AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: [A] (A = ADD, C = CHANGE, D = DELETE) — PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: DS/AGR/FCP Type C. Field Service

4. DOCUMENT REVISION NUMBER: 6

5. PROJECT NUMBER (7 digits): 931-0930

6. BUREAU/OFFICE: A. SYMBOL: DSB; B. CODE: 10

7. PROJECT TITLE (Maximum 40 characters): Pest Mgt Related Environment Protection

8. ESTIMATED FY OF PROJECT COMPLETION: FY 85

9. ESTIMATED DATE OF OBLIGATION (for 5-year extension)
A. INITIAL FY: 80 B. QUARTER: (Enter 1, 2, 3, or 4)
C. FINAL FY:

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 - (for 5-year extension)

A. FUNDING SOURCE	FIRST FY 1980			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	357		357	4,374	-	4,374
(GRANT)	(500)	( )	(500)	(4,374)	(-)	(4,374)
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY						
OTHER DONOR(S)						
TOTALS	357		357	4,374		4,374

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	Thru 9/30/79 E. 1ST FY ___ F. GRANT	Thru 9/30/79 E. 1ST FY ___ G. LOAN	1st H. ~~2ND~~ FY 80 I. GRANT	1st H. ~~2ND~~ FY 80 J. LOAN	2nd K. ~~3RD~~ FY 81 L. GRANT	2nd K. ~~3RD~~ FY 81 M. LOAN
(1) FN	120 I	011		3,229	-	357	-	750	-
(2)									
(3)									
(4)									
TOTALS				3,229	-	357	-	750	-

A. APPROPRIATION	3rd ~~XXX~~ N. FY 82 O. GRANT	3rd ~~XXX~~ N. FY 82 P. LOAN	4th ~~XXX~~ Q. FY 83 - 85 LIFE OF PROJECT R. GRANT	4th ~~XXX~~ Q. FY 83 - 85 LIFE OF PROJECT S. LOAN	T. GRANT	U. LOAN
(1) FN	825	-	2,442	-	7,603	
(2)						
(3)						
(4)						
TOTALS	825	-	2,442	-	7,603	

12. IN-DEPTH EVALUATION SCHEDULED: MM 01 YY 82

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

[1] 1 = NO, 2 = YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE

TITLE Ray R. Solem
Acting Director, DS/AGR

DATE SIGNED: MM DD YY

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-76)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE) — PAF

2. DOCUMENT CODE: 5

3. COUNTRY/ENTITY: DS/AGR/FCP Type C. Field Service

4. DOCUMENT REVISION NUMBER: 6

5. PROJECT NUMBER (7 digits): 931-0930

6. BUREAU/OFFICE: A. SYMBOL: DSB; B. CODE: 10

7. PROJECT TITLE (Maximum 40 characters): Pest Mgmt. Related Env. Protection

8. PROJECT APPROVAL DECISION — ACTION TAKEN: A (A = APPROVED, D = DISAPPROVED, DE = DEAUTHORIZED)

9. EST. PERIOD OF IMPLEMENTATION (for 5 year extension): YRS. 5 QTRS. 0

10. APPROVED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. Thru 9/30/79 F. GRANT	E. Thru 9/30/79 G. LOAN	1st FY 80 I. GRANT	1st FY 80 J. LOAN	K. 2nd FY 81 L. GRANT	K. 2nd FY 81 M. LOAN
(1) FN	120 I	011	-	3,229	-	357	-	750	-
(2)									
(3)									
(4)									
TOTALS				3,229	-	357	-	750	-

A. APPROPRIATION	N. 3rd FY 82 O. GRANT	N. 3rd FY 82 P. LOAN	Q,4,5,6 FY 83-85 LIFE OF PROJECT R. GRANT	Q,4,5,6 FY 83-85 LIFE OF PROJECT S. LOAN	T. GRANT	U. LOAN
(1)	825	-	2,442	-	7,603	-
(2)						
(3)						
(4)						
TOTALS	825	-	2,442	-	7,603	

11. PROJECT FUNDING AUTHORIZED (ENTER APPROPRIATE CODE(S)) 1 = LIFE OF PROJECT 2 = INCREMENTAL LIFE OF PROJECT: A. GRANT: 2; B. LOAN: -

C. PROJECT FUNDING AUTHORIZED THRU: FY 85

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED ($000)

B. ALLOTMENT REQUEST NO. _____

A. APPROPRIATION	C. GRANT	D. LOAN
(1) NA		
(2)		
(3)		
(4)		
TOTALS		

13. FUNDS RESERVED FOR ALLOTMENT

TYPED NAME (Chief, SER/FM/FNP)

SIGNATURE

DATE

14. SOURCE/ORIGIN OF GOODS AND SERVICES: ☐ 000 ☐ 941 ☐ LOCAL ☐ OTHER _____

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

This amendment is for a two-month unfunded extension of the currently approved PP (through May 31, 1980) and for a major 5-year funded extension (from June 1, 1980 to May 31, 1985) for a total 5-year cost of $4,374,000. This extension is, under a completely revised PP, thereby raising the approved life of the project cost from $3,229,000 to $7,603,000.

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

AID 1330-4 (7-78)

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

ENTITY: Bureau for Development Support

PROJECT: Pest Management and Related Environmental Protection

PROJECT NO: 931-0930.

1. I hereby authorize a two-month unfunded extension (through May 31, 1980) of subject project in order to complete the Scope of Work as specified under the currently approved PP.

2. I also hereby approve a five (5) year extension from June 1, 1980 to May 31, 1985) requiring grant funds totaling $4,374,000 for continued field support on Pest Management and Related Environmental Protection.

3. This five (5) year extension will be incrementally funded with $357,000 in FY 80, $750,000 in FY 81, $825,000 in FY 82, $903,000 in FY 83, $993,000 in FY 84, and $546,000 in FY 85 depending on the availability of funds.

4. This five (5) year extension was reviewed and endorsed by the TPCA Subcommittee for Crops Production/Protection on November 21, 1979 and by the DSB/TPCA on February 8, 1980. Suggested revisions based on comments from both of these groups have been incorporated in the final PP and Scope of Work.

5. This five (5) year extension will be implemented by a noncompetitive cooperative agreement with the consortium for International Crop Protection (CICP) which includes the Universities of California/ Berkeley (the current contractor), Oregon State, Texas A&M, Cornell, University of Miami (Florida), University of Florida, Hawaii, Minnesota, and North Carolina State.

Tony Babb
Deputy Assistant Administrator
for Food and Nutrition

Date: 3·21·80

Attachments:
1. Action Memo, DS/AGR to DAA/FN
2. Project Paper for 5-yr. extension
3. Environmental Determination
4. Minutes of TPCA Subcommittee (11/21/79) and DSB/TPCA Committee (2/11/80)

Clearances:

DS/AGR/FCP:FWWhittemore	[signature]	Date:	3/12/80
DS/AGR:JMYohe	[signature]	Date:	3/12/80
DS/AGR:MMozynski	[signature]	Date:	3/14/80
DS/AGR:RSolem	[signature]	Date:	
DS/PO:ASilver	[signature]	Date:	3/14/80
DS/PO:BChapnick	[signature]	Date:	
LAC/DR/RD:JBalis	[signature]	Date:	3/14/80
ASIA/TR/ARD:DPlucknett	[signature]	Date:	3/14/80
AFR/DR/ARD:LHeilman	[signature]	Date:	
NE/TECH/AD:KSherper	[signature]	Date:	3/14/80
PPC/PDPR:DCaton	[signature]	Date:	3/19/80
LAC/DR:HLusk	[signature]	Date:	

DS/AGR/FCP:CCollier/cl
3/7/80

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

FROM: DS/AGR, Ray Solem

Problem: Your approval is required for a two-month unfunded extension (through May 31, 1980) and for a funded five-year extension (from June 1, 1980 to May 31, 1985 for the Pest Management and Related Environmental Protection Project (931-0930). This will require grant funds totaling $4,374,000.

Discussion: The project, first negotiated with the University of California, began on June 30, 1971 and since a renegotiation in 1975 has been under extension to the present time. The purpose of the project is to provide developing countries with assistance in devising and implementing ecologically sound and economically valid integrated pest management systems for the control of agricultural pests and diseases. The project has two goals: (a) to reduce losses of agricultural crops caused by plant pests and diseases, and (b) to improve the ecological conditions caused by efforts to eradicate or reduce causes of such crop losses.

Based on the last project review (see attached Report of External Evaluation Team - Pest Management and Related Environmental Protection - May 15-19, 1978), it was concluded that:

> Virtually no changes have been made in the original purpose, goals, or objectives and "we see no reason for changing the purpose and goals of the project".
>
> Additionally, the group concluded that "the project is being implemented (outputs) in such a way that the probability of accomplishing the objectives is good" and that the "type and level of project activities to date have been helpful in improving the competency in pest and pesticide management in a cadre of scientific technical and administrative personnel in a limited number of countries".

Since this project review, the activities of the project related to mission requested technical assistance in terms of A.I.D. Regulation 16, have continued at an increasing rate. Pesticide components in agriculturally related A.I.D. projects are continually surfacing with concommitant requests for technical assistance. Also, the area of integrated pest management has continued to develop momentum both in the developing and developed portions of the world. It is noteworthy that a recent Presidential message contained a special section on this highly important technique.

In addition to A.I.D.'s own internal environmental mandate, via Regulation 16, many of the developing countries are developing their own environmental awareness through newspapers, radio, and magazine reporting. A rapid response capability by A.I.D. to field technical assistance requests in this area can do much to cement good working relationships in projects of material interest to LDCs, Missions, Regional Bureaus, and the Bureau for Development Support.

Already, as a natural outgrowth of the project, a Regional Pest Management Specialist has been funded by the Latin American Bureau and is attached to ROCAP. Interest has also been expressed by other regional bureaus in funding and posting similar Regional Pest Management Specialists in Asia, Africa, and the Near East.

A major concern expressed by TPCA during review of the proposed project extension is that the project recipient develop long-term capabilities with the utlimate goal of emergence as a self-sustaining entity capable of funding by multiple donors such as World Bank, UNDP, and other bilateral and multilateral donors. This philosophy has been addressed in the new project proposal and a recipient willing and able to mobilize international cooperation in this field has been identified.

Since review and approval in principle by the TPCA, DS/PO has raised the issue of the impact of the proposed level of funding of this project ($5,500,000 over 5 years) upon the total funding available to the Office of Agriculture for other projects, and suggested that the proposed funding level, particularly as it related to consultants and travel, be reduced. Further, DS/PO also suggested that missions should be asked to defray in part, at least, the costs of the proposed activities. Accordingly, we have drastically reduced the estimates for travel and consultants and reduced the overall five-year costs to $4,374,000. This reduction has been accomplished with the understanding, agreed in our meeting of February 26, that we should proceed on this basis and that, if we subsequently found that we could not deliver an adequate level of assistance to the missions, consideration would subsequently be given to raising the level of funding.

The concept of mobilizing additional support for project activities by the mission has also been incorporated in the revised Scope of Work.

Recommendation: That you approve the five-year extension (including a two-month unfunded extension) requiring funds of $4,374,000 for the subject project by signing the attached PAF and Environmental Threshold Determination.

Attachments
a/s

Clearance:
DS/AGR, MMozynski MEM 3/14/80
DS/PO, BChapnick ____

DS/AGR/FCP, CCollier/cl

ENVIRONMENTAL THRESHOLD DECISION

TO: DAA/DS/FN, Mr. Tony Babb

FROM: DS/AGR, Ray Solem

SUBJECT: Environmental Threshold Decision

Project Title: Pest Management and Related Environmental Protection

Project No: 931-0930

Project Manager: Dr. F. W. Whittemore

REFERENCE: Project Paper (page 31), dated March 1980

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

The proposed agency action is not a major federal action which will have a significant effect on the human environment and a negative threshold decision is hereby recommended.

APPROVED: Tony Babb

DISAPPROVED: _____

Date: 3.21.80

Attachment
a/s

Clearance:
DS/AGR/FCP, FWWhittemore FW
DS/AGR, MMozynski _____
DS/PO, ASilver _____
DS/PO, BChapnick _____

INITIAL ENVIRONMENTAL EXAMINATION
FOR
PEST MANAGEMENT AND RELATED ENVIRONMENTAL PROTECTION
(DS/AGR PROJECT NO. 931-093D)

Since the entire thrust of all project activities is to encourage the adoption of environmentally acceptable methods of plant pest and disease control where chemical pesticides are used only when there are no satisfactory alternatives, the over-all impact of the program will be to reduce significantly the environmental impacts of crop protection programs which rely solely on the use of chemical pesticides. In addition, the initial project developed a two-volume document entitled "Environmental Impact Statement on the A.I.D. Pest Management Program" dated May 13, 1977 which related all A.I.D. pest/pesticide management programs to their environmental impact. Hence, the environmental impact will be minimal and a Negative Threshold Decision is recommended.

IMPACT IDENTIFICATION AND EVALUATION FORM

FOR: Pest Management and Related Environmental Protection Project (No. 931-0930)

Impact Areas and Sub-areas 1/	Impact Identification and Evaluation 2/
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	N
b. Extracting natural resources	N
c. Land clearing	N
d. Changing soil character	N
2. Altering natural defenses	N
3. Foreclosing important uses	N
4. Jeopardizing man or his works	N
5. Other factors	
_____	_____
_____	_____
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	N
3. Ecological balance	N
4. Other factors	
_____	_____
_____	_____

1/ See Explanatory Notes for this form.

2/ Use the following symbols: N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

C. ATMOSPHERIC

1. Air additives ——— N
2. Air pollution ——— N
3. Noise pollution ——— N
4. Other factors

_____ N
_____ N

D. NATURAL RESOURCES

1. Diversion, altered use of water ——— N
2. Irreversible, inefficient commitments ——— N
3. Other factors

_____ N.
_____ N

E. CULTURAL

1. Altering physical symbols ——— N
2. Dilution of cultural traditions ——— N
3. Other factors

_____ N
_____

F. SOCIOECONOMIC

1. Changes in economic/employment patterns ——— N
2. Changes in population ——— N
3. Changes in cultural patterns ——— N
4. Other factors

_____ N
_____

G. HEALTH

1. Changing a natural environment ———— N
2. Eliminating an ecosystem element ———— N
3. Other factors

H. GENERAL

1. International impacts ———— N
2. Controversial impacts ———— N
3. Larger program impacts ———— N
4. Other factors

I. OTHER POSSIBLE IMPACTS (not listed above)

The project per se will have no direct environmental impacts. However, one of the major project goals is to assist other projects to which it lends assistance to minimize all impacts of an environmental nature and to minimize within that framework agricultural production.

See attached Discussion of Impacts.

PEST MANAGEMENT
AND
RELATED ENVIRONMENTAL PROTECTION

PROJECT PAPER

(Revised February 1980)

Food Crop Production Division
Office of Agriculture
Bureau for Development Support

PROJECT PAPER OUTLINE

PEST MANAGEMENT AND RELATED ENVIRONMENTAL PROTECTION

TABLE OF CONTENTS

ANNEX

C. Rule 16, Environmental Procedures, as Amended

D. Policy on Pesticide Support

E. Evaluation Report of External Review Team

F. Airgram to Missions

G. Mission Responses to Airgram Arranged by Geographical Region

H. Summary of Mission/Host Government Expressions of Interest in Proposed Project Activities

I. Example of Project Identification Document as Proposed by the UofCa/AID Pest Management Project

J. List of UofCa/AID Project Reports

K. Reference to Philippine IPM Demonstration Projects

L. Proposed Grantee to Implement the Cooperative Agreement on Pest Management and Related Environmental Protection

M. Examples of Cost/Benefits of Previous Project Activities

PART I. SUMMARY AND RECOMMENDATIONS

A. RECOMMENDATION.

It is recommended that $4,374,000 in grant funds be approved to finance a five-year project to provide technical assistance to missions and LDCs in the areas of pest and pesticide management. The assistance will be in the form of short courses, workshops, and seminars as well as technical professional assistance in the design and implementation of integrated pest management pilot projects and other agricultural development projects which include assistance for the procurement or use of pesticides. The project would be initially funded with $357,000 for six months in FY 80 and funded in FY 81 with $750,000 to cover the costs of the first eighteen months of project activity, or a total of $1,107,000.

B. SUMMARY DESCRIPTION.

This project responds to the need for providing assistance to LDCs in the fields of pest and pesticide management with specific reference to the development and utilization of environmentally acceptable pest management programs by small farmers.

This five-year project is designed to provide A.I.D. and LDCs with useful development tools. The tools will be provided by means of a number of pest and pesticide management seminars, workshops, and short courses which will for the most part be conducted in the LDCs.

In addition, substantial project outputs useful to A.I.D. missions and LDC institutions are expected in terms of the preparation of Projject Identification Documents and Project Papers in the areas of pest and pesticide

management and in the technical evaluation of agricultural development projects which include assistance for the supply and/or use of pesticides. Thus, the project is also designed to provide TDY professional/technical guidance to missions at project expense.

The project is also expected to materially strengthen LDC capability in pesticide residue analysis, monitoring, and maintainance of in-country capability to regulate conformance of locally used pesticide formulations to predetermined standards of performance and quality, both through training courses conducted in the U. S. and in the LDCs as well as by individual professional assistance to LDC analysts. Finally, the project is expected to sensitize officials in the LDCs to the importance of pesticide safety, the establishment of human health and environmental monitoring programs, and to provide ready access by the LDCs to a basic pesticide safety training program aimed at minimizing in-country pesticide poisonings and exposure of applicators.

PART II. PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. BACKGROUND.

