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XD-AAP-847-A SN-29072

UNCLASSIFIED
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Seed Program and Industry Development	931- 0203	S&T/AGR/AP

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 845 2/29/84

☒ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES	6. ESTIMATED PROJECT FUNDING	7. PERIOD COVERED BY EVALUATION
A. First PRO-AG or Equivalent FY 58	A. Total $ 3,745,000	From (month/yr.) 6/79
B. Final Obligation Expected FY 83	B. U.S. $ 3,745,000	To (month/yr.) 6/83
C. Final Input Delivery FY 84		Date of Evaluation Review July 19-22, 1983

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Continue active support for the project.	S&T/AGR R. Jackson	Continuing
2. STL-MSU should publish more of its research findings, including that done by graduate students.	MSU	Continuing
3. Amend Project Paper to extend Cooperative Agreement for one year.	S&T/AGR R. Jackson	April 30, 1984

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- [X] Project Paper
- [ ] Financial Plan
- [ ] Logical Framework
- [ ] Project Agreement
- [ ] Implementation Plan e.g., CPI Network
- [X] PIO/T
- [ ] PIO/C
- [ ] PIO/P
- [ ] Other (Specify) _____
- [ ] Other (Specify) _____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. [X] Continue Project Without Change
- B. [ ] Change Project Design and/or [ ] Change Implementation Plan
- C. [ ] Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

S&T/AGR/AP:JMYohe Date: 2/20/84 S&T/AGR/AP:RIJackson
S&T/AGR:MBlakeney Date: 2/24/84
S&T/AGR:JARoyer Date: 2/24/84
S&T/PO:FCampbell Date: 2/2/84 Date: 2/10/84

12. Mission/AID/W Office Director Approval

Signature

Typed Name
Anson R. Bertrand, Director S&T/AGR

Date

13. SUMMARY: The project for the Seed Program and Industry Development was evaluated by a team during July 19-22, 1983. This PES will address the period between July 1979 and July 1983. A three member Team visited Mississippi State University (MSU), and with University staff during the evaluation. The Team was provided a series of documents as background information regarding the project.

This project is one of the oldest of S&T/AGR's and has been called upon to provide technical services to nearly all of the USAID missions at one time or another. The Team recommended that the project be continued.

14. EVALUATION METHODOLOGY: The evaluation was made up by a Team consisting of the following members:

Dr. Harve J. Carlson
Dr. John M. Poehlman
Dr. Elvin Frolik, Team Leader

The Team reviewed about 20 documents concerning the project to obtain an understanding and appreciation of the project. During the site visit at MSU, the Team met with administrative officers and staff of the Seed Technology Laboratory (STL). After the discussions with the MSU staff, the Team analyzed and summarized their findings in line with the terms of reference, and developed recommendations.

16. INPUTS: MSU has a well equipped STL and does not require additional seed conditioning equipment from this Cooperative Agreement. New equipment and supplies are provided to the Laboratory from MSU's own sources. The equipment is used to process seeds from Mississippi State Foundation Seeds and this allows students to obtain first hand experience in seed conditioning.

17. OUTPUTS: The MSU/STL professional staff spent about 30 to 35 percent on the Cooperative Agreement activities, the remainder is spent on ongoing MSU teaching, research and service programs. MSU has provided technical assistance to 54 LDCs at missions' requests to solve local problems in ongoing seed programs or development and implementation of comprehensive seed programs. The STL provides general informational publications and reprints of scientific articles to LDCs. Training both at MSU and overseas is provided under the Agreement. Short courses are given both on campus and overseas while work leading to advanced degrees is offered on campus.

18. PURPOSE: To provide technical assistance in seed program and industry planning, implementation and evaluation leading to a seed production industry capable of meeting LDC farmers' needs for improved seeds.

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 underway. As these programs progress and are adapted, superior crop varieties are identified, seed production and supply will become increasing 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.

19. GOAL/SUBGOAL: To increase quantity and quality of food and feed crop production in LDCs. The subgoal is the development of policies, institutions and manpower resources which contribute to greater effectiveness in seed input delivery systems.

The STL staff contributed 41 person-months to LDC programs from April 1979 to June 1983. Ten staff members were involved in problem solving, increasing and maintaining technical capabilities, information development, training students, LDC training programs and assistance to other staff members on technical matters in 11 countries.

20. BENEFICIARIES: It is not possible to quantify the impact of the STL 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 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 STL technical assistance, adaptive research and information services. The small farmers in the LDCs were the ones who benefitted most from the availability of good seed as a result of improved seed programs.

21. UNPLANNED EFFECTS: Even though this project/Cooperative Agreement has been in operation for several years, there have been no unplanned effects of any consequence.

22. LESSONS LEARNED: The STL has been fully equipped and is constantly being updated at no cost to the Cooperative Agreement. It is much less expensive to be able to use such facilities. The STL staff charges have been kept to a minimum because only the services provided to a mission or LDC are charged to the Cooperative Agreement. These and other factors have made this Agreement one of the very most cost effective ones in S&T/AGR's portfolio.

23. SPECIAL COMMENTS OR REMARKS: The following document is attached: Team Evaluation, July 19-22, 1983

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XD-AAP-034-A
PN-AAP-034
ISN 29672

TEAM EVALUATION

Project No. 931-0203

"Seed Program and Industry Development"

Cooperative Agreement No. AID/DSAN-CA-0148

Between

The United States Agency for International Development

S&T/AGR/AP

and

Mississippi State University

July 19 - 22, 1983

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I. Introduction and Review Panel

Dr. Gordon L. Hiebert, Program Manager, Division of International Programs, National Science Foundation, Washington, D.C. 20550, under terms of an interagency agreement with AID, arranged for a Review Team to make an in-depth evaluation of Project No. 931-0203, Cooperative Agreement No. AID/DSAN-CA-0148 between the United States Agency for International Development S&T/AGR/AP and Mississippi State University. The title of the Project is "Seed Program and Industry Development."

