE OF PROJECT		A. GRANT	B. LOAN
(1) FN	307	-	658	-	3,545	-			1	-
(2)										
(3)										
(4)										
TOTALS		307	-	658	-	3,545	-	C. PROJECT FUNDING AUTHORIZED THRU		FY 83

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED (\$000)				13. FUNDS RESERVED FOR ALLOTMENT				
A. APPROPRIATION	B. ALLOTMENT REQUEST NO. _____			N/A				
	C. GRANT	D. LOAN		TYPED NAME (Char. SER/FM/FSD)				
(1) N/A				SIGNATURE				
(2)				DATE				
(3)								
(4)								
TOTALS								

14. SOURCE/ORIGIN OF GOODS AND SERVICES 000 341 LOCAL OTHER _____

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

The purpose of this amendment is to extend the life of project by five (5) years (from May 1, 1979 to April 30, 1984) which will require additional funds of \$1,528,000 for the five year period.

FOR PPC/PIAS USE ONLY	16. AUTHORIZING OFFICE SYMBOL	17. ACTION DATE	18. ACTION REFERENCE (Optional)	ACTION REFERENCE DATE
		MM DD YY		MM DD YY

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

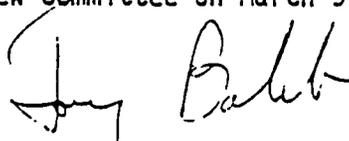
PART II

ENTITY: Bureau for Development Support
PROJECT: Seed Program and Industry Development
PROJECT NUMBER: 931-0203.11

1. I hereby authorize grant funds totaling \$1,528,000 for a five year extension (from May 1, 1979 to April 30, 1984) of the field service project entitled "Seed Program and Industry Development" with Mississippi State University.

2. This five year project extension will be incrementally funded in FY 1979 with \$273,000, in FY 1980 with \$290,000, in FY 1981 with \$307,000, in FY 1982 with \$323,000 and in FY 1983 with \$335,000 depending on the availability of funds.

3. This five year project extension was reviewed and endorsed by the DS Bureau Project Review Committee on March 9, 1979.



Tony Babb
Deputy Assistant Administrator
for Food and Nutrition
Bureau for Development Support

Date: 4/30/79

Clearances:

DS/AGR/FCP: GFWarren GFWarren
DS/AGR/FCP: RMByergo RMByergo
DS/AGR: MMozynski MMozynski
DS/AGR: DFPeterson DFPeterson
DS/PO: RRogers RRogers
DS/PO: RSimpson RSimpson

References:

Action Memo, Peterson(DS/AGR) to Babb (DAA/FN/DSB)-attached
Project Paper, dated 2/22/79-attached

March 20, 1979

ENVIRONMENTAL THRESHOLD DETERMINATION

TO: DAA/DS/FN, Tony Babb
THRU: DS/PO, Robert Simpson
FROM: DS/AGR, Dean F. Peterson *[Signature]*
SUBJECT: Environmental Threshold Determination for

Project Title: Seed Program and Industry Development
Project #: 931-0203.11
Specific Activity: Field Service Project
Reference: Initial Environmental/Examination (IEE)
contained in PP. for subject project extension
dated 2/22/79 (page 16). (attached)

On the basis of the Initial Environmental/Examination (IEE) referenced above and attached to this memorandum, I recommend that you make the following determination:

- X 1. The proposed agency action is not a major Federal action which will have a significant effect on the human environment.
2. The proposed agency action is a major Federal action which will have a significant effect on the human environment, and:
- a. An Environmental Assessment is required; or
- b. An Environmental Impact Statement is required.

The cost of and schedule for this requirement is fully described in the referenced document.

3. Our environmental examination is not complete. We will submit the analysis no later than _____ with our recommendation for an environmental threshold decision.

Approved: *Tony Babb*

Disapproved: _____

Date: 4/30/79

Clearance:

DS/AGR/FCP, GFWarren *[Signature]*
DS/AGR/FCP, KMBergo *[Signature]*
DS/AGR, MZozynski *[Signature]*
DS/PO, RRogers *[Signature]*

Adaptive research activities continues to be an important aspect of contract services. In many ways, the phrase "adaptive research" does not properly define the type of work carried on. Perhaps, "development of essential technology" would be more descriptive, 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 LDCs, especially those with humid or extremely arid tropical or sub-tropical climates.

In retrospect, one can easily discern a gradual evolution in the emphasis and scope of activities beginning with AID-W-607 in 1968. 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 in 1970 and continuing to the present, seed program development in total based in part on economic considerations has been emphasized. Presently, therefore, technical assistance activities involve all the major aspects of agribusiness, *viz.*, production technology, investment, management, training, and marketing. It seems to us that these aspects must continue to be taken into account in rationalizing past, present, and future commitments to seed program-industry development in the LDCs by both AID and MSU.

2. Initial Environmental Examination - The activities of this project fall into the area described in environmental procedure regulations, paragraph 216.2 (c) "Analyses, studies, academic or investigative research, workshops and meetings." These classes of activities will not normally require the filing of an Environmental Impact Statement or the preparation of an Environmental Assessment. It is possible that an output of this project will be a set of procedures, guidelines or research results which when used would require such an assessment. However, the project itself only proposes analyses and studies and directly supportive activities. Under these guidelines, this activity clearly qualifies for a negative determination at the time when the threshold decision is determined.

3. Design - The project was designed to provide technical assistance and services to the Regional Bureaus, Missions, and LDCs in the area of seed improvement. MSU's Seed Technology Laboratory serves as a major informational and resource center. In this capacity, it provides information and advice on seed and seed problems which is the major source of up-to-date technology available for dissemination. The laboratory complex provides modern facilities unequalled elsewhere for theoretical, practical, and operational training in seed technology, applied seed research, and as a base for technical assistance and advisory services.

4. Summary - The project is technically sound and will provide needed technical assistance and services which have excellent potential for improving farmer practices, and increasing his income while increasing food production at a low expense. With careful project management, its probability of success is high.

April 13, 1979

ACTION MEMORANDUM FOR THE DEPUTY ASSISTANT ADMINISTRATOR FOR FOOD
AND NUTRITION, BUREAU FOR DEVELOPMENT SUPPORT

FROM: DS/AGR, Dean F. Peterson *Dean F. Peterson*

Problem: Your authorization is required for a five (5) year extension, requiring funds totaling \$1,528,000, of the field service project "Seed Program and Industry Development" with Mississippi State University (MSU).

Discussion: The socio-economic benefits to the LDCs of the enormous efforts in crop breeding and improvement are directly proportional to the quantity of improved seed multiplied, distributed and planted by their farmers. Much progress has been made in many countries but in several LDCs, seed production and supply systems are notably ineffective to totally lacking. Small to medium sized farmers in these countries who mainly produce basic food and feed crops have only limited access to supplies of improved seed.

MSU started an international seed technology assistance program in 1956 with AID support. As a result of this work, countries such as Brazil have greatly improved their seed handling and delivery systems. The MSU inputs have expanded as the demands for their services increased. For example, from April 1, 1977 to March 31, 1978, the staff spent 358 worker days with the missions and another 315 worker days at MSU giving technical assistance in 13 countries. In addition, they conducted intensive short courses, directed 19 thesis research studies of LDC students, answered technical inquiries, and spent many hours with visitors from LDCs.

In the earlier years, MSU activities were mostly in Latin America but recently they have become heavily involved in Africa and to a lesser extent in the Near East and Asia. The program has been well received and requests for assistance are now exceeding staff capacity. Therefore, an increase in funding was recommended by the DS Bureau Project Review Committee at its meeting on March 9, 1979. An increased funding level will enable the MSU contract to hire current or former advanced degree students in seed production technology and develop them as international seed specialists. Also it will allow the contract to buy additional time of MSU staff during peak periods of demand thus offer more prompt services to the missions. The five year costs for these additional services has been estimated to be \$132,000 or approximately \$26,000 per year. The total five year extension for this project thereby increases from \$1,395,000 (as outlined in the PP which was reviewed on March 9, 1979) to \$1,528,000 for which your authorization is now being requested. A revised five year budget is attached which shows this increased project funding level.

Recommendation: That you approve and authorize this project extension by signing the attached PAF and Environmental Threshold Determination.

Attachments: a/s

Clearances:

DS/AGR/FCP:GWarren	<u>GFW</u>	Date:	<u>4/13/79</u>
DS/AGR:MMozynski	<u>MM</u>	Date:	<u>4/13/79</u>
DS/PO:RSimpson	<u>RS</u>	Date:	<u>4/13/79</u>
AFR/DR:JKoehring		Date:	
ASIA/TR:ADoyle	<u>AD</u>	Date:	<u>4/18/79</u>
LAC/DR:HLusk	<u>HL</u>	Date:	<u>4/16/79</u>
NE/TECH:EKMacManus	<u>EM</u>	Date:	<u>4/16/79</u>

REVISED BUDGET-FIVE YEARS

Project: Seed Program and Industry Development
 Project Number: 931-0203.11

<u>CATEGORY</u>	<u>First Year</u> FR:05-01-79 TO:04-30-80	<u>Second Year</u> FR:05-01-80 TO:04-30-81	<u>Third Year</u> FR:05-01-81 TO:04-30-82	<u>Fourth Year</u> FR:05-01-82 TO:04-30-83	<u>Fifth Year</u> FR:05-01-83 TO:04-30-84	<u>Total</u> <u>Five Years</u> FR: 05-01-79 TO: 04-30-84
1. Salaries	\$115,800	\$123,870	\$132,500	\$140,461	\$146,110	\$658,741
2. Fringe Benefits	15,050	16,100	17,225	18,260	18,990	85,625
3. Consultants	10,000	10,400	10,800	11,000	11,400	53,600
4. Travel	49,670	51,628	52,915	53,966	55,704	263,883
5. Other Direct Costs	8,500	9,000	9,200	9,500	10,000	46,200
6. Indirect Costs (a. 65% of MSU Salaries)	73,980 (69,480)	79,002 (74,322)	84,360 (79,500)	89,813 (84,863)	92,796 (87,666)	419,951 (395,831)
(b. 45% of consultant)	(4,500)	(4,680)	(4,860)	(4,950)	(5,130)	(24,120)
TOTAL	\$273,000	\$290,000	\$307,000	\$323,000	\$335,000	\$1,528,000

66 p

ACTIVITIES UNDER AID/ta-C-1219

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Statistical Summary of Activities -----	1
April 1, 1977 - March 31, 1978 -----	2
June 30, 1975 - March 31, 1977 -----	11
Narrative Summary of Activities in and with LDCs -----	18
June 30, 1975 - March 31, 1978 -----	18
Reports and Papers, 6/30/75 - 3/31/78 -----	28

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

A. Statistical Summary

Period: 1 April, 1977 - 31, March, 1978

		<u>Professional Man Days</u> ^{1/*}	
		<u>With</u> <u>Mission</u>	<u>Home</u> <u>Station</u>
Services performed at request of AID Missions and AID/W normally involves field trips; includes trip preparation; formulation and writing of reports; follow-thru and after actions from home stations.			
Total		358	315
A. <u>Latin America</u>	Subtotal	<u>178</u>	<u>137</u>
1. <u>Bolivia</u> . Consultation on seed equipment and facilities; designs and specifications developed. Report TA 78-01. <u>Beck, Vaughan and Welch</u> ^{2/*} Dec '77.		18	25
2. <u>Costa Rica</u> . Two consultations: -Aug-Sep '77, assistance with first operational run of new seed processing and drying plant at Barranca. Report TA 77-06. <u>Beck and Boyd</u> -Dec '77, assistance with rice seed drying operations. Report TA 77-07. <u>Boyd</u>		46 (40)	20
3. <u>Colombia (CIAT)</u> . Organization and conduct 3-week seed training course for Colombian Seed Specialists and workers from adjacent countries. Report TA 77-8. <u>Andrews, Potts, Welch and Beck</u> . Oct-Nov '77.		50	30
4. <u>Dominican Republic</u> . follow-up to previous consultation. <u>Welch</u> .			6
5. <u>Ecuador</u> -Follow-up on previous projects (Delouche and Welch). -Prep. for training course in May '78. <u>Andrews, Vaughan and Welch</u> .			3 5

^{1/} See footnotes at end of section.