1. General.

The broad-spectrum persistent insecticides which have become available since the end of World War II have been widely used in the developed countries and in some developing countries to reduce crop losses caused by plant pests and diseases. However, the development of resistance to these insecticides led to the massive expansion of both government and industrial research programs to

find possible substitute chemicals for the control of those pests which had become resistant. These research programs have led to the discovery of more narrow spectrum, less persistent insecticides such as some of the organophosphates and carbamates, and a number of other pesticides, e.g., such herbicides as 2, 4-D and 2, 4, 5-T and such fungicides as maneb and zineb.

One unforeseen result of the discovery and widespread use of the more persistent, broad spectrum insecticides has been the somewhat belated recognition of their possible adverse side effects on man and non-target organisms, such as fish and wildlife and pest parasites and predators. In fact, the widespread use of such pesticides has "created" new pests by eliminating the parasites and predators responsible for keeping the numbers of potential pests below economic injury levels thus allowing them to multiply virtually unchecked.

Although use of the broad spectrum persistent pesticides in the developed countries has markedly decreased over the past ten years, such pesticides are still manufactured in the United States, Western Europe, the Communist Bloc countries, Israel, and Japan, and to a very limited extent in the LDCs. Hence, they are readily available and still extensively used in the LDCs, many of which place higher priority on meeting immediate short-term needs for crop protection with the broad spectrum persistent pesticides which are relatively cheap and safe to the user and lower priority than on the possible long-term adverse environmental impacts.

2. <u>A.I.D. Policies and Procedures Pertaining to Pest and Pesticide Management</u>

Since its creation in 1961, A.I.D. has engaged in efforts worldwide to help developing countries increase food production and reduce disease. Pesticide activities, i.e., their supply and use, have historically played a large role in these efforts both in commodity import programs and specific project assistance.

However, by 1975 A.I.D.-financed pesticides comprised less than 2% of all pesticides used in the LDCs. (Environmental Impact Statement on AID's Pest Management Program page 29, filed with the President's Council on Environmental Quality (CEQ) on May 12, 1977). Of major concern, however, are the limited capabilities of many countries to regulate the importation, distribution, and use of such highly toxic materials which possess a real potential for environmental damage, both within and beyond their national borders. While some countries have become acutely aware of the need for such regulation and have undertaken determined efforts to establish appropriate controls, the task is still largely short of its objectives.

In 1976, as a result of a civil suit brought against A.I.D. by various environmentally concerned organizations, two actions were taken which had a significant influence on A.I.D. policy with respect to the supply and use of pesticides. These were: an amendment to Regulation 16 of the Code of Federal Regulations by the addition of a new part 216 on Environmental Procedures, and the adoption by A.I.D. of Interim Regulations governing assistance for the procurement and use of pesticides.

In May of 1978, the Environmental Procedures of Regulation 16 were amended to add supplemental procedures for in-depth evaluation of all proposed

A.I.D. projects involving assistance for the procurement or use, or both, of pesticides and to remove pesticides from eligibility in the Commodity Import Program with certain stated exceptions (see Annex C). These amended procedures supersede the Interim Regulations referred to above.

Following the May 1978 amendment of the Environmental Procedures, the Administrator approved a revised A.I.D. "Policy on Pesticide Support" on June 6, 1978 (Annex D) which supplements the formal procedure for evaluating pesticides requested by other governments. These policy guidelines provide for A.I.D.:

a. To establish wherever possible, programs aimed at assisting developing countries in designing and operating economically and environmentally sound integrated pest management systems and procedures in which pesticides will be used only when necessary.

b. To help develop infrastructures of developing countries for pest and pesticide management.

c. To exert a greater degree of international leadership by communicating U. S. policies and experience on pest control and pesticide problems to other nations and international organizations.

3. Office of Agriculture/DS Activities Designed to Implement A.I.D. Pest and Pesticide Management Policies and Procedures

As a first step towards providing assistance to LDCs in the safe and effective use of pesticides, the Office of Agriculture prepared a Project Paper on "Pest Management and Related Environmental Protection" which was

subsequently contracted to the Regents of the University of California/ Berkeley for implementation on June 30, 1971. The project was completed on December 31, 1974 and a second project was subsequently negotiated with the same contractor on March 1, 1975. This second project was approved through December 31, 1979 but the approved funding was only sufficient to cover contract costs through July 31, 1979, a situation caused largely by increased costs, particularly of travel. The project/contract has now been administratively extended to May 31, 1980 to allow sufficient to prepare this revised Project Paper and negotiate an appropriate implementation document.

The purpose of the two previous projects was to provide less developed countries (LDCs) with assistance in devising and implementing ecologically sound and economically valid integrated pest management systems for the control of agricultural pests and diseases. The projects had two goals: (a) to reduce losses of agricultural crops caused by plant pests and diseases, and (b) to improve the ecological conditions caused by efforts to eradicate or reduce causes of such crop losses. A detailed summary of the activities of these two projects is given in Attachment B to the Evaluation Report of the external review team, dated May 14, 1978 (Annex E, Attachment B).

In designing the current project paper, the recommendations of the external review team, Annex E, Attachment C, pg. 16, have been taken into account with respect to strengthening the principal activities of the previous project. However, one recommendation, the inclusion of in-country or regional pest management specialists, has not been incorporated in the current project design, since it is felt by DS/AGR that such activities are more appropriately funded by Missions or Regional Bureaus. This concept

has already been accepted by the LA Bureau by their funding of such a position for the Central American countries.

Additionally, mission/host government expressions of interest in the proposed project activities were solicited in a recent airgram (Annex F). A summary of these responses is given in Annexes G and H.

4. Linkages Between Project Activities and Regional Bureau Environmental Officers

With the designation of environmental officers in the Regional Bureaus, and their concern with the use of pesticides, in addition to other environmental concerns, the activities and technical services provided by this project will provide them with the resources necessary to review projects which involve assistance for the supply or use of pesticides and where appropriate, identify more environmentally acceptable alternatives. Such support has already been provided by the previous project and will have to be expanded as the "pesticide components" of more generalized "agricultural development" projects are identified.

B. DETAILED DESCRIPTION.

This project will be accomplished by qualified experts providing information, handbooks, training courses, training aids, and facilities for LDC personnel concerned with crop protection. The project is focussed at the farm level on the development of LDC services which will provide experienced technical people with increased understanding of pest and pesticide management techniques and appropriate technologies and implementation guidelines to optimize pesticide use in the context of integrated pest management programs given existing resource and socioeconomic constraints.

Insofar as possible, this project will draw on the basis of previous experience gained during the initial phase and will supplement past experiences rather than create anew. It is recognized that Integrated Pest Management procedures must be fitted into the broader perspective of crop production which includes a number of other equally important inputs. Since, the ultimate aim of the project is to directly benefit the small farmer appropriate involvement of local extention agencies will be a constant goal. The purpose of the project is to develop and provide A.I.D. and the LDCs with materials and methodologies to improve pest and pesticide management programs in LDCs and, in particular, to provide technical backstopping to Regional Bureau Agricultural Divisions and Environmental Offices and to country agricultural development projects which include crop protection components.

Project funds are for development and packaging of these materials, and their publication in English, Spanish, and French, for the conduct of workshops and short courses and for coordinating A.I.D. activities in the field of pest and pesticide management with similar activities conducted by multilateral agencies and with the international agricultural research centers.

Users of project outputs will be A.I.D. Missions, other donor agencies, LDCs, and contractors thus providing the development community with technical assistance in pest and pesticide management. The project will provide training materials and the services of appropriate technical specialists to conduct:

1. Country or regional surveys of pest and pesticide management problems;
2. Five-day in-country pesticide management workshop/seminars;
3. Regional short courses on integrated crop protection;
4. In-country integrated crop protection demonstration projects;

5. In-country pesticide residue sampling and analysis short course;
6. Two-week in-country training in basic pesticide residue analysis short courses;
7. Twelve-week training courses in pesticide residue analysis at a centrally-based U. S. facility;
8. Four-week training courses in pesticide formulation analysis at a U. S. Facility;
9. Three-day in-country training courses to train trainers in the prevention, diagnosis, and treatment of pesticide poisonings;
10. Two-week in-country training courses on aerial and ground application techniques and procedures.

Additionally, the project will:

11. Provide the services of short-term consultants for up to 30 days at the request of missions;
12. Provide technical backstopping to country or regional pest management specialists as funded by missions or regional bureaus;
13. Provide a central pesticide residue analysis facility capable of monitoring and assisting A.I.D.-sponsored pesticide programs, conducting analyst training and serving as a coordination mechanism for an international quality control program;
14. Organize and conduct short courses and seminars on subjects related to integrated crop protection and pesticide management, cooperate with other bilateral and multilateral donors and LDC institutions in organizing and conducting such short courses and seminars, and arrange for study visits of individual LDC personnel to appropriate institutions;

15. Publish a quarterly pest management newsletter and a list of forthcoming international conferences and meetings related to pest management;

16. Establish and maintain an appropriate reference library including a reference slide collection on integrated crop protection and pesticide management for use by project consultants in workshops and training courses and to meet information requests from LDCs.

Systematic evaluative analyses will be made of the above activities to identify transferable elements and to package them into products suitable for general use. The emphasis will be on small farm systems where sophisticated, high energy, and expensive approaches are not presently feasible.

Access to existing A.I.D. project information will be essential. A close working relationship will be developed between the recipient and the A.I.D. Project Manager. After project initiation, the A.I.D. Project Manager and the recipient will establish working relations with other donor and development agencies in order to use their information and available knowledge.

Past contacts with FAO, OECD, UNDP, and UNEP have demonstrated a strong interest in sharing information and working together on dissemination of results. An international advisory committee has already been established by FAO and UNEP, an Integrated Pest Control Expert Panel which provides excellent communication links among the agencies involved in pest and pesticide management. Arrangements will be made to have the Project Manager, Project Director, and project specialists participate in FAO/UNEP Panel meetings and other, appropriate international meetings.

Relevant IARCs will be fully apprised of on-going and planned project inputs into programs of mutual interest. All necessary coordination will be established.

The project's planned outputs will be:*

1. Country or Regional Surveys of Pest and Pesticide Management Problems.

Past project activities in this area have provided valuable background information reports on some 38 LDCs (Annex J) and identified specific problems requiring priority attention, e.g., pesticide over use and misuse. However, all but four of the reports are now more than seven years old and they should be up-dated to reflect current patterns of pesticide use and the increasing concerns of the LDCs with the environmental impacts of pesticide use. Furthermore, the changes in the countries to which A.I.D. provides assistance over the past eight years has resulted in some gaps in our information. Up-dated reports on those countries of current A.I.D. priority interest would be extremely helpful to missions in preparing future Country Development Strategy Statements (CDSSs) and to AID/W in future overall program planning.

In implementing this activity, the recipient will prepare a computerized roster of highly qualified U. S. plant protection specialists who would be available to serve on the study teams and be prepared to field such teams as specified in the Scope of Work (Annex A).

2. Five-Day In-Country Pesticide Management Workshop/Seminars.

Since pest management programs cannot be developed where all farmers have unrestricted access to the wide variety of pesticides now on the market, particularly the more persistent, broad spectrum pesticides, these pesticide management workshop/seminars will be aimed at high level decision makers in both the Ministries of Health and Agriculture and other ministries involved in pesticide procurement or use in LDCs. These pesticide management workshop/seminars will emphasize the necessity for developing an agromedical

---

* Also see Annex A and B

approach to the problems inherent in pesticide use, and to minimize the adverse human health and environmental impacts of widespread use of pesticides. Such seminar/workshops will be particularly important to those LDCs where pesticide use is still minimal so that the known human health and environmental impacts of widespread pesticide use can be ameliorated from the start thus avoiding the mistakes already made in the more developed countries and in some LDCs. The recipient will be prepared to conduct such workshop/seminars as specified in the Scope of Work (Annex A).

3. In-country Short Courses on Integrated Crop Protection (ICP) Small Farmer Cropping Systems.

As pesticide resistance problems developed both in the Unites States and elsewhere, and a number of new pesticides were introduced in efforts to control the resistant pests, it gradually became apparent that sole reliance upon chemical pesticides could not provide satisfactory long-term control of many plant pests and diseases. Some of the earliest concepts to which this realization led related to integrated control of the pest which had become resistant to chemical pesticides, e.g., the cotton leaf worm in the United States. However, it was soon realized that, to be truly effective, the concept must be extended to all pests and diseases attacking a particular crop, because what might be an acceptable technique for managing a specific pest might in turn exacerbate the problem of the control of a second pest or disease attacking the same crop. More recently, it has been realized that the concept must be extended still further to specific cropping systems

because, again, what may be an acceptable system for managing the pests and diseases of a specific crop may seriously jeopardize our abilities to manage plant pests and diseases attacking adjacent crops or other crops in a crop rotation system.

Accordingly, a generalized short course on integrated crop protection in small farmer cropping systems will be developed to include lectures and appropriate training aids on subjects which are generally applicable in all LDCs. The course will be aimed at extension workers engaged in providing technical guidance to small farmers and to LDC personnel engaged in crop protection research activities. The "generalized" short course will be adapted to local cropping systems on a regional basis and will be conducted as described in the "Scope of Work" (Annex A).

4. In-country Integrated Crop Protection Demonstration Projects.

The country participants in the three 4-week short courses on pest management already held in Lima, Peru; Los Banos, the Philippines; and Turrialba, Costa Rica developed a number of specific proposals for in-country ICP demonstration projects (e.g., Annex K). Under this activity, it is proposed to identify those proposals developed by the short course participants as being of the highest priority based upon the following criteria:

a. Major food crop of the country produced by small farmers;

b. Critical plant pests and diseases seriously limiting production;

c. Potential for transfer of existing technology to specific LDC situations; and

d. Potential for transfer of technology to other LDCs.

Following this process, subject to mission and host country priorities, and in close collaboration with the responsible USAIDs, project personnel will develop a specific project proposal in the form of a Project Identification Document (PID) to be incorporated, with the agreement of the relevant USAID, in an appropriate Annual Budget Submission (ABS). Following approval of the ABS, project personnel will then work closely with mission and host country personnel in the development of the project paper (PP) and subsequently, if requested by the mission, provide expert services, both short- and long-term, as well as technical backstopping as specified in the PP and funded by the mission. While, of necessity such projects will be aimed at specific crops, the project will include provision for the evaluation of the effects of the crop-specific integrated crop protection procedures in the cropping system and the identification of procedures needing improvement.

This new activity impacts directly on a major problem of DSB technical services projects, that of gaining implementation of consultancy recommendations and training information at the farm level. This activity is seen as a prototype from which similar activities could be developed for other technical services projects.

ICP demonstration projects will be developed and implemented by the recipient in conjunction with missions and regional bureaus as specified in the Scope of Work, Annex A.

5. In-country Pesticide Residue Sampling and Analysis Familiarization Short Course.

Many responsible government officials and technicians in the LDCs are not fully aware of the potential future (and frequently already existing) problems they face in the area of pesticide residues both in terms of food contamination, but also other important parts of their environment. Also, they frequently lack adequate insight as to what they can do to ameliorate such contamination. Even in the developed nations, who only allow pesticide usage under strict regulatory scrutiny, problems related to pesticide residues all too frequently occur.

Fortunately, due to intensive analytical surveillance programs, and regulatory oversight wherein specific pesticide use patterns are carefully matched with potential adverse environmental effects, the developed countries for the most part discover and correct their problems before they reach crisis levels. Since the same is not true in the LDCs, it is necessary to sensitize and instruct responsible officials as to the interrelationships and relative importance of pesticide residue in various ecological substrates including man himself. Although, quantitative differences will occur from country to country many qualitative similarities can be found in all situations where pesticides are used.

In simple terms, these can be expressed as what, where, why, when, how, and how much of a pesticide is involved. Once all of these questions are answered any existing problem can be identified and quantified. Many

of the tools answering these questions are already available within the LDCs and those which are not can usually be obtained, in simplified form, at relatively little expense. The purpose of this course is to show what tools are available, how they can be used and interrelated and to suggest specific approaches which can be taken under various LDC situations. The course will include, but not be limited to the following items.

(1) Delineation of resources affected by pesticide, including man, food, soil, fish and wildlife, and water and methods for estimating the relative importance of each resource item in terms of expected exposure levels.

(2) Methods for estimating exposure levels of the various environmental components based on analysis of residues (monitoring) including techniques for design of statistically valid sampling programs.

(3) Comparison of exposure estimates, as discussed in Item 2, with established "norms of safety".

6. Two-week In-country Training Courses in Basic Pesticide Residue Analysis.

Some LDC institutions are already at least partially equipped with some types of instrumentation which can be used for pesticide residue analysis. However, in a number of other LDC institutions, particularly in Africa, such equipment is lacking or cannot be properly operated and

maintained because of fluctuating electric current, lack of purified gases (for use in gas chromatography), lack of purified solvents or for other technical reasons. Accordingly, the current contractor has proposed to develop a training course and a list of laboratory equipment and supplies for making relatively simple qualitative and quantitative pesticide residue analyses. Such analyses, employ thin layer chromatography (TLC) paper chromatography, and bioassay and while these techniques do not have the specificity, precision and accuracy of the more sophisticated techniques of gas/liquid chromatography, neutron activation, and atomic absorption, they can be utilized under virtually all LDC conditions. Furthermore, the required laboratory equipment is relatively inexpensive and could be procured at low cost, much less than the cost of a single item of more sophisticated equipment such as a gas chromatograph.

However, these methods are no longer widely used in the U. S. since more precise, sensitive, and accurate methods are now available and used in routine regulatory work. TLC and similar methods are capable of detecting specific pesticide residues down to about 0.5 ppm with an accuracy of about $\pm$ 15 per cent. Such degrees of precision, sensitivity, and accuracy are adequate to monitor compliance with many of the internationally recommended pesticide residue tolerance levels in human foods and animal feeds. Where possible emphasis will be placed on analysis of plant substrates playing a key role in incountry human nutrition and/or of high economic importance in export markets. Additionally, pesticides to be

to be selected for analytical emphasis will be taken from those subject to the greatest misuse or where the possibility of residues in excess of established tolerances is greatest.