The Review Team consisted of the following members:

Dr. Harve J. Carlson
Consultant in Science
406 Dorset Drive
Cocoa Beach, Florida 32931

Dr. Elvin F. Frolik (Team Leader)
Dean, College of Agriculture, and
Professor of Agronomy (retired)
University of Nebraska
Lincoln, Nebraska 68503

Dr. John M. Poehlman
Professor Emeritus, Agronomy
University of Missouri
Columbia, Missouri 65211

In addition, Dr. Robert Jackson, S&T/AGR/AP, AID/W, Project Manager, was present and available for consultation throughout the review.

II. The Project

The cooperative arrangement between AID and MSU for providing assistance to LDCs in the general area of seed production and supply systems dates back to 1958 (1) *. Various arrangements have been used in carrying out this cooperative effort, with four contractual agreements preceeding the present one. The period covered under the present agreement dates from 4/30/79 through 4/30/84.

The purpose of the Project is to provide "...technical assistance and services to the Agency (AID), bureaus, missions and cooperating LDCs in all phases of seed program/industry planning, implementation and evaluation leading to the establishment of responsible, responsive seed production and supply systems capable of meeting the farmers' needs for improved seed."

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* Numbers refer to Literature Cited, Section VIII of this Report.

Details on background, goal, purpose, programs and other relevant features of the agreement were made available to the Team members through copies of the Project Paper (4) and the Cooperative Agreement (3). The Project Evaluation Summary (2) provided by Dr. G. F. Warren in 1979 and the findings of the comparative study of the Field Support Projects at MSU, KSU, and by CIC made by Mozynski and Jackson (19) were also reviewed by the Team members.

III. Procedure

The Team members were provided with a series of documents (1 through 17 and 19) some by AID/W in advance of going to MSU, and the remainder by MSU during the course of the review. This documentary material was very helpful in orienting the Team members on the assignment to be carried out, and also in obtaining an appreciation and understanding of the MSU activities carried out under the Project. Two of the documments especially useful to the Team in carrying out its assignment were STL "Summary of activities, 30 April 1979 to 30 June 1983" (14), and STL "Our history program and staff" (15).

The site visit consisted of presentation by Administrative Officers of MSU and by STL staff members, question-and-answer sessions, and tours of the STL and field plots. A list of key personnel and of those participating in the review are shown in Appendix 1. Following the discussions with the MSU staff, the Review Team members, with Dr. Jackson also present, analyzed and summarized their findings, arrived informally at responses to the "Terms of Reference," developed recommendations, and made plans for completing the report.

The Team was very appreciative of the fact that a number of the MSU Administrators devoted so much time and attention to the conduct of the review. All of the STL staff not away on other assignments were present throughout most of the review, made their presentations in a most capable manner, and were cooperative in providing information requested by the Team. The strong support given the STL by MSU and the "esprit de corps" within the STL staff were very obvious from the beginning to the end of the review. Certainly this is a big factor in the success of the project.

IV. Responses to the Terms of Reference

The "Terms of Reference" were provided to the Team in Dr. A. R. Bertrand's memorandum on the subject "Scope-of-Work for Team Evaluation of the Seed Program and Industry Development Project (931-0203) with Mississippi State University" (1). In the discussion which follows, each question is numbered to correspond to the above document. The questions in turn are followed, respectively, by the responses of the Team.

G2c. Are interests and needs of Regional Bureaus and Missions in areas of seed production and processing being adequately addressed?

Yes. The STL has not turned down any requests made by the Bureaus and Missions, except in those cases where STL lacked the necessary expertise.

G2d. Determine the feasibility of extending the technical services and transforming technology to the private sector.

It is the understanding of the Team that AID does not fund persons for training from the private sector nor private sector operations. However, the STL philosophy is geared to encouraging the private sector, and within limits of governmental policies and regulations in the individual LDCs, they make their recommendations accordingly. Also, many foreign visitors from the private sector come to MSU for assistance.

G3a(1). How do the numbers, job classifications, and duties of MSU staff compare to situations where staffs work full-time on AID projects?

The MSU Seed Technology Program has eight professional staff persons, six from the Department of Agronomy, and one each from Agricultural Engineering and Agricultural Economics. Their biodata and the MSU Seed Program are described in "Our History, Program and Staff" (15).

Overall, about 30-35% of the professional staff's time is spent on the Cooperative Agreement, the remainder being spent on ongoing MSU teaching, research and service programs which include an international component. Each staff member participates in activities of the Cooperative Agreement, their duties including:

(a). Technical assistance which has been provided to 54 countries at Mission request, solving local problems in ongoing seed programs, or development and implementation of comprehensive seed programs either independently or as components of a larger development program.

(b). Training at Mission request for B.S., M.S., or Ph.D. education programs and short course training (4-8 weeks) at MSU and overseas. MSU has assisted in development of training programs in 10 LDC countries. (Appendix No. 2, "Institutions in LDC's assisted by MSU to develop training programs.")

(c). Informational Resources, provided by general informational publications (over 200), MSU research publications, reprints of scientific articles, personal correspondence with overseas correspondents, and consultations.

(d). Research to answer specific seeds problems in developing countries. There are no full-time professional staff persons employed on the Cooperative Agreement. Having each MSU staff member perform a mix of MSU and contract duties permits employment of a larger staff by MSU and provides a wider range of expertise than would be possible if only a few full-time staff served the project.

G3a(2). Is training, job classification and experience of professional staff adequate?

The eight professional MSU staff persons have excellent training and extensive overseas experience. Two of the six Agronomists have Ph.D. degrees in Seed Technology, two have M.S. degrees in Seed Technology and Ph.D.'s in related fields, one has M.S. and Ph.D. degrees in Economic Botany, and one has a M.S. degree in Seed Technology. The Agricultural Economist and the Agricultural Engineer each have Ph.D. degrees. Four of the eight staff persons have had long term (2 year) overseas experience in seed programs. All have extensive short-term consultation, two in more than 20 countries, four in more than 12 countries, and two in three countries each. Biodata of the professional staff will be found in "Our History, Program and Staff," pages 16-17 (15).

