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UNCLASSIFIED
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Improvement of Tropical Production of Beans and Cowpeas Through Disease and Insect Control	931-0562	DSB/AGR/FCP 15p

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)

☐ REGULAR EVALUATION ☒ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	7. PERIOD COVERED BY EVALUATION
A. First FRO-AG or Equivalent FY 73	B. Final Obligation Expected FY 79	C. Final Input Delivery FY 80	A. Total $ 2,490 B. U.S. $	From (month/yr.) 11/30/76 To (month/yr.) 6/30/78 Date of Evaluation Review June 27-30, 1978

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. Strengthen the network of cooperators. Assign a full-time network coordinator with technical background and broad familiarity with the project and its goals.	UPR	3/31/79
2. Strengthen the training component of the project i.e., on the job and on campus training to improve increased involvement of LDC trainees.	UPR	9/79
3. Project management must assure professional development of staff through summary of research data which is reflected in up-to-date annual reports, submission of the research data to peer scientific scrutiny.	AID/W, UPR	3/31/79
4. More detailed attention be given to delineating experimental design in reports.	UPR	9/79
5. Project plan and conduct a workshop on "Identification, Distribution and Potential for Control of Major Diseases and Insect Pests Affecting Production of Beans/Cowpeas in the Caribbean and Tropical America."	UPR	9/1980
6. Integrate component parts of the project; periodic staff meetings and seminars for project staff.	UPR	10/31/79

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

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

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

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

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

Dr. M.W. Adams, Mich. State Univ., Prof. of Bean Genetics
Dr. Victor Lateef, NE/TECH/AD
Dr. James Erickson, DSB/RD/RES

Clear: John R. Wilson, Dep. Dir
DS/AGR

12. Mission/AID/W Office Director Approval

Signature: [signature]

Typed Name: DAA/DS/FN, Mr. T. Babb

Date: March 8, 1979

13. SUMMARY - The purpose and expected products initially defined in the Project Statement of October, 1975 are still valid. The problems originally addressed and needs defined have not changed in any major way. Significant progress in the development of multi-disease resistance in beans and cowpeas has been achieved. Forty-four individuals in 29 different countries requested seed of the multiple resistant germplasm in recent years. Some 87% of the recipients grew the material and about 35% indicated that the germplasm was being incorporated into their breeding programs. The project has sought to exploit the genetic potential extent in related species for additional kinds of resistance, not only to biological hazards but to certain environmental hazards as well. Both field and laboratory work has shown the value of certain chemicals and application schedules for the control of plant diseases of beans and cowpeas. A limited amount of training has been undertaken. Results appear to have been successful, but the scale of training has been very limited in numbers of personnel involved. In view of progress made, it should be recognized that problems have been encountered in the outreach program, the limited training capacity of the the project, the integration of the component parts of the project and the professional development of the staff through publishing the research results from the project in professional journals so that project accomplishments can be subjected to peer scientific scrutiny.

14. EVALUATION METHODOLOGY - This was an in-depth evaluation. It was in accordance with the evaluation plan of the Office of Agriculture and DS/PO with respect to timing, study design, scope, methodology and issues. The primary sources of data were the 1975 annual report, draft 1976 and 1977 annual reports, detailed reports by individual project personnel through written and tabulated summaries and slide presentations. Field visits took place to laboratories, screen houses, and field nurseries after the oral presentation. The team was composed of Dr. Wayne Adams, Michigan State University; Mr. Victor Lateef, Near East Bureau; Dr. James Erickson, DS/PO/KES. The evaluation team held an evening critique after the presentations and a half morning session to reach a consensus on major issues and to draft the outline for the evaluation report.

15. DOCUMENTS TO BE REVISED TO REFLECT DECISIONS NOTED PAGE 1

XX Project Paper (PP) XX Logical Framework __ CPI Network __ Financial Plan

__ PIO/T __ PIO/C __ PIO/P __ Project Agreement __ Other

__ This evaluation brought out ideas for a new project -- a Project Identification Document (PID) will follow

16. Evaluation findings about EXTERNAL FACTORS - Identify and discuss major changes in project setting which have an impact on the project. Examine continuing validity of assumptions.

There have been no major changes that have had any major impact upon the project.