As a first step, the recipient, in consultation with missions and LDC laboratories which have participated in the analytical quality control program established by the previous contractor, will identify crops and pesticides which may be of particular concern to specific LDCs from the standpoint of either export crops or local consumption and will develop and evaluate the suitability of TLC, paper chromatography, and other simple analytical techniques for monitoring these residues. Where necessary, sample clean-up methods will also be developed. These methods and techniques will then be incorporated into a two-week training course format.

The contractor will then be prepared to conduct two-week in-country training courses in basic pesticide residue analysis in those LDCs which do not yet have the sophisticated laboratory equipment required for more rigorous pesticide residue analysis as specified in the Scope of Work (Annex C). The courses will also be conducted in countries having more sophisticated laboratory equipment since the techniques are useful in confirming analyses made by more precise methods, in screening out "negative" samples, and in releasing any more sophisticated instrumentation to projects where maximum sensitivity and/or selectivity are needed.

This introductory course is not intended to produce fully qualified analysts even though simplified noninstrumental techniques will be covered.

Instead, the technician will be provided enough basic tools to give the individual a fledgling start. It is a virtual certainty that any serious practioner of the art, as outlined in the course, will solicit additional training.

7. Twelve-Week Advanced Training Course in Pesticide Residue Analysis at a Central U. S. Facility.

Under the previous contract, a seven-week training course in instrumental pesticide residue analysis was developed and conducted in cooperation with EPA personnel at facilities made available at the University of Miami Medical School. Additionally, the project chemist visited more than 30 LDC laboratories to provide hands-on instruction and assistance to LDC personnel in resolving a number of analytical problems being encountered in their work. In June of 1978, an airgram was sent to all missions calling their attention to this training course and the services available from this laboratory. As a consequence, AID/W has received so many inquiries from missions and LDCs for training and technical assistance, that an expansion of this output in this project is thoroughly justified. Based on experience gained from conducting such courses and from the on-going quality control program (See No. 13), the following modifications are anticipated in future courses:

a. Make provision for simultaneous group and individual instruction;

b. Modify curriculum to individual LDC technician needs, including appropriate emphasis on instrumental and noninstrumental techniques and on food residue, human exposure, and environmental samples.

c. Encourage LDC participants to identify potential in-country residue problems and, if possible, arrange for "hands-on" experience with actual or simulated samples.

d. Supplement analytical training with instruction in statistics and practice of residue sampling and monitoring. Also discussions will be held with regard to tolerances, acceptable daily intakes (ADIs), the relationship between toxicity and exposure, importance of supervised field trials for developing local residue data and other items which will allow the analyst to better interact with his compatriots in related regulatory or pest control disciplines.

e. Conduct an instructional subunit in laboratory safety and management.

8. Four-week Training Courses in Pesticide Formulation Analysis.

At the present time, there are significant quantities of technical grade and formulated pesticide products in many of the LDCs. In most instances these stocks were synthesized or formulated in the developed countries and exported to the LDCs, usually with non-A.I.D. funding.

In the developed countries, synthesis, formulation, sale, and use usually takes place within a maximum of 18 calendar months. In the LDCs, however, this time span between synthesis and formulation in the developed country and use in the LDCs can frequently extend to as long as two to three years or even longer. This extended time lapse coupled with the conditions under which the products are frequently stored in the developing countries often results in problems of product identification because of loss or defacement of labels and to problems of stability under tropical storage conditions.

To deal with such problems of product identification and suitability for continued use after prolonged storage in the field, WHO, FAO, the Center for Disease Control of the United States Public Health Service, and A.I.D. in cooperation with the Groupement International des Associations Nationales de Fabricants de Pesticides (GIFAP) have developed a series of specifications for pesticide products together with appropriate analytical procedures. To assist LDC personnel in identification and evaluation of such products, the recipient will develop and conduct a four-week training course in pesticide formulation analysis in properly equipped laboratory facilities in the United States, as specified in the Scope of Work (Annex A).

9. Three-day In-country Training Courses in the Prevention, Diagnosis, and Treatment of Pesticide Poisonings.

In 1976, the United States Environmental Protection Agency (USEPA) and the Office of Migrant Health Services, United States Department of Health, Education and Welfare (HEW) developed a three-day training course

and related instructional material in the prevention, recognition, diagnosis, and treatment of pesticide poisonings for medical and paramedical personnel furnishing primary medical care to migrant agricultural workers.

The instructional material included instructor and trainee manuals, other printed educational circulars and "hand-outs" and a professionally narrated ten-module slide tape program.

The need to improve overall food production and to increase crop yields is a high priority objective for the LDCs. Agricultural pesticides have been and will continue to be an important input to increased food production, but from time to time the introduction of this technology has led to serious agro-medical problems including a significant increase in numbers of pesticide poisoning cases.

For example, in many of the Central American countries, and other countries where there are large scale, excessive aerial applications of pesticides to cotton, the numbers of pesticide poisonings and death among pilots, groundcrews, flagmen, and agricultural workers has become a very significant problem. Although no accurate figures on the extent of this problem are available even in such countries as the United States, there are specific examples of as many as 2000 diagnosed cases of pesticide poisoning including 200 deaths in a population of approximately 80,000 during the course of a single year. In fact, the World Health Organization has estimated the annual number of pesticide poisonings and deaths to be in the order of 500,000 and 2,000 respectively.

Although the problem is most acute in cotton growing countries such as those described above, there are also large numbers of pesticide poisonings and deaths where the distribution and use of highly toxic pesticides, such as parathion and sodium monofluoracetate, are not strictly controlled by the government and are freely available to large illiterate populations who are completely unfamiliar with the acute toxic hazards of such materials. Furthermore medical and paramedical personnel, both in the U. S. and in the LDCs, receive little or no training in the recognition, diagnosis, and treatment of cases of pesticide poisoning. To assist LDC personnel in the prevention, diagnosis, and treatment of pesticide poisonings, the recipient will adapt the EPA/HEW course to LDC conditions, field test the course, prepare English, French, and Spanish versions, and conduct train-the-trainer courses in the LDCs as specified in the Scope of Work (Annex A). These training courses will also include guidance on the establishment of human health monitoring programs which will be designed to reduce worker and third party pesticide exposures, intoxications, and deaths.

10. Two-week In-country Training Courses on Aerial and Ground Application Techniques and Procedures.

In many LDCs, particularly in Latin America but also in some countries in Africa, the Near East, and Asia, pesticides are frequently applied by aircraft or ground equipment to extensive areas of field crops. However, in many instances, the pilots and supporting ground crews as well as ground applicators are not aware of the toxicological and environmental hazards associated with such operations and in particular have only a rudimentary knowledge of calibration techniques, reduction of drift to non-target areas and the necessity to keep the number of applications down to the

smallest possible number consistent with the objective of holding pest populations below economic injury levels.

In addition to pilots and supporting ground crews, and ground applicators, course participants should include key LDC officials and other in-country personnel responsible for job contracting for pesticide applications with aerial and ground applicators. Surveillance of applicators by knowledgeable parties having a vested interest in the quality, quantity, and related cost of the applications can go a long way in "regulating" this important aspect of pesticide misuse. The recipient will develop and conduct training courses in aerial and ground pesticide application techniques and procedures as specified in the Scope of Work (Annex A).

11. Short-term Consultants.

As specified in the Scope of Work (Annex A), the recipient will provide the services of short-term consultants for up to 30 days at the request of missions: (a) to assist countries in collaboration with missions in the preparation of project papers for country agricultural development projects which include the provision of assistance for the procurement and or use of pesticides including the preparation of the pesticide sections of IEEs, and EAs, or EISs when required, (b) to assist countries in collaboration with missions in the preparation of PIDs and PPs on projects designated to strengthen national plant protection services, and (c) to provide technical advice on other matters pertaining to pest and pesticide management. An example of a recent PID substantially modified with the assistance of the UC/AID Pest Management Contract is shown in Annex I.

12. Technical Backstopping of Regional Pest Management Specialists Funded by Missions or Regional Bureaus.

In some of the LDCs agricultural pesticides have been used very extensively for a number of years on export crops such as cotton. In many of the Central American countries, for example, this extensive use of such persistent pesticides as DDT began in the early 1950s. However, many of the pests soon developed resistance to DDT, and in attempting to control them, rates of application were increased, and more frequent applications were made. Nevertheless, the effectiveness of these pesticides continued to decline as the pests became more resistant and additional pesticides were incorporated into the treatment schedules and included such acutely toxic compounds as parathion and methyl parathion. Indeed, there are records in some countries of as many as 65 applications of pesticides (including defoliants) on 120-day cotton or an average of more than 1 application every 2 days. Such excessive use led to the "creation" of additional pests, by eliminating parasites and predators which had previously kept so-called "secondary" pests below economic injury levels. Additionally this excessive use of pesticides resulted in widespread environmental contamination and the presence of very high levels of pesticide residues in a variety of environmental media such as human and animal fat, shrimp, and other shell fish and soil and water, generally.

Accordingly, the Central American countries in cooperation with ROCAP have taken steps to ameliorate such problems through the establishment

of a Regional Pest Management Specialist whose scope of work will be to advise and assist ICAITI, OIRSA, INCAP, ROCAP, and USAID missions in Central America and Panama, and other appropriate Central American Regional and National Institutions, and where feasible Caribbean countries in the LAC region, in the identification, quantification, and establishment of priorities, and to help implement specific project activities aimed at solving problems of pest and pest management. Since funding to establish such posts is not included in the current project, it should be provided, as necessary, from Regional Bureau funds, as is the funding for the current post at ROCAP.

The activities of this specialist must be supported by short-term consultants since no single individual can be expected to be a specialist in all fields of pest and pesticide management and although some funding is included in his budget for such consultants, he will require additional resources in the form of technical backstopping from this project.

Regional Bureaus should consider establishing similar activities in other areas, not only with current problems of pesticide misuse and mismanagement, but also in countries where the level of pesticide use is still relatively low because it is much easier to prevent such problems from developing than to solve them after the environment has been extensively contaminated and pest resistance problems have reached unmanageable levels.

As specified in the Scope of Work (Annex A), the recipient will provide technical backstopping for the regional pest management specialist in Central America and any other similar specialists who may be established by the LA Bureau and other Regional Bureaus.

13. Maintainance of a Collaborative Pesticide Residue Analysis Support Facility

During the previous contract the contractor instituted and coordinated a collaborative quality control program wherein carefully prepared samples of "unknown" pesticides (actual amount present is only known by coordinator) were sent to collaborating LDC laboratories who, using standardized techniques and their own local equipment used for day-to-day routine analyses, attempted to identify and quantify the contents of the "unknown" sample. Results from the collaborating laboratories are then sent to the central laboratory for statistical comparison with all other laboratories and with the actual true amounts of pesticides known to be present. Maintainance of such a program allows each LDC to measure its capabilities with other counterpart facilities in its own country as well as with other laboratories in other LDCs. Under the new cooperative agreement, this program will be expanded to achieve as wide a range of LDC participation as possible. The central training laboratory will also maintain a capability for analytical support to LDCs in terms of residue analysis problems particularly as related to A.I.D. sponsored projects involving pesticides.

14. Short Courses & Seminars.

Under the previous project a series of short courses and seminars were set up on an ad hoc basis, in conjunction with international meetings being held in the United States. A short course on integrated pest management was set up in conjunction with the 12th International Congress of Entomology in 1977, as well as a short course on breeding of pest and disease resistant varieties of food crops in conjunction with the IXth International Congress of Plant Protection in 1979. These short courses held in conjunction with international meetings were found to be particular helpful to LDC personnel by familiarizing them with pest management concepts now in use in the United States, and most importantly, bringing them into contact with persons engaged in this work both in the U. S. and other countries. Since no international meetings related to crop protection are scheduled to be held in the United States during 1980 and 1981, the recipient will arrange to hold short courses in conjunction with international meetings scheduled for other countries as specified in the Scope of Work (Annex A).

15. Pest Management Newsletters and Lists of Forthcoming Conferences and Meetings Related to Pest Management.

To keep LDC institutions, USAIDs, Regional Bureaus, and other interested parties up-to-date with recent developments in the field of pest management, the recipient will publish a pest management newsletter in English, French, and Spanish and a list of forthcoming international conferences and meetings related to pest management as specified in the Scope of Work (Annex A). In addition to presenting recent developments in the field of

pest management, the newsletter will draw particular attention to on-going and planned project activities in specific LDCs to illustrate the types of assistance which can be provided by the recipient. In distributing the newsletter and the list of forthcoming conferences and meetings, the addressee lists developed by the previous contractor will be utilized and expanded as additional interested LDC personnel are identified.

16. Reference Library Including a Reference 35 m.m. Slide Collection on Pest and Pesticide Management.

A reference library and 35 m.m. slide collection is an essential resource for many of the above activities, and the recipient will expand those resources developed under previous contracts as specified in the Scope of Work (Annex A).

PART III PROJECT ANALYSIS

A. TECHNICAL ANALYSIS.

1. Timeliness.

A.I.D. has, for almost 10 years, been financing very limited technical assistance in the field of pest and pesticide management in an effort to promote more rational use of pesticides in the LDCs as essential components of integrated crop protection programs for small farmer cropping systems.

Meanwhile in A.I.D.'s total program, agricultural development projects which include pesticide components have become increasingly popular as a means to reach farmers with a technology that can significantly increase the

the quality and quantity of food and cash crops available to small farmers while increasing farmer income. Most developed countries are giving high priority to the development of integrated pest management programs and are allocating a significant portion of their agricultural budgets for this purpose. However, the improvement of the productivity of cropped lands depends not only upon the development of integrated crop protection techniques, but also upon the ability of the rural sector to respond to and utilize the technology that integrated crop protection projects provide.

In many of the developing countries, there is wide-scale use of pesticides by large growers to control pests and diseases attacking plantation crops such as cotton, coffee, bananas, and cocoa. In some instances, some growers adopted integrated pest management programs when levels of pest and disease resistance reached economically unacceptable levels. However, integrated crop protection projects in which small farmers are helped with day-to-day pest management problems are rather new and much more complicated.

Several existing and developing projects, e.g., the Sahel Integrated Pest Management Research Project being executed by FAO, as well as the West African Food Crop Protection Project and similar country projects in the Ivory Coast, Senegal, Liberia, Upper Volta, Honduras, Panama, Nepal, The Philippines, Indonesia, Morocco, and Tunisia have indicated specific needs in training methodologies and techniques to provide integrated crop protection assistance to small farmers. Much is known and appropriate; however, it is not in readily available form and exists as discrete pieces of information within the experience of individuals and site specific projects. This project

will, inter alia, assemble this information, build on projects already in place or anticipated, and continue to provide assistance in an orderly, coordinated, systematized way so that as experience builds, refinements, and improvements will evolve.

2. Suitability.

A.I.D.'s mandate to reach small farmers, especially the poorer sector, with adequate crop protection technologies can only be achieved when minimal demands are placed upon their limited financial resources for the procurement of pesticides which they can use safely and effectively. Accordingly systems which make maximum use of natural factors such as pest parasites and predators, cultural control techniques, trap crops and resistant cultivars, and minimum use of chemical pesticides are particularly suited to small farmer needs.

3. Initial Environmental Examination.

Since the entire thrust of all project activities is to encourage the adoption of environmentally acceptable methods of plant pest and disease control where chemical pesticides are used only when there are no satisfactory alternatives, the overall impact of the program will be to reduce significantly the environmental impacts of crop protection programs which rely solely on the use of chemical pesticides. Hence, the environmental impact will be minimal and a Negative Threshold Decision is recommended.

4. Design.

The project is designed to provide a comprehensive approach to the formulation and implementation of pest and pesticide management programs in

the LDCs. Accordingly, all of the proposed activities are essential to the attainment of project objectives in the sense that the regulation of the use of pesticides to minimize their environmental impacts is an essential prerequisite to the development of sound integrated crop protection procedures. For a national government to regulate the use of pesticides effectively, it must have the technical capability to make chemical and physical analyses of formulated pesticides and to detect and measure pesticide residues in a variety of environmental media. It is for these reasons that the project will provide training in pesticide analysis. Additionally, training will be provided in the safe and effective use of pesticides, as well as training in the prevention, diagnosis, and treatment of accidental pesticide intoxications and technical guidance will be provided in design and establishment of national pesticide monitoring programs to include human intoxications and deaths as well has general environmental contamination. Finally, the project will also provide training in the principles, methods, and techniques of integrated crop protection programs which minimize the use of chemical pesticides.

In conducting all project activities, the grantee will give full consideration to similar programs conducted by other bilateral and multilateral agencies and, where possible, conduct jointly sponsored activities with them. In this context, special consideration will be given the on-going FAO/UNEP Global Integrated Pest Management Program and, in particular, to the FAO/UNEP projects for the development of IPM programs for rice, sorghum, maize, peanuts, and soybeans. Thus, the utlimate objective, working with other donors, is to establish a multinationally funded network of integrated pest management and related environmental protection programs which will

ameliorate the adverse environmental impacts of chemical pesticides and reduce preharvest plant pest and disease losses.

5. Summary.

The project is felt to be technically sound and is based upon the combined experiences of a number of highly qualified plant protection specialists, some of whom have been engaged in similar activities for almost 40 years in both developed and developing countries. The project has an excellent potential for providing small farmers with useful techniques which will increase the availability of food and cash crops at minimal cost, since these techniques will only include the use of chemical pesticides when there are no satisfactory nonchemical control methods.