G3a(3). Does the use of full-time professional staff result in desirable utilization of resources available at MSU?

None of the professional staff at MSU is utilized full-time on the Cooperative Agreement. The Cooperative Agreement is charged only for the days that staff members perform duties for the contract. (See "Summary of Activities" (14), Tables 26, IIa, IIb, IIc, V, and VI, pages 7 to 23, 42 to 50.)

G3a(4). Has adequate provision been made in the event of unanticipated short- and long-term absences of staff members?

All staff members have broad training and experience in seed technology and can share teaching, research and service activities. Two or more staff members are qualified to teach each course and substitutions are made freely in the absence of a designated teacher on an overseas consultative assignment.

G3a(5). Is MSU providing assistance to LDC scientists/technicians and professionals which is not charged to the Cooperative Agreement?

Various types of assistance are provided to LDC countries which are not charged to the Cooperative Agreement. These include among others:

(a). B.S., M.S., Ph.D. programs for LDC students supported by LDC countries, AID missions, FAO, World Bank, and ~~other sponsers~~.

(b). Short-course training sessions sponsored by the USDA.

(c). Technical assistance provided to projects supported by the World Bank, FAO, UNDP, IBEC, and other sources.

(d). On-campus consultations with foreign visitors, some of whom may stay for several weeks.

(e). Correspondence from LDC countries.

(f). Participation of MSU staff in international workshops and seminars.

(g). Publication of MSU funded research.

G3b(1). Are facilities adequate? Who finances the facilities?

The Seed Technology Program has excellent facilities completed in 1974 from an appropriation of the Mississippi Legislature and private contributions of seedsmen and seed companies. The facilities include offices for professional and secretarial staff, conference room, teaching and research laboratories, and a seed processing plant utilized for research, teaching and processing of Foundations Seed. The State Seed Testing Laboratory and offices of the Mississippi Seed Improvement Association are adjacent to the Seed Technology Laboratory and they also serve as training facilities for students and visitors.

G3b(2). Is MSU funded research relevant to requirements of LDC countries?

The MSU staff conducts a broad range of basic and applied research. Partial funding of staff through the Cooperative Agreement has broadened staff expertise and the type of research that can be conducted. M.S. and Ph.D. thesis research include basic studies applicable world-wide as well as specific problems related to LDC countries. Extensive overseas experience obtained by staff through this Cooperative Agreement has increased awareness of staff to seed production and processing problems in LDC countries that need to be researched.

G3b(3). Is available equipment of the right type and up-to-date?

The MSU Seed Technology Laboratory has all necessary equipment for receiving, drying, storing, and conditioning bulk lots of seeds. It is utilized for processing Mississippi State Foundation Seeds so that students obtain actual experience in this phase of seed conditioning. The equipment is kept up-to-date, many pieces of equipment are on consignment from the manufacturer and are changed as new models become available. (See Appendices 3 through 6 - items on consignment are marked with an asterisk.)

G3b(4). Are facilities and equipment appropriate for training students from LDC's?

The Seed Technology Laboratory maintains the basic equipment needed for development of a modern seed processing plant. Some pieces of equipment are duplicated in smaller models where the smaller models would be more appropriate in LDC countries.

G3c. Are there serious deviations from project goals?

MSU has not deviated from the project goals which include (a) technical assistance, (b) training, (c) research, and (d) providing informational services to LDC countries on problems related to seed technology.

G3d(1). Did MSU place the appropriate emphasis on the high priority elements included in the scope of work in terms of professional time and expenditures against the AID budget?

The Summary of Activities (14) shows that the STL staff contributed 41 man months to AID programs from April 1979 to June 1983. If we single out a specific period, July 1982 to June 1983, 10 staff members were involved in problem solving, increasing and maintining technical capabilities, information development, working with visitors, preparing correspondence,

training students, LDC training programs and assistance to other staff members on technical matters in 11 countries or regions. The total time devoted to these programs and countries included 789 man days for technical assistance and in-country training. This accounted for 237 man days in countries requesting assistance (13 countries and regions) and 252 man days at MSU.

Much of the discussion with staff members during the site visit emphasized and high lighted the special attention given to training and service (high priority elements) in the countries they had been requested to work in by AID. This is also superbly documented in the Reports on work undertaken and completed in better than 40 countries by MSU.

G3d(2). Are the assumptions for obtaining the goal, purpose and objectives, as indicated in the cooperative agreement still valid and are they being adequately fulfilled?

In our discussions it was amply emphasized that the STL staff were concerned with the purpose and goals of the cooperative agreement. Their discussion of seed production and supply programs were adequate to support an LDC's food requirements and represented a careful analysis of current agricultural development. It was pointed out that each LDC presented a different set of problems. The following items were considered in recommending an adequate seed production and supply system for the LDC: careful planning, a national policy, trained personnel, quality control, adequate technical information, applied research to solve technical problems, cooperation and encouragement of industry involvement, and a commitment on the part of advisors to establish a productive seed program.

The above as described by the Director of the STL demonstrated that the staff members were definitely fulfilling the objectives of the cooperative agreement.

G3d(3). Was the quality and quantity of the project output adequate for the separate tasks?

The panel discussed the quality/quantity of the project output after reviewing the very adequate reports of each program effort in the LDCs and two days of discussion with the Administration, Director and staff. We came away feeling that STL is doing an acceptable job under each task undertaken.

G3d(4). What kinds of applied research activities have been carried out to resolve problems in LDC seed technology? Describe and characterize these activities.

MSU has assisted in the establishment of seed and supply programs having components of applied research in Ghana, Nigeria, Cameroon, Philippines, Thailand, Bolivia, Brazil, Costa Rica, Panama, Peru, Honduras, Taiwan , El Salvador, India and Niger.