	<u>With Mission</u>	<u>Home Station</u>
6. <u>Guyana</u> . Assistance with preparation of PP on Food Crop Seed Production. Report TA 78-3. <u>Couvillion, Delouche, Potts, Welch and Beck</u> . Feb-Mar '78.	36	30
7. <u>Panama</u> . Two consultations: -May-Jun '77, general consultation on all aspects of seed program. Report TA 77-4. <u>Boyd, Delouche, Welch</u> . -Jan '78, consultation on soybean seed production and harvesting. Report TA 78-1. <u>Boyd, Welch</u>	28 (19) (9)	18
B. <u>Africa</u>	<u>117</u>	<u>104</u>
8. <u>Cameroun</u> . Organization and conduct of seed training course for seed workers from Cameroun and surrounding countries. Report TA 77-9. <u>Beck, Vaughan, Delouche, Welch</u> . Sep-Oct '77	58	24
9. <u>Chad</u> . Assistance with preparation of seed multiplication sub-project PP. Development of designs and specification for facilities. Reports 77-10 & 77-10A. <u>Bunch, Beck, Delouche, Welch</u> . Dec '77, Jan '78.	30	36
10. <u>Guinea-Bissau</u> . Consultation on seed testing; assistance in recruiting seed specialist for 1 yr. assignment in Guinea-Bissau. Report TA 77-05. Jul '77. <u>Andrews, Delouche, Potts</u> .	13	20
11. <u>Niger</u> . Follow-up to previous consultation. <u>Welch, Potts</u> .		2
12. <u>Togo</u> . Review of seed multiplication and control in Togo. Report TA 77-11. <u>Delouche, Potts, Vaughan</u> .	16	16
13. <u>Upper Volta</u> . Background preparation for consultation assignment (April-May '78) <u>Potts, Delouche</u> .		6
C. <u>Near East and South Asia</u>	<u>60</u>	<u>63</u>
14. <u>Nepal</u> . two consultations	60	63

-Jul-Aug '77, survey and review of economic dimensions of seed production and supply. Report TA 77-7A. <u>Couvillion, Delouche, Welch.</u>	(31)	
-Aug-Sep '77, review of technical dimensions of a proposed seed production and supply PP. Report TA 77-7. <u>Delouche, Couvillion, Welch, Potts.</u>	(29)	
D. <u>East Asia</u>	0	0
None		
E. <u>World-wide</u>	0	0
No trips		
F. U.S.	<u>3</u>	<u>11</u>
15. Three trips into seed production areas of Mississippi, Louisiana, and Arkansas to collect economic and technical data on seed operation applicable to LDCs.		9
16. <u>Washington, D.C.</u>	3	2
-Discussion of Nepal project	(1)	
-Discussion of Burundi project	(2)	

^{1/} Man days reported includes only professiona 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) mandays 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.

II. RESPONSES TO TECHNICAL INQUIRIES AND VISITS

A. Statistical Summary

Professional Man Days

Responses to technical inquiries from Missions, LDCs, international development agencies and institutions, and other agencies/institutions involved in technical assistance to LDCs; visits from officials and other personnel from LDCs, Missions, AID/W, and international agencies.

	<u>TOTAL</u>	<u>114.5</u>
A. Latin America	Subtotal	<u>32</u>
1. <u>Argentina</u> - letters	(0.5)	
2. <u>Brazil</u> - letters (1); visitors (5)	(6.0)	
3. <u>Chile</u> - letter.	(0.25)	
4. <u>Colombia</u> - letters.	(1.5)	
5. <u>Costa Rica (CATIE)</u> - visitor.	(4.0)	
6. <u>Dominican Republic</u> - letters, and visitor.	(1.5)	
7. <u>Guyana</u> - letters	(0.5)	
8. <u>Guatemala</u> - letters	(2.5)	
9. <u>Haiti</u> - letter	(0.25)	
10. <u>Honduras</u> - letters (1); visitor (2)	(3.0)	
11. <u>Mexico</u> - letters	(2.0)	
12. <u>Panama</u> - phone calls (.25); visitor (2)	(2.25)	
13. <u>Peru</u> - letters and cables	(2.0)	
14. <u>Venezuela</u> - letters (0.75); visitors (5)	(5.75)	
B. Africa	Subtotal	<u>22</u>
15. <u>Botswana</u> - letters	(2.0)	

16.	<u>Cameroon</u> - letters and cables (1.0); visitors (6)	(7.0)	
17.	<u>Egypt</u> - letters	(1.0)	
18.	<u>Ghana</u> - letters	(1.0)	
19.	<u>Israel</u> - letters	(0.5)	
20.	<u>Jordan</u> - visitor	(2.0)	
21.	<u>Kenya</u> - letters	(1.5)	
21a.	<u>Nigeria</u> - letters (0.5), visitor (2)	(2.5)	
22.	<u>Sudan</u> - letters (1); visitor (2)	(3.0)	
23.	<u>Tunisia</u> - letter	(0.25)	
24.	<u>Upper Volta</u> - letter	(0.25)	
25.	<u>WARDA</u> (Monrovia) - letters	(1.0)	
C.	Near East and South Asia	Subtotal	14.0
26.	<u>India</u> - letters (1.5); visitor (2)	(3.5)	
27.	<u>Irag</u> - letters	(1.0)	
28.	<u>Pakistan</u> - letters, cables, phone calls	(6.0)	
29.	<u>Nepal</u> - letters (1); visitor (2)	(3.0)	
30.	<u>Sri Lanka</u> - letters	(.50)	
D.	East Asia	Subtotal	12.0
31.	<u>Indonesia</u> - letters	(1.0)	
32.	<u>Korea</u> , letters	(0.5)	
33.	<u>Philippines</u> - letters (1); visitor (2)	(3.0)	
34.	<u>Malaysia</u> - letters	(1.0)	
35.	<u>Thailand</u> - letters (4.5) and visitor (2)	(6.5)	
E.	U.S. and World-wide	Subtotal	<u>34.5</u>
36.	<u>ACTION</u> - letters	(0.5)	
37.	AID/W - visitors	(4.0)	
38.	East-West Center (HA) - visitor	(1.0)	

39. FAO - letters and cables	(5.5)
40. <u>IADS</u> - visitor, calls	(3.5)
41. IFDC - call (0.25); visitors (3)	(3.25)
42. INTSOY - calls and letters (1); visitors (3)	(4.0)
43. <u>Kansas State</u> - letter and phone call	(0.5)
44. <u>Rockefeller Fdn.</u> - call and visitor (2)	(2.0)
45. <u>USDA</u> - call	(0.25)
46. <u>U.S. Welfare Service</u> (Utah) - call	(0.5)
47. <u>World Bank</u> - letters and calls	(5.5)
48. <u>CIAT</u> - visitors	(4.0)

III. PREPARATION AND DISSEMINATION OF TRAINING
AND INFORMATIONAL MATERIALS

	<u>Prof. Man Days</u>
Total	<u>80</u>
1. Revision and final editing of Chapter 5, "Preparation of Seed Programmes" in IMPROVED SEED PRODUCTION. FAO Plant Production and Protection Series No. 15. FAO, Rome. 1978 (Delouche and Welch).	6
2. Revision and editing of final draft of chapter on "Getting Seed Used" for IADS Handbook, "Toward a Successful Seed Program - An Administrator's Guide. (Potts and Boyd)	
3. Revision and editing of final draft of chapter on "Seed Supplies Today and Tomorrow" for IADS Handbook cited in 2. above (Delouche, Potts, Vaughan and Andrews).	6
4. Revision and editing of final draft of chapter on "Personnel Development and Staffing" for IADS Handbook cited in 2. (Bunch, Delouche and Potts).	5
5. Revision and additional writing for chapter on "Resources Needed" for IADS Handbook cited in 2. above (Boyd, Welch, Couvillion).	11
6. Paper on "Storage of soybean seed for more than one year." (Delouche).	5
7. Paper on "Effects of <u>Fusarium moniliforme</u> on seedlings of sorghum cultivars" (Andrews and others).	5
8. Preparation and revisions of handbooks on seed drying, seed storage and quality assurance and control (Staff).	10
9. Preparation of draft instructional and training units on: - Concept of seed. - Seed dormancy - Deterioration of seed. (Staff).	21

IV. ADAPTIVE RESEARCH - TECHNICAL AND ECONOMIC

	<u>Prof. Man Days</u>	
	Total	<u>107</u>
1. <u>Development of design criteria for seed storage facilities.</u> Final draft prepared, illustrations and final editing in progress. Manuscript is 95 pages.		9
2. <u>Establishment of basic considerations for seed drying facilities.</u> First draft completed. Revision and illustrations needed. First draft manuscript is 103 pages.		28
3. <u>Economic analysis of conditioned storage of seed. Study in progress.</u> Information urgently needed for use in LDCs.		23
4. <u>Economic analysis of a seed industry.</u> Continuing study of economic dimensions and aspects of the seed segment of the input supply industry which has been essentially totally neglected. The Mississippi seed industry is used as a model with field verifications made as possible during consulting assignments in the LDCs. During this report period, some of information developed was used in economic analyses of seed project papers in Nepal and Guyana.		15
5. <u>Identification of seed characters associated with resistance to weathering and deterioration.</u> Limited work in this area was continued mainly on soybeans cowpeas, and sorghum. Hardseededness in soybeans and cowpeas which is genetically controlled (complex) dramatically improves the resistance of seed to weathering in warm humid climates. In the case of sorghum and other dormancy mechanism does the same thing. It is expected that this line of work will be transferred to Title XII funded research projects on sorghum - millet and beans-cowpeas.		19
6. <u>Mechanical separation of seed of red rice from those of cultivated varieties.</u> Red rice is a serious problem in most rice growing areas. Although it is well known that some mechanical separators can effect a separation of red rice seed from some seed of some varieties of cultivated rice - the efficiency of the separation is not known. In response to many inquiries for information on this separation, a study was initiated to establish the efficiency of several types of separators		13

for several types of red rice and cultivated rice seed. This information will be most useful in deciding whether specialized separators are justified, and for establishment of reasonable tolerances of red rice seed in certified rice seed.

Summary of
 Services Rendered under Contract AID/ta-C-1219
 Mississippi State University - June 75 - April 77

Region/ Country	Origin of Request	Type of Services	No. of Professionals*	Man Days		Remarks
				TDY	Home Station	
<u>Latin America</u>						
1. Argentina	Direct inquiries	Tech. information	2 HS	-	1.5	Inf. on corn and cotton
2. Bolivia	USAID/B	Tech. asst. consultation	1 TDY 2 HS	21	37.0	Consultation TA 76-02 and follow-up
3. Brazil	Direct inquiries and visitors	Tech. information & training	6 HS	-	24.5	7 letters and 35 visitors on 6 visitations
4. Chile	Direct inquiries	Tech. information	1 HS	-	0.5	Training opportunities
5. Colombia	Direct inquiries	Tech. information	1 HS	-	2.5	Inform. on costs of processing and library materials
6. Costa Rica	Direct inquiries, USAID/CR	Tech. information, visits and consultations	3 TDY 4 HS	73	65.0	Reports TA 75-10, 76-04, 76-09, 76-14, 76-15, 76-22, 77-02, letters and visitors
7. Dominican Rep.	Direct inquiries USAID/DR	Tech. information and 3 consultations	3 TDY	44	44.0	Reports TA 76-03, 76-16 A & B, 76-M-2
8. Ecuador	Direct inquiries USAID/E	Tech. information and 4 consultations	4 TDY 7 HS	108	100.5	Reports: TA 75-18, 75-M-3, 76-01, 76-08, 76-10, 76-12, 76-M-3
9. El Salvador	USAID/ES	One consultation	2 TDY 3 HS	26	27.0	Report 75-09, 75-M-4
10. Guatemala	Direct inquiries USAID/G	Tech. information, 2 consultations	2 TDY	7	9.0	Reports: TA 75-M-2, 76-21
11. Guyana	Direct inquiries	Tech. and Tng. information	2 HS	0	1.5	Processing rice

*HS = home station, TDY = overseas services

Summary of Services Rendered Under
 Contract AID/ta-C-1219
 Page 2
 (cont'd)

Region/ Country	Origin of Request	Type of Services	No. of Professionals*	Man Days		Remarks
				TDY	Home Station	
12. Haiti	Direct inquiries	Tech. information	1 HS	0	1.0	Drying
13. Honduras	Direct inquiries, USAID/H	Tech. information, visit, 3 consultations	5 TDY 5 HS	27	25.0	Reports: TA 75-11, 75-17, 75-19
14. Mexico	Direct inquiries	Tech. information, visits	3 HS	0	5.0	Seed storage and training
15. Panama	USAID/P	Consultation	1 TDY	20	12.0	TA 75-16, 77-04
16. Peru	Direct inquiries	Tech. information, training	3 HS	0	2.5	Training program development
17. Trinidad	Direct inquiries	Tech. information	1 HS	0	1.5	Seed production & processing
18. Uruguay	Direct inquiries	Visit	2 HS	0	3.0	Seed certification & processing
19. Venezuela	Direct inquiries	Visits	4 HS	0	8.0	Proc. plant design & general discussions
20. CATIE	Direct inquiries	Tech. information	2 HS	0	2.0	Seed drying
21. CIAT	MSU	Consultation	1 TDY 2 HS	3	3.0	TA 75-M-4 consultation to encourage cooperative efforts
22. Cent. Amer. & Caribbean	USAID/ROCAP USAID/H	Training	3 TDY 5 HS	29	42.0	TA 76-06, 76-19
23. LA Regional	AID/W USAID/H	Consultation	2 TDY 2 HS	12	11.0	TA 77-M-1 Pan American seed seminar

Summary of Services Rendered Under
 Contract AID/ta-C-1219
 Page 3
 (cont'd)

Region/ Country	Origin of Request	Type of Services	No. of Professionals*	Man Days		Remarks
				TDY	Home Station	
<u>Africa</u>						
1. Algeria	Direct inquiry	Tech. information and visit	2 HS	0	3.5	Veg. seed production and seed consultant going on assignment
2. Cameroon	USAID/C Direct inquiry	Visit and information	4 HS	0	9.0	Visit by RDO/USAID/C, information on peanut production
3. Cent. Afr. Rep.	USAID/C&CAR	Consultation	1 TDY 3 HS	15	18.0	TA 76-05
4. Chad	USAID/C	Consultation	3 TDY 3 HS	73	41.0	TA 76-11, 76-18, 76-M-1
5. Egypt	Direct inquiry	Visit and Tech. infor.	2 HS	0	2.0	Training and soybean prod. proc. & stge.
6. Ghana	USAID/G	Consultation	2 TDY	42	30.0	TA 75-08
7. Ivory Coast	State Dept.	Tech. information	3 HS	0	12.0	Follow up to previous consultation
8. Kenya	Direct inquiry	Tech. information	1 HS	0	2.0	Info. & literature on seed handling devices
9. Liberia	Direct inquiry	Tech. information	1 HS	0	1.0	WARDA seed specialist, info on quality control programs
10. Morocco	Direct inquiry	Tech. information	1 HS	0	0.5	Seed testing
11. Niger	Direct inquiry USAID/N	Visit, Tech. infor., consultation	1 TDY	29	25.0	TA 77-01, Tng. seed specialist going on assignment