17. Evaluation findings about GOAL/SUBGOAL - For the reader's convenience, quote the approved sector or other goal (and subgoal, where relevant) to which the project contributes. Then describe status by citing evidence available to date from specified indicators and by mentioning progress of other projects (whether or not U.S.) which contribute to same goal. Discuss causes -- can progress toward goal be attributed to project, why shortfalls?

The approved program or sector goal is "To increase quantity and nutritional value of food crops in developing countries". The objectively verifiable indicators for this goal are based upon: 1.) Significant increase in per capita production of major food crops in LDCs; and 2.) Improvement in Nutritional quality of major LDC food crops with emphasis on protein levels. According to the 1977 FAO Production Yearbook, a comparison of the total production of dry beans for Latin America and South America is as follows:

Region	1961 - 65 MT(000)	1969 - 71 MT(000)	1977 MT(000)
Central America	1081	1255	1199
South America	2204	2682	2915

The per capita production comparison is as follows:

Bean Production/Capita

Region	1961-65 KG/Capita/Year	1969 - 71 KG/Capita/Year	1977 KG/Capita/Year
Central America	13.7	14.0	10.8
South America	13.4	12.5	12.9

Considering the continue increases in population growth there has been a net decrease in production of dry beans per capita, but this reduction has been offset by net increases in total production of beans for each region. The rate of growth of bean production has not kept pace with population growth. The germplasm from this project is one of many factors contributing to increased production growth as the need for new sources of disease and insect resistance in breeding germplasm is a continuing need.

EVALUATION FINDINGS ABOUT PURPOSE - Quote the approved project purpose. Cite progress toward each End-of-Project Status (EOPS) condition. When can achievement be expected? Discuss causes of progress or shortfalls

The project purpose is to improve the tropical production of beans and cowpeas through disease and insect control. Significant progress in the development of multidisease resistant bean and cowpea varieties has been achieved. Ninetee lines have been isolated after repeated season location testing, carrying various combinations of resistance to the soil-borne fungi complex consisting of Rhizoctonia, Macrophomina, Fusarium, and Phytophthora and to one or more foliage and/or seed borne diseases, of which rust, angular leaf spot, and common bean mosaic are most prominent.

Numerous genotypes have been produced with resistance to single disease entities (Cercospora, leaf spot, anthracnose, and Rhynchosia virus). Lines with tolerance to common bacterial blight have been observed but no high level resistance has been found to the virulent strains present in the tropics. A similar situation prevails with respect to golden yellow mosaic, the white fly transmitted virus of beans.

Forty-four individuals in 29 different countries requested seed of the multiple-resistance germplasm in recent years. Some 89% of the recipients grew the material and about 35% indicated that the germplasm was being incorporated into their breeding programs. Cooperation between the LDCs and the project can be strengthened.

19. EVALUATION FINDINGS ABOUT OUTPUTS AND INPUTS - Note any particular success or difficulties.

Significant progress in the development of multidisease resistance in beans and cowpeas has been achieved. Nineteen lines have been isolated after repeated season-location testing, carrying various combinations of resistance to the soil-borne fungi complex consisting of Rhizoctonia, Macrophomina, Fusarium, and Phytophthora and to one or more foliage and/or seed borne diseases, of which rust, angular leaf spot, and common bean mosaic are most prominent. Numerous genotypes have been produced with resistance to single disease entities (Cercospora leaf spot, anthracnose, and Rhynchosia virus). Lines with tolerance to common bacterial blight have been observed but no high level resistance has been found to the virulent strains present in the tropics. A similar situation prevails with respect to golden yellow mosaic, the white fly transmitted virus of beans.

Although several of these lines are good yielders, and yield has in fact been

employed as a selection criterion of disease resistance in many instances, the agronomic suitability of most of these lines with respect to plant type, maturity, and seed type, and ease of cooking have not been rigorously evaluated.

Forty-four individuals in 29 different countries requested seed of the multiple-resistance germplasm in recent years. Some 87% of the recipients grew the material and about 35% indicated that the germplasm was being incorporated into their breeding programs.

The impact of this component cannot be measured at this time but it could be far reaching. Clearly, however, essential elements are lacking. These will be presented as "Recommendations" below.