Several applied research programs which solved problems were (a) development, adaptation and testing of a simple heater-fan unit for drying smaller quantities of cowpea seed. The unit uses a small, low BTU grid oil

burner of the type used in construction to keep a building site warm and an off-the-shelf high pressure centrifugal fan. The heater has a built-in high volume but low pressure fan. This unit was used in Guyana and has worked well for drying small lots of cowpea seed. The cost of the components was nominal - $800. (Boyd and Cabrera) (b) Evaluation of seed quality in tropical forage grasses is a major problem due to sterile florets/spikelets and appendages on the seed unit. Research was undertaken to develop technics for evaluation of a relatively new forage grass (Andropogon gayanus) in South and Central America. A student from Venezuela did the work under the dirction of MSU staff member (Potts). With collaboration from CIAT, methods for purity and germination testing were established. (c) Lack of inaccessibility of transportation in Nepal caused problems in modern seed drying technics. As a result MSU staff members (Boyd and Cabrera) and a Nepalanese MSU student worked on the feasibility of a small solar dryer with a kerosene burner for heat during the night. A prototype solar dryer was the result of this research effort. (d) Seed production of black cowpeas is difficult in Guyana and other Caribbean countries. Mechanical harvest is next to impossible. A research study on this problem by a student from Guyana under the direction of MSU staff (Delouche) is underway using defoliants and dessicants to speed up drying and force more uniform maturity of the seed for mechanical or hand harvest. (e) Continuing research is underway on tropical grasses in cooperation with CIAT on the establishment of quality components of three forage grasses in tropical regions. A Colombian student was involved at MSU (Andrews) and at CIAT. Uniform flowing technics for germination testing and purity analysis procedures were developed.

The above are examples of the many applied research problems commonly encoutered when the MSU staff members go to the LDCs to solve their seed production problems.

G3d(5). Describe the kinds of training provided. What kind of assistance has been given to agricultural educational institutions in LDCs to establish or upgrade programs?

Training is one of the major components, both at MSU and in the LDCs, of the cooperative agreement with AID. In-depth degree training has increased at MSU, as well as, the number of requests for in-country (LDC) and in-service training. The Director and staff are pleased with this trend because the lack of trained, resourceful workers, supervisors and managers continues to be a major impediment to progress in the seed program-industry development in many of the countries.

In-country training has been intensive, as well as, extensive. This is well documented in the Summary of Activities (14).

The training programs included such subjects as:

a. Regional Workshops on Seed Program strategies, plans and implementation - Colombia

b. Basic Training Course in Seed Technology - Colombia (CIAT), Upper Volta

c. Training Course in Seed Conditioning - Kenya

d. Seed Pathology Workshop -Thailand

e. Advanced Regional Training Course on Seed Conditioning - Colombia, etc.

These courses varied in time from one to three weeks with 20 to 40 participants attending the sessions. The staff in an average year would be involved 237-460 days in some form of instruction in the many LDCs with whom they are concerned. Further support of the training program effort are the institutions in LDCs assisted by MSU (see Appendix 2). The SOA Table IV (14) lists the numbers of students participating in on-campus training courses for degrees and non-degrees. The names of the students receiving B.S. degrees and their country of origin are listed in attachments to Table IV (14). Many training courses were also provided for the non-degree participants and students from LDCs and these are listed by name and country in the SOA (14).

G3d(6). Describe a sample of the in-country programs carried out as described on pages 5-6 of the cooperative agreement.

As emphasized many times during our informative site visit a major constraint to the development of an effective and efficient seed supply system in many LDCs is the lack of trained manpower including supervisory groups. An example of this problem was experienced by MSU staff (Potts and Cabrera) when they were working in Paraguay (6). In their report it was pointed out there was a "lack of technical personnel with in-depth professional training and experience in seed technology and program development." This was resolved by training a postgraduate (Paraguayian) seed technologist who returned to become an important cog in the national seed program.

USAID/Upper Volta requested MSU Seed Economist to assist the Mission and NSS personnel in analyzing a survey to determine the methods farmers used to procure seed for major crops produced (13). The study showed that farmers purchased seed with improved varieties being demanded. It was thought that the farmers do an excellent job of maintaining the quality of the seed. An additional survey was concerned with pricing. It was immediately apparent there was no easy way or formula to determine price each year. Short supply can and does push seed prices higher. There should be some mechanism for altering prices to insure that seed stays in the supply channel and does not enter the food channel. In Burma (12), AID is funding a maize of oil seed project, the primary purpose of which is to increase production of maize, sunflower, soybean, ground nuts and sesame. MSU has provided technical assistance in developing seed farms and a seed production and supply program. Without a successful assistance program, production could drop 50%.

The agreement requires the University to prepare designs, layouts and equipment specifications, make recommendations and prepare meaningful and detailed reports. From our discussion and from reviewing Reports, it was very apparent that this aspect of the agreement is being well and adequately handled by MSU.

G3d(7). Do reports from the project cover the various activities in sufficient detail?

The answer to this question is "yes." The activities were well documented in all the reports reviewed by the Panel. The excellent information center at the STL underscores this conclusion.

G3d(8). Are the financial resources under the project justified in terms of actual accomplishments and outputs?

Again, the panel's answer to this question is "yes." The cost sharing on the part of MSU enables AID to expand its overall effort manyfold. The STL staff outlined many accomplishments and outputs in the 40 countries MSU worked with. AID could fully justify the project even on a single aspect such as training. As it is, they come out way ahead with sound programs in technical assistance, information dissemination, industry involvement, development of facilities and equipment, etc. This project is a very sound investment of Government funds.

H(1). Ratio of contractor person-days/project expenditures to outputs.