B. FINANCIAL PLAN.

This proposal provides for five-year funding to support project activities. No personnel will be stationed outside the U. S. although considerable foreign travel will be necessary. Much information will be gathered from reports, project documents, TDY, and existing project experiences; therefore, some project input will be available at little expense. The estimated budget reflects both a phasing in of certain new activities and continuation of a number of on-going activities supported by the previous project.

Project costs to be borne by A.I.D. are estimated at $4,374,000 for the five-year period, as shown on page 34. The project will be initially funded in FY 80 from June 1, 1980 to November 30, 1980.

BUDGET (000)

FY 81 From 12/1/80 To 11/30/81	FY 82 From 12/1/81 To 11/30/82	FY 83 From 12/1/82 To 11/30/83	FY 84 From 12/1/83 To 11/30/84	FY 85 From 12/1/84 To 5/30/85	Totals
$750,000	$825,000	$903,000	$993,000	$546,000	$4,374,000

Detailed budget tables appear in Annex A, Scope of Work.

C. SOCIAL ANALYSIS.

The initial beneficiaries of the project are those LDC institutions and agencies involved in regulating the use of pesticides in the LDC and in designing and implementing crop protection programs. The ultimate target group of beneficiaries is the small farmer who will be offered environmentally acceptable integrated crop protection programs for their own use. The project will facilitate reaching the ultimate users by working closely with missions and host countries in the design and implementation of pilot IPM demonstration projects for small farmers.

There are many labor-intensive integrated crop protection techniques which can be exploited under LDC conditions and many of these have been developed to a very high level in the People's Republic of China and in other countries where unemployment and underemployment of agricultural labor is a perennial problem. Examples of such labor intensive methods are the handpicking and destruction of unopened cotton bolls at the end of the cotton season in Egypt (to destroy the over-wintering habitat of the spiny boll worm), application of diazinon granules from a perforated metal can to maize hills at the time of planting, use and servicing of pheromone or light traps for either survey or control activities, monitoring or surveying of

pest populations or to check crop conditions, "roguing out" infested or diseased plants, and certain weed control practices related to IPM, in addition to weeding per se. Furthermore, many of these tasks can be performed by illiterate personnel, even those who cannot count except by using knots on a string or notches on a stick.

While many of these techniques are not suitable for use in the developed countries, where agricultural labor is scarce and expensive, they are particularly suited for LDCs where agricultural labor is usually more plentiful and much less expensive. Furthermore, such techniques can be easily exploited in the LDCs because illiterate farm laborers can be taught exactly what to look for or what to do, providing a knowledgeable specialist can provide the detailed specific information which is needed.

The role of women and the important part they play in agricultural development within the LDCs was recognized during the preparation of this paper. Insofar as is possible, this aspect will be considered in the design of any in-country demonstration projects (See Item 4, Page 13) where labor intensive methodologies may be employed.

D. ECONOMIC ANALYSIS

In the developed countries, projects dealing with plant protection are economically justified by relating the total cost of the plant protection methods and techniques which are used to protect the specific crop to the increased productivity which results from the use of the procedures. In the case of small farmer cropping systems, however, we must differentiate between techniques and procedures which are labor intensive but do not

require access to credit and those labor saving techniques which do require access to credit (or cash). Hence, a conventional economic analysis, as conducted under developed country conditions, might be wholly irrelevant to conditions in the LDCs where labor intensive practices can be justified on the basis of increased work opportunities at the farm level accompanied by a concomitant decrease in migration to urban centers of population.

As indicated under Section C, Social Analysis above, many integrated crop protection techniques are labor intensive and while they are more costly in terms of labor, they are less costly in terms of hard cash (or credit). Hence, many of these techniques are ideally suited to the small farmer situation in many of the LDCs.

Additionally, an essential component of integrated crop protection systems is identification of these pests causing economic damage and, where necessary, the application of an appropriate pesticide at the point in the development of the pest attack that will produce maximum control of the pest and minimum impact on other elements of the environment. For examples of cost/benefits of previous project activities, see Annex N.

PART IV. IMPLEMENTATION ARRANGEMENTS

A. ANALYSIS OF THE ADMINISTRATIVE ARRANGEMENTS.

1. Recipient.

It is essential that the recipient has considerable knowledge, experience, and a disciplinary background in integrated pest management as well as an international reputation in the field as evidenced by experience and service with international organizations and learned societies concerned with plant protection. Such background and experience is considered to be essential to the establishment of linkages between project activities and personnel and institutions in the LDCs.

The following recipient attributes are essential to project success:

a. The recipient must show evidence that training and research on integrated pest management is and has been an important element of his portfolio;

b. The recipient must have at least two full-time professional staff who are trained in integrated pest management at the PhD level, or who have equivalent experience. Preferably, both professionals should have had field experience in the LDCs and one should be fluent in Spanish and the other in French;

c. The project leader must devote at least 75% of his time solely to this project;

d. The project leader must have had at least 5 years experience conducting pesticide management seminar/workshops and pest management short courses in the LDCs. The project cannot afford to have this experience gained post hoc through conduct of the project;

e. Consultants or part time experienced professional personnel from within the disciplines of entomology, plant pathology, nematology, acarology, agricultural economics, rural sociology and extension methods, pesticide chemistry, and toxicology, plant quarantine, and biostatistics must be readily available to the recipient;

f. The recipient must also have a full time information specialist to assume leadership in publishing the Newsletter, and in the drafting and publishing of the various handbooks and proceedings of the seminar/workshops and short courses;

g. The recipient must also have access to technical translators of Spanish and French to translate published materials into these languages. The recommended recipient which possesses all of the above attributes is discussed in Annex L.

2. LDC Institutions.

Most project output will be provided with direct linkages to LDC institutions, some of which will be associated with existing projects. Some specific LDC institutional cooperation will be needed in planning and conducting the various workshops and training courses.

3. A.I.D.

The Project Manager in DS/AGR will need to be heavily involved with this project. It is anticipated that the project manager will spend at least 150 work days annually on the project. Such involvement is necessary so that the recipient has A.I.D.'s specific assistance with linkages and planning. A.I.D. must play a key role in providing these as the cooperator will not be able to secure this assistance from any other source. The A.I.D. Project Manager will necessarily use all the formal and informal technical aids within A.I.D. to assist him with detailed planning, scheduling of seminars and short courses, and publication review.

The A.I.D. Project Manager must also provide a technical input into detailed project planning, selection of consultant personnel and in the review of project activities.

B. IMPLEMENTATION PLAN.

AID/W is the proposed procurement agent for this cooperative agreement which will be negotiated with an appropriate consortium of specified colleges and universities. The anticipated procurement schedule is as follows:

1.	TPCA Review of PP	February 8, 1980
2.	PIO/T to CM/COD	March 15, 1980
3.	Cooperative Agreement Negotiation	April 1, 1980
4.	Initiation of Work.	June 1, 1980*

Many of the project outputs are closely linked in many instances. For example, pesticide management workshop/seminars for personnel of specific LDCs should precede pest management and pesticide application short courses. Additionally, the first phase of the advanced pesticide residue analysis training course should be scheduled immediately following a pesticide management workshop/seminar. On the other hand, development of in-country pest management pilot projects, either as separate projects or as subprojects of larger agricultural development projects, should be scheduled subsequent to pest management short courses.

Careful examination of the activities will reveal that there will be a preparatory phase for certain activities which require input development by the recipient prior to conduct of certain courses (training courses in basic pesticide residue analysis; evaluation of pesticide formulations; prevention, diagnosis and treatment of pesticide poisonings; training in ground and aerial application of pesticides). On the other hand, other inputs are already available for immediate use in short courses in pesticide management, workshop seminars, pest management and advanced pesticide

*Assuming a no-cost 2 month administrative extention of present contract

residue analysis. For these latter courses to be successful, however, careful consideration must be given, well in advance of any activity, to soliciting and encouraging maximum cooperative inputs from the recipient countries in terms of country priorities, interests, and technical expertise.

C. EVALUATION PLAN

The project will be managed by the Food Crop Production Division in DS/AGR. The Food Crops Subcommittee of the Technical Program Committee for Agriculture (TPCA) will serve an advisory evaluation role. The project will be closely monitored by the Project Manager, who will be in almost daily contact with the Project Director by telephone and who will meet with the Project Director on an ad hoc but routine basis taking full advantage of the Project Leader's frequent visits to Washington in connection with other activities, both project and nonproject. A regular evaluation will be made at the end of the first, third, and fourth years of project activity with the Project Director presenting a progress report to the Crops Subcommittee of the TPCA at which time, projected activities for the following year will also be discussed. A comprehensive (team) evaluation (to include the members of the Crops Subcommittee of the TPCA) will be made between the project's 18th and 24th month to evaluate progress, determine project impact, to suggest improvements, and to identify those activities which will be conducted during the last three years of the project (see Section IV, B, Implementation Plan.)

IMPACT IDENTIFICATION AND EVALUATION FORM

FOR: Pest Management and Related Environmental Protection Project (No. 931-0936)

Impact Areas and Sub-areas 1/

Impact Identification and Evaluation 2/

A. LAND USE

1. Changing the character of the land through:
   - a. Increasing the population ---------- N
   - b. Extracting natural resources ---------- N
   - c. Land clearing ---------- N
   - d. Changing soil character ---------- N
2. Altering natural defenses ---------- N
3. Foreclosing important uses ---------- N
4. Jeopardizing man or his works ---------- N
5. Other factors
   _____ _____
   _____ _____

B. WATER QUALITY

1. Physical state of water ---------- N
2. Chemical and biological states ---------- N
3. Ecological balance ---------- N
4. Other factors
   _____ _____
   _____ _____

1/ See Explanatory Notes for this form.

2/ Use the following symbols:
N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

G. HEALTH

1. Changing a natural environment ---------- N
2. Eliminating an ecosystem element ---------- N
3. Other factors

H. GENERAL

1. International impacts ---------- N
2. Controversial impacts ---------- N
3. Larger program impacts ---------- N
4. Other factors

I. OTHER POSSIBLE IMPACTS (not listed above)

The project per se will have no direct environmental impacts. However, one of the major project goals is to assist other projects to which it lends assistance to minimize all impacts of an environmental nature and to minimize within that framework agricultural production.

See attached Discussion of Impacts.

ANNEX A

SCOPE OF WORK

FOR

PEST MANAGEMENT AND RELATED

ENVIRONMENTAL PROTECTION

COOPERATIVE AGREEMENT

SCOPE OF WORK

The purpose of this project is to draw upon the expertise and knowledge developed by the members of the Consortium and other institutions as may be appropriate to provide training and technical assistance to LDC personnel in the areas of pest and pesticide management. This will be accomplished through interrelated activities that will assist LDC personnel in planning, developing, and implementing plant pest and disease control programs in ways which will minimize human health hazards and other adverse environmental impacts. The activities will be conducted over a five-year period.

All specific project activities discussed in this Scope of Work, with the exception of those U. S.-based activities discussed in paragraphs 15 and 16 below (Pest Management Newsletter and Lists of Forthcoming Conferences and Meetings Related to Pest Management" and "Establish and Maintain an Appropriate Reference Library") will be developed and coordinated by the recipient in consultation with the A.I.D. Project Manager and appropriate Regional Bureau Agricultural and Environmental Officers. Level of effort for the various described project activity areas will, of course, be dependent on the level of funding. A proposed budget for this cooperative agreement can be found on page 14 of the Scope of Work. The recipient will also consult with Missions, as appropriate and necessary. In cooperation with the A.I.D. Project Manager, the recipient will make every effort to secure additional mission support for the proposed activities in the interests of developing cost-sharing of the proposed activities. Such actions will

reduce costs of specific activities to this centrally-funded project, thereby enabling the project to support a wider range of activities at the mission level.

As a first step in implementing project activities, the recipient will establish a multidisciplinary Advisory Group of plant protection specialists representing those institutions and organizations which can be expected to provide personnel who will participate in the various project activities. The recipient will convene meetings of the Advisory Group as necessary but, generally, on an annual basis, to develop and coordinate specific project inputs to various project activities. Costs of such meetings will be charged to the agreement.

1. Country or Regional Surveys of Pest and Pesticide Management Problems.

The recipient is expected to field multidisciplinary teams of plant protection specialists to review pest and pesticide management problems on both a country and regional basis. Specific sites and composition of Recipient's teams will be determined by the Recipient with the approval of A.I.D., taking into account A.I.D. needs as discussed with the Recipient by the Project Manager after consultation with Missions and Regional Bureaus.

2. In-Country Pesticide Management Workshop/Seminars.

In consultation with Regional Bureaus and Missions, the Recipient plans to hold Pesticide Management/Workshop Seminars of five days duration for personnel in appropriate developing countries giving due consideration to those countries where such seminar/workshops were previously held. In

selecting locations for seminar/workshops, the Recipient is expected to give first priority to those countries (or subregions) where the pesticide problems are most serious in terms of human poisonings and environmental contamination. Second priority is expected to be given to those countries (or subregions) where pesticide use is still minimal in an effort to provide guidance in proper pesticide regulation and use and avoid unnecessary adverse environmental impacts and preventable human intoxications.

After the location and tentative dates for each seminar/workshop have been established, the recipient, with appppropriate Regional Bureau and Mission clearance, will visit the country for the purpose of establishing an organizing committee of LDC personnel representing Ministries of Agriculture, Health, and any other Ministries involved with the importation, regulation, or use of pesticides, and will also include, where appropriate, representatives of the local pesticide industry and farmer/grower organizations. Working with the organizing committee, the recipient will develop an appropriate agenda taking into consideration local needs, priorities, and capabilities. Depending upon specific agenda items and the technical qualifications and interests of local personnel, the recipient will then arrange to have appropriate subjects presented by project and LDC personnel.

3. Integrated Crop Protection Short Courses.

In consultation with Regional Bureaus and Missions, the Recipient will hold integrated crop protection short courses for LDC personnel in appropriate developing countries, giving due consideration to those countries where such training courses have already been held.

4.

The Recipient plans to develop a course curriculum specific to each country, including at a minimum the following topics:

a. Principals of integrated crop protection (ICP);

b. Information sources and retrieval for ICP;

c. The agroecosystem concept and its relationship to ICP;

d. Tactics of ICP including host plant resistance, cultural control, biological control, monitoring and forecasting, and ecosystem modeling;

e. Economics of ICP including crop loss assessment and economic injury levels;

f. Detailed analysis of management of major pests in local cropping systems giving particular attention to cropping systems used by small farmers;

g. Information transfer to farmers;

h. Analysis of integrated crop protection problems in specific situations.

A summary report of each course will also be prepared by the Recipient and furnished to the A.I.D. Project Manager in the prescribed number of copies.

The recipient will also, with appropriate Regional Bureau and Mission clearance, arrange a follow-up evaluation of the short course, with the participants approximately 12 months after the completion of the course.

5.

4. In-Country Integrated Crop Protection Demonstration Projects.

In consultation with appropriate Regional Bureaus and Missions, the Recipient is expected to provide consultant services to Missions in the development of PIDs and PPs for integrated crop protection demonstration projects. Where possible the Recipient will seek to develop these projects as add-ons or supplemental components to on-going agricultural development projects. The Recipient will coordinate all efforts with relevant IARCs and any active or proposed Title XII IPM methods development programs. The Recipient is expected to assist in the planning of at least one demonstration project for each of the four Regional Bureaus annually.

5. In-Country Pesticide Residue Sampling and Analysis Familiarization Course.

The Recipient is expected to organize, prepare, and conduct familiarization courses on pesticide residue analysis/sampling aspects as related to LDC needs. Primary beneficiaries of the course will be expected to be selected chemical technicians attending the seminar/workshops and therefore the Recipient is expected to coordinate this course with the previously described seminar/workshops discussed in Section 2, above. The Recipient will seek to respond to specific training needs including but not limited to the following topics:

a. The importance and significance of national and international tolerances and action levels;

b. The meaning and utility of the concept of acceptable daily intakes;

c. The relationship between toxicity and exposure;

d. Routes and rates of exposure to pesticides from different patterns of use;

e. Statistical and logistical aspects of residue sampling analysis programs;

f. Guidance in conduct of supervised field trials, including residue decline components;

g. Pesticide formulation problems in LDCs, including sampling of specifications and quality control formulation;

h. Analytical and sampling methods available to LDCs for monitoring pesticide residues in various substrates.

The Recipient is expected to underscore methods of sampling and analysis which will be compatable with various levels of LDC development and formulate a training program which will offer suitable options on courses of future action useful to the respective countries. The Recipient will seek to develop "hands-on" demonstration aids which will clearly show that a minimal monitoring/regulatory program can be mounted even with relatively small expenditures. Finally, the Recipient is expected to inform the course participants as to the type(s) of more sophisticated support which might be available from A.I.D. and/or the Recipient for special in-country problems identified by rudimentary sampling/analysis

programs. The Recipient is expected to identify, with the aid of course participants, potential candidates for other training as discussed in sections 6 through 8 .

6. Basic In-Country Pesticide Residue Analysis Training Short Courses.

The Recipient is expected to identify analytical problems currently being encountered in the LDCs and to evaluate the suitability of thin layer chromatography, paper chromatography, and other simple non-instrumental techniques for monitoring these problems. Based on these evaluations, the Recipient is expected to organize and conduct a series of basic pesticide residue analysis training courses in appropriate developing countries, giving due consideration to the countries which have sent trainees for U. S. based training under the previous project as well as to the countries which may be expected to send trainees for U. S. based training in pesticide residue analysis under 7 , below. In this context, the Recipient will be expected to give first priority to countries which have not and probably will not send trainees for U. S. based training.