Summary of Services Rendered Under
 Contract AID/ta-C-1219
 Page 4
 (cont'd)

Region / Country	Origin of Request	Type of Services	No. of Professionals*	Man Days		Remarks
				TDY	Home Sta.	
12. Nigeria	Direct inquiry USAID/N	Tech. info, visit consultation	1 TDY 4 HS	2	15.0	TA 75-14, seed facilities development & tng.
13. Rawanda	USAID/R	Consultation	1 TDY 1 HS	14	8.0	TA 76-17
14. Sudan	Direct inquiry	Tech. information	1 HS	0	1.0	Foundation seed programs
15. Tanzania	U. of Minn.	Visit	2 HS	0	2.0	Participant on exit program
16. Togo	State Dept.	Visit	2 HS	0	1.0	Director of Agri. Research
17. Tunisia	CYMMIT	Visit	4 HS	0	5.0	Two day tng. for Tunisia seed officials
18. Upper Volta	AID/W USAID/UV	Visit and consultation	1 TDY 5 HS	30	29.0	AID seed specialist in tng. and TA 75-15
19. Uganda	Direct inquiry	Tech. information	1 HS	0	0.5	Info. on foundation seed programs
20. Zaire	Direct inquiry	Tech. information	1 HS	0	0.5	Seed program development
21. W. Afr. Rice Dev. Assn.	Visit	Tech. infor. & tng.	4 HS	0	3.0	Dr. Aré general discussions
<u>Near East & So. Asia</u>						
1. Bangladesh	Direct inquiry	Tech. & Tng. info.	3 HS	0	2.0	Experience Inc. & MA on tng., UNDP specialist on seed storage
2. Cyprus	Direct inquiry	Tech. information	1 HS	0	0.5	Seed production

Summary of Services Rendered Under
 Contract AID/ta-C-1219
 Page 5
 (cont'd)

Region/ Country	Origin of Request	Type of Services	No. of Professionals*	Man Days		Remarks
				TDY	Home Sta.	
3. India	Direct inquiry	Tech. info. & visit	4 HS	0	9.0	Info. on equip. and production World Bank tour group
4. Iraq	Direct inquiry	Training	1 HS	0	0.5	FAO rep. info. on tng.
5. Nepal	Direct inquiry FAO	Tech. info. & visit	2 HS	0	3.0	FAO seed specialist visit info. on seed certification
6. Pakistan	Direct inquiry	Tech. information	1 HS	0	1.0	Soybean prod. and seed supplies
7. Saudia Arabia	Direct inquiry	Tech. information	1 HS	0	2.0	Info. on seed quality and processing
<u>East Asia</u>						
1. Indonesia	Direct inquiry	Tech. information	1 HS	0	2.0	Seed storage, testing
2. Korea	Direct inquiry AID contractor	Tech. & tng. info., visit	4 HS	0	6.5	Korean MA officials - 4 days info. on seed treatment
3. Malaysia	Peace Corps	Tech. information	2 HS	0	3.0	Peanut seed operations
4. Philippines	Direct inquiry	Tech. & Tng. inf.	3 HS	0	6.0	Outline and syllibi for Univ. level courses in seed tech. Cent. Mindinao Univ.
5. Thailand	Direct inquiry USAID/T	Tech. & Tng. info., Visits, 3 consultations	7 TDY 7 HS	59	54.75	Reports: 75-07, 75-20, 76-M-4, 5 visitors & tech. info. on soybeans

Summary of Services Rendered Under
 Contract AID/ta-C-1219
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 (cont'd)

Region/ Country	Origin of Request	Type of Services	No. of Professionals*	Man Days		Remarks
				TDY	Home Sta.	
World-Wide - (Intl. Tech. Asst. Organizations, consultants, and similar organizations)						
1. ACTION	Peace Corps	Visit	2 HS	0	2.0	Inter-relationship between contractor and Peace Corps
2. AID/W	AID/W	Visit & consultation	2 TDY 8 HS	4	9.0	AID program officers on visit & contract reviews at MSU & AID.
3. Am. Seed Trade	MSU	Visit	6 HS	0	5.0	ASTA International Exec. Committee meeting
4. CARE	Direct contact	Tech. information	1 HS	0	1.0	Advice on "back-woods" seed dryer (Philippines)
5. CIMMYT	Ford Foun.	Visit	6 HS	0	4.0	N. African seed specialist at MSU for consultation
6. Consultants from developed countries	Direct contact	Tech. information & visits	3 HS	0	7.0	Info. on seed production (Africa); equip. for LDC's; veg. seed processing; rice drying in Fugi islands; tng. in seed tech.; plant design for Ivory Coast.
7. FAO	Direct Contact & AID/W	Tech. info. and consultation	1 TDY 2 HS	7	11.0	Delouche represented AID/W at Rome conference, continuous information exchange
8. IADS	Direct contact	Preparation of info. materials	4 HS	0	50.0	Contributing authors to "An Administrators Guide to Seed Program Development"
9. INTSOY	Direct contact	Tech. info. and 3 group visits	4 HS	0	5.0	INTSOY-training groups soybean seed production

Summary of Services Rendered Under
 Contract AID/ta-C-1219
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 (cont'd)

Region/ Country	Origin of Request	Type of Services	No. of Professionals*	Man Days		Remarks
				TDY	Home Station	
10. IITA	Direct contact	Visit	2 HS	0	2.0	Soybean seed problems
11. Mich. State U.	Direct contact	Tech. information	1 HS.	0	1.0	Information on cereal seed prod. in north and west Africa
12. UNDP	Direct contact	Consultation	1 HS	0	1.0	Desk review of seed activities Cameroon
13. World Bank	AID/W	Vist & Infor.	4 HS	0	6.0	7 man team, So.Asia Div. briefing on seed program development & STL services
14. U.S.						
(a) USDA	Direct Contact	Information	1 HS	0	1.0	Info. on Thai seed programs
(b) MSU	MSU	Educational	2 HS	0	6.0	Trip to Ga.-Ala. peanut area in preparation for consultation to Niger
Subtotals				645.0	839.25	
<u>Other Contract Activities</u>						
1. Preparation of Informational/Reference Material			7 HS	0	131.0	
2. Adaptive Research/Technical/Economic Studies			7 HS	0	181.0	
3. Administration: preparation of annual reports; coordination with TAB and Bureaus, etc.			3 HS	0	40.0	
PROFESSIONAL TOTALS				645.0	1191.25	

Narrative Summary of Activities in LDCs
30 June 1975 - 1 April 1977

A. Latin America

1. Bolivia (Jan-Feb, 1976)

Assistance given in the installation of seed processing equipment at Cochabamba ordered following previous (1973) consultation. Consultant and GOB technicians prepared basic plans for expansion of seed processing and distribution facilities at Chuquisaca, Tarija and Potosi and a new facility at Santa Cruz. Follow-up anticipated for on-the-job training and installation of new equipment. (Report TA 76-02).

2. Costa Rica (July, '75, Apr., May, Aug, Nov., 76, Jan, 77)

The seven consultations were part of the continuous assistance given the Mission and GOCR in implementation of the seed component of the AID sector loan. Consultation activities included working with the architect in the modifying of specifications of plans for the Barranca seed processing facility, the building contractor in proper installation of equipment and on-the-job training of local personnel when the facility became operational.

An initial economic analysis of the Barranca facility's operations was made to provide base data for future operational decisions. Additional analyses to determine location of new facilities and effectiveness of seed marketing procedures are planned. Development of these base data are considered critical to the establishment of economic guidelines for seed processing and marketing operations in the LDCs. Such information simply is not available at present.

Visits were also made to CAITE (Turrialba) to work on solutions to seed drying and storage problems (Reports TA 75-10, 76-04, 76-09, 76-14, 76-15, 76-22, 77-2).

3. Dominican Republic (Feb-Mar, Aug-Sept, Nov, 76)

The initial consultation was made to assist USAID/DR in preparation of the improved seed and plant materials component of a proposed Agricultural Sector Loan II. Two follow-up consultations were provided. The first to review the seed/plant materials activity as incorporated into the Loan's project paper, to outline the implementation plan, and determine the facility and equipment needs. Upon return to the home station, preliminary engineering drawings and technical specifications for all recommended equipment were prepared and returned to the Mission.

The third consultation was made to work with the architect, construction engineer and GODR personnel on the detailed drawings

and installation plans. Subsequent requests are anticipated during construction and equipment installation and for on-the-job training during the initial operation period (Reports TA 76-03, 76-16 A&B, 76-M-2).

4. Ecuador (Aug, Oct-Nov 75; Jan, May, May-June, July, Dec 76)

Ecuador has been the focus of rather intensive assistance by the contractor since 1970, however, the need for further assistance is limited. During the past two years the initial consultation was made to review the plans for a processing facility to be built under AID Loan 518-L-033. The need for this facility was questioned in view of the formation of a newly operational public-private seed company, Empresa Mixta de la Semillas.

The Mission then requested assistance in making a detailed review of Ecuador's total seed program and possible inputs by the USAID in view of the pending approval of a \$3 million World Bank loan for seed industry development. The principal areas of needed input were determined to be in training and the design and equipment specifications necessary to complete the EM Semillas processing facility which would fill the needs of the AID Loan. Two training courses were conducted in cooperation with the principal GOE agencies concerned for 60 participants. The design and equipment specifications for the processing facility were completed at the home station with the Ecuadorian technician sent to the U.S. by the Mission. Subsequently, an MSU consultant returned to Ecuador to assist in the evaluation of bids for the construction and equipment which were awarded in December, 1976.

In addition to the above, the Mission requested preparation of layout plans and equipment specifications for a 100 MT and 200 MT grain receiving, drying, and bulk storage facilities. This request was honored without overseas travel because of the in-country combined knowledge and expertise of the Laboratory staff (Reports TA 75-M-3, 75-18, 76-01, 76-08, 76-10, 76-12, 76-M-3).

5. El Salvador (July-Aug, Nov. 75)

Following a five year period of relative inactivity, the GOES renewed emphasis on seed program activities requesting assistance to revise and update programs and plans originally developed in 1968-70. Two consultants worked with GOES technicians to revise the plans and needs and subsequently prepared the equipment specifications and plans. A brief visit was made during November to work with the architect and engineers to verify design and construction details. A request for follow-up assistance is anticipated after the buildings are completed and the equipment installed. (Reports TA 75-09, 75-M-4).

6. Guatemala (Nov, 75, Oct, 76)

Two brief consultations were made, as "stop-over" visits, to work with ICTA, DIGESA, and Rockefeller personnel in the location and

design of a foundation seed processing facility to be funded by BID. A location near Guatemala City was selected and the equipment layout initially proposed by the architect was altered to gain efficiency. Plans for a bag dryer were supplied. No requests for technical assistance are anticipated because GOG, BID and Rockefeller personnel are adequate to implement the current program. (Reports TA 75-M-2, 76-21).

7. Honduras (July, Sept-Oct, Oct-Nov, 75)

During a stop-over visit in July 75 to initiate planning for a regional training course (see Central Amer. & Caribbean) USAID and GOH officials requested further assistance in the development of seed legislation and to review and recommend improvements in the operation of processing facilities at San Pedro Sula and Tegucigalpa, both part of the AID/GOH Ag Sector loan. The consultant on seed legislation rendered his services during Sept-Oct and the processing engineer in Oct-Nov.

Reportedly, marked improvement in operational efficiency of operations had been achieved by March 1977, however, the proposed seed legislation had lost emphasis due to the resignation or transfer of several key seed specialists. Future requests are dependent upon the emphasis placed upon the seed program activities by the "new" officials (Reports TA 75-11, 75-17, 75-19).

8. Panama (Sept 75)

Among the periodic services requested by the GOP through the Mission was for a consultant to supervise on-the-job training of personnel in the GOP seed program at three facilities completed under supervision of MSU consultants. Recommendations were also made to encourage assumption of responsibility for foundation seed production by the Dept. of Agronomy of the U. of Panama and that commercial seed be produced and distributed by the MID A/MA as an autonomous quasi-commercial organization. A request for assistance was received in April '77 to assist in planning the implementation of the above recommendations (Report TA 75-16, TA 77-04).

9. CIAT (Aug '75)

A stop-over visit was made for the purpose of exploring possible areas of cooperation in training, research or service between CIAT and this contractor. Areas of potential cooperation which were identified included: training in all aspects of seed technology. Although CIAT facilities for practical training in the subject matter areas are very limited. The MSU contract could also assist CIAT in the organization and development of a foundation seed program and facilities to permit more effective extension of CIAT's crop breeding efforts to the adjacent countries. Such facilities could also serve a training function. (Report TA 75-M-4). A regional training course in seed production and technology, sponsored by MSU/AID, CIAT and GOC, will be held October 17 - November 11, 1977.

10. Central America & Caribbean (May, Oct-Nov '76)

The IV International Training Course in Seed Technology was held at the Escuela Agricola Panamericana (EAP) October 31-November 13, 1976. Twenty-eight participants from seven countries completed the course with 17 third-year students at EAP attending the lectures. Although specific dates have not been established, it is anticipated that a fifth course will be held at this site in 1978-79 (Reports TA 76-06, 76-19).