Project leaders, recognizing that resistance to certain diseases and insect pests either does not exist in present agronomically useful types, or, if found, is not genetically broadly-based, have sought to exploit the genetic potential extent in related species for additional kinds of resistance, not only to biological hazards, but to certain hazards of the physical environment as well. Phaseolus coccineus and Phaseolus acutifolius are two species, crossable with Phaseolus vulgaris, that have potential for contributing useful genes and/or gene-complexes to cultivated beans, and potential in themselves for exploiting certain ecological niches to which Phaseolus vulgaris is not well adapted.

Progress is being made in selecting tepary beans Phaseolus actifolius for combined resistance, and in developing populations derived from coccineus-vulgaris hybrids, the latter in cooperation with the University of Florida, Vegetable Crops Department. Hybrids of wild coccineus and wild vulgaris may be genetic "bridges" leading to the incorporation of useful genes into domesticated beans, as well as suggesting a theory of origin of the common bean.

Both field and laboratory work has shown the value of certain chemicals and application schedules for the control of plant diseases of beans and cowpeas. Rust control is best achieved, powdery mildew control has been effective in earlier tests but not subsequently, suggesting racial changes. No really consistent effective control was found for common bacterial blight. Soil borne diseases could be partially reduced with certain rates of PCNB or hexachlorophene. Pathogens affecting seed quality and germination were identified as belonging to five common fungi, namely, Fusarium, Rhizoctonia, Alternaria, Macrophomina, and Phomopsis.

A beginning was made on exploring agents of biological control. In vitro inhibition of typical pathogens could be obtained with certain bacteria and/or actinomycetes.

The entomological work has shown the value of insecticides and spraying frequency and dosages on various harmful insects. Genetic resistance to leafhopper has also been demonstrated. The mechansim appears to be one of tolerance. The native cultivar Bonita (sel. #1) and cv. H-2-4-A appeared to be the best yielders under leafhopper pressure. The chemical carbofuran, at a rate of 2.2 kg/ha, adequately protected all cultivars season long. Bean seed weevil also differentially attacked cultivars and it appears that selection toward greater freedom from weevil might be effective.

An electron microscopy laboratory and competent working staff has been assembled. Preliminary characterization of virus particles transmitted by the white fly from various wild host plants has been undertaken. It has been found possible to mechanically transmit the golden yellow mosaic virus to beans, but correlation with symptoms from white fly transmission has been inconsistent, and it has therefore been concluded that genetic screening will have to be conducted using the insect as vector.

A limited amount of training has been undertaken. Results appear to have been quite successful, but the scale of training has been extremely limited in numbers of personnel involved.

Acknowledging the progress made thus far and the dedicated efforts of the project personnel, the evaluation team identified several areas of needing project attention. These areas are greater emphasis on project inputs that will assure achievement of project outputs and subsequently the project purpose. These items are also particularly important in view of the expectation of project termination by September 30, 1980 and it is anticipated that this project would also qualify as a participant in the upcoming Title XII Bean/Cowpea Program. The areas needing greater project emphasis are as follows:

1. An Outreach Program. This should receive high priority. The results breeding, selection of multi-resistant types, and development of pest control practices clearly must be disseminated to a broad region - presumably including the Caribbean and Central America - by means of demonstration collaborative testing. A network of cooperators in this region should be formed to receive the potentially useful germplasm and control practices, place them in representative well-designed and well-supervised tests, and valid results generated. The project should receive funds for this purpose - funds sufficient for hiring a coordinator and for his operations and travel - at least $35,000 per annum. Special care should be taken in the individual obtained for this purpose, he should have a technical background, broad familiarity with the project and its goals, capable of rapport with a wide variety of collaborators, freedom to travel, since the character of the individual will be of paramount importance to success of the outreach program.

The team realized that such a program should have been started at least a year ago but anticipated termination of the project within 2 - 2 1/3 years now clearly demands it.

2. A Training Component. The team points to the extraordinary success of the CIMMYT training program. A similar program but scaled according to the region to be served and the technical skills to be communicated should be the goal here. A group of 6-10 individuals brought in on scholarships for 6 months would make an appropriate nucleus of trainees and of potential network collaborators later.