This point is addressed in the Mozynski/Jackson report (19) wherein a comparison is made among three Field Support projects located at the respective universities as follows: The comparative daily cost of providing support to the Missions, RBs and LDCs was $249 at Mississippi State (for the project under review), $731 at Kansas State University, and $1,404 for CICP at Berkeley, CA. It is also pointed out that all three contractors have provided excellent service, showing that the quality of the output was both good and comparable among the three contractors.

H(2). Ratio of trainees/training expenditure to number trained.

Training was included in the comparison shown in H(1) above. A numerical comparison from the same report shows the following: MSU trained 272 participants and provided consultation time with 81 international visitors, Kansas State trained 56 participants, and CICP held workshops and seminars for 97 participants. The favorable showing by MSU is obvious.

H(3). Is project providing adequate useful information to LDCs on seed production, processing, storage, handling, drying, marketing and distribution?

A review of the referenced documents, and the oral presentations made in the course of the Review provide a completely positive response to this point. All of the requests channeled through AID have been responded to in a most capable and complete manner. One gains the impression that any eligible country, organization, or individual "need but ask" and they will receive excellent assistance. The points enumerated above require expertise of agronomists, including specialization in various aspects of seed technology, engineers, and economists. Training and background experience of the STL include all of these disciplines among the various staff members. And in those rare cases where the expertise called for is

not available in the STL staff, as for example sociology or vegetable seeds, Dr. Delouche utilizes consultants, first from Mississippi staff if available, and secondly from the outside if necessary.

V. Additional Observations

A. The public sector seed program in Mississippi - a unique organization

One of the unique features of the seed work in Mississippi is that all of the important units of the public sector are located in close proximity on MSU campus, and are practically interwoven into one overall operation. The units which are a part of the Department of Agronomy of MSU are: (1) the Seed Technology Laboratory, and (2) the Foundation Seed Section. Also on campus and a part of the University is the educational work on seed in the Cooperative Extension Service. The other seed units on campus are the Mississippi Official State Seed Regulatory Laboratory and the Mississippi Seed Improvement Association.

The Seed Technology Laboratory has access to and cooperates closely with the other units. For example, staff personnel from the other units help conduct seed technology training on campus.

By statute, "The Agronomist" of the Mississippi State University is the "State Seed Analyst" (presently Dr. James Curtis Delouche). The Law also provides that the Commissioner of Agriculture and Commerce will maintain a seed laboratory on the Campus of MSU assuring close cooperation of MSU with the Seed Technology Laboratory.

Mr. Dennie Keith is Manager of the Foundation Seed Section. The Section constitutes a large operation, with headquarters on the MSU campus, but with sizeable operations in the Delta where cotton and rice seed are grown, conditioned and distributed. On campus, Foundation Seed owns a limited amount of equipment, using seed equipment interchangeably with the Seed Technology Laboratory, largely owned by or on consignment to the latter. (Appendix 3 through 6).

Mr. W. W. Buerry is the Executive Secretary of the Mississippi Seed Improvement Association -- the seed certifying agency. This organizaiton is an independent corporation governed by a Board of Directors of which Dr. Delouche is the only permanent member.

Dr. Charles C. Baskin of the Cooperative Extension Service is an Adjunct Professor of Agronomy. His area of specialization is seed and grain, the latter consisting of grain sorghum and wheat. In Mississippi, the Extension Specialists are housed separately from the subject matter Departments. However, Dr. Baskin works closely with the Seed Technology Laboratory, helps conduct seed training on campus, and occasionally takes overseas assignments under the AID cooperative agreement.

The close physical proximity of the facilities and staff of the Seed Technology Laboratory, with the five important public sector seed units, together with their extremely high degree of cooperativeness, constitutes a coordinated institutional establishment in seed research, training, service and regulatory work unequalled in capability anywhere in the United States, and to the best knowledge of the Review Team members, unequalled anywhere else in the world.

B. Cooperation and Follow-up in the LDCs

One of the outstanding characteristics of the STL is the emphasis placed by the staff on a continuing interest in seed programs in the LDCs in which they have become involved, along with an unusual willingness to share their knowledge with others who also provide assistance in such programs. The emphasis is on helping the LDCs without any apparent concern on who gets the assignment to provide assistance or on who gets the credit.

There may be even better examples of the above than the seed programs in Botswana, but it happens to be the one about which the Review Team is most knowledgeable.

In 1978, Frolik, under the auspices of the USAID/B made two trips to Botswana, conducted a fairly intensive study of the seed situation in that country, and issued a report entitled, "The Seed Program of Botswana--Present and Proposed." (18) In doing the study, he made substantial use of reports previously issued by the STL, and conferred at various times by telephone with Delouche, Potts and Boyd. (These sources of information are referenced in this report.) The assistance provided by MSU was indispensable.

One of Frolik's recommendations was that the seed production and distribution activities of the Seed Multiplication Unit be limited to Foundation and Basic Seed. The recommendation was adopted by the Government of Botswana. In activating the plan, Dr. C. Hunter Andrews, in 1980, at the invitation of USAID/Botswana, under the AID Cooperative Agreement, was asked to assist the Seed Multiplication Unit in reviewing equipment specifications and prices and to provide other long term technical assistance. He used the Frolik report as a point of departure in making his study and recommendations, issued in his report TA 80-13, entitled, "Technical Assistance in Seed Processing for Botswana Foundation Seed Program." (7)

In his report, Frolik had also suggested a number of alternative organizational structures which could be used in the production of Certified (commercial) seed. Of the possible alternatives the Government of Botswana selected, the Botswana Agricultural Marketing Board (BAMB), a parastatel, to condition and distribute the commercial seed. In accordance with the wishes of the Government of Botswana, USAID/Botswana requested "...The services of a senior seed technologist for the purpose of assisting Mission and BAMB personnel in determining the design and preparing detailed equipment specification for a seed conditioning unit to be located at Pitsane, Botswana." The assistance was provided through the MSU/AID Cooperative Agreement by Dr. Howard C. Potts, Dr. Edgar Cabrera and

Dr. A. H. Boyd. Here, as with Andrews' report on facilities at Sabele, Frolik's recommendations were taken into account and referenced in the report. (10)

Thus the three studies and recommendations provided in three separate reports issued in 1978, 1980 and 1981, respectively, constitute an integrated program of assistance. Botswana has responded to the MSU/AID recommendations on this overall seed project. With the three successive programs of assistance building on each other, signficant progress was made.