11. Latin America Regional (Mar '77)

Two consultants served as AID observers during the VIII PanAmerican Seed Seminar held in Tegucigalpa, Honduras. Technicians from 17 Latin American countries, Canada, Spain, Switzerland and the U.S. participated. A paper emphasizing the USAID technical assistance program for Seed Industry Development was presented. Numerous requests for information were filled and tentative requests for technical assistance were made by representatives from Costa Rica, Dominican Republic, Honduras, Columbia and Ecuador.

B. Africa

1. Central African Republic (Apr-May '76)

The AID and UNDP are supporting the GOCAR in the expansion and equipping of seed facilities at the Grimari research center. The contractor provided the services of a seed equipment specialist to determine the building, equipment and training needs and prepare specifications for those materials to be supplied by the Mission. The facilities to be established include a seed testing laboratory, a seed drying and processing unit and a storage facility. In this program, in-country training will be the responsibility of an FAO seed specialist.

A second phase of expansion and improvement of seed facilities is anticipated after operations are initiated at Grimari (about 1979). It is probable that the Mission will request further assistance at that time. Report TA 76-05.

2. Chad (June-July 76, October 76)

The initial request was for assistance in preparing a PID for the multiplication and distribution of improved seed and plant materials of selected crops. The basic program outlined included existing GOC facilities and personnel to the extent possible. A foundation seed project was proposed for the principal research center with seed multiplication centers to be established at three strategic locations. The national extension service would serve as the seed distribution agents.

Following AID/W reviews the PIDs prepared by the MSU and other consultants, were consolidated and this contractor was re-

requested to provide both a seed multiplication and an agronomic research consultant to work with a grain marketing consultant, supplied under the AID/KSU contract, to prepare a PRP entitled, "Agronomic Research, Seed Multiplication and Grain Marketing Project". The PRP was prepared and reviewed by Mission personnel prior to the consultant's departure.

The seed multiplication portion of the PRP was eliminated during the PRP review procedure because of funding limitations, therefore, this contractor declined further involvement until need for consultations concerning seed are requested (Reports TA 76-11, 76-18, 76-M-1).

3. Ghana (June-July 75)

This was the fourth in a series of consultations dating back to 1973. As the result of previous consultations the overall GOG seed project were outlined, sites for facilities identified, preliminary building and equipment layout drawings prepared and subsequently approved. The primary purpose of this two-man consultation was to assist the Mission and GOG in preparation of the equipment orders and prepare cost factor determinations for building construction, equipment and operational costs for each of three facilities for a five year period.

Additional assistance will be required when the proposed facilities near completion (Report TA 75-08).

4. Niger (Jan-Feb '77)

The USAID/N requested assistance from MSU to determine the need for, and feasibility of, construction of a climatized seed storage facility for peanut seed. It was determined that a 150 MT capacity conditioned storage facility was needed to assure the maintenance of peanut seed of acceptable quality for a period of 18 months. This seed would serve primarily as an emergency reserve in case of natural disaster and to preserve valuable breeding materials. Preliminary engineering drawings for construction and detailed equipment specifications were provided. No overseas follow-up is anticipated since the AID/CIC contract has a seed specialist in Niger, however, this contractor will continue its back stopping role for Mission and CIC personnel involved in the Natl. Cereal Crop and Peanut Seed Projects. (Report TA 77-01).

5. Nigeria (June-July 75)

The Joint Cereals Project 26 requested through USAID/Lagos assistance of one consultant to plan and develop building and equipment layout drawings and prepare equipment specifications for the foundation seed project at IAR/ABU. Drawings for office, quality control, drying, processing, and storage facilities were prepared along with specifications for the equipment to be purchased from the U.S. Recommendations for seed production, marketing and training of personnel were made (Report TA 75-14).

6. Rwanda (Sept-Oct '76)

A three man team was organized by AID/W to visit Rwanda for the purpose of developing a project in seed multiplication with the technical consultant provided by MSU. No interest was expressed by any GOR organization for U.S. assistance in developing a seed project. The report suggested some possible ways in which the USAID may be able to assist, should a request for assistance be received at some later date (Report TA 76-17).

7. Upper Volta (Sept-Oct '75)

A modest seed multiplication project has been undertaken by the USAID/UV and the GOUV. USAID assistance to this program includes training and supply of essential facilities and equipment for a seed testing laboratory and four seed storage facilities. Funds for processing facilities and the included equipment are being supplied by the Austrian government.

The achievements of this consultation were elimination of duplication of equipment, evaluation of equipment procurement lists, preparation of detailed equipment specifications for U.S. origin equipment and preparation of layout drawings for laboratory, office and storage facilities. (Report 75-15). The Chief of the U.V. seed service participated in the AID/USDA Seed Improvement Training Course, June-Aug 1977.

C. Near East and So. Asia - None

D. East Asia

1. Thailand (April-June, Nov-Dec 75, Nov 76)

Continued assistance has been provided USOM/T and the RTG since 1973. This periodic technical assistance was culminated in June 1975 with the acceptance of the PP for the Thailand Seed Project and the granting of a \$4 million loan to the RTG for the development of a nationwide production, processing and marketing program for seed of the six basic crops of Thailand.

In October 75, the RTG and USOM/T requested services of a seed specialist to prepare designs and equipment specifications for the seed facilities recommended by the MSU consultants which served on the PP team. Preliminary designs and equipment specification lists for the Phitsanulok and Korat (formerly Khon Kaen) seed centers were prepared and reviewed prior to the consultant's return. Preliminary designs for the Lampang (formerly Chiang Mai) were developed after return.

Following consultations at MSU with several RTG officials the USOM/T requested services of two MSU staff members to work with USOM and RTG officials to develop a technical assistance contract suitable to attract a qualified organization to assist in implementing the Seed Development Project. A tentative contract and proposed budget were prepared and approved by the tech-

nical agencies involved (Reports TA 75-07, 75-20, 76-M-4)

E. World Wide

1. FAO-Rome (Nov-Dec 76)

The Director of the STL was designated as the AID delegate to the 2nd Expert Consultation on Seed Industry Development and to give a paper, "Development of technology for storage of seeds under adverse climatic conditions." The Director was elected chairman and presided during the conference during which a wide range of programming and technical subjects were presented and discussed. The conference report was adopted with copies provided to AID/W.

1 April 1977 - 31 March, 1978

A. Latin America

1. Bolivia (Dec, 1977)

Two consultants responded to request from USAID/Bolivia for assistance in developing seed equipment specifications and designs for seed sub-project of agricultural sector loan. The assistance requested was provided. It is anticipated that periodic requests for assistance will be made as sub-project is implemented. Report No. TA 78-01, 24 pp., plus 6 blueprints.

2. Costa Rica

Aug-Sept, 1977. Two consultants were requested to assist GOCA and CNP with the initial start-up operation of CNP's new seed processing and drying plant at Barranca. Numerous modifications were worked out in collaboration with the contractor to improve flow of seed through the plant, and to eliminate "bugs" that crept into the installation. Report No. TA 77-06, 24 pp.

Dec, 1977. One consultant was requested to assist CNP during the first full scale operation of new rice drying and cleaning facilities at Barranca. Several adjustments had to be made, but the new facilities performed quite satisfactorily and according to design specifications. Report TA 77-7A, 1 pp.

3. Colombia (Oct-Nov, 1977)

Assistance was requested for the organization and conduct of a three week seed training course for Colombian private and public sector seed specialists, and several from surrounding countries. The course was organized and conducted in collaboration with CIAT. Thirty-five technicians participated in the training course: 24 from Colombia (10 private sector, 14 public sector); -2 Brazil; 1-Bolivia; 1-Panama; 1-Honduras; 2-Peru; 1-Dominican Republic; 1-Ecuador; 1-Jamaica; 1-Guatemala. The course was judged to be excellent. Report No. 77-8, 19 pp.

4. Dominican Republic

Assistance from home station was requested several times to further clarify technical details in designs and specifications for seed facilities developed during previous consultations. No travel involved. No formal report prepared.

5. Ecuador

Assistance from home station was requested several times to resolve technical problems encountered in implementation of recommendations and designs made during previous TDY consultations. Preparations were also made to respond to a request for a training course which was held in May, 1978 (after this reporting period). No report prepared.

6. Guyana (Feb-Mar, 1977)

USAID/Guyana requested services of two specialists to assist the Mission with preparation of a PP on Food Crop Seed Production of a PP on Food Crop Seed Production. A seed technologist and agricultural economist undertook the assignment. A report was prepared providing information and analyses needed for the PP Report No. TA 78-3, 75 pp.

7. Panama

May-Jun, 1977. Specialist was requested to give assistance and advice to the seed program in Panama. All facilities were visited and recommendations were made concerning maintenance, repairs, and operational procedures. Report No. TA 77-4, 50 pp.

Jan, 1978. Services were requested by USAID/Panama to assist the GOP with its first attempt at soybean seed production and harvesting. An INTSOY plant pathologist joined the MSU specialist during the consultation. Report No. TA 78-1, 7 pp.

B. Africa

8. Cameroun (Sep-Oct, 1977)

MSU was requested under contract AID/ta-C-1219 to organize and conduct a seed training course for Cameroun and other Central Africa countries. A 2½ week course was organized and conducted at Maroua, Cameroun from Sep. 19 to Oct. 5, 1977. The two MSU instructors arrived a week early to prepare for this "first" course. Thirty-two technicians (Cameroun -23; Niger -3; Togo -2; Empire Central Africian -3). An interpretator was used as all participants were French speaking. It is anticipated that a second training course will be needed when processing and other seed facilities are completed. Report No. TA 77-9, 28 pp.

9. Chad (Nov-Dec, 1977)

Assistance was requested for preparation of the "seed multiplication sub-project of the Agronomic Research, Seed Multiplication and Grain Marketing Project Paper" for Chad. This was the third stage of consultation. In earlier consultations, assistance was given in preparation of the PID and PRP documents. Much of the report and all the technical specifications and designs were prepared after consultant's return to home station. Report Nos. TA 77-10, 47 pp., and TA 77-10A, 29 pp., plus 6 blueprints.

10. Guinea-Bissau (July, 1977)

One specialist was requested to assist with the review of a PP for a Seed Laboratory-Seed Storage-Plant Pathology Project for Guinea Bissau. The MSU specialist joined the CDO for Guinea Bissau, a civil engineer, and an AID/TDY Officer for the review. The review as made and appropriate revisions recommended in the PP. On return to home station, equipment and space specifications for a seed testing and a plant pathology laboratory were prepared along with an implementation time frame, budget, and terms of reference for a technical assistant for the project. A technical assistant was then recruited and he was subsequently hired by AID for a one year assignment in Guinea Bissau. Report No. TA 77-05, 27 pp.

11. Niger

Assistance from home station was requested in continuation of services provided during previous TDY consultations. No formal report was prepared.

12. Togo (Nov, 1977)

Assistance was requested for review of seed multiplication and control in Togo. During the review it was determined that the World Bank was funding one project and about to fund another project both of which had "seed components". In view of this situation and considering difficulties Togo was experiencing in finding personnel for the SAFGRAD project, recommendation was made to defer AID intervention until progress under the WB projects could be determined and implementation of SAFGRAD was well underway. Report No. 77-11, 51 pp.

13. Upper Volta

Background material on Upper Volta agricultural sector and seed multiplication project was reviewed in preparation for a project evaluation assignment in the next report period (April-May, 1978).

C. Near East and South Asia

14. Nepal (July-Aug, Aug-Sep, 1977)

Two specialists were requested to assist USAID/Nepal with preparation of a project paper on seed production. The two specialists - an economist and seed technologist - were scheduled to make the trip together. Difficulties arose, however, which required a delay in the seed technologist's consultation. The seed program in Nepal were thoroughly reviewed. Pertinent parts of the PP were drafted. Reports TA 77-7, 107 pp., and TA 77-7A, 20 pp.

REPORTS AND PAPERS

1 April 1975 - 1 August 1977

A. Activity Reports Submitted under Contract AID/ta-C-1219

	<u>MSU/STL Report Number</u>	<u>Title</u>
1.	TA 75-07	Project Paper - Thailand Seed Industry Development 243 pp.
2.	TA 75-08	Ghana National Seed Program Facilities. 61 pp.
3.	TA 75-09	Consultation Visit with USAID/ES and CENTA, GOES. 19 pp. 11 blueprints.
4.	TA 75-10	Consultative Visit with USAID/Costa Rica and GOCR. 10 pp.
5.	TA 75-11	Consultative Visit with USAID/Honduras, Escuela Agricola Pan-Americana and the GOH. 8 pp.
6.	R 75-12	Terminal Report. AID/CM/ta-C-73-34. 118 pp.
7.	R 75-13	Periodic Report to AID (AID/CM/ta-C-73-34). 34 pp.
8.	TA 75-14	Foundation Seed Project Facilities for ABU/IAR (Nigeria). 33 pp. 5 blueprints.
9.	TA 75-15	Upper Volta Seed Multiplication Project. 46 pp. 2 blueprints.
10.	TA 75-16	Consultation Visit with Panama Seed Project. 13 pp.
11.	TA 75-17	Seed Legislation Consultation in Honduras. 50 pp.
12.	TA 75-18	Seed Program/Industry Development in Ecuador. 53 pp.
13.	TA 75-19	Seed Processing Center Evaluation in Honduras. 39 pp.
14.	TA 75-20	Consultation Visit on the Thailand Seed Development Project. 36 pp., 13 blueprints.
15.	TA 75-M-1	Not used.
16.	TA 75-M-2	Seed Program Consultation in Guatemala. 7 pp.
17.	TA 75-M-3	Preliminary Evaluation of Ecuador's Seed Facility Plans. 5 pp.
18.	TA 75-M-4	Possible Areas of Cooperative Work with CIAT. 4 pp.
19.	TA 76-01	Seed Production and Training Course. Boliche Exp. Station, Guayaquil, Ecuador. 11 pp.