3. Professional Development of Staff. To secure and maintain professional credibility and promote the objectives of the project, it is imperative that the various project leaders publish portions of their research in professional journals, attend appropriate scientific meetings, and submit their data and ideas to scientific scrutiny. Accordingly, it is recommended that the individual project leaders, particularly Drs. Vakili and Freytag, set aside a portion of time each day or each week to spend in:

a. summarizing data and writing for publication.
b. reviewing literature pertinent to the research and publication process

This recommendation is related to another issue - the obligation to publish a project monograph on tropical diseases and pests of grain legumes - to be discussed below.

4. Integration Between Component Parts of the Project. Integration is an important dimension to a multi-disciplinary project such as this. A common example would be the submitting of germplasm screened for disease resistance to a leafhopper screening test, followed by agronomic tests for yield and adaptation. An example of a second kind would be a seminar on the question of the nature of "horizontal" resistance - Vakili's definition versus Van der Plank's definition, and the reaching of a consensus opinion.

Periodic staff meetings at which data can be examined, significance evaluated, and ideas thrown out for discussion can be instructive and stimulating; at such times plans for future experiments may be proposed and exposed to criticism.

The calling of such meetings is properly the task of the project coordinator. The team recognizes, however, that periodic meetings is only one means of achieving integration, and that unprogramed encounters among the staff probably results in a certain amount of interchange that facilitates the work of the project.

5. Greater Experimental Design Discipline. One useful outcome of work planning sessions is experiments designed to obtain a greater amount of data per unit of input, to extend the inferential scope of the experiment, to obtain just as meaningful information on a greater number of entires than before, to place research efforts on more meaningful problems, to design experiments in such a way that, if publishable, there will be no question of

inferential credibility. The team recognizes that not all field experiments fall into the category of design for publication, but all field experiments do fall into the category of design for credible results, thus our emphasis upon a "tightening up" of field procedures wherever possible.

6. The Virology Component. There appears to be a need to re-allocate modest support in this area; to assist in a resolution of the "black-root" virus identification and of the inter-relationship to strains of the common bean mosaic virus causing, in certain hypersensitive genotypes, the top-necrosis effect. We are informed that this manifestation - the black-root effect - is more widespread than previously recognized, and that it should be possible to resolve the question of its basis with a relatively modest effort in virology under the direction of Dr. Julio Bird.

7. The Monograph. On the question of an obligation accepted previously by the project to develop a disease-pest control monograph, the team wishes to make the following recommendation:

That the project plan and conduct, approximately 18 months hence, a symposium on the subject "Identification, Distribution, and Potential for Control of Major Diseases and Insect Pests Affecting Production of Beans and Cowpeas in the Caribbean and Tropical America"; that leading scientists including members of the project staff be invited to present papers according to a well thought-out comprehensive outline of topics; that these papers be assembled as the text of a publication to fulfill the obligation alluded to above

A budget item in the 1979-80 budget request should be included to cover costs of this recommendation. If approved by the contract manager and US/AID at the 1978/79 contract renewal, a symposium-editorial committee under the chairmanship of Coordinator Lopez-Rosa should make preliminary plans and extend invitations and/or assignments to various scientists for papers so as to give each participant as much lead time as possible.

20. EVALUATION FINDINGS ABOUT UNPLANNED EFFECTS.

There were no unplanned effects.

21. CHANGES IN DESIGN OR EXECUTION.

There is no basic changes in design or execution recommended. The recommendations all pertain to strengthening present activities to assure achievement of the project purpose.

22. LESSONS LEARNED.

The greater participation between project personnel, the international research centers, the LDC national programs and the project staff will always assure more effective communication. This results in greater and more efficient cooperation.

For evaluation methodology of centrally funded research contracts, it would be advisable to include a member of the RAC on the review team.

23. SPECIAL COMMENTS OR REMARKS

The outputs from this project are being utilized in LDCs and are being effective. There would be greater effective use, if the network of cooperators were more integrated. This would involve greater project staff time being assigned to that activity alone.

APPRECIATION

The team wishes to compliment Coordinator Julis Lopez-Rosa and members of the project staff for their work and their presentation of results to us, and to offer our sincere appreciation for all courtesies extended to us during the week at Mayaguez, not the least of which was maintaining an unfailing good humor and patience in the face of our persistent probing into details and interpretations of their data.

Respectfully Submitted, for the
Evaluation Team, by
M.W. Adams.