Within this priority, preference should be given to conducting a course or courses for trainees in countries participating in the A.I.D. West African Food Crop Protection Project followed by courses in other African countries which do not currently have the technical inputs required for instrumental analysis (e.g. gas/liquid chromatography, neutron activation, and atomic absorption).

In conducting these training courses, the Recipient will adapt existing and/or develop new equipment, kits, and training manuals as needed and provide the necessary qualified pesticide residue chemists and technicians.

As may be required by specific country needs, the recipient is expected to develop specific analytical methods using non-instrumental technique for pesticides of concern to particular LDCs. Additional specific training sites will be determined by the Recipient, taking into account Mission needs as discussed with the Recipient by the Project Manager after consultation with Missions and Regional Bureaus.

7. Intensive U. S. Based Pesticide Residue Analysis/Training Course.

The Recipient is expected to carry out training of LDC personnel in pesticide residue analysis, laboratory management/safety and statistical sampling/supervised field trial design at a U. S. based facility established and equipped by the Recipient. The Recipient will seek to coordinate these courses with the Pesticide Management/Workshop Seminars from which the majority of attendees can be expected to be nominated, either directly or indirectly.

The Recipient will seek a meaningful balance between the three major components of the course and is expected to utilize, to the extent possible, training manuals produced by the previous contractor. The Recipient is expected to supplement such training materials with material developed by guest lecturers and to provide for both individual and group

instruction with individual instruction tailored to specific in-country needs of the chemist and the specific equipment the analyst will have available to him upon his return to his country's worksite.

Where applicable, the Recipient will seek the advice and assistance of U. S. regulatory agencies having responsibilities in the areas of tolerance setting, environmental exposure, monitoring, and enforcement.

The recipient will also arrange for the translation and publication of all relevant manuals in French and Spanish (250 copies of each language version). As indicated in the output listed above, the only costs of these courses which will not be funded by the Recipient will be for trainee travel and per diem which must be funded from non-project sources.

In this context, travel and per diem costs for trainees taking the course in the United States will be defrayed from other funding sources such as on-going in-country USAID or UNDP projects having an appropriate training component, the host government, WHO, UNEP, the local pesticide industry or any other appropriate funding source. The entire training program will be coordinated with, but not duplicative of, a somewhat similar technical assistance program being funded by the Federal Republic of Germany.

8. Training Course in Pesticide Formulation Analysis.

The recipient is expected to design this new course after consultation with CIPAC, WHO, Communicable Disease Center, EPA, GIFAP, and A.I.D. Insofar as practical, the analytical methodology to be used is expected to be patterned after internationally accepted and standardized methods. The course should include identification and quantification of representative active ingredients of pesticides taking into account those pesticides most frequently used in the LDCs as reflected in the most recent edition of the FAO Production Yearbook or those pesticides whose formulations have been determined by other means to have a high impact on small farm cropping systems. Where possible, emphasis should be placed on identification and quantification of active ingredients by simple, inexpensive thin layer chromatography procedures. The course should also include physiochemical evaluation of formulated products to include but not be limited to emulsion stability, dispersability in water and phytotoxicity.

9. Training Courses in Prevention, Diagnosis, and Treatment of Pesticide Poisonings.

The Recipient is expected to develop a training course for medical and paramedical LDC personnel in three phases. The first phase will seek to adapt existing English language training programs to representative LDC situations. Audio-visual components are expected to be revised by the Recipient utilizing their existing scientific and communications capabilities. The Recipient will seek to modify the slides, tapes, and other visual aids to depict the actual working conditions in LDCs and will be expected to utilize resource personnel already identified through other LDC training/ consultant contacts. By means of the above, a training manual useful in LDC situations is expected to be prepared.

In the second phase, the Recipient will seek to organiza and conduct short pilot courses in countries where English is in common use, using the training manual developed under Phase I. The Recipient is expected to utilize the assistance of a project physician and/or nurse trainees to conduct these courses and to modify training manual, course content, and procedures based on the experience gained. The Recipient is expected to develop a packaged training "kit".

In Phase III, the Recipient in consultation with the A.I.D. Project Manager, Regional Bureaus, and Missions will be expected to conduct "train-the-trainees" courses in various developing countries in English, French, and Spanish using the previously developed kits. The Recipient will also furnish a limited number of training "kits" at cost to qualified LDC institutions requesting them.

11.

10. Training Courses on Aerial and Ground Application Techniques and Procedures.

The Recipient is expected to organize and conduct in-country training courses for aerial applicators, supporting ground crews, ground applicators, and key LDC personnel. The Recipient will seek to respond to specific training needs he has identified in his seminar/workshops and other consultant efforts in the LDCs.

The Recipient will seek to achieve a proper balance in emphasis on aerial and ground application techniques as determined by individual country or regional needs. As a preliminary to initiation of actual course instruction, the Recipient will be expected to develop and reproduce the appropriate training manuals and audio-visual aids.

11. Short-Term Consultants.

The Recipient is expected to provide the services of short-term consultants to assist Missions in the preparation of PIDs and PPs for country agricultural development projects which include integrated crop protection or pesticide supply or use components.

12. Technical Backstopping of Regional Pest Management Specialists Funded by Missions or Regional Bureaus.

The Recipient upon request of AID/W or the Regional Bureaus is expected to provide technical backstopping to any Regional Pest Management Specialists who may be put into place.

12.

13. Maintainance of a Collaborative Pesticide Residue Analysis Support Facility.

The Recipient will be expected to adequately staff and equip a central U. S. Pesticide Training Facility so that all on-going programs can be serviced along with maintaining an emergency response capability (including in-country consultation) to deal with special pesticide residue problems which may arise as related to A.I.D. sponsored pest control components of agricultural and public health projects.

The Recipient will also seek to establish a workable linkage with a mass spectrometer facility capable of assisting in pesticide unknown identification and/or confirmation. Additionally, the Recipient is expected to continue, expand, and improve the Collaborative International Analytical Quality Control Program now on-going. Also, the Recipient is expected to identify and maintain contact with suitable contractor-type laboratories having a demonstrated capability in pesticide residue analysis and able to respond to data development needs in excess of the capacity of the central A.I.D. cooperation facility.

14. Short Courses and Seminars.

In consultation with the A.I.D. Project Manager, regional bureaus, and missions, the recipient will identify appropriate international meetings related to plant protection being held during each year of project activities and in consultation with the organizers of the meeting and the host government, organize and conduct a two-week short course on

integrated crop protection for LDC personnel in conjunction with these meetings as appropriate. In organizing these short courses in other countries, the contractor will use his good offices to ensure, insofar as possible, joint sponsorship of the short courses by the Ministries of Agriculture of the host governments, FAO and other interested international organizations, and national and international professional societies concerned with crop protection.

15. Pest Management Newsletters and Lists of Forthcoming Conferences and Meetings Related to Pest Management.

As specified in the Project Paper (page 28), the recipient is expected to prepare and distribute pest management newsletters in English, French, and Spanish on a quarterly basis throughout the life of the project agreement. Additionally, the recipient will publish a list of forthcoming conferences and meetings related to pest management on a semiannual basis throughout the life of the project agreement.

16. Reference Library and Reference 35 mm Slide Collection.

The recipient is expected to build upon the resource developed by the previous contractor and expand it to the point necessary to provide the necessary technical information and audio-visual aids required for the efficient conduct of the training courses, seminars, and workshops as discussed above.

BUDGET (000)

Cost Element	FY 80 Fm 6/1/80 To 11/30/80	FY 81 Fm 12/1/80 To 11/30/81	FY 82 Fm 12/1/81 To 11/30/82	FY 83 Fm 12/1/82 To 11/30/83	FY 84 Fm 12/1/83 To 11/30/84	FY 85 Fm 12/1/84 To 5/30/85	Totals
Salaries	110	243	267	294	323	177	1,414
Fringe Benefits	12	27	30	32	36	20	157
Consultants	35	80	80	100	120	50	465
Travel	65	148	155	167	186	85	806
Supplies	50	75	100	100	100	100	525
Equipment	10	20	20	20	20	-	90
Overhead 26.6%	75	157	173	190	208	114	917
TOTAL	357	750	825	903	993	546	4,374

DRAFT

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1980 to FY 1985
Total U.S. Funding $5,500,000
Date Prepared: 1/15/80

Project Title & Number: Pest Management and Related Environmental Protection

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
I. Program or Sector Goal: The broader objective to which this project contributes: To increase agricultural crop production in LDCs at the small farmer level with the maximum of safety and with full recognition of the labor intensive aspects available within the LDCs.	Measures of Goal Achievement: Increase in awareness by LDC governments in need for more and larger pest and pesticide management programs. Adoption of ICP methodologies for local use. Decreased use of pesticides per se as compared to incorporation of pesticide use into broader crop protection strategies. Increase in national emphasis on building and/or improving crop protection service infrastructure.	Review of mission and regional bureau reports dealing with baseline changes in crop protection methodologies. Special surveys. Number of publications and monographs on local ICP projects appearing in scientific literature. Survey of LDC scientist, agriculturists, and extension specialists active in national, regional, and international meetings on ICP and pesticide management.	Assumptions for achieving goal targets: Continued emphasis by LDCs, regional bureaus and missions on achieving safer and more efficient methods for small farmer/multiple cropping system agricultural production. Continued U. S. emphasis at all levels of government and academia, on maximum exploitation of ICP methodologies.
II. Project Purpose: To aid in strengthening pest and pesticide management programs in the LDCs.	Conditions that will indicate purpose has been achieved: End of project status: Increase in-country awareness of the needs for and mechanisms available for effective integrated pest management programs. Increased number of viable IPM programs, including demonstration projects related to local small farmers needs in the LDCs served by the project. Improved LDC systems for regulating, and enforcing pesticide related projects and problems. Increased participation by in-country government, university and agriculturists in pest and pesticide management related activities at home and abroad. Increase in quality and quantity of available training kits, manuals, and facilities within the boundaries of the LDCs. Increased surveillance at national level of pesticide residues in foods and the environment and of pesticide formulation for compliance to chemical and physical specifications. Increase numbers of LDCs participating in laboratory quality control programs and maintaining active analytical facilities.	Mission, AID/W, and recipient cooperator reports. Selective monitoring of various environmental substrates for degree of pesticide exposure. Special surveys. Services utilized in A.I.D. project development, implementation, and evaluation.	Assumptions for achieving purpose: Acceptance of recommendations developed by recipient and AID/W. Outputs of training programs and seminar/workshops are put into actual practice. Backup funding to continue initiated projects continues. Projects are carried through to completion and those which are successful are adopted for routine use. Information obtained by LDC from recipient-AID/W is passed on to other LDC nationals. A.I.D. project documents are sufficiently informative to identify components related to provision of assistance for supply or use of pesticides. LDCs and USAIDs will cooperate in providing access to information and on-going projects.

AID 1020:20 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 80 to FY 85
Total U.S. Funding 5,500,000
Date Prepared: 1/15/80

Project Title & Number: Pest Management and Related Environmental Protection

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
III. Outputs: 1-Country or regional surveys of pest and pesticide management problems; 2-Five-day in-country pesticide management workshop/seminars; 3-Regional short courses on integrated crop protection; 4-In-country integrated crop protection demonstration projects; 5-In-country pesticide residue sampling and analysis short course; 6-Two-week in-country training courses in basic pesticide residue analysis short courses; 7-Twelve-week training courses in pesticide residue analysis at a centrally-based U. S. facility; 8-Four-week training courses in pesticide formulation analysis at a U. S. facility; 9-Three-day in-country training courses to train trainers in the prevention, diagnosis, and treatment of pesticide poisonings; 10-Two-week in-country training courses on aerial and ground application techniques and procedures. 11-Provide the services of short-term consultants for up to 30 days at the request of missions; 12-Provide technical backstopping to country or regional pest management specialists as funded by missions or regional bureaus; 13-Provide a central pesticide residue analysis facility capable of monitoring and assisting A.I.D. sponsored pesticide programs, conducting analyst training and serving as coordinator for an international quality control program; Cont'd next page	Magnitude of Outputs: Based on requested funding, a per annum equilibrium level of outputs using a hypothetical "mix" of specific outputs might be as follows: Item 1 — 3 each 2 — 3 " 3 — 3 " 4 — 5 " 5 — 2 " 6 — 5 " 7 — 3 " 8 — 1 " 9 — 2 " 10 — 2 " 11 — 3 " 12 — 5 " 13 — 1 " 14 — 2 " 15 — 10 "	Quarterly report of recipient, Mission and regional bureau reports. On site visits to training/seminar/demonstration sites. Follo up visits to LDC participants in training programs. Review of PIDs and PPs assisted by project. Publication of study team reports. Publication of workshop proceedings. Publication of short-course proceedings.	Assumptions for Achieving Outputs: Continued funding at specified level. Continued level of interest and support of project goals by mission and host countries; Successful completion of in-country demonstration projects. LDCs will cooperate in studies and will provide relevant information. LDCs will cooperate in analysis of pesticide management problems and will actively participate in workshops. LDCs will provide personnel sufficiently qualified to understand and utilize information presented. Bilateral and unilateral donors will participate in supporting project activities.

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 80 to FY 85
Total U.S. Funding $5,500,000
Date Prepared: 1/15/80

Project Title & Number: Pest Management and Related Environmental Protection

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
III. Outputs: (Cont'd) 14-Organize and conduct short courses and seminars on subjects related to integrated crop protection and pesticide management, cooperate with other bilateral and multilateral donors and LDC institutions in organizing and conducting such short courses and seminars, and arrange for study visits of individual LDC personnel to appropriate institutions; 15-Publish a quarterly pest management newsletter and a list of forthcoming international conferences and meetings related to pest management. 16-Establish and maintain an appropriate reference library including a reference slide collection on integrated crop protection and pesticide management for use by project consultants in workshops and training courses and to meet information requests from LDCs. 17-Participation of bilateral and unilateral donors in supporting project activities.			
IV. Inputs: 1. Cooperator personnel; 2. A.I.D. project records; 3. A.I.D. funds; 4. Cooperative management between contractor and A.I.D.	Implementation Target (Type and Quantity) Salaries $1,414 Fringe 157 Consultants 465 Travel 806 Supplies 525 Equipment 90 Overhead 917 $4,374 for 5 years	Beginning of Project Status: 1. Much technology available for improvement of pest and pesticide management programs. 2. Technology transfer mechanisms inadequately addressed in agricultural development projects. 3. Interest high worldwide in implementing integrated pest management projects. 4. Reservoir of highly trained plant protection specialists available in the U. S.	Assumptions for Providing Inputs: Adequate funding. Continued interest by U. S. Universities in international agriculture.

MISSING PAGE NO. 1

merican in its makeup, character and interests. Specifically it was sug-ested that the "internationalization" of CICP should be one of the es-ablished targets on the evaluation schedule.

special issues-clarification paper was circulated to the TPCA members at he meeting. The paper responded to two concerns raised by Doug Caton. aton and the other TPCA members were satisfied that the memorandum dated eb. 7, 1980 from DS/AGR, Ray Solem, responded to their concerns. A copy of his memorandum will be kept in the TPCA office file of these minutes.

TAFF ANNOUNCEMENTS: Shane MacCarthy announced that:

- Tony Babb has been requested to recommend candidates for the Consultative Group Boards of Trustees. Regional bureaus were asked to submit names by Feb. 15, 1980. Disappointment was expressed that there was insufficient time to get input on this subject from the field missions.

- Babb and several DS/FN senior staff members met with Maurie Williams to discuss Food Sector Studies. A draft paper from WFC entitled "Formulating a Food Sector Strategy - Criteria and Guidelines" was distributed to all TPCA members. Copies of this paper with additional food sector strategy documents (see January 9, 1980 memorandum from Charles French) will be kept in the TPCA office file.

- Both Babb and MacCarthy had opportunities to speak with John Nicholaides (see pages 2 and 3 of TPCA minutes dated Feb. 4, 1980). Nicholaides was satisfied that his task/mission needed better definition prior to any meeting he might have either individually or collectively with TPCA members.

- Russ Olson had circulated a memo (Tab 4) regarding a feedback session he set regarding the Ag Manpower Study. It was determined that TPCA participation in this meeting would be helpful but not essential.

  Special note: David Bathrick was one of many aggies who participated in the above-cited Olson meeting. Bathrick expressed some of his concerns about the direction he felt the Ag Requirements Report was taking. These written comments will be kept in the TPCA office file.

- DS/FN was putting together a briefing memorandum for the upcoming BIFAD discussion on the Woods Thomas paper entitled "Title XII and the Middle Income Countries." The Regional Bureaus were urged to contribute their thoughts. This request to contribute RB views was formalized later in the day at the request of Joe Wheeler who would be officially representing AID at the BIFAD meeting.

- Additionally, two papers were distributed:

  a) The Special Report from the Shenandoah Conference on AID's Staffing Requirements (Tab 5) and,

  b) The Ken McDermott thinkpiece dated Feb. 8, 1980 (Tab 6).

TPCA RESPONSE TO BIFAD MANPOWER STUDY (KNOLL REPORT): The general consensus among TPCA members was that the Knoll Report was at best an incomplete [illegible] staffing requirements). Further.

would be seen in its proper perspective. It was decided by TPCA that Babb would write a memorandum to Elmer Kiehl of BIFAD indicating that TPCA would want the opportunity to formally comment on the Knoll Report if BIFAD had the intention of giving the report a public review. One copy of the Knoll Report will be kept in the office file.

STATUS REPORT ON PLUCKNETT ACTION MEMO TO BENNET: Don Pluckett indicated that the memo was still not completed and would be ready for review at the next TPCA meeting.

REVERSE IPA REPORT: TPCA members recommended that any further consideration of the reverse IPA concept should be postponed until after the completion of the Olson report. The idea of reverse IPAs then would be seen within the larger context of agency personnel needs.