20. TA 76-02 Republic of Bolivia Seed Program. 31 pp. 8 blueprints.
21. TA 76-03 Improved Seed and Plant Materials Program for the Dominican Republic. 75 pp.
22. TA 76-04 Report on Consulting Support to CNP, Costa Rica. 4 pp.
23. TA 76-05 Report to USAID/Yaounde and AID/W on Central Africa Republic Seed Project. 26 pp.
24. TA 76-06 Report on Consulting Visit to Coordinate Planning of C.A. Training Course. 42 pp.
25. R 76-07 "Annual" Report of Contractor's Services to TAB/AID/W. 55 pp.
26. TA 76-08 Report on Seed Production and Training Course, Santa Catilina (Ecuador). 12 pp.
27. TA 76-09 Report on Consulting Visit to Costa Rica to assist CNP. 6 pp.
28. TA 76-10 Report to USAID/Ecuador and AID/W on Coastal Seed Facility. 50 pp. 7 blueprints.
29. TA 76-11 Seed Multiplication and Distribution in Chad. 28 pp.
30. TA 76-12 Report on 100-200 MT Grain-Cleaning-Drying-Storage Facility (Ecuador). 22 pp., 4 blueprints.
31. TA 76-14 Report on Assistance to Costa Rica on Various Phases of Seed Program. 9 pp.
32. TA 76-15 Economic Analysis of the Seed Drying and Processing Facility for CNP, Barranca, Costa Rica. 39 pp.
33. TA 76-16A Seed/Plant Materials Multiplication/Distribution: Dominican Republic; Agr. Sector Loan II. 17 pp.
34. TA 76-16B Seed/Plant Materials Multiplication/Distribution: Dominican Republic. Agr. Sector Loan II. Equipment and Facilities. 54 pp., 15 blueprints.
35. TA 76-17 Consultation Services with an AID/REDSO/EA Team Visiting Rwanda. 27 pp.
36. TA 76-18 Agronomic Research Sub-Project of the Agronomic Research, Seed Multiplication, and Grain Marketing PRP for Chad. 30 pp.
37. TA 76-19 Report on IV International Seed Training Course for ROCAP and Caribbean Areas. 16 pp.

38. TA 76-21 Report on Consultation Visit to Guatemala (ICTA, RF, USAID). 2 pp.
 39. TA 76-22 Report on Inspection Visit to Seed Facility at Barranca, Costa Rica. 5 pp.
 40. TA 76-M-1 Memorandum on Consultation Visit to Chad (remainder of report in PRP form, AID/W). 5 pp.
 41. TA 76-M-2 Report on Consultation Visit to Dominican Republic (USAID/DR, CНИЕCA, Juma). 3 pp.
 42. TA 76-M-3 Report on Consultation Visit with Semillas Certificadas CIA de Economica Mixta (Ecuador). 9 pp.
 43. TA 76-M-4 Report on Consultative Visit with USOM/ Thailand. 4 pp.
 44. TA 77-01 Climatized Peanut Seed Storage Facilities for Niger. 26 pp., 2 blueprints.
 45. TA 77-02 Report on Visit to Costa Rica to Assist CNP in Initial Operation of Facilities. 6 pp.
 46. TA 77-03 "Annual Report of Contractors' Services 1 April 1976 - 31 March 1977." 56 pp.
 47. TA 77-M-1 Report on VIII Pan American Seed Seminar and Seed Program Activities in Pan American Countries (Honduras). 11 pp.
 48. R 77-M-2 "Statistical Summary of MSU/AID Technical Assistance Contract Activities. April 1958 - March 1977. 18 pp.
- B. Technical Reports and Published Papers for or in support of contract activities.
1. U. R. Bishnoi and J. C. Delouche. 1975. Cotton seed quality and its relation to performance in laboratory and field tests. p 90 Agron. Absts., Am. Soc. Agron.
 2. J. C. Delouche. 1975. Planning seed programs with developing countries. p 92 Agron. Absts., Am. Soc. Agron.
 3. J. C. Delouche. 1975. Formulation of a seed industry plan. Chap. III. In "Seed Industry Development". FAO-Rome (In Press).
 4. Aguiar, P. A. A. and H. C. Potts. 1975. Some relationships between seed diameter and quality in soybeans (Glycine max (L) Merrill). p. 90 Agron. Absts., Amer. Soc. Agron.
 5. Duangpatra, J. J. and H. C. Potts. 1975. Some characteristics of hard seed development in soybeans. p. 92 Agron. Absts., Am. Soc. Agron.

6. Davis, R. G. and C. H. Andrews. 1976. The effect of foliar applications of fungicides on the internal microflora of soybean seed in Mississippi. Absts. Am. Path. Soc. -So. Div. (1977).
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15. Peske, S. T. and A. H. Boyd. 1976. Processing Pensacola bahiagrass seed. p. 95. Agron. Absts., Am. Soc. Agron.
16. Chandler, J. M., R. L. Munson and C. E. Vaughan. 1976. Purple moonflower: emergence, growth, reproduction. Weed Sci. 25: 163-167.
17. Ghanmi, M. and C. E. Vaughan. 1976. The use of polyethylene glycol 6000 and mannitol to simulate drought conditions in germinating wheat. p. 94. Agron. Absts., Am. Soc. Agron.
18. Beck, J. M. 1977. Damper control for use with a dessicant dehumidifier. 5 pp. Seed Tech. Lab., Miss. State Univ.
19. Burson, B. L., J. Corea and H. C. Potts. 1977. An anatomical study of seed shattering in bahiagrass and dallisgrass. Crop Sci. 17: (In Press).

20. Potts, H. C., J. Duangpatra, W. G. Hairston and J. C. Delouche. 1977. Some influences of hardseededness on soybean seed quality. *Crop Sci.*, 17: (In Press).
21. Potts, H. C. and F. C. Byrnes. 1977. Getting seeds used. Chapt. VI In *An administrator's Guide to Successful Seed Programs* (J. E. Douglas ed.) (In Review). IADS, NY, NY.
22. Delouche, J. C. and W. F. Feistritzer. 1977. Seed supplies today and tomorrow. Chapt. I In *An administrator's Guide to Successful Seed Programs* (J. E. Douglas ed.) (In Review) IADS, NY, NY.
23. Bunch, H. D. and C. Vechi. 1977. Personnel development and staffing. Chapt. VII In *An Administrator's Guide to Successful Seed Programs* (J. E. Douglas ed.) (In Review), IADS, NY, NY.
24. Dougherty, G. M. and O. Svensson. 1977. Resources. Chapt. VIII In *An Administrator's Guide to Successful Seed Programs* (J.E. Douglas ed.) (In Review) IADS, NY, NY.

The following articles will be published in the Proceedings 1977 Short Course for Seedsmen. Vo. 19. Seed Tech. Lab., Miss. State Univ.

25. Vaughan, C. E. and H. C. Potts., Processing soybean seed.
 26. Potts, H. C., Processing small grain seed.
 27. Delouche, J. C., Needed - A quality control program.
 28. Andrews, C. H., Pathological considerations of seed quality.
 29. Potts, H. C., Non-uniform seed lots: Causes.
 30. Welch, G. B., Conditioned seed storage: Technical considerations.
 31. Couvillion, W. B., Conditioned seed storage: Economic considerations.
- C. Dissertations and Theses which support contract activities.
1. D. B. Desai. 1975. Effects of fungicide seed treatments on germination and emergece of soybean in relation to seed quality. Dissertation, Indian student directed by Dr. Delouche.
 2. C. W. Jordan. 1975. Some effects of temperature on germination of soybeans as related to cultivar and vigor. Dissertation, American student directed by Dr. Delouche.
 3. C. T. Wetzel. 1975. Some effects of seed size on performance of soybeans. Dissertation, Brazilian student, directed by Drs. Potts and Delouche.

4. S. B. daRocha. 1975. Relation of specific gravity of rice to laboratory and field performance. Thesis, Brazilian student, directed by Dr. Andrews.
5. C. L. Rosal. 1975. Design criteria for a basic seed processing facility. Thesis, Brazilian student, directed by Drs. Welch and Boyd.
6. M. B. Mohd-Lassim. 1975. Comparison of rates of field deterioration of Mack, Dare, and Forrest soybean seed. Thesis, Malaysian student, directed by Dr. Delouche.
7. B. P. Parajuli. 1975. An equilibrium relative humidity method for measuring moisture content in seed and grain. Thesis, Nepalese student, directed by Dr. Delouche.
8. N. R. A. Vieira. 1975. Development and release of seed dormancy in rice as related to stage of maturity. Thesis, Brazilian student, directed by Dr. Delouche.
9. C. Pieta Filho. 1975. Effects of freezing temperature on sorghum seed differing in moisture content. Thesis, Brazilian student, directed by Dr. Potts.
10. A. L. Alvim. 1975. Relation of seed size and specific gravity to germination and emergence in sorghum. Thesis, Brazilian student, directed by Dr. Delouche.
11. S. Srijugawan. 1975. Relation of seed size and seed weight to germination in wheat. Thesis, Thai student, directed by Dr. Delouche.
12. J. Duangpatra. 1976. Some characteristics of the impermeable seed coat in soybeans. Dissertation, Thai student, directed by Drs. Potts and Delouche.
13. A. J. M. A. Islam. 1976. The influence of specific gravity and deterioration of rice seed on field performance under two plant populations. Dissertation, Bangladesian student, directed by Drs. Delouche and Merwine.
14. V. Boonying. 1976. Effect of foliar application of benomyl on seed quality and yield in soybeans. Dissertation, Thai student, directed by Dr. Andrews.
15. G. E. Galvez. 1976. Establishment of a program in Brazil for producing disease-free seed of beans. CIAT, Cali, Columbia, Special study coordinated by Dr. Gregg.
16. M. A. C. Ogidi. 1976. Effects of seed germination level and planting method on performance of rice seed. Thesis, Nigerian student, directed by Dr. Potts.
17. M. Ghanmi. 1976. The use of polyethylene glycol 6000 and mannitol to simulate drought conditions in germinating wheat. Thesis, Tunisian student, directed by Dr. Vaughan.

18. F. M. Daher. 1976. Resistance to air flow and drying studies on Pensacola bahiagrass seed. Thesis, Brazilian student, directed by Drs. Boyd and Welch.
19. C. Bragantini. 1976. Effects of screen adjustments on removal of undersize materials from a soybean lot. Thesis, Brazilian student, directed by Mr. Dougherty and Dr. Potts.
20. E. Possamai. 1976. Some influences of seed size on performance of soybeans. Thesis, Brazilian student, directed by Dr. Potts.
21. F. Oropeza. 1976. Seed maturation in cowpeas. Thesis, Venezuelan student, directed by Dr. Delouche.
22. S. T. Peske. 1976. Processing Pensacola bahiagrass seeds. Thesis, Brazilian student, directed by Drs. Boyd and Welch..
23. G. M. B. Fernandes. 1976. Methods for overcoming seed dormancy in Pensacola bahiagrass. Thesis, Brazilian student, directed by Dr. Delouche.
24. K. H. Basta. 1976. Some aspects of seed maturation in three species of morning-glory. Thesis, Sudanese student, directed by Dr. Vaughan.
25. L. F. Gomes. 1976. Germination and emergence of three Ipomeoea species as influenced by temperature, planting depth and age of seed. Thesis, Brazilian student, directed by Dr. Vaughan.
26. L. B. deAraujo. 1976. Evaluation of the effects of Fusarium moniliforme on seedling development of sorghum cultivars. Thesis, Brazilian student, directed by Dr. Andrews.

REPORTS AND PAPERS

Addendum

1 April 1977 - 31 March 1978

A. Activity Reports Submitted under AID/W and Missions.

	<u>MSU/STL Report No.</u>	<u>Title</u>
1.	TA 77-04	Consulting visit concerning seed production in Panama. 50 pp.
2.	TA 77-05	Project paper (PP) review for seed laboratory-storage-plant pathology in Guinea Bissau. 27 pp.
3.	TA 77-06	Seed program consultation and review in Costa Rica. 24 pp.
4.	TA 77-M-7	Report to USAID/Costa Rica and CNP on visit to rice seed facilities at Barranca. 2 pp.
5.	TA 77-07	Seed production and supply in Nepal. Part 1. Technical analysis and proposal. 107 pp.
6.	TA 77-07A	Seed production and supply in Nepal. Part 2. Economic analysis. 20 pp.
7.	TA 77-08	Intensive course for postgraduate training in production, processing and commercialization of seeds. CIAT, Cali, Colombia. 19 pp.
8.	TA 77-09	Rept. to USAID/Cameroon and AID/W on the First International Seed Technology Training Course for Central and West Africa. 29 pp.
9.	TA 77-10	Seed multiplication sub-project of the Agronomic Research, Seed Multiplication and Grain Marketing Project Paper for Chad. 47 pp.
10.	TA 77-10A	Same title as TA 77-10 but containing specifications and designs. 29 pp.
11.	TA 77-11	Seed multiplication/quality control - Togo. 51 pp.
12.	TA 78-01	Proposed designs for seed processing facilities, Republic of Bolivia seed program. 29 pp.