Dr. M. W. Adams, Michigan State University _____ date 10/26/78

Mr. Victor Lateef, US/AID REgional Bureau Staff _____ date 10/25/78

Dr. James Erickson, US/AID, Research & Methodology Div./DSB _____ date Oct. 15, 197

PROJECT EVALUATION SUMMARY

US/AID/Univ. Puerto Rico Contract "AID/CM/ta-C-73-26"

The evaluation was conducted June 28-30, 1978, by a team consisting of

Dr. James Erickson, US/AID
Mr. Victor Lateef, US/AID, Regional Bureau Staff, and
Dr. M.W. Adams, Michigan State University;

in conjunction with

Dr. John Yohe, US/AID, Project Manager.

The responsibilities of the evaluation team were set forth in a paper "Project Evaluation Scope of Work", provided by Dr. Yohe, which will be identified here as Reference #1. The evaluation necessarily must be based to a major degree upon the "Research Purposes and Expected Products" as stated in the Project Statement of October, 1975. This document will be identified here as Reference #2.

Team Findings - Achievements of the Project

The purpose and expected products initially defined in reference #2 and jointly agreed upon by US/AID and University of Puerto Rico are as valid and reasonable in 1978 as when originally conceived. The problems originally addressed and needs defined have not changed in any major way, though a shift in emphasis in the virology component appears to be in order.

Significant progress in the development of multi-disease resistance in beans and cowpeas has been achieved. Nineteen lines have been isolated after repeated season-location testing, carrying various combinations of resistance to the soil-borne fungi complex consisting of Rhizoctonia, Macrophomina, Fusarium, and Phytophthora and to one or more foliage and/or seed borne diseases, of which rust, angular leaf spot, and common bean mosaic are most prominent. Numerous genotypes have been produced with resistance to single disease entities (Cercospora leaf spot, anthracnose, and Rhynchosia virus). Lines with tolerance to common bacterial blight have been observed but no high level resistance has been found to the virulent strains present in the tropics. A similar situation prevails with respect to golden yellow mosaic, the white-fly transmitted virus of beans.

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A limited amount of training has been undertaken. Results appear to have been quite seccessful, but the scale of training has been extremely limited in numbers of personnel involved.

Evaluation Methodology

The evaluation consisted primarily of a critical analysis of project results as reported in detail by individual project personnel. Reporting was done both through written and tabulated summaries and through use of slide presentations. A short excursion to laboratories, screen houses and field nurseries followed the oral presentations.

Evaluation teammates held an evening critique after the presentations, and a half-morning session to reach a consensus on major issues. A final 2-hour session was held to discuss team findings and recommendations at which all personnel of the project, together with immediate administrative leaders, were present.

Recommendations

Acknowledging the progress made thus far, and the dedicated efforts of the project personnel, the evaluation team nevertheless recognizes several areas needing project attention in the months ahead. These items are particularly important in view of the expectation of project termination in two years, and/or possible renewal in part via a Title XII Bean-Cowpea program.

1. An Outreach Program. This should receive high priority. The results of breeding, selection of multi-resistant types, and development of pest control practices clearly must be disseminated to a broad region - presumably including the Caribbean and Central America - by means of demonstration collaborative testing. A network of cooperators in this region should be formed to receive the potentially useful germplasm and control practices, place them in representative well-designed and well-supervised tests, and valid results generated. The project should receive funds for this purpose - funds sufficient for hiring a coordinator and for his operations and travel - at least $35,000.00 per annum. Special care should be taken in the individual obtained for this purpose - he should have a technical background, broad familiarity with the project and its goals, capable of rapport with a wide variety of collaborators, freedom to travel - since the character of the individual will be of paramount importance to success of the outreach program.

   The team realizes that such a program should have been started at least a year ago, but anticipated termination of the project within 2-2 1/3 years now clearly demands it.

2. A Training Component. The team points to the extraordinary success of the CIMMYT training program. A similar program but scaled according to the region to be served and the technical skills to be communicated should be the goal here. A group of 6-10 individuals brought in on scholarships for 6 months would make an appropriate nucleus of trainees and of potential network collaborators later.

3. Professional Development of Staff. To secure and maintain professional credibility and promote the objectives of the project, it is imperative that the various project leaders publish portions of their research in professional journals, attend appropriate scientific meetings, and submit their data and ideas to scientific scrutiny. Accordingly, it is recommended that the individual project leaders, particularly Drs. Vakili and Freytag, set aside a portion of time each day or each week to spend in:

   a) summarizing data and writing for publication.
   b) reviewing literature pertinent to the research and publication process.