AGENDA FOR APAPM: Don Mitchell's Feb. 7, 1980 memorandum (Tab 7) was reviewed by TPCA members. The following issues/recommendations were made:

- APAPM should meet within the next week to review ALL anticipated forthcoming Backstop 10 personnel changes.
- Mitchell should draft an action memorandum requesting that a certain number of positions for Backstop 10 be set aside in the training complement. The memorandum should also indicate that ag recruitment will not be against vacant positions but in advance/anticipation of need (see TPCA minutes, page 2, dated Dec. 12, 1979).
- It was learned that Peter Brownbak, the Ag recruiter in PM had retired and that many of Brownbak's responsibilities were falling on Mitchell. Mitchell was instructed to draft a letter to PM for Babb's signature reminding PM of the recruitment vacancy and that Mitchell was not transferred to PM to assume ag recruitment responsibilities. In brief, TPCA should make sure that this vacant position is not lost.
- It was recommended that much of the work associated with APAPM ought to be staffed out. Within APAPM there shoud be ad hoc and permanent work groups. These work groups need not in most instances comprise of more than three people. APAPM then should receive the reports/recommendations of the work groups and not have to be burdened with much of the staff work.

In conjunction with the Mitchell-led discussion, two papers were circulated:

a) an alphabetical listing of all BS-10 Agricultural officers and,

b) a list of aggies by position and departure dates.

These papers can be found in the TPCA office file.

NEXT TPCA MEETING: The next meeting of TPCA is scheduled for:

Date: Tuesday, February 26, 1980
Place: Room 4942 NS
Time: 10:00 a.m.

Agenda to follow.

Tab 1

TPCA/APAPM AGENDA - FEBRUARY 8, 1980

1. Review of revised TSM Cable (Johnson)

2. Concurrence-review of Pest Management and Related Environmental Protection Project Paper (Babb & Collier, et al)

3. Staff announcements:

   E - Nominees for Consultative Group Boards of Trustees

   - Distribution of food sector strategy guidelines and background information (Babb)

   - Update on Nicholaides mission (Babb & MacCarthy)

   - Announcement/reminder of Olson feedback discussion

4. TPCA response/involvement in the BIFAD study of AID's Professional Agricultural Manpower (Sherper)

5. Status report on Plucknett Action Memo to Bennet (Plucknett)

6. Report on research involving reverse IPA concept (MacCarthy)

7. ISTC follow-up.

8. APAPM/TPCA priorities for 1980 (Mitchell)

MISSING PAGE NO. Tab 2

TAB 3

Balis suggested that the project summary, pages 1 and 2 be expanded to include all proposed activities and, in particular those activities of primary, immediate interest to USAIDs.

Balis felt that the role of short-term consultants was not given sufficient emphasis vis-a-vis seminar/workshops and there should be more discussion of support (expand discussion on page 24).

Babb felt that considerations should be given to development of longer term capabilities with the ultimate goal of institution-building and emergence of CICP as a self-sustaining entity. He also suggested that CICP groom itself for future conversion to an international type unit which could be funded by multiple donars, World Bank, UNDP and possibly other bilateral and multi-lateral donors(Discussion of such long-range developments will be incorporated in an added paragraph in Section III.A.4. Project Design, page 32). Caton also expressed his feeling that the ultimate goal should result in CICP as a self-sustaining entity.

-Balis expressed concern that the discussion of backstopping of Regional Pest Management Specialists (RPMSs), particularly the Specialist in ROCAP now funded by the LA Bureau, pages 25 and 26, reflect the fact that funding for these positions is not included in the DS/AGR project.

-Sherper expressed concern that health aspects in LDCs are not being adequately addressed and wondered if the project provided for some sort of monitoring capability. (The discussion of training courses in prevention, diagnosis and treatment of pesticide poisonings, beginning on page 21, will be expanded to include assistance to develop national human health monitoring schemes.)

-Gage requested further clarification of project interaction with FAO/UNEP. (These relationships will be clarified as part of the revised discussion on Project Design.)

CCollier, DS/AGR/FCP
2/11/80

February 21, 1980

MEMORANDUM

TO: TPCA Members

FROM: DAA/DS/FN, Shane MacCarthy

SUBJECT: Draft Minutes of TPCA Meeting - February 8, 1980

The TPCA Steering Committee convened at 10:00 a.m. in Room 4942 NS on February 8, 1980. The following members/alternates were present.

DAA/DS/FN, Tony Babb
LAC/DR/RD, John Balis
DS/AGR, Keith Byergo
PPC/PDPR, Doug Caton
AFR/DR/ARD, Dillard Gates
AFR/DR/ARD, Bill Johnson
DAA/DS/FN, Shane MacCarthy
DS/AGR, Ken McDermott
PM/PO/SAO, Don Mitchell
ASIA/TR, Don Plucknett
NE/TECH, Keith Sherper

Also participating in the meeting as specially invited guests were:

DS/AGR, Carroll Collier
DS/AGR, Steve Engberg
DS/PO, Pat Gage
DS/AGR, Fred Whittemore

The TPCA members agreed to follow the attached agenda which was distributed prior to the meeting (Tab 1).

REVIEW OF REVISED TSM CABLE: The Committee concurred with the most recent redraft of the proposed TSM cable (Tab 2). Some minor changes were recommended and are reflected on the attached tab. These changes will be incorporated in the action memorandum which is being prepared for the Administrator's signature. Further, the committee confirmed an earlier recommendation that the TSM memo would assume the importance it deserves if it were sent as a cable to the field from the Administrator. Prior clearances would be sought from the Regional AAs, SER/CM, GC and BIFAD.

REVIEW OF PEST MANAGEMENT PROJECT PAPER: TPCA concurred in principle with the PP from DS/AGR. This concurrence evolved from an hour-long discussion during which time considerable concern was expressed about the international character of CICP. Among the specific recommendations (Tab 3) it was suggested that the consortium should be broadened so as to include institutes from other countries so that hopefully, funding might come from a number of donors.

TPCA members emphasized the need for CICP to be international and not solely

DATE: November 26, 1979

memorandum

REPLY TO ATTN OF: DS/AGR/FCP, F.W. Whittemore C. Collier for F.W. Mr. Collier

SUBJECT: Minutes of TPCA Crops Subcommittee Meeting Held, November 21, 1979, Room 413 RPC

TO: Distribution

Attendees: ASIA/TR, D. Plucknett; AFR/DR, D. Gates; NE/TECH, V. Lateef; DS/AGR/FCP, F. Whittemore; C. Collier, M. Smith

Discussion: Dr. Whittemore presented the new project paper for the Pest Managment and Related Environmental Protection Project. This project is currently under extension until March 1979 with the University of California, Berkeley. The new project paper will, in its final format, be prepared in terms of a cooperative agreement.

No substantive issues were raised and it was generally agreed that the project should continue. In fact, it was suggested that the paper be revised from a projected project life of five years to cover a potential span of 10-20 years. The following modifications of the project paper and/or work scope were agreed upon:

a. More clearly define the working linkages of the project with IARCs and other international organizations so as to eliminate redundancy of effort and foster better communications;

b. provide additional cross referencing between the project paper, work scope and attached reference annexes;

c. restrict adaptation of short-courses to a regional basis (e.g., agroclimatic regions, etc.) rather than adopt on a country-by-country basis;

d. further clarify the inter-relationships of Phase I, II and III of the pesticide analysis training course component;

e. provide for additional initiative on the part of the pesticide residue analyst trainees in the identification of their "local" pesticide problems vis-a-vis pre-selection by AID;

f. provide specific examples of PIDs which have been developed and/or substantially modified by the project;

g. add clarification to PP of rationale for in-country M.S. program rather than U.S. based training.

D. Caton (PPC) did not attend the meeting but informed this office he was in substantial agreement with the project.

Annex #E

REPORT

EXTERNAL EVALUATION TEAM*

"PEST MANAGEMENT AND RELATED ENVIRONMENTAL PROTECTION"**

MAY 15-19, 1978

*Team members are listed on page 11, [redacted] Attachment 1

**A DS/AGR Centrally Funded General Technical Services Project, contracted to the Board of Regents of the University of California, Berkeley

[redacted] ANNEX #E

OUTLINE

PAGE

PAGE

EVALUATION REPORT

ON

"PEST MANAGEMENT AND RELATED ENVIRONMENTAL PROTECTION"
A PROJECT CONTRACTED WITH THE REGENTS OF THE
UNIVERSITY OF CALIFORNIA, BERKELEY

MAY 14, 1978

1. HISTORY AND BACKGROUND

The first contract for the execution of the Project entitled "Pest Management and Related Environmental Protection" that was negotiated with the University of California (3296) began on June 30, 1971 and ended on December 31, 1974. A second project that was contracted (TA-C-1195) to the University of California at Berkeley on March 1, 1975, has been currently funded until September 30, 1978 and is being proposed to continue with current funding until July 31, 1979. Various extensions of the current contract have involved 10 different amendments which related essentially to funding. Virtually no changes have been made in the original purpose, goals, or objectives.

The purpose of the project is to provide developing countries (LDCs) with assistance in devising and implementing ecologically sound and economically valid integrated pest management systems for the control of agricultural pests and diseases. The project has two goals: (a) to reduce losses of agricultural crops caused by plant pests and diseases, and (b) to improve the ecological conditions caused by efforts to eradicate or reduce causes of such crop losses.

The budget history of the project, which is currently funded until September 30, 1978 is as follows:

Contract No. csd/3296

Period	Amount
6/30/71 to 6/30/73	$410,000.00
6/30/73 to 1/31/74	95,000.00
1/31/74 to 3/31/74	20,000.00
3/31/74 to 12/31/74	168,586.00
Additional Supplement	55,414.00
Additional Supplement	5,414.51

Contract No. ta/c/1195

Period	Amount
3/1/75 to 12/31/75	$283,000.00
1/1/76 to 10/31/76	310,000.00
11/1/76 to 12/31/76	52,000.00
1/1/77 to 12/31/77	393,399.00
1/1/78 to 9/30/78	365,098.00
TOTAL	$2,157,911.51

There have been three special assignments given to the project which were funded by missions as follows:

Bangladesh, 10/75 - 2/76	$78,627.00
Philippines, 9/76 - 10/76	16,148.00
Central America and Panama, 2/78 - 7/78	79,227.00
TOTAL	$174,002.00
Grand Total	$2,331,913.51

Since its inception, the project has been under the direction of Dr. Ray F. Smith, Professor of Entomology, Department of Entomological Sciences, University of California-Berkeley. Dr. Smith has an ad hoc Advisory Group that assists in formulating policy, assigning priorities, and reviewing and assessing project activities. On October 19, 1977, the Group consisted of 24 scientists representing 11 universities, the U.S. Department of Agriculture and AID. The Group meets several times per year.

2. ACCOMPLISHMENTS

In order to give the reader a concise picture of the scope and diversity of the project we are briefly listing its many activities below. More details concerning each activity are recorded under the following outline in Annex A.

a. Pesticide manual (pg. 1, Annex A).
b. Pest and pesticide surveys in 35 countries (pg. 1, Annex A).
c. Special surveys (pg. 2, Annex A).

(1) Pest and pesticide management in South Vietnam
(2) Pesticide use in Pakistan
(3) Plant protection in Bangladesh
(4) Tropical fruit flies in Central America and Panama
(5) International survey on selected pesticide problems

d. Special reports (pg. 3, Annex A).

(1) List of references on plant protection
(2) Rice losses to pests
(3) Information systems for methods of pest control
(4) Agromedical approach to pesticide management
(5) Acronym list
(6) Pest management colloquium in Egypt
(7) List of international conferences related to pest management

e. Seminars, workshops and conferences (pg. 4, Annex A).

(1) Seminar on pesticide and environmental management in El Salvador.

(2) Seminar, workshop and training program on pesticide management in Indonesia
(3) Conference on managing crop pests in the Sahel
(4) Seminar and workshop on pesticide management in the Philippines
(5) International research bacterial wilt conference
(6) Seminar and workshop on pesticide management in Egypt
(7) Seminar and workshop on pesticide management in Guatemala (terminated because of an earthquake).
(8) Seminar and workshop on pesticide management in Colombia
(9) Pest management training workshop for LDC entomologists

f. Quality control program for pesticide analytical laboratories in the LDCs (pg. 6, Annex A)

g. Other special projects and activities (pg. 6, Annex A).

(1) Crop pest management in the Sudan
(2) FAO consultation on integrated pest control in rice in South and Southeast Asia
(3) Planning for integrated pest management workshop in Peru
(4) Participation in a training course on integrated pest management in Peru
(5) Colloquium on bird control
(6) Meeting of the Inter-African Phytosanitary Council in Ghana
(7) Planning trip to Senegal and Nigeria on pesticide management workshop
(8) Meeting on international standardization of pesticide registration requirements in Rome
(9) Trip to Colombia to review the pesticide handling program
(10) Trip to Peru to study viral diseases of citrus
(11) Workshop on pesticide and pest management in Thailand
(12) Study of potential pest management strategies in Haiti
(13) International plant protection library
(14) Pest management newsletter
(15) Participation in other international meetings

h. List of progress and annual reports (pg. 8, Annex A)

i. List of project publications (pg. 8, Annex a).

3. CRITIQUE AND RECOMMENDATIONS

Pursuant to the scope of work and terms of reference directed to the Evaluation Team, this Critique and Recommendation section of the report is organized according to Paragraphs 4, 5, 6, 7, 8, and 9 of the scope of work and terms of reference of the teams (Annex C).

4. ASSESSMENT OF PROJECT

a. Project design, goals, and purpose

As indicated in the Project Paper and noted in Section 1. of this report, the purpose of the project is to provide developing countries with assistance in devising and implementing sound and economically valid integrated pest management systems for the control of agricultural pests and diseases. The two goals of the project are: (a) to reduce losses of agricultural crops caused by plant pests and diseases and (b) to improve the ecological conditions caused by efforts to eradicate or reduce causes for such crop losses. The populations of developing countries are literally exploding, and the requirements for food are similarly increasing. Most LDCs have limited technology in pest management, and only a few have programs in pesticide management. Further, those that do have pesticide management programs are literally in their infancy when compared to the programs in the more developed countries of the world. Such programs are frequently ineffective or only partially effective because of lack of information and properly trained scientific and administrative personnel, as well as problems related to political and economic stability. So, we agree that the purpose and goals of the project are appropriate to the needs of developing countries. The project design and its implementation are directed toward assisting LDCs in overcoming the lack of information and trained personnel.

Hence, we see no reason for changing the purpose and goals of the project.

b. Planned results of the project.

We feel that the planned results of the project, i.e., the accomplishment of the nine objectives set forth in the Project Paper, are realistic. The project is being implemented (outputs) in such a way that the probability of accomplishing the objectives is good.

c. Assumptions in relation to the anticipated E.O.P. status.

Below we discuss the assumptions for achieving outputs as indicated on the Project Design Summary Logical Framework.

(1) Problems defined and priorities estimated.

As AID assistance through the project proceeds in an LDC a cadre trained scientists, technicians and administrators will develop. It is this group of people, with some continued project assistance, who will define the nations problems (in this case, problems in pest and pesticide management) and determine which ones are the most important. For example, in a rice-oriented country like Indonesia a realistic pest management program on rice would likely have one of the highest priorities. Similarly, in a "corn and beans" country in Latin America, pest problems in these crops would have high priority. The project will "lead" the nation's leaders toward such decisions, and, of course, assist in planning and implementing the programs.

(2) AID funding to implement recommendations.

As indicated in the assumption above, AID funding through the project will make it possible to implement recommendations. We are confident that the pest management specialists "on the ground", as we have suggested elsewhere in this report, is a logical way to follow through with programs to the ultimate user, the small farmer.

(3) Maintainance of effective liaison with multilateral organizations to support and utilize contract outputs.

We visualize a coalition of in-country and international (such as FAO, CIAT, CIMMYT) groups having involvement in planning and implementing pest management programs in LDCs. The primary in-country organizations will be the ministries of agriculture (the combined efforts of research, extension and regulatory arms) and health and the universities. One would expect the local pest management specialist to assist these organizations as they proceed with implementation of country-wide programs. The project leadership, as well as in-country leaders, will maintain liaison with international research and other organizations, changing and improving plans and implementation technology as appropriate.

It seems to us, as an Evaluation Team, that these assumptions are logical, realistic and possible. We re-state, however, that progress toward the realization of these EOP assumptions is contingent and proportional to the amount of effort that will be put forth by AID.

5. EVALUATION OF THE SCOPE OF WORK OF THE PROJECT

a. Project design. The adequacy and correctness of the project design or methodology to include:

(1) Training provided to LDCs -

(a) Should the training component be expanded or is present level of effort adequate?

The degree and quality of training provided to LDCs by the project with its current resources appear to be reasonable and appropriate within the budget imposed. The several seminar/workshops organized, coordinated and implemented by the project have constituted a significant beginning in training approaches. The needs are great for continuing and expanding training efforts to every appropriate LDC in which AID has an interest. To do so will require additional resources appropriately allocated over a minimum five-year period.

(b) Has the type and level of training provided been adequate or should it be changed for a different targeted audience?

Project activities to date have been helpful in improving the competency in pest and pesticide management in a cadre of scientific, technical and administrative personnel in a limited number of countries. We believe this approach is an essential first step and that this type and level of training should be continued and expanded to other countries. However, we do not believe that these activities by themselves are sufficient. They should be supplemented by short-term training and updates, such as is now being conducted for the first time in Peru.

In the countries where the upper echelon of personnel have had training and desire to implement effective country-wide programs, we suggest an expansion of design to implement effective country-wide programs we suggest an expansion of design and efforts by the project to assist those countries in an implementation process that would result in the use of appropriate technology at the production level. A next logical step in accomplishing this objective would be the assignment of trained pest management specialists to individual countries and/or regions. As a preliminary step toward the efficient and effective implementation of this procedure, it might be in order to provide appropriate familiarization with pest and pesticide management for AID mission and host country personnel concerned with pest and pesticide management systems. This will provide missions with information on integrating pest management with their current assistance programs in agriculture and health.