13. TA 78-02 Report to USAID/Panama and GOP on assistance to
(numbered soybean project. 7 pp.
78-1 by error)
 14. TA 78-03 Food Crops Seed Production in Guyana. 75 pp.
- B. Technical Reports and Papers for or in support of Contract Activities.
1. J.C. Delouche. 1976. Seed maturation. Proc. 1976 Miss. Short Course for Seedsmen. 18:25-33.
 2. J.C. Delouche. 1977. Standardization of seed vigor tests. Jour. Seed Technology. 1(2):55-69.
 3. J.C. Delouche. 1978. Storage of soybean seed for more than one year. Proc. 8th Soybean Seed Res. Conf. (ASTA, Washington D.C. 8:60-73.
 4. W. Couvillion. 1977. Economics of grass and legume seed production in warm humid areas. Proc. Miss. Section ASA. 10 pp.
 5. C.H. Andrews and others. 1977. Effects of Fusarium moniliforme on seedling development of sorghum cultivars. Plant Disease Reporter. 61:616-618.
- C. Dissertations and Theses Supporting Contract Activities.
1. R.A. Burdett. 1977. Effects of weathering on soybean seed quality . Dissertation, American student, directed by Dr. Delouche.
 2. B.B. Panta. 1977. Some aspects of seed maturation in soft, red winter wheat. Thesis, Nepalese student, directed by Dr. Andrews.
 3. G.J. Carvalho. 1977. Some interrelationships among seeding methods and seed weight on field performance of rice. Thesis. Brazilian students, directed by Dr. Potts.
 4. J. Elias-Neto. 1977. Seed certification in the United States and proposed application to Santa Catarina, Brazil. Thesis, Brazilian student, directed by Dr. Andrews.
 5. S.L. Weerasena. 1977. Comparison of rates of field deterioration of seed in three cultivars of cowpeas. Thesis, Sri Lankian student, directed by Dr. Vaughan.

6. R.V. De Andrade. 1977. Evaluation of firm seed in Pensacola bahiagrass and browntop millet. Thesis, Brazilian student, directed by Dr. Vaughan.
7. P. Siriwan. 1977. An assay of methods to overcome dormancy in seed of browntop millet. Thesis, Thai student, directed by Dr. Vaughan.
8. J. Caceres C. 1977. Pod and seed development in Lee 68 soybean. Thesis, Honduran student, directed by Dr. Andrews.
9. F.M. Miranda. 1977. Influence of some seed-borne pathogens and field weathering on soybean seed quality. Thesis, Venezuelan student, directed by Dr. Potts.
10. E.C. Lesqueves. 1977. Removal of soil "peds" from soybean seed. Thesis, Brazilian student, directed by Dr. Boyd and Welch.
11. W.G. Hairston. 1977. Effects of mechanical harvest and field weathering on quality of permeable and impermeable soybean seed. Thesis, American student, directed by Dr. Potts.
12. M.B. Mohd-Lassim. 1977. Respiratory characteristics of soybean seed. Dissertation, Malaysian student, directed by Dr. Delouche.
13. J.L. Faeth. 1977. Lipoygenase and ATPase activity in soybean seed as related to aging. Dissertation, Costa Rican student, directed by Dr. Delouche.
14. R.M. Viera. 1977. Moisture exchange and seed quality relationships in blended soybean seeds. Thesis, Brazilian student, directed by Dr. Boyd.
15. J. Bohorquez. 1977. Temperature relations of cotton seed germination. Thesis, Bolivian student, directed by Dr. Delouche.
16. E. Martins. 1977. Basic considerations for seed drying facilities. Thesis, Brazilian student, directed by Dr. Boyd.
17. T. Bonney. 1977. Tetrazolium evaluation of seed vigor in corn as compared to other methods. Thesis, Ghanaian student, directed by Dr. Vaughan.
18. L. Cerdeira. 1977. Preharvest desiccation of protepea (cowpea) with glyphosate. Thesis, Brazilian student, directed by Drs. Cole and Andrews.
19. S. Chirnaksam. 1977. The effect of high temperature drying on germination of soybean seed. Thesis, Thai student, directed by Dr. Welch.

Statistical Summary (Partial)
of
MSU/AID Technical Assistance Contract Activities
from
April 1958 - March 1977

Contract	Dates
AID W-607	1958-1971
AID/csd 2976	1971-1973
AID/CM/TA-C-73-34	1973-1975
AID/ta-C-1219	1975-to date

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Statistical Summary (Partial) of MSU/AID
Technical Assistance Contract Activities (April, 1958 - March, 1977)

Summary^{1/}

I. Consultative services rendered at the request of USAID Missions,
Regional Offices and AID/W. (1958-1977)

A. Consultative Visits

Region	Number of Visits			Time Overseas ^{2/} (Man Days)	Activities ^{3/}
	Total ^{4/}	Regional	Individual Countries		
Latin America	90	12	17	2096	TA, TR, P, S
Africa	28	5	13	711	TA, P, TR
Near East & So. Asia	5	0	3	191	TA, P
Far East	16	4	6	1054	TA, TR, P, S
World Wide	4	-	-	30	P, S
Totals	<u>143</u>	<u>21</u>	<u>39</u>	<u>4082</u>	

B. Formal Training Courses (overseas) ^{5/}

Region	Total	Courses		Participants
		Regional	In-Country	
Latin America	14	7	7	474
Africa	1	1	0	Unk.
Near East & So. Asia	0	0	0	0
Far East	2	1	1	44
				Total <u>518</u> +

II. Responses to Technical Inquiries, Visitors, etc.

1 Apr. 1968 - 31 Mar. 1977 Prof. Man days 1718^{1/}

III. Preparation and Dissemination of Informational Materials

1 Apr. 1968 - 31 Mar. 1977 Prof. Man days 1445^{1/}

IV. Adaptive Research - Technical & Economic

1 Apr. 1968 - 31 Mar. 1977 Prof. Man Days 2873^{1/}

V. Other Related AID and Country Contracts

A. Participant Training (1958-1976)

Level of Study	Participants	Countries
Academic Degree	102	23
Academic Non-degree	52	17
AID Seed Imp. Ing. Course	299	52

B. Technical Assistance Contracts

Country (Organization)	Duration	Activity
Brazil (AID)	1964-73	Seed Industry Devel.
Brazil (GOB)	1973-76	Seed Industry Devel.
India (AID)	1968-72	Seed Industry Devel.
Thailand (RTG)	Pending(4 yrs.)	Seed Industry Devel.
World Wide (AID)	1966-69	Survey of Seed Industry Devel.

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(2) man-days of work equal one (1) man-month.

2/ Does not include time spent preparing for or follow-up actions after each visit.

3/ Major activity of the requested consultation: TA = Technical assistance to an on-going Mission project; TR = Formal Training course; P = Program planning such as input on PIP's, PRP's, PP's, sector loans, long range planning; S = Service as a consultant to AID sponsored activities such as seminars, preparation of multilateral publications, etc.

4/ Number of separate consultative visits not consultants. To Supply the requested services it has often been necessary for two consultants to travel simultaneously (ex. training courses) this is reported as one (1) consultative visit.

5/ Does not include on-the-job training or seminar frequently provided as part of a TA consultative visit.

INTRODUCTION

The purpose of this report is to summarize the principle activities conducted by the staff of the Seed Technology Laboratory, Agronomy Department, Mississippi Agricultural and Forestry Experiment Station, Mississippi State University (MSU) to fulfill their responsibilities under a series of contracts between the MSU and the Agency for International Development (AID/W) for technical assistance in the area of seed technology. The activities under the various specific contracts fall into four broad categories; (a) Services requested by USAID Missions, Regional Offices or AID/W, (b) Responses to Technical Inquiries, including visitors to the home station, (c) Preparation and Dissemination of Informational Materials and (d) Adaptive Research. Through the years the level of effort funding and emphasis have varied and this fact is reflected to some extent through the information included in this report.

The emphasis of this particular report is on the overseas and training (non-degree) activities conducted under the contracts. Readers should not assume that the "Overseas Activities" per se are more important than the other activities. However, requests for assistance from Missions in the LDC's have and will continue to receive a higher priority than those activities which are conducted primarily at the home station.

Data for this report was compiled from the annual or terminal reports of contract activities, all of which have been supplied to the cognizant technical offices of AID/W. Because the different contracts have required different formats for reporting the services rendered, some specific data was estimated from a total, for example; (Costa Rica, 1972-73, 4 trips - 82 days overseas) is shown as 4 separate trips of either 20 or 21 days duration.

For more specific information readers should obtain copies of the reports listed below:

1. "Terminal Report to the Agency for International Development for Services Rendered under the agreement between the Agency for International Development and Mississippi State University. (AID-W-607) March 18, 1958 -March 31, 1971." Report No. ST-TR2. July, 1971. pp. 100. Seed Tech. Lab., Miss. State Univ.
2. "Summary Report of Contractor's Services 1 April, 1971-31 March, 1973 - Services Rendered under the agreement between AID/W and MSU(AID/csd-2976.)" Report No. R 73-6. pp. 45. Seed Tech. Lab., Miss. State Univ.
3. "Terminal Report of Contractor's Services 1 April, 1973-29 June, 1975 - Services Rendered under the agreement between AID/W and MSU(AID/CM/TA-C-73-34.)" Report No. R 75-12. pp. 110. Seed Tech. Lab., Miss. State Univ.
4. "Annual Report of Contractor's Services - 30 June, 1975-31 March, 1976 - Services Rendered under the agreement between AID/W and MSU(AID/ta-C1219.)" Report No. R 76-07. pp. 55. Seed Tech. Lab., Miss. State Univ.

5. "Annual Report of Contractor's Services - 1 April, 1976-31 March 1977 - in 'Seed Program and Industry Development' - Services Rendered under the agreement between AID/W and MSU(AID/ta-C-1219.)" Report No. R 77-03. pp. 56. Seed Tech. Lab., Miss. State Univ.

I. Services rendered at the request of USAID Missions, Regional Offices or AID/W

A. Consultative Visits

<u>Location</u>	<u>Contract Year</u>	<u>Prof. Man Days Overseas^{1/}</u>	<u>Type Activity^{2/}</u>
1. <u>Latin America</u>			
a. Regional			
Chile	1959	60	TR
Chile	1960	40	TR
Brazil	1963	10	TA
Brazil	1964	14	TR
ROCAP (Honduras)	1968	32	TR
ROCAP (Honduras)	1969	36	TR
ROCAP (Honduras)	1971	28	TR
Mexico	1972	6	S
ROCAP	1974	78	P
CIAT (Colombia)	1976	3	P
ROCAP (Honduras)	1977	28	TR
Honduras	1977	12	S
b. Argentina	1959	14	TA
c. Bolivia	1973	16	TA
	1975	0	TA
	1976	21	TA
d. Brazil	1964	18	TA
	1965	88	TA
e. Chile	1958	7	P
f. Colombia	1968	28	TA
	1969	61	TR
	1969	53	TA
g. Costa Rica	1960	14	TA
	1960	15	TA
	1963	21	TA
	1970	16	TA
	1971	5	TA
	1971	34	TA
	1971	34	TA

^{1/} Does not include time spent preparing for or follow up action after each visit.

^{2/} Major emphasis of the requested consultation TR=training; TA=Specific Technical assistance to on going Mission Project; P=Program Planning; S=Service as Contract consultant to AID sponsored activity.

<u>Location</u>	<u>Contract Year</u>	<u>Prof. Man Days Overseas</u>	<u>Type Activity</u>
g. Costa Rica (cont'd)	1972	20	TA
	1972	21	TR
	1973	20	TA
	1973	21	TA
	1974	0	TA
	1975	5	TA
	1975	15	TA
	1976	6	TA
	1977	8	TA
	1977	7	TA
	1977	32	TA
	1977	6	TA
	1977	14	TA
	h. Dominican Republic	1977	24
1977		6	TA
i. Ecuador	1969	14	TA
	1969	48	TR
	1971	88	TA
	1971	50	TR
	1972	73	TR
	1975	10	TA
	1976	15	P
	1976	36	TR
	1977	36	TR
	1977	0	TA
	1977	9	TA
j. El Salvador	1968	6	TA
	1976	26	TA
k. Guatemala	1976	0	TA
	1977	3	P
l. Haiti	1973	16	P
m. Honduras	1965	14	P
	1967	30	TA
	1967	21	TA
	1968	7	TR
	1969	16	TA
	1970	15	TA
	1974	12	P
	1975	17	TA
	1976	27	TA
n. Nicaragua	1970	2	TA

<u>Location</u>	<u>Contract Year</u>	<u>Prof. Man Days Overseas</u>	<u>Type Activity</u>
o. Panama	1966	20	TA
	1966	21	TA
	1967	40	TA
	1969	18	TA
	1971	18	TA
	1971	15	TA
	1972	17	TA
	1972	17	TA
	1972	16	TA
	1973	10	TA
	1975	0	TA
	1976	20	TA
	p. Paraguay	1958	60
1972		18	P
1972		14	TA
1973		16	TA
1975		0	TA
q. Peru	1959	24	S
	1967	7	TA
	1969	33	TA
	1970	16	TA
	1972	46	TR
	1972	21	TA
	1974	29	P
	1975	0	TA
r. Venezuela	1964	12	TA
2. <u>Africa</u>			
a. Regional			
(14 countries)	1960	30	P
Kenya	1961	42	TR
WARDA (Liberia)	1973	0	TA
WARDA (Liberia)	1975	7	TA
WARDA (Liberia)	1976	10	TA
b. Central Africa Republic	1977	15	TA
c. Chad	1977	23	P
	1977	50	P
d. Congo	1970	35	P
e. Ethiopia	1974	22	P&TA