C. Fiscal and Administrative Procedures

Background. MSU established the Southern Regional Seed Research Laboratory in 1949 to serve the research, training and technical assistance needs of seed producers, suppliers, and farmers in Mississippi and the rest of the Southern Region. (15) The Laboratory developed rapidly and became recognized as the outstanding center of information and expertise on seed technology in the U.S.A. In 1956 USDA asked MSU to undertake seed training courses for participants from cooperating countries, which, in turn, resulted in a series of training programs that have continued to the present. In 1958 the name of the Laboratory was changed to the Mississippi STL.

The success of the training courses highlighted the need for direct technical assistance in all aspects of seed production and processing. The trainees on returning to their countries often contacted MSU staff and faculty for additional information and advice. Many of the requests arose out of AID Mission sponsored programs in the LDCs. MSU soon realized it could not provide the assistance wholly from its own resources. This guided MSU and AID into a contractual arrangement whereby the University agreed to provide technical assistance and services to the LDCs in seed program development (1). This service expanded to other areas and MSU now provides help to countries, e.g., Brazil, Mexico, etc., through direct contacts not under AID financing.

Administration. The contractual agreement between MSU and AID began in April, 1958 and has continued under a number of successive contractual agreements (1) since. The few minor administrative problems which have developed over the 25-year span of the program were satisfactorily resolved.

During the site visit the Review Panel talked with the STL staff as well as administrative officials in the President's office, Experiment Station and the College of Agriculture about the management agreements between AID and MSU. It is known that serious consideration is presently being given to changing from a contract to a "task order" arrangement. So the Team asked if the present contractual agreement is satisfactory and if other arrangements such as grants, task orders, or other administrative mechanisms should be considered. Could MSU move to this kind of an arrangement, i.e., "task order," without disrupting the present program? This question was posed to both administrative officers and Agronomy Department faculty involved in the STL program.

Dr. Louis Wise, Vice-President for Agriculture and Dr. H. Dean Bunch, Director, Office of International Programs, have been closely associated with the STL since its inception. Drs. Wise and Bunch and the STL faculty are firmly convinced that the program can best be administered through the present contractual arrangements.

In 1971-73 "task orders" were used as the administrative vehicle. The "task orders" system was not nearly as efficient as the contract arrangement (Cooperative Agreement). If the task order system is reinstated, it is expected that each faculty member would have to operate as an individual. They would be forced to request leave from MSU each time they wanted to work with an LDC or assist an AID mission. This would be further complicated by the staff member's previous University commitments. The team effort that has been so well developed over the years would be lost.

It was also stated that the scope of the seed technology effort would be reduced. Few Embassies or AID missions will have the expertise needed to request seed technology assistance sufficiently in advance so that cost will get included when budgets are prepared. When the need arises funds may not be available, so delays in developing the seed project will inevitably occur. Under the present cooperative agreement, most requests for seed technology assistance are met within the year that the request is received.

The administrative cost to the University would also increase. These costs would need to be passed on to the technology recipient or the sponsoring agency. The net result would thus be less technology transfer at a higher cost. One of the unique features of the MSU project - low administrative costs compared to other contractual projects - would be weakened, if not lost.

Cost Effectiveness. One interesting by-product of this discussion on the possible administrative changes would be the cost effectiveness of the program. Under the present effort cost effectiveness is very high with MSU contributing and committing funds and large segments of faculty time to the AID cooperative agreement, which under the task order vehicle would be nonexistent. The faculty members are very efficient and strongly motivated in carrying out their University functions - teaching, research, work with the private sector, students and service. Their other duties are beautifully interwoven with their AID commitments -- training, technical studies, planning, seed production, information, applied research, advisory functions, encouragement of industry participation, etc. to the LDCs.

VI. Recommendations

1. The Review Team strongly recommends continuation of the program at MSU. Since the present agreement expires on April 30, 1984, AID should proceed forthwith to develop a PP so that the new agreement can be

developed and in place by that time. The amount of services called for in the new agreement should equal the anticipated demand for seed services by the AID/W, Bureaus, Missions, and the LDCs.

2. It is strongly recommended that the MSU/AID program be continued under its present administrative arrangements of a Contract-Cooperative Agreement in all future funding. The University is to be highly commended for its very cost effective program at the STL.

3. The corollary of No. 2 above is that the Team strongly recommends against the "task order" type of arrangement.

4. There should be periodic reviews of the status, needs and progress on seed programs in LDCs where there is interest in continued assistance from AID/MSU.

5. The Team commends the STL on the excellent set-up for distributing the many reports they have produced and for their generosity in providing copies on request. This fine service should by all means be continued.

6. The Team believes that the STL is missing some opportunities in not getting more of their research findings published including research done by students in meeting requirements for Masters and Ph.D. degrees. There is presently no problem in making use of such research findings, as the results and recommendations emanating therefrom find their way into the TA reports and are utilized in training and other programs. However, both the faculty and the students would gain additional scientific stature if more of the material which is appropriate would be published in scientific journals such as Seed Science and Technology and the Journal of Seed Technology. Also, the information would thus receive wider dissemination.

7. AID should provide additional support for intensive training of non-degree seeking persons from the LDCs who come to the STL for periods ranging from ca. one to four months. There is a great demand for this type of assistance, which amounts to almost a one-on-one arrangement. Present funding is not adequate to meet this need, i.e., these persons are not getting the amount of assistance that STL staff think is called for.