(2) Technical assistance (TA) to LDC -

(a) Should contractor's effort in this area be expanded?

Technical assistance to LDCs striving to develop and implement effective programs in pest and pesticide management is essential. Even if a more advanced LDC in pest and pesticide management, such as Costa Rica, had a currently effective and efficient country-wide program, which it does not, it would quickly find itself with problems. Pest management, including the proper and safe use of pesticides , is a rapidly evolving science. Even in the U.S., there are differing views of good pest management and impacts on the environment of the use of some pesticidal chemicals. There is extensive research and development by the pesticide chemical industry, world-wide, on the manipulation of synthetic molecules for pesticidal effects. New products are constantly being evaluated for potential marketing. LDCs are often the trial ground for many such products because regulations on use are largely inadequate, non-existent or not enforced. The result is frequently ineffective, produces unacceptable residues, poisonings of people and domestic animals and as yet, undetermined environmental impacts. The first EOP condition indicated in the Project Design Summary Logical Framework is that LDCs will have the capacity to analyze and manage many pest problems but will still require some technical assistance. A constant flow of technical

assistance from knowledgeable scientists must continue at least until the above indicated EOP condition is reached. In reality it should continue until the LDCs reach a reasonable state of self-sufficiency.

Thus, the project should expand its technical assistance activity to all LDCs in which AID has an interest.

(b) What percentage of TA effort was initiated upon requests from the USAIDs and Regional Bureaus? What should be done to generate more requests for assistance from the field?

We estimate that approximately 20 percent of project technical assistance was initiated upon requests from AID missions and regional bureaus. We suspect that most of that came indirectly by referral from the AID/W project manager because many missions and bureaus are unacquainted with the service the project could provide. More requests for technical assistance would surely flow from missions and bureaus if they were fully aware of the potential service from the project. We suggest that an in-house AID awareness program, such as would result from our suggestion in para. 5.a.(1) (b) above about familiarization of mission personnel would substantially increase requests for technical assistance.

(3) Limit contractor to insects only

We think there are several important reasons why the total pest and pesticide management contract should remain with the current contractor. While several other universities have good international programs and excellent scientists in the related fields, the University of California is probably the largest and best know, world-wide. It has demonstrated its resolve in international programs, and the project leadership has been effectively established. The project leadership has developed an informal arrangement with several other leading universities that permits it to draw on their scientific expertise. In this respect, the Evaluation Team recommends that the project involve other scientists from other universities to keep the program vital and open to new views and ideas.

Pest management, including proper management of pesticides, is effective only if it involves an amalgamation of all relevant disciplines. This includes not only entomology but also plant pathology, nematology, weed science, vertebrate pest management, and occasionally other disciplines. Further, pest management is only fully effective if it is integrated with all ~~other aspects of crop~~ production, such as varietal selection, crop rotation, fertilization, irrigation, etc. Thus, if one contractor had entomology, another had plant pathology, etc., it would be essentially impossible to administer a coordinated program of assistance to LDCs.

(4) Status of the research components

The project, of course, does not do research per se with its own personnel. One or two small research activities have been supported with project funds, such as the one on protection clothing at the University of Miami.

The project does provide training for scientific and technical personnel in LDCs that leads them into research applicable to their own needs. The pest management training workshop for entomologists conducted by Cornell and North Carolina State Universities in 1976 is an example. Most of the participants were involved in research programs in their home countries. They actually witnessed much research technology in the U.S. during the training workshop.

Project participation in U.S. and international research discussions and planning has contributed to some coordinated research activity. Frequently, consultant visits may lead to in-country research programs, such as suggested by Dr. Wallace on citrus virus diseases in Peru or Dr. Smith on developing a knowledge base for implementing control strategies in Haiti. The ad hoc advisory groups has been looking at areas of needed research, and some were suggested in the survey reports from studies made in LDCs early in the project. In fact, about five areas of needed research have been identified for AID. The only one that has been funded is the Meloidogyne project at North Carolina State.

Further indications of research needs are provided by the high priority accorded to crop protection by BIFAD and FAO/UNEP efforts to establish a global pest management program.

(5) Effectiveness of participation in international conferences

While research and development in pest management by the U.S. scientific community is more extensive then that in any other country in the world, we do not have a monopoly on such activity. Leading U.S. scientists have known this for a long time. In fact, this fundamental point is why the U.S. scientific community is supportive of international scientific conferences, such as the XV International Congress of Entomology which was held in Washington, D.C. in 1976. Hence, one important reason for project participation in international meetings is to learn about the many activities taking place in other parts of the world. Conversely, the participation of U.S. scientists in international meetings also lets the rest of the world know what is being accomplished here. Thus, international meetings keep project personnel up to date on developments and needs in pest management wherever they occur.

There is an increasing amount of participation in international meetings and conferences by representatives from the LDCs. Project personnel get to know these people and their capabilities at such meetings. This is helpful as AID works through the project to develop improved pest management in the LDCs.

The presence and participation of project people (known as UC/AID representatives) in the international theatre of science, witnessed by representatives from the LDCs, demonstrates leadership in integrated pest management which strengthens the potential role for U.S. ideas and procedures such as AID pesticide policy as perceived by the LDCs.

Further, but nevertheless directly related to the transfer of technology to the developing world, other international efforts, such as FAO, depend heavily on U.S. involvement and participation. This is reflected by the frequent involvement of project personnel in FAO panels and other activities.

We note that the project has made judicious decisions about which international conferences it attends. It is virtually impossible, and, we feel quite inappropriate for project personnel to attend all such conferences. We recommend that the project management continue to carefully select and participate only in those conferences that are most related to AID purposes.

We conclude, therefore, that attendance and participation by project personnel is meaningful and desirable for the proper transfer of technology to the LDCs.

b. External Factors.

Major external factors which have had or will have an impact on the project, including technical and scientific factors, cooperating U.S. and LDC institutions, and host government priorities, etc. The validity of the assumptions for obtaining the Goal, Purpose, and Outputs.

The AID policy on pesticide support, the ultimate formation of which was contributed to by the project through its assistance in the preparation of AID's Environmental Impact Statement on its Pest Management Program, has had an important impact on the project. It was instrumental in changing the thrust of the project toward the integration of pest control technologies in place of heavy reliance on pesticidal chemicals. In addition, the new regulations and the accompanying pesticide policy require the preparation of risk/benefit analyses of all pesticide uses proposed by missions, analyses which can only be prepared in most instances with the assistance of project personnel.

There is an increasing world-wide awareness of problems associated with chemically oriented pest control. While the U.S., and especially project personnel, recognize the importance of reducing dependence on pesticides, the concept is also developing internationally. Thus, AID and project personnel are also influenced by this increasing awareness. The temptation of LDCs to use what appears to be immediate solutions to long-time problems, i.e., dependence on pesticides for pest control, is great. This pressure for immediate solutions is lessened by training and technical assistance by project leadership.

Increasing demand for more food of increased quality has a significant impact on project activities. The need for more food to feed rapidly increasing populations in LDCs, together with the preservation of non-renewable resources urgently requires that more effective pest management programs be implemented. Therefore, the goal and purposes assumed at the outset of the project are even more valid now. Increased project output toward their realization should be an immediate priority.

c. Inputs.

Timeliness of delivery of contractor inputs (technical, training and/or information services) and project supporting activities; effectiveness of the inputs in achieving the planned outputs; whether the technical and/or managerial experience with the inputs, level of effort and/or assumptions indicates the necessity for any changes in project design or funding of inputs to facilitate achievement of output targets.

As indicated previously relative to the AID policy on pesticides and the growing awareness of problems associated with heavy dependence on pesticides, the timeliness of the thrust toward integrated pest management is right on target.

The project approach of training the technical and administrative personnel in LDCs by seminars and assisting in developing implementation programs in short courses is a logical one. The enthusiasm demonstrated in such countries as Indonesia demonstrates this. Insofar as the contractor has input relative to selection of seminar and workshop participants from the LDCs, we suggest efforts should be made to involve new people. This will broaden the base of knowledge in the various countries.

The process of laying the groundwork for and implementing country-wide seminars and workshops should be strengthened and increased, carrying the process to more LDCs. Secondly, in those countries where the groundwork for pest and pesticide management programs has been established, the project should put technically trained pest management specialists in country to lead and assist in implementation at the production level. We envision this approach as being a most effective technical assistance mechanism.

d. Outputs.

Contractor progress in achieving output targets for each category of project activity in the current project design/implementation plan. Analyze costs of outputs. Comment on significant technology and management experiences. Analyze the effectiveness of the project outputs to achieve the project purposes. Does experience indicate any changes in the output targets or relationships to facilitate the achievement of project purpose(s)?

Discussions under this topic are organized according to outputs indicated on the Project Design Summary Logical Framework.

(1) Reports on selected countries

Multidisciplinary teams made surveys of pest problems, pest control and pesticide handling problems in some 35 countries early in the history of the project. A summary of recommendations from these survey reports subsequently led to recommendations to AID for five coordinated research projects. Subsequently there were studies made in South Vietnam, Pakistan, Bangladesh, Central America and Panama, as well as Egypt and Haiti. Recommendations resulted from each of these studies, particularly for in-country action but which, of course, is or will be reflected in AID programs.

(2) Manuals on pesticide use and procurement

Development and publication of a Pesticide Manual was an early accomplishment of the previous project. The manual provides extensive information on 35 of the most widely used pesticides, their safe handling and use, and specifications that set forth reliable quality standards that assure that pesticides are suitable for the purposes for which they are used. While the AID policy on pesticides reduce the significance of pesticides in AID pest management programs, the manual will continue to be useful as a handbook and guide on pesticides until more appropriate methods are found.

(3) Training seminars and workshops

Seminars and workshops have been held in El Salvador, Indonesia, the Philippines, Egypt, Guatemala, and Colombia. There has been participation in several other seminars and workshops by project personnel as well. As explained in 5 (b) above, these seminars and workshops were useful and should be offered in other countries but we also suggest an expansion of technical assistance by providing in-country pest management specialists to provide for specific, in-depth, in-country pest management program implementation.

We would suggest to the project leadership that perhaps some greater attention might be given to control of vertebrate pests in a total pest management program. AID has an extensive involvement in research and technical assistance in rodent control with the Wildlife Research Center in Denver. When reference is made to vertebrate control by the project, this involvement should be acknowledged. In Latin America, in particular, these two projects should interface.

(4) Technical advice and assistance to LDCs

Some advice and assistance has been given to LDCs in connection with the seminars and workshops. Several consultant trips have been made to LDCs, such as the tropical fruit fly program in Central

America and Panama, Dr. Gress to Senegal and Nigeria and Dr. Wallace to Peru. Of particular significance to entomologists from the LDCs was the pest management training course conducted by Cornell and N.C. State for 25 representatives from 15 countries as a part of project activities.

(5) Linkages with LDC scientists and institutions

The linkages established by the project with LDC scientists and institutions comprise and extensive list. In the countries where seminar/workshops have been held there have been tie-ins with the ministries of agriculture and health as well as one or more of the more prominent universities. Similarly, in countries where surveys have been made or consultants sent, relationships were established with the ministries of agriculture and university scientists.

The project also maintains liaison with several international research centers, such as CIAT (Centro Internacional de Agricultura Tropical) and CIMMYT (Centro Internacional de Mejoramiento de Maiz y Trigo), and the related consultative group, CGIAR (Consultative Group for International Agricultural Research).

The AID missions have played an important role in helping contractor personnel make such contacts. Each time contractor personnel attend an international conference it provides opportunities for additional contacts with scientists and/or administrators from LDCs.

The Pest Management News, currently distributed to some 2,500 organizations and people is another way that the project maintains linkages, as well as to provide information on training in pest management. The proposal to publish the newsletter in Spanish will be helpful. The project might consider the publication of a different, less sophisticated organ to promulgate information on managing specific pests. On the other hand, such information might best be made country specific and distributed through in-country publications by cooperative effort of the resident pest management specialist and the local government.

Perhaps a short article on what the project can do for AID missions, including information on the Miami lab, would be helpful in the Pest Management News. We suggest a constant effort to keep the distribution list up to date.

(6) Upgrade quality control of pesticide analyses

This output consists of the quality control and improvement program in pesticide analysis currently being carried out under subcontract with the University of Miami. This program involves 46 laboratories in 18 LDCs. The approaches used are logical and appropriate. Discussions are given in the in-country seminar/workshops, during which in some cases there has been actual training of LDC chemists. Other LDC chemists come directly to the laboratory in Miami for training.

The laboratory routinely sends unknown samples to LDC labs for analysis. The reports are assembled, coded, and returned to all cooperators. This gives them no indication of their quality of work. This system also provides the Miami lab the opportunity to assist some labs by correspondence. Also, the Miami lab may send an analyst directly to a country to assist their technicians.

We are concerned about the appropriateness for some LDC laboratories of the highly sophisticated technology for determining minute pesticide residues that is employed in the Miami facility. Perhaps some less demanding procedures and less sophisticated equipment would be more appropriate for countries just starting in analytical work.

The University of Miami program may not be as well understood by the missions as it should be. Perhaps some effort should be made to inform the missions of this part of the project and how it can be used by LDCs.

In summary, we conclude that reasonable and satisfactory outputs have been made to achieve the project purposes. We suggest an increase in project resources and a conscious effort to increase the awareness of missions on the significance of pest and pesticide management.

e. Purpose.

List progress made to date toward each planned end-of-project (EOPS) condition, using a table format, if appropriate. Are the EOPs' conditions in the Project Paper still considered a good description of what should exist when the project purpose is achieved? Discuss causes of any shortfalls, e.g., causal linkage between outputs and inputs, external, factors, etc.

Below we discuss each end-of-project condition set forth in the Project Design Summary Logical Framework.

(1) LDC capability is to analyze and manage pest problems

We see the project moving some LDCs toward this EOP condition, particularly where the greatest inputs have occurred, namely those that have had seminar/workshops with some follow-up. El Salvador and Egypt might be good examples. On the other hand, countries such as Chad, Niger, and Mauritius have only begun.

(2) Environmental monitoring teams trained and functioning

Our comments about this EOP condition are essentially the same as the one above. When one considers the difficulties that a developed country like the U.S. has in implementing a good monitoring program, it is obvious that LDCs will experience the same. A determined effort will be required by LDCs, as well as extensive project technical assistance, to effect this desirable EOP condition. However, progress has been made in

those countries where the greatest project effort has occurred.

(3) LDCs aware of need for integrated management systems

By virtue of the AID policy on pesticides, which is continuously reflected by project personnel, we are confident that every LDC that has been touched by the project has some awareness of the necessity for integrated pest management systems. The extent of awareness is probably directly related to the efforts (outputs) of the project in each LDC.

(4) Multidisciplinary teams trained in pest and pesticide management

As in EOP 1 and 2 above, and reflected in the outputs discussed previously, satisfactory progress has been made toward this condition in those countries where seminar/workshops have been held. Others are, as yet, far away from such a situation.

Conclusively, we agree that these EOP conditions are good and desirable ones for LDCs. The scope of effort required to achieve these conditions in some 35 LDCs is tremendous. Increased project effort, which can be achieved with increased resources, is indicated as a requirement for reaching these EOP conditions.

f. Goal.

List the project goal and describe status of achieving that goal by citing evidence available to date from specified indicators, and by mentioning progress of other contributory projects, if appropriate. If the progress toward achieving the goal is not satisfactory, explore the reasons; e.g., proposal inadequate for hypothesized impact, new external facts affecting the purpose-goal linkage.

The program or sector goal set forth in the Project Design Summary Logical Framework is to increase the quality and quantity of food for the rural poor in the LDCs by reducing the loss caused by diseases and insects. This program goal involves what may be designated as two subgoals: (a) to reduce losses of agricultural crops caused by pests and diseases, and (b) to improve the ecological conditions caused by efforts to eradicate or reduce causes for such crop losses.

While changes in the quality and quantity of food crops in the LDCs is difficult to assess, we know that the changes are likely to be proportional to the extent and use of pest management technology at the production level. The extent and use of such technology is directly dependent on the efforts of governments to aid and educate the agricultural producer. The efforts of government to do this are dependent on the competency, awareness, resources and determination of its scientists, technicians and administrators. It is at this sector of LDC society that the project is having its impact, which, as we indicated previously, is

essentially proportional to project effort in the individual countries.

Progress has been made toward these goals, and we believe the approach is logical. The movement of such countries as Egypt, Philippines, El Salvador and Haiti are good examples. The road to self-sufficiency is very long for the least developed of the LDCs. Progress will continue to be proportional to the effort we expend. Here, we must again emphasize our earlier suggestion on the importance of increased technical assistance in the form of in-country pest management specialists from the project and/or the missions. Such personnel can help to implement pest management at the epitome of application, the producer level.

g. Beneficiaries.

Identify direct and indirect beneficiaries of this project and nature of benefits. Describe any field experience involving intended beneficiaries and likelihood of results being utilized by LDCs.

The direct beneficiaries of project efforts are the scientists, technicians and administrators of the LDCs. Their benefits are the training in pest and pesticide management and strategies for implementing programs in their own countries. We visualize this benefit to the cadre of scientists, technicians and administrators as a necessary and required step in providing the benefits of improved pest and pesticide management to the producers and the ultimate consumer. The benefit to the producer and consumer might be designated as indirect.

h. Unplanned effects.

Has the project produced any unexpected results or effects? Are there any implications which would require any change in project design or execution?

There have been no unexpected results or effects from the project.

6. ISSUES CONSIDERED BY THE EVALUATION TEAM

a. Level of funding

The current level of funding ($365,098 for 9 months), with minimal funding built in for ad hoc response capabilities to bureaus and missions, is $486,972 per year.

The team recommends a 10 percent increase of this annual funding level to cover the need for employing a person experienced in international work as an understudy for the Project Director and to cover inflation ($50,000). The subcontract at the University of Miami needs a strengthened capacity ($40,000). The project needs improved funding for the seminar/workshops ($100,000) and for the short courses ($50,000). The team also

recommend that the project employ six in-country/regional pest management specialists ($600,000). Based on previous experience and anticipated increased ad hoc assistance to bureaus and missions, funds should be put into the budget for this purpose ($175,000).

Thus, the recommendations for annual funding are as follows:

Item	Amount
Current level	$486,792
Increase for management	50,000
Increase for sub-contract	40,000
Increase for seminar/workshops	100,000
Increase for short courses	50,000
Pest management specialists	600,000
For ad hoc responses	175,000
TOTAL	$1,501,792

The AID policy on pesticides, has put increased emphasis on providing information and strategies for implementing integrated pest management programs in the LDCs. This proposed budget will provide the contractor with a modest increase in resources for implementing a good program toward this objective. Therefore, the Project Paper should be revised to incorporate this improved budget.

b. Need for training in pesticide analysis

Pesticides will remain a significant component of pest management programs for the foreseeable future. For proper pesticide management activities it is essential to have the capability to determine what pesticide (s) are present and in what amounts in various substrates. For the protection of the pesticide user a regulatory agency must be prepared to determine if a commercial formulation is unadulterated and that it contains the amount of active ingredient indicated on the label. For consumers and for commerce, a regulatory agency must be prepared to measure pesticide residues on foods and feeds. For environmental monitoring, governments must be prepared to continuously measure the amounts of pesticides and/or their metabolites in water, air, soil, humans, plants and animals. Thus, it is essential for governments of LDCs to have the capability for pesticide analysis.

Pesticide analysis is essentially a chemical process, and in some cases, a highly sophisticated one. Training by competent chemists is essential for technicians to learn sophisticated pesticide analyses.

Pesticide analysis training has been done for the project under subcontract with the University of Miami. Dr. John Davies, the Director of the subcontract at Miami is widely known for his work in pesticide analysis, and he works closely with project management. If this arrangement is continued with the University of Miami, some additional funding is

needed to enhance the program. This is indicated in our budget recommendations.

c. Need for IQCs

It appears logical to the Evaluation Team that bureaus and missions should have the flexibility to fund their needs if an when funds in the contract for this purpose have been exhausted. The use of IQCs appears to be a reasonable way to do it.

d. Priorities for pesticide and pest management training activities

As indicated above, pesticides are an integral and significant component of pest management programs. Procurement, formulation, distribution, storage, proper application and safe use, disposal, analysis and environmental impact are all involved in pesticide management. Thus, pesticide management activities are so inextricably entwined with pest management that one can hardly have priority over the other. If there is pest management, there must be pesticide management.

The project management is currently devoting about 25 percent of its operating budget to readily identifiable pesticide management activities (such as the University of Miami contract). Unidentifiable portions are involved in seminars/workshops and other activities. Our proposed budget for future contract operations would be in about the same proportion of the budget exclusive of the costs for pest management specialists and ad hoc activities with bureaus and missions.

7. FORMAT FOR THE EVALUATION REPORT

The Project Evaluation Summary (PES) format has been used for reporting the results of the evaluation and this narrative report has been attached thereto as Annex B.

8. ADDITIONAL INFORMATION

Describe the methods used for conducting the evaluation, including the design, scope of work, cost, techniques of collecting additional data and the analysis made. Indicate what changes were made in the evaluation plan made while the evaluation was taking place.

The Evaluation Team (Eden, Hankins, Erikson, Hinkle, Lateef and Whittle) plus Project Manager Whittemore traveled to the University of California-Berkeley on May 14. We spent May 15 and 16 with Dr. Ray F. Smith, Project Director, and members of his staff. Dr. Smith gave a complete history of the project and activities carried out since the project began. He provided the team with complete sets of documents, showed us the library and answered numerous questions.

We spend May 17 in travel to Miami and in evening conference with Dr. Davies and his staff. May 18 was spent with Dr. Davies and staff

and in travel to Washington, Dr. Davies and his staff provided background on the subcontract, described activities, and showed us the facilities.

The Team met on May 19 in Washington for preliminary discussions and made plans for the preparation of a draft of the report. Dr. Eden worked from May 19 to May 26 in the preparation of a first draft, consulting with various members of the team and the project manager in the interim. The team met on May 26 for discussion of the draft. Dr. Eden then returned to Dell City, Alabama, to revise the report according to the team discussions. A revised draft was returned to the Project Manager on June 3. The draft report was passed to the other members of the team for final review. The final draft was then typed and passed to the team for signature.

9. LESSONS LEARNED

What advice can the team give about the development strategy; e.g., how to tackle a similar research and development problem or to manage similar project activities? What can be suggested for follow-on activities to utilize project results in LDCs? Does the team have any suggestions about evaluation methodology?

Projects of this nature obviously have application in all LDCs and probably are best centrally funded for the most part. We deduce that there is a need and desire for greater involvement of bureaus and missions in the development of broadly applicable projects. AID/W should devise some method of meeting this need in developing future projects.

There is a need for closer coordination of project activities with missions in recipient countries. In those cases where there has been close coordination and cooperation with the missions, such as with the seminars/workshops in Indonesia and the Philippines, the activities appear to have been more effective.

The proposed use of in-country/regional pest management specialists would be a good follow-on technique to utilize project activities in the LDCs. An ultimately shared funding responsibility with missions for such personnel might be desirable.

Appropriate team composition for evaluations is important. The participation of the project manager and bureau representatives is essential for outside consultants to adequately comprehend project operations and impacts and a representative from the mission would be helpful. An additional dimension that could add to evaluation of project impact would be a short visit by some team members to one or two recipient countries.

Attachment 1

DETAILED SUMMARY OF PROJECT ACTIVITIES

a. Pesticide Manual. The project supervised the preparation of a pesticide manual for use by A.I.D. in planning and executing well-designed pesticide programs for LDCs. The project, which contracted the preparation of the manual to a consulting firm, provided the outline for the manual, supervised its preparation, reviewed the draft, and furnished important data and references. The Pesticide Manual consists of three parts: I - Safe Handling and Use of Pesticides; II - Basic Information on Thirty-five Pesticide Chemicals; and III - Specifications. The manual was published in 1972 in two volumes totaling 609 pages. One chapter in Part I on handling, transportation, and storage of pesticides was revised and re-published in 1976 (See Project Publications 1, 2, and 3).

b. Pest and pesticide surveys. An early activity of the project was a survey for the identification and evaluation of pest problems that were having significant impact on food production in the LDCs. The survey also included an evaluation of pest control and pesticide handling practices in these countries. In 1972 the project organized six multi-disciplinary teams, each consisting of an entomologist, a plant pathologist, a nematologist, and a weed scientist. The teams were dispatched to the following regions and countries:

East Asia:

Philippines	Hong Kong
Thailand	Singapore
Malaysia	Japan
Taiwan	

Near East/Asia:

Turkey	Afghanistan
Iran	Pakistan

Near East/Mediterranean:

Jordan	Spain
Lebanon	Portugal
Tunisia	

Africa:

Senegal	Nigeria
Niger	Kenya
Mali	Tanzania
Ghana	Ethiopia

Central America:

Guatemala	Costa Rica
Honduras	Panama
Nicaragua	Guyana

South America:

Brazil — Bolivia
Uruguay — Ecuador
Dominican Republic

The Central and South America Teams were preceded by a two-man pilot study team which made a preliminary study of the situation in these regions. The South American team also included a pesticide specialist.

Upon completion of these surveys, each team prepared a report recording the principal pest problems on the major crops in each country, the effectiveness of current control operations, a description of the pesticide regulation and handling (management) and the actual or potential problems relating to the pesticide management situation in each country (See Project Publications as follows: East Asia, 4; Near East/Asia, 5; Near East/Mediterranean, 6; Africa, 7; Central America, 8; South America, 9. The report of the two-man team preliminary study in Latin America is given in Project Publication 10. An overall report of the situation on weeds, a summary from the six team reports, is given in Project Publication 11).

c. Special surveys.

(1) Pest and pesticide management in Vietnam. A special study on pest and pesticide management in South Vietnam was made by Dr. B.E. Day in 1974. The results of his study are presented in Project Publication 12.

(2) Pesticide use in Pakistan. A three-man project team made a study of pesticide use in Pakistan in 1974 at the request of the Government of Pakistan. Results of the study and recommendations are given in Project Publication 13.

(3) Plant protection in Bangladesh. In 1975, at the request of the Government of Bangladesh, a special five-man multidisciplinary team made a study of plant protection in that country. Results of the study and recommendations from the team are given in Project Publication 14.

(4) Tropical fruit flies in Central America and Panama. A seven-member team of scientists made an on-site investigation and evaluation of tropical fruit flies on the production and economy of Central American countries and Panama. The study was conducted in 1977. The multidisciplinary team reflected expertise in fruit fly ecology, biological control, mass rearing of parasites, and fruit flies, chemical control, agricultural economics, and plant quarantine. The results of the investigation and the team recommendations are given in Project Publication 15.

(5) International survey on selected pesticide problems. A five-member panel on pesticides conducted a mail survey on selected pesticide problem areas. A questionnaire consisting of nine general questions was sent to 54 organizations or individuals on a worldwide basis. Good response (40 percent) was received from the request. The results of the

survey are presented in Project Publication 16.

d. Special reports.

(1) List of references on plant protection. In 1974, the project prepared a list of reference books in the plant protection sciences. The list of books, published in English, included those considered to be an important part of a plant protection laboratory, particularly where a facility may be isolated from a major laboratory. It includes publications in entomology, plant pathology, nematology, weed science, and vertebrate pests. The publication is Number 17 in the attached list of Project Publications.

(2) Rice losses to pests. In 1975, the project made a study of the scientific literature on losses to rice from various pests. The purpose was to present some representative loss data from some of the more important rice-growing regions and for some of the more significant pests to call attention to the need for effective crop protection schemes. The 64-page report is Number 18 in the attached list of Project Publications.

(3) Information systems for methods of pest control. In 1976, the project published a report on information systems for alternative methods of pest control. It synthesizes the current status of information systems science, computer science, and biological sciences involved in crop protection and pest management. The report was presented at the FAO/UNEP Consultation on Pest Management Systems for the Control of Cotton Pests in Karachi, Pakistan, in 1975. The report is listed as Number 19 in the attached list of project publications.

(4) Agromedical approach to pesticide management. As the Project has proceeded through several years of activities, it has become abundantly clear that effective countrywide pesticide management programs must be a joint effort of both the agricultural and medical components of a society. The approach and suggestions on how to accomplish such a program were put together in a manual published in 1976. It is referenced as Number 20 in the list of project publications.

(5) Acronym list. In the process of dealing with the numerous organizations in the United States and worldwide, the project management has found a long list of acronyms. In order to have the list for ready reference, the project prepared a list of 391 acronyms with the full names of the organizations represented by the acronyms. The list, published in 1977, is indicated as Number 21 in the attached list of project publications.

(6) Pest management colloquium in Egypt. The project sent a six-man team to participate in a pest management colloquium in Egypt on October 25-31, 1975. During this time, the team analyzed the current pest and pesticide management situation in Egypt. The participation of the team in the colloquium laid the groundwork for the subsequent seminar/ workshop in pesticide management which was held in 1977 and noted in a

subsequent part of this appendix. Observations of the team are recorded in project publication Number 22 in the attached list.

(7) List of international conferences relate to pest management. The project has prepared lists of international conferences related to pest management. Such lists are a valuable document to LDC scientists in planning for their participation in such meetings. The latest list, dates April, 1978, notes 110 such conferences spanning the years of 1978 through 1982, inclusively. This list is referenced as Number 23 in the attached list of project publications.

e. Seminars, workshops, and conferences.

(1) Seminar on pesticide and environmental management in El Salvador. During the last decade serious pesticide management problems have occurred as a result of the importation and indiscriminate use of large amounts of agricultural chemicals. The project, cooperatively with the Ministers of Agriculture and Health of El Salvador, the USAID Mission in San Salvador, and the Pan American Health Organization, sponsored a training seminar on "Management of Pesticides and Protection of the Environment" in El Salvador. The seminar, which was held on December 3-7, 1973, drew 88 participants, some of which came from Guatemala, Peru, and Nicaragua. A report of the seminar was published and is listed as Number 24 in the list of project publications.

(2) Seminar, workshop and training in pesticide management in Indonesia. The level of pesticide use in Indonesia was relatively low in 1974, but was expected to increase by 8 times by 1980. That seemed like a propitious time to lay the foundation for improved pesticide management. So, the project cooperatively with the Indonesian government and other agencies held a seminar on pesticide management in Jakarta on July 8-11, 1974; a workshop on July 12-13; and a training program from July 19 to August 3. There 205 registrants for the seminar. The workshop, the purpose of which was to develop plans for implementation of pesticide management programs in the country, involved six working groups of 10-15 people representing the ministries of health, agriculture and manpower, and the pesticide industry. Following the seminar and workshop, a three-week specialized training session in residue analysis was provided for Indonesian chemists, 22 of whom participated. Proceedings of the three activities are documented in the project publication 25 in the attached list.

(3) Conference on managing crop pests in the Sahel. The Sahel governments and members of the donor community to these governments are aware of the limitations in these countries to manage pests of annual crops. The project held a Sahel Crop Pest Management Conference in Washington to obtain a consensus among the interested donor agencies and African technicians as to a feasible approach to the solution of the problem. The conference was held on December 11-12, 1974. It involved 32 scientists and administrators from the United States, Senegal, England, Mexico, Mali, Italy, Canada, France, and Chad. Proceedings by the con-

ference and its conclusions are documented in project publication referenced as Number 26 in the attached list. The results of this conference led directly to the development of the Regional Food Crop Protection Project in West Africa as well as the Sahel Integrated Pest Management project being executed by FAO with AID funding.

(4) Seminar and workshop on pesticide management in the Philippines. The project, jointly with the Philippine Government and the pesticide industry, conducted a seminar and workshop in pesticide management in Manila on February 10-15, 1975. The seminar covered the basic problems with pesticides and procedures for management; the workshop was devoted to developing a system of pest and pesticide management for the Philippines. The seminar led directly to the enactment of new pesticide legislation by the Government of the Philippines. There were 291 participants. Proceedings of the seminar and workshop are documented in a report listed as Number 27 in the attached list of project publications.

(5) International bacterial wilt research conference. An international conference to assess the status of research and to consider areas for emphasis in future studies of bacterial wilt, caused by Pseudomonas solanacearum, was held at North Carolina State University on July 18-23, 1976. While the project did not conduct the conference, it did participate by providing funds to North Carolina State to assist in defraying the costs of holding the conference. Fifty-three people representing 23 countries participated in the conference. Results of the conference are recorded in publication Number 28.

(6) Seminar and workshop on pesticide management in Egypt. The project, cooperatively with the University of Alexandria, the Ministry of Agriculture of Egypt, and three United Nation agencies conducted a seminar and workshop on pesticide management at the University of Alexandria in Egypt on March 5-10, 1977. The seminar was devoted to information on pesticide management, and the workshop was directed at planning a system for managing pesticides in Egypt. There were 136 participants in the seminar and workshop. The proceedings are recorded in the publication referenced as Number 29 in the attached list.

(7) Seminar and workshop on pesticide management in Guatemala. The project organized and planned a seminar-workshop on pesticide management in Guatemala on February 2-4, 1976. However, it had to be terminated because of an earthquake that caused widespread damage. The activity is documented in project publication Number 30.

(8) Seminar and workshop on pesticide management in Colombia. A seminar-workshop on pesticide management was organized and conducted by the project in Colombia on February 13-17, 1978. The report from this activity has not been published.

(9) Pest management training workshop for LDC entomologists. A pest management training workshop for entomologists from LDCs, sponsored by the project, was conducted by Cornell and North Carolina State universities from July 18 to August 27, 1976. The workshop included extensive

lectures and demonstrations on insect pest management technology, travel through the agricultural areas of several states and attendance at the XV International Congress of Entomology in Washington, D.C. The workshop was attended by 25 entomologists from 15 LDCs. The proceedings of the workshop are given in project publication Number 31.

f. Quality control program for pesticide analytical laboratories in LDCs

In 1975 the project, through its subcontract with the University of Miami (Florida), initiated a quality control program for pesticide analytical laboratories in developing countries for the purpose of measuring the overall performance of each participating laboratory and determining any specific training needs that would be required to upgrade and standardize their performance. At present there are 46 laboratories from 18 LDCs involved in the program. As part of this program, specialized training sessions for chemists employed in laboratories in the LDCs have been organized and conducted, either in conjunction with a seminar-workshop in the home country of the trainee or at the University of Miami. In 1977, three separate training sessions were held at the University of Miami for six chemists from Egypt and one from Costa Rica. A training manual to assist personnel in residue analyses was published in 1978 (Reference Number 32 in project publications).

g. Other special project and activities

(1) Symposium on crop pest management in the Sudan in 1978 participated in by Dr. Ray Frisbie, Texas A&M University; documented in a trip report.

(2) FAO Technical consultation on Inter-Country Programme for Integrated Pest Control (IPC) in Rice in South and Southeast Asia, Bangkok, Thailand, in 1978 participated in by Dr. Ray F. Smith; documented in trip report.

(3) Planning for integrated pest management training in Peru. Documented in trip report.

(4) Training course on integrated pest