<u>Location</u>	<u>Contract Year</u>	<u>Prof. Man Days Overseas</u>	<u>Type Activity</u>
f. Ghana	1961	7	TA
	1973	30	P
	1974	29	TA
	1975	34	TA
	1976	42	TA
g. Ivory Coast	1975	26	TA
h. Morocco	1967	40	TA
	1967	42	TA
	1973	43	TA
	1975	0	TA
i. Niger	1975	29	P
	1977	29	TA
j. Nigeria	1972	0	TA
	1975	21	TA
k. Rwanda	1977	14	P
l. Tanzania	1975	25	P
m. Tunisia	1972	36	TA
n. Upper Volta	1976	30	TA
<u>3. Near East & South Asia</u>			
a. Regional	(none)	-	-
b. East Pakistan	1968	90	P
c. India	1970	45	TA
	1972	0	TA
d. Nepal	1974	56	P&TA
	1974	0	TA
<u>4. Far East</u>			
a. Regional			
Japan	1959	19	S
Taiwan	1960	54	TR
Philippines	1960	60	TA
Taiwan	1963	60	TR
b. Indonesia	1968	41	TA
	1971	27	TA

<u>Location</u>	<u>Contract Year</u>	<u>Prof. Man Days Overseas</u>	<u>Type Activity</u>	
c. Laos	1968	14	TA	
d. Philippines	1971	110	P&TA	
e. Taiwan	1959	92	TA&TR	
	1959	97	TA-TR	
	1960	40	TA	
	1963	90	TR	
f. Thailand	1973	40	P	
	1973	42	TA	
	1974	80	TA&TR	
	1974	32	P	
	1975	82	P	
	1976	32	TA	
	1977	27	P	
g. Vietman	1963	15	P	
5. <u>World Wide</u>				
	Austria (FAO)	1973	8	S
	Austria (FAO)	1975	8	P
	Ethiopia (INTSOY)	1975	7	S
	Rome (FAO)	1976	7	P

B. Formal Training Courses*

<u>Actual Year</u>	<u>Location</u>	<u>Scope</u>	<u>Partici-pants</u>	<u>Emphasis</u>
1959	Chile	R ^{1/} (12)	33	Seed Testing & Pro- cessing
1960	Chile	R (7)	43	Seed Testing & Pro- cessing
1960	Taiwan	R (16)	18	Seed Testing
1961	Kenya	R (UNK)	UNK	General Seed Improvement Seminar

*No record has been maintained of the numbers of technicians who have received on-the-job training during consultative visit having a primary emphasis of technical assistance.

^{1/}R = regional participation with number of countries requested in parenthesis ().

<u>Actual Year</u>	<u>Location</u>	<u>Scope</u>	<u>Partici- pants</u>	<u>Emphasis</u>
1963	Taiwan	IC ^{2/}	26	Seed Testing
1964	Brazil	R (8)	40	Seed Testing
1968	Honduras	R (5)	18	General Seed Tech.
1969	Colombia	IC	28	General Seed Tech.
1969	Honduras	R (9)	24	General Seed Tech.
1969	Ecuador	IC	26	General Seed Tech.
1971	Honduras	R (8)	28	General Seed Tech.
1971	Ecuador	IC	32	Seed Processing & Drying
1972	Peru	IC	39	General Seed Tech.
1972	Ecuador	IC	20	Seed Testing & Quality Control
1974	Costa Rica	IC	55	Seed Tech. Seminar
1976	Ecuador (2)	IC	60	Seed Production & Tech.
1976	Honduras	R (7)	28	Seed Proc. & Technology
TOTAL			518+	

^{2/} IC = training courses with only in-country personnel participating

II. Responses to Technical Inquiries

From the beginning of the MSU/AID World Wide Contract, a substantial amount of professional time has been required to respond to the written, phoned, cabled, and personal requests for general or technical information, resolution of specific technical problems and requests for training materials. Since the early 1960's, an almost continuous flow of technicians from the LDC's, USAID, FAO, Rockefeller Foundation and private seed companies (U.S. & LDC) have visited our Laboratory for periods of one to ten days for the purpose of consulting with our staff or short term training. Additionally, considerable effort has been expended in reviewing proposals and plans for seed programs submitted by organizations such as UNDP, FAO, Ford Foundation, SIDA, Columbo Plan, IBRD, etc.

No record of the time involved in these activities was kept prior to the 1968-69 contract year. The available data are given below.

Contract Year	Professional Man Days
1968-69	375
1969-70	275
1970-71	210
1971-72	205
1972-73	135
1973-74	122
1974-75	158
1975-76	97
1976-77	<u>141</u>
Total	1718

III. Preparation and Dissemination of Informational Materials

Relevant, practical reference and informational materials in the areas of seed technology and seed-program/industry development have mainly originated within our laboratory during the past 20 years. Over 210 separate publications are estimated to have been prepared by the Laboratory staff since the contract was initiated. The total numbers distributed in response to requests, in training courses, etc. number in the thousands.

Because of the dearth of information that was available in all areas of seed technology, except seed testing, and the fact that preparation of these materials are secondary to a response to a Mission request, progress has been continuous but slow. Many of the handouts have been translated into Spanish, Portuguese, and other languages by technicians from the LDCs. Two handbooks have been translated (Spanish) reproduced, and distributed by the USAID.

Since 1968 the following numbers of professional man days have been spent in preparing these publications for use by LDC technicians and advisors.

Year	Professional man days
1968-69	300
1969-70	210
1970-71	234
1971-72	204
1972-73	120
1973-74	132
1974-75	114
1975-76	53
1976-77	<u>78</u>
Total	1445

Participants Trained in U.S.A.

A. List of International Students who have graduated from Mississippi State University with degrees in Agronomy-Seed Technology (1959-1977).

<u>Name</u>	<u>Country</u>	<u>Degree</u>	<u>Year</u>
Ampol Senanarong	Thailand	M.A.	1959
Joel A. Mascarenhas	Brazil	M.S.	1961
Sermasak Awakul	Thailand	M.A.	1962
Soedarmo Hodisoemarto	Indonesia	M.A.	1962
Martief Jemain	Indonesia	M.A.	1962
Gerritt Kasenda	Indonesia	M.A.	1962
Pricha Khambononda	Thailand	M.A.	1962
Noel Mamicpic	Philippines	M.S.	1962
Ponchai Pookamana	Thailand	M.A.	1962
Tsay Yen Sung	China	M.A.	1962
Sanit Kittikorn	Thailand	M.A.	1963
Sung Man Lim	Korea	M.S.	1963
Sadjad Sjamsoe'oad	Indonesia	M.A.	1963
M. Samir M. Abdel-Al	Egypt	M.S.	1964
Shu-Hui Feng (Miss)	China	M.S.	1964
Huon C. Huor	Cambodia	B.S.	1964
Pil Ju Kim Joo (Mrs.)	Korea	M.S.	1964
Nghe Thi Nguyen (Miss)	Vietnam	M.S.	1964
Ismu Sukanto Suwelo	Indonesia	M.S.	1964
Parviz Maleki	Iran	M.S.	1966
Somchai Thamnoonragsa	Thailand	M.A.	1966
Eduardo Zink	Brazil	M.S.	1966
Azizul Islam	Pakistan	M.S.	1967
Erlinda Pili (Miss)	Philippines	M.S.	1967
Prasoot Sittisroung	Thailand	M.S.	1967
Carlos V. Herrera	Peru	M.S.	1969
Nelson De Carvalho	Brazil	M.S.	1969
Sylvia Shoohwa Chang (Miss)	Taiwan	M.S.	1969
Nirmal Singh Gill	India	Ph.D.	1969
Bettaiya Rajanna	India	M.S.	1970
Luiz A.B. de Castro	Brazil	M.S.	1970
Augusto Aponte	Venezuela	M.S.	1970
Chai Chi Chen	Taiwan	M.S.	1970
Carlos Vechi	Brazil	M.S.	1970
Prasoot Sittisroung	Thailand	Ph.D.	1970
Bangalore Phaneendranath	India	M.S.	1971
Cilas Camargo	Brazil	M.S.	1971
Sergio Fagundes	Brazil	M.S.	1971
Lingegowda Hanumaiah	India	M.S.	1971
Maria Regina Sartoria (Miss)	Brazil	M.S.	1971
Rozane Coelho (Mrs.)	Brazil	M.S.	1971
Fernando Gomez	Colombia	M.S.	1971
Jamie Flores	Ecuador	M.S.	1971
Bettaiya Rajanna	India	Ph.D.	1972
Panoo Satayavibul	Thailand	M.S.	1972

ANNEX C (cont'd)

<u>Name</u>	<u>Country</u>	<u>Degree</u>	<u>Year</u>
Shirley Shao (Miss)	Taiwan	M.A.	1972
Vinicius Assuncao	Brazil	M.S.	1972
Manoel Olivera	Brazil	M.S.	1972
Roberto Garcia	Honduras	B.S.	1972
Rene Mondragon	Philippines	M.S.	1972
Tawee Pluemsab	Thailand	M.S.	1972
Peter Lai	Taiwan	M.S.	1972
Nieves Belandes (Miss)	Philippines	M.A.	1972
Fernando Matuloy	Philippines	M.S.	1972
Jairo Correa	Colombia	Ph.D.	1973
Adelson Freire	Brazil	M.S.	1973
Edwardo Lopez	Venezuela	M.S.	1973
Pranom Saisawat	Thailand	M.S.	1973
Prabowo Tjitropranto	Indonesia	M.S.	1973
Journalis Kamil	Indonesia	Ph.D.	1974
Flavio Popinigis	Brazil	M.S. & Ph.D.	1974
Mario Correa	Brazil	M.S.	1974
Marco Lanz	Venezuela	M.S.	1974
Wirach Jacktong	Thailand	M.A.	1974
Luiz Pereira	Brazil	M.S.	1974
Kasem Tunstul	Thailand	M.S.	1974
Ki Ho Suh	Korea	M.A.	1974
Aisha Lema (Miss)	Tanzania	B.S.	1974
D.B. Desai	India	Ph.D.	1975
Clovis Wetzel	Brazil	Ph.D.	1975
Arnoldo Alvim	Brazil	M.S.	1975
Jose Azevedo	Brazil	M.S.	1975
Antonio Barros	Brazil	M.S.	1975
Jose Chaves	Brazil	M.S.	1975
Antonio Lago	Brazil	M.S.	1975
Mohammad Lassim	Malaysia	M.S.	1975
Joseph Okumdaye	Nigeria	M.S.	1975
Carlos Pieta	Brazil	M.S.	1975
Sidney Rocha	Brazil	M.S.	1975
Celso Rosal	Brazil	M.S.	1975
Somsook Srijugawan (Miss)	Thailand	M.S.	1975
Suppavat Tippayark	Thailand	M.S.	1975
Edson Viera	Brazil	M.S.	1975
Noris Viera (Mrs.)	Brazil	M.S.	1975
Jose Torres	Honduras	B.S.	1975
Bharat Parajuli	Nepal	M.S.	1975
Jacobo Careres	Honduras	B.S.	1975
Paulo Aguiar	Brazil	M.S. & Ph.D.	1976
Visanu Boonying	Thailand	M.S. & Ph.D.	1976
Jaungjun Duangpatra (Mrs.)	Thailand	Ph.D.	1976
Laercio Araujo	Brazil	M.S.	1976
Kamal Basta	Sudan	M.S.	1976
Claudio Bragantini	Brazil	M.S.	1976
Gloria Fernandis (Mrs.)	Brazil	M.S.	1976

ANNEX C (cont'd)

<u>Name</u>	<u>Country</u>	<u>Degree</u>	<u>Year</u>
Luciano Gomes	Brazil	M.S.	1976
Orlando Gressler	Brazil	M.S.	1976
Silmar Peske	Brazil	M.S.	1976
Edilberto Possamai	Brazil	M.S.	1976
Fernando Daher	Brazil	M.S.	1976
Mouldi Ghanmi	Tunisia	M.S.	1976
Moses Ogidi	Nigeria	M.S.	1976
Francisco Oropeza	Venezuela	M.S.	1976
Charles Mmari	Tanzania	B.S.	1976
Jorge Faeth	Costa Rica	Ph.D.	1977
Mohammad Lassim	Malyasia	Ph.D.	1977
Ramiro Andrade	Brazil	M.S.	1977
Julio Bohorquez	Ecuador	M.S.	1977
Thomas Bonney	Ghana	M.S.	1977
Jacobo Caceres	Honduras	M.S.	1977
Giovani Carvalho	Brazil	M.S.	1977
Eugenio Lesqueves	Brazil	M.S.	1977
Emerson Martins	Brazil	M.S.	1977
Fausto Miranda	Venezuela	M.S.	1977
Miriana Miranda (Mrs.)	Venezuela	M.S.	1977
Jorge Elias, Neto	Brazil	M.S.	1977
Bhadra Panta	Nepal	M.S.	1977
Siriwan Piyanan (Miss)	Thailand	M.S.	1977
Suyasri Sopit	Thailand	M.S.	1977
Robson Vieira	Brazil	M.S.	1977
Sarath Weerasena	Sri Lanka	M.S.	1977
Edgar Cabrera	Honduras	B.S.	1977
Rafael Diaz-Donaire	Honduras	B.S.	1977
J. Bohorquez	Ecuador	M.S.	1977
T. Bonney	Ghana	M.S.	1977

Summary: 128 graduates from 25 countries.