8. The STL staff has a good philosophy with respect to encouraging private sector participation in the seed industry. Recognizing that there are often political limitations on what the private sector can do, the Team commends STL on their philosophy and attempts in this area of endeavor, and strongly endorses continuation and if possible even greater encouragement for involvement of the private sector.

VII. Acronyms Used in this Report

AGR	-	Agriculture (AID)
AID/W	-	Agency for International Development/Washington
AP	-	Agricultural Production (AID)
BAMB	-	Botswana Agricultural Marketing Board
CICP	-	Consortium for International Crop Protection
CIAT	-	Centro International de Agricultura Tropical, Colombia
FAO	-	Food and Agriculture Organization
IBEC	-	International Business Economy Corporation
LDC	-	Less Developed Country
MSU	-	Mississippi State University
NSF	-	National Science Foundation
PP	-	Project Paper
RB	-	Regional Bureau, AID
S&T	-	Science and Technology (AID)
SOA	-	Summary of Activities
STL	-	Seed Technology Laboratory
UNDP	-	United Nations Development Program
USDA	-	United States Department of Agriculture

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IX APPENDICES

Appendix 1. MSU Key Personnel

I. Administrative Officers

Dr. James D. McComas, President, Mississippi State University
* Dr. Louis N. Wise, Vice President for Agri., Forestry and Vet. Medicine
* Dr. H. D. Bunch, Director, Office of International Programs/Agri. and Forestry
* Dr. Rodney Foil, Director, Miss. Agri. & Forestry Experiment Station (MAFES)
Dr. Charles E. Lindley, Dean, College of Agriculture
Dr. James R. Carpenter, Director, Miss. Cooperative Extension Service (MCES)
* Dr. Roy G. Creech, Head, Department of Agronomy
* Dr. William Fox, Head, Department of Agricultural & Biological Engineering
Dr. Verner Hurt, Head, Department of Agricultural Economics

II. Seed Technology Laboratory (Agronomy Department)

* Dr. James Curtis Delouche, In Charge
* Dr. C. Hunter Andrews, Agronomist
* Dr. A. H. Boyd, Agronomist
* Mr. Edgar Cabrera, Research Associate
* Dr. Warren Couvillion, Agricultural Economist
Dr. Howard C. Potts, Agronomist
Dr. Charles E. Vaughn, Agronomist
* Dr. G. Burns Welch, Agricultural Engineer
Mrs. Shirley Carter, Secretary
Miss Shirley Livingston, Secretary
Mrs. Tammy Mayo, Secretary

* Present during part or all of the review.

Appendix 2. Institutions in LDCs Assisted by MSU to Develop Training Programs in Seed Technology

1. Seed Unit, CIAT--Assisted in identifying need, organization, design of facilities, preparation of instructional materials, and in instruction in many training courses.

2. Universidad Autonoma Agraria "Antonio Narro," Buena Vista. Saltillo, Coahuila, Mexico--Trained seed conditioning engineer for faculty (M.S. degree), and seed technologist (M.S.); provided syallabi, curricula, and reference materials.

3. Federal Rural University, Pelotas, Brasil--Trained most of seed technology faculty; assisted with development of M.S. degree curriculum in Seed Technology; provided training materials and references; assistance still in progress. The Federal University of Pelotas is already involved in training seed technologists from other Latin American countries.

4. University of Costa Rica, San Jose--Provided assistance over many years to develop the Center for Grains and Seeds (CIGRAS) in the University of Costa Rica; faculty training; curricula, course syllabi, instructional materials.

5. Kasetsart University, Bangkok, Thailand--MSU trained faculty members who organized graduate training in Seed Technology in KU; additional faculty are being trained now. KU now offers a M.S. degree in Seed Technolgoy.

6. University of Philippines, College of Agriculture, Los Banos--MSU trained principal faculty (Ph.D. and M.S. degrees) who are presently operating the Vegetable Seed Training Center in cooperation with Dutch Technical Assistance.

7. National Agrarian University, La Molina, Lima, Peru--MSU trained faculty member (Ph.D.) who has organized seed technology courses in the agronomy curriculum.

8. University of Sao Paulo, Agriculture, "Piracicaba," Campinas, Brazil--MSU trained principal faculty; provided many instructional materials; Piracicaba has been offering the M.S. degree in Seed Technolgoy for about 6 years.

9. Institute of Agriculture, Bogor (IPB), Bogor, Indonesia--MSU trained faculty who organized the seed technology curriculum in IPB, and has provided extensive support (advice, syllabi, curricula, instructional materials, design of facilities) over many years.

10. Escuela Agricola Panamericana (EAP), Zamarano, Honduras--MSU assisted with organization of seed technology unit and establishment of facilities under sponsorship and with support of ROCAP anad TA contract; first seed training courses in Central America and Caribbean region were offered cooperatively by MSU and REAP at EAP.

Appendix 3. Main Seed Conditioning Plant Equipment (includes equipment in Foundation Seed, First Floor and Mezzanine)

1	Center discharge holding bin above air & screen cleaner, 6'0" x 8'0"	1
2	Center discharage holding bin, above bagger, 6'0" x 6'0" x 4'0"	1
3	Center discharge holding bin above fractionating aspirator 3'0" x 3'0" x 3'0"	1
4	Center discharge holding bin above cylinder separator, and width and thickness graders 3'0" x 3'0" x 1'6"	3
5	Side discharge holding bin above disch separator, 3'0" x 3'0" x 1'2"	1
6	Center discharge holding bin, 2'0" x 2'0" x 1'10"	1
7	Center discharge holding bins, 4'0" x 4'0" x 4'0"	10
* 8	CEA Carter-Day width and thickness grader Model No. 1-VT, provided with two vibrating trough conveyers	2
* 9	12" x 62" width and thickness grader shells with round and oblong perforations of different sizes	21
* 10	CEA Carter-Day disc separator, Model No. 1547, mounted on casters	1
* 11	CEA Carter-Day disc separator Model No. 1827, provided with one trough vibrating conveyer	1
* 12	CEA Carter-Day cylinder separator, Model No. 3 Uni-Flow	

* Equipment on consignment.

* I3	18" x 90" indent cylinder shells of different indert sizes	
* I4	CEA Carter-Day Superior fractionating aspirator Model No. FA24	1
* 15	Enclosed spiral separator, Amos Model 200	1
* 16	Crippen debearder Model S	1
* 17	Clipper debearder	1
* 18	Clipper huller and scarifier, Model Eddy-Giant, provided with carborundum and rubber concaves	1
* 19	Clipper air and screen cleaner, Model Super X 2959D, provided with clean seed vibrating conveyor, dust collector and a hundred and forty (140) 42" x 60" screens	1
20	Mitchell type continuous bucket elevator, with three compartment buckets	1
* 21	Enclosed spiral separator, Amos Model 100	1
* 22	Crippen air & screen cleaner Model H-534A, provided with support and working platform, clean seed vibrating discharge spout and two (2) dust collectors	
23	Center discharge holding bin above Crippen H-534A air & screen cleaner	
24	Clipper air & screen cleaner Model No. 27, mounted on casters and provided with leading elevator, unloading screw and ninety (90) 34" x 44"	
* 25	Clipper air & screen cleaner Model M-2B	1
* 26	Sutton Steele & Steele gravity table, Model AX-350 provided with four triangular decks.	1
* 27	Oliver Mfg. gravity table, Model 50A, provided with three (3) rectangular decks and aspirating feed hopper	1
* 28	Oliver Mfg. gravity table Modle 30 AB, provided with two (2) decks	1
* 29	GEOSOURCE electric color sorter Model GB-103	1
* 30	CLELAND Open spiral separator	1
* 31	Gustafson seed treater Model SS1, provided with mixing chamber and pumping system	1
* 32	Gustafson seed treater Model LA provided with mixing chamber and pumping system	1

* 33	Gustafson automatic seed sampler	
* 34	Clipper air & screen cleaner, miniature Model Super X 29D	1
35	Roller type cottom gin	1
36	Drag-flite conveyor, 8" x 20'0"	1
37	Burrows inclined belt conveyor	2
38	Fairbanks scale, 2500 lb. capacity	1
39	Yale forklift Model 6510-040-NFS-083	1
40	Baker forklift Model FGHG-40/48	1
41	Big Joe hydraulic lift truck	1
* 42	Clipper roll mill	1
* 43	Black Diamond valve packer	1

Appendix 4. Teaching Lab Seed Conditioning Equipment

1	Crippen air & screen cleaner, Model NW-334, provided with support and working platform clean seed vibrating discharge spout	
2	34" x 44" screens for Crippen NW-334 and H-534A air and screen cleaners	100
3	CEA Carter-Day disc separator Model 1522, provided with hopper bin and support platform mounted on casters	1
4	Howe-Richardson bagging/sewing systems, provided with Model G-17 scale, Unison special sewing machine and 12" x 90" belt conveyor	1
5	W. A. Rice Seed Co. roll mill, Model 52S	1
6	Forsberg aircycle gravity table, Model 15R	1
7	John F. Grisez magnetic separator, provided with seed hopper, screw lift and continuous bucket internal discharge evevator	1
8	Kyarnmaskiner indent cylinder separator, provided with eight (8) 12" x 30 1/2" cylinder shells	1
9	Helmut electrostatic separator	1
10	Holding bin, 45° center discharge, 2'6" x 2'6" x 1'6"	5
11	Corn sheller (manually operated)	1
12	Carpo electrostatic separator	1
13	Electrostatisc separator	1
14	Calking Mfg. seed treater, miniature Model S-30	1
15	Forsberg gravity table, Model 10 MZ	1
16	CEA Carter-Day dockage tester Model XT1	1
17	Soil microenvironment simulator, provided with temperature cam programmer and controller	2
18	Barber Colman Data-Pro. Continuous/interval temperature recorder	1
19	Cotton seed dilute acid delinter (modified clothes washer and dryer)	1

20	Morton Chemical Co. seed treater	1
21	Vac-A-Way seed cleaner	2
22	Electric mini thresher	1

Appendix 5. Seed Drying and Bulk Storage Equipment

1	18 ft. diameter round metal bins, 17'6" wall height, perforated floor 34" above roung level. 3000 bu storage capacity. Equipped with wall mounted bean ladder.	3
2	Axial airfoil fan, 25" blade. 10 HP motor, equipped with Farm Systems Corporation propane vapor crop drier heater, Model BF10H, thermostat and humidistat.	2
3	Centrifugal flow, arrangement 4 fan, 10 HP motor, equipped with propane vapor heater, thermostat and humidistat.	1
4	Overhead drag-flite conveyor, 10" x 83'0", equipped with seven (7) discharge gates and clean out end discharge. Under each gate a two-way valve is provided to avoid lot mixtures.	1
5	Unloading drag-flite conveyor, 8" x 83'0", provided with five (5) intake hoppers for unloading drying bins.	1
6	Overhead drag-flite conveyor 10" x 30'0" branch extension.	1
7	Feed type hopper bottom bin, 10'0" diameter, 10'6" wall height.	1
8	4" bin unloading auger	1
9	6" bin unloading auger	1
10	4" flighting bin sweep auger	1
11	Inclined tubular belt conveyor	1

Receiving Area

1	Clipper vibro-pit, receiving dump pit, 4'0" x 7'0" x 10'0".	1
2	Universal D-1000 easy dump, receiving elevator	1

Appendix 6. Other Equipment

1	Bag trucks, 48" handle length	2
2	Universal bag holder	1
3	Bundle plot thresher, gasoline powered	1
4	Portable bag closer (sewing machine)	1
5	Bag cart	2
6	Six (6) bushel truck	2
7	Ten (10) bushel truck	2
8	55 gal. drum vacuum cleaner	2
9	Small vacuum cleaner	3