   This recommendation is related to another issue - the obligation to publish a project monograph on tropical diseases and pests of grain legumes to be discussed below.

4. Integration Between Component Parts of the Project. Integration is an important dimension to a multi-disciplinary project such as this. A common example would be the submitting of germplasm screened for disease resistance to a leafhopper screening test, followed by agronomic tests for yield and adaptation. An example of a second kind would be a seminar on the question of the nature of "horizontal" resistance - Vakili's definition versus Van der Plank's definition, and the reaching of a consensus opinion.

   Periodic staff meetings at which data can be examined, significance evaluated, and ideas thrown out for discussion can be instructive and stimulating; at such times plans for future experiments may be proposed and exposed to criticism.

   The calling of such meetings is properly the task of the project coordinator. The team recognizes, however, that periodic meetings is only one means of achieving integration, and that unprogramed encounters among the staff probably results in a certain amount of interchange that facilitates the work of the project.

5. Greater Experimental Design Discipline. One useful outcome of work planning sessions is experiments designed to obtain a greater amount of data per unit of input, to extend the inferential scope of the experiment, to obtain just as meaningful information on a greater number of entries than befor to place research efforts on more meaningful problems, to design experiments in such a way that, if publishable, there will be no question of inferential credibility. The team recognizes that not all field experiments fall into the category of design for publication, but all field experiments do fall into the category of design for credible results, thus our emphasis upon a "tightening up" of field procedures wherever possible.

6. The Virology Component. There appears to be need to re-allocate modest support in this area to assist in a resolution of the "black-root" virus identification and of the inter-relationship to strains of the common bean mosaic virus causing, in certain hypersensitive genotypes, the top-necrosis effect. We are informed that this manifistation - the black-root effect - is more widespread than previously recognized, and that it should be possible to resolve the question of its basis with a relatively modest

effort in virology under the direction of Dr. Julio Bird.

Also, a virus disease of pigeon peas, Witches Broom, has shown increasing incidence, according to Dr. Bird. Since pigeon peas is a widely-grown edible legume of Puerto Rico and the American Tropics, it was requested that the project be allowed to study this disease with respect to identity or similarity to other tropical legume viruses, possible vectors, and possible genetic resistance. The evaluation team concurs, provided the budget is forthcoming, but it should not be given top priority.

7. The Monograph. On the question of an obligation accepted previously by the project to develop a desease-pest control monograph, the team wishes to make the following recommendation:

That the project plan and conduct, approximately 18 months hence, a symposium on the subject "Identification, Distribution, and Potential for Control of Major Diseases and Insect Pests Affecting Production of Beans and Cowpeas in the Caribbean and Tropical America"; that leading scientists including members of the project staff be invited to present papers according to a well thought-out comprehensive outline of topics; and that these papers be assembled as the text of a publication to fulfill the obligation alluded to above.

A budget item in the 1979-80 budget request should be included to cover costs of this recommendation. If approved by the contract manager and US/AID at the 1978-79 contract renewal, a symposium-editorial committee under the chairmanship of Coordinator Lopez-Rosa should make preliminary plans and extend invitations and/or assignments to various scientists for papers, so as to give each participant as much lead time as possible.

8. Termination. And, finally, the evaluation team wishes to emphasize to the project staff the importance of looking ahead to the closing out of the project, as presently structured and financed, in approximately two years. It is our expectation that some phases of the project may continue, with modification and some re-direction, under activities planned as part of a comprehensive bean-cowpea program sponsored by the BIFAD (Title XII). This does not relieve the present project staff of the obligations, however to begin now to draw the loose ends together, to conduct a new series of experiments only if they are crucial and can be concluded quickly, to begin summarization of the masses of data already collected, to plan for publications based on assembled data, and to prepare for the recommended symposium and monograph.

9. Renewal Recommendation. The work done, information obtained, and germplasm produced by the project up to this time is noted, with commendation. Some critical steps are clearly in order and timely in the life of the project if the original goals are to be met. The team has outlined these in the list of recommendations of this report. Thus, much has been accomplished and much remains to be done. The team therefore recommends a renewal for a minimum of two years, subject to acceptance of these recommendations and the availability of funds.