- B. List of developing countries and number of participants who have registered in non-degree, academic programs in Agronomy-Seed Technology (1959-1977).

<u>Country</u>	<u>Participants</u>	<u>Country</u>	<u>Participants</u>
Afghanistan	2	Liberia	1
Brazil	2	Mexico	1
East Pakistan	1	Nepal	1
Ecuador	1	Nigeria	1
Egypt	2	Philippines	11
India	17	Romania	2
Indonesia	3	Sri Lanka	1
Iran	1	Thailand	3
Korea	1	Cameroun	2

Summary: 54 participants from 18 countries.

ANNEX C (cont'd)

C. List of developing countries and number of participants who have completed the 6-week AID/USDA Seed Improvement Training Course (1956-1977).

<u>Country</u>	<u>Participants</u>	<u>Country</u>	<u>Participants</u>
Afghanistan	7	Korea	4
Algeria	3	Laos	3
Argentina	1	Lebanon	1
Bangladesh	2	Lesotho	1
Bolivia	3	Liberia	1
Brazil	11	Mexico	2
Cambodia	3	Morocco	12
Chile	8	Nepal	9
China (Taiwan)	9	Nigeria	16
Colombia	2	Pakistan	11
Costa Rica	4	Panama	4
Cuba	2	Paraguay	1
Ecuador	6	Peru	3
Egypt	4	Philippines	18
El Salvador	1	Romania	1
Ethiopia	1	Spain	3
Ghana	18	Sri Lanka (Ceylon)	2
Greece	1	Sudan	1
Guatemala	4	Tanzania	9
Guyana	2	Thailand	26
Honduras	4	Trinidad	2
India	43	Turkey	5
Indonesia	24	Uganda	2
Iran	1	Upper Volta	1
Iraq	1	Uruguay	3
Israel	1	Venezuela	2
Ivory Coast	1	Vietnam	4
Jordan	1	Yugoslavia	8

Summary: 323 participants from 56 countries.

List of Publications and Reprints Maintained for
AID Contract Support (1 August 1977)

Books & Bulletins*

1. "The Tetrazolium Test for Seed Viability". 1962. Tech. Bul. 51 pp. 64. Miss. Agri & Forestry Expt. Sta. Miss. State Univ. Miss. State, MS (English, Spanish, French).
2. "Seed Processing and Handling". 1968. Handbook No. 1, pp. 295. Seed Tech. Lab., Miss. State Univ., Miss. State, MS (English, Spanish, Portuguese).
3. "Seed Program Development". 1971. Tech. Rel. TR-1, pp. 120. Seed Tech. Lab. Miss. State Univ., Miss. State, MS (English, Portuguese).
4. "Proceedings 1973 Short Course for Seedsmen". 1973. Vol. 16, pp. 132. Seed Tech. Lab., Miss. State Univ., Miss. State, MS.
5. "Proceedings Southeastern Soybean Seed Seminar". 1974. pp. 245. Miss. Coop. Ext. Ser., Miss. State Univ., Miss. State, MS.
6. "Proceedings 1975 Short Course for Seedsmen". 1975. Vol. 17, pp. 150. Seed Tech. Lab., Miss. State Univ., Miss. State, MS.
7. "An Economic Analysis of Seed Processing Facilities". 1976. Tech. Bul. 79, pp. 47. Miss. Agri. & Forestry Expt. Sta., Miss. State, MS.

*Single copies of reference publications, such as the AOSA-Rules for Testing Seeds, AOSCA-Handbook for Seed Certification, etc., not printed by MSU are supplied at cost to libraries in the LDC's on a discriminatory basis.

Articles and Reprints

A. General and Miscellaneous

1. A Closer Look at Seeds
2. Seeds - Development, Structure, and Function**
3. Pure Seed is a "Cultural Tool"
4. Seed Power
5. Seed Teams Help
6. High Quality Seed is Lowest Input
7. So You Want to Be a Seedman
8. Seedsmen Have Big Shoes to Fill
9. Let's Keep it Clean
10. Plant Introduction Men Seek New Crops for the South
11. 1964 Mississippi Cottonseed Survey
12. Our History, Program, and Staff

B. Seed Multiplication and Production

1. Breeder and Foundation Seed Programs
2. Seed Growing Problems Solved by Researchers
3. Pathway of Seed Improvement
4. Effects of Boron on Seed Production of Legumes
5. The Purpose and Benefits of Seed Certification
6. Haphazard Seed Production
7. Origins of Cultivated Plants
8. Adequate Seed Supply Assurance for Superior Alfalfa Variety
9. Production of Hybrid Seeds
10. Field Deterioration of Soybeans as Affected by Environment
11. Modes of Reproduction in Crops
12. ESCOP Policies Statement on Seeds and Other Propagation Materials

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11. Modes of Reproduction in Crops
12. ESCOP Policies Statement on Seeds and Other Propagation Materials

13. Seed Field Inspector's Handbook

C. Maturation - Harvesting

1. Seed Maturation**
2. Trends in Seed Maturation of Rice
3. Seed and Boll Maturation in Cotton
4. Germination of Kentucky Bluegrass Harvested at Different Stages of Maturity
5. Field Environment May Effect Cotton Quality
6. Parameters for Optimal Harvesting**
7. Harvesting - Source of Many Problems
8. Harvesting, Handling, and Storage of Soybean Seed
9. Approximate Harvest Dates of the Major Field Crops

D. Storage - General and Structures

1. Precepts for Seed Storage**
2. Seed Conditioning for Tropical Environment
3. Environment and Structural Requirements for Seed Storage**
4. Seed Processing and Storage Facilities for Tropical Areas
5. Systems for Controlling Relative Humidity and Temperature**
6. Controlled Temperature and Humidity Storage
7. Storage of Seed in Sub-Tropical and Tropical Regions
8. Drying, Processing and Storage of Corn Seed in Tropical and Sub-Tropical Regions
9. Conditioned Storage of Seed
10. How a Psychrometric Chart is Used to Determine Air Properties**
11. Allowable Safe Storage Times for Field Shelled Corn
12. Seed Moisture Equalibrium Tables

E. Storage - Equipment

1. Seed Quality and Storage of Soybeans

2. Principles and Methods of Moisture Measurement
3. Factors and Considerations in Design and Operation of an Environment Chamber**
4. Drying, Storage, and Packaging Seed to Maintain Germination and Vigor**
5. Simple Method to Determine Seed Moisture Content
6. Store Soybean Seed Properly to Maintain Quality**
7. Seed Processing and Storage
- F. Storage Physiology - Deterioration
 1. Physiology of Seed Storage**
 2. Deterioration of Seed Corn During Storage
 3. Deterioration of Crimson Clover Seed in Storage
 4. A.A. Techniques for Predicting the Relative Storability of Seed Lots
 5. Deterioration of Soybean Seed in Storage
 6. Comparison of Methods for Evaluating Deterioration in Rice Seed
 7. GADA Test for Seed Storability
 8. Effects of Mechanical Shelling on Storability of Peanut Seed
 9. Possible Mechanisms in Loss of Seed Viability
 10. TZ Evaluation of Deterioration in Peanut Seed
 11. The Case of the Missing Tap Root
 12. TZ Best Method for Evaluating Seed Life
 13. Mechanical Damage of Soybeans**
 14. The Pattern of GADA Degeneration and Its Relation with Rice Seed Deterioration
- G. Physiological Quality - Vigor - Physical Properties
 1. Determinants of Seed Quality
 2. Planting Seed Quality
 3. Seed Vigor and Vigor Tests

4. Seed Vigor
5. Vigor Determines Performance of Cottonseed
6. Physical Properties of Seed Associated with Viability in Small-Seeded Legumes
7. Effect of Seed Vigor on Field Performance and Yield of Grain Sorghum
8. Influence of Quality of Seed on Growth, Development, and Productivity of Some Horticultural Crops
9. Effects of Seed Size in Cabbage and Turnips on Performance of Seeds, Seedlings, and Plants
10. Seed Quality and Performance Relationships
11. Differences in Metabolic Activity in Peanut Seed of Different Size Classes
12. Relation of Bulk Density of Acid Delinted Cottonseed to Field Performance
13. Relation of Specific Gravity to Vigor and Viability in Rice Seed
14. Some Indices of Vigor and Deterioration in Seed of Crimson Clover
15. Laboratory Evaluation of Vigor of Garden Peas
16. Seed Vigor in Soybeans
17. Procedure for Cold Test for Cotton
18. The Cold Test for Corn
19. Electrical Properties of Seed Associated with Viability and Vigor
20. Physical Properties Related to Seed Viability
21. A Preliminary Study of Methods of Separating Crimson Clover Seed on the Basis of Viability
22. Seed Characteristics Associated with Viability in Small-Seeded Legumes
23. Evaluation of Hardseededness in Meechee and Arrowleaf Clover
24. Effect of Gravity Separation on Cotton

H. Quality Control

1. Quality Control in Seed Production
2. Quality Control in Processing Foundation Seed
3. Seed Quality Evaluation
4. Maintaining Soybean Seed Quality
5. Effect of Mechanical Damage on Germination of Soybeans
6. Effect of Static Loads and Energy on Germination of Cottonseed

I. Germination Physiology - Dormancy

1. Absorption of Water by Seeds
2. Influence of Moisture and Temperature Levels on the Germination of Corn, Soybeans, and Watermelons
3. Effect of Gibberellin on the Germination of Bracted Plantain
4. Effect of Gibberellin and Light on Germination of Centipedegrass Seed
5. Effect of Light and Darkness Upon the Germination of Seeds of Western Wheatgrass
6. Methods for Overcoming Seed Dormancy in Rice
7. Seed Dormancy**

J. Seed Testing - General

1. Introduction to Seed Testing (Emphasis: Germination)**
2. Opportunities for Progress in Germination Testing
3. Low Cost Temperature Controlled Rooms
4. Identification of Soybean Varieties by Laboratory Techniques
5. Seedling Characters of Oats Useful in Trueness-to-Variety Tests
6. The Story of Mississippi Certified Seed
7. Why Test Seed?
8. Interpretation of Germination Tests**
9. Sampling**

K. Blending

1. Blending - Free-flowing Seeds with Bin Flow Control Devices
2. Non-Uniformity in Seed Lots
3. Further Studies on Blending Free-Flowing Seeds with Bin Flow Control Devices

L. Drying

1. Articles on Seed Drying**
2. Drying, Processing, and Storage of Corn Seed in Tropical and Sub-Tropical Regions
3. Aeration of Cottonseed in Storage
4. Psychrometrics and Psychrometric Chart**
5. Seed Conditioning for Tropical Environments
6. Effect of Temperature Rise on the Relative Humidity of Air**
7. Effect of Relative Humidity When Air is Heated by Direct Burning of LP Gas
8. Static Pressures Developed in Ear Corn**
9. Shedd's Chart (Resistance of Grain and Seeds to Air Flow)
10. Hygroscopic Equilibrium Moisture Content As Affected By Temperature
11. Weight of Water Vapor Per Pound of Dry Air at Saturation
12. Harvesting and Drying Hybrid Seed Corn
13. Dry Bromegrass Seed Artificially
14. Grain and Seed Drying Fundamentals**
15. Plot Harvesters (Mfg. Book)
16. Top Sweating Causes Spoilage of Corn Stored in Bins
17. Drying Facilities Boost Seed Quality
18. How a Psychrometric Chart is Used to Determine Air Properties**
19. Heated Air Drying of Soybean Seed
20. Harvesting, Handling, and Storage of Soybean Seed

21. Allowable Safe Storage Time for Field Shelled Corn
22. Seed Drying and Conditioning
23. Principles and Methods of Moisture Measurement
24. Seed Moisture Equilibrium Tables
25. Drying and Conditioning Seeds
26. Drying, Storing, and Packaging Seeds to Maintain Germination and Vigor**
27. Dimensional Analysis of Seed-Moisture Movement in Deep-Bed Drying
28. A Simple Method to Determine When Seed are Sufficiently Dry for Storage
29. Some Thoughts on Seed Drying
30. Drying Soybeans for Seed in the Southern United States

M. Processing

1. Fundamentals of Seed Processing**
2. Every Seed Lot is a Special Processing Problem
3. Spiral Separators Serve Useful Purposes
4. Quality Control in Processing Foundation Seed
5. Planning a New Processing Plant
6. Seed Processing and Storage Facilities for Tropical Areas
7. Potential Applications of Electric Color Sorting
8. More Efficient Soybean Separation
9. Effect of Gravity Separation on Cottonseed
10. New Developments in Seed Processing and Handling
11. Magnetic Seed Cleaners
12. Problems in Modern Seed Processing
13. Let's Clean Up
14. Gravity Table
15. Separation of Cockleburs From Acid-Delinted Cottonseed

16. Soybean Processing
17. "Procesamiento De Semillas "Presentado En Seminario Sobre Semillas**
18. Screen Size Conversion Table
19. Seed Conveying - Problems and Solutions**
20. How to Get the Most From Your Seed Cleaner
21. Seed Processing and Storage
22. Evaluation of Hardseededness in Meechee and Arrowleaf Clover
23. Scarification
24. Efficient Cleaning and Handling of Seed
25. Screen Selection
26. Seed Treaters**

**Also available in Spanish.

NOTE: In addition, bulletins, leaflets and flyers prepared by the Mississippi Agricultural Experiment Station and Extension Service and catalogs and flyers supplied by equipment manufacturers are distributed on request or as needed to support technical information concerning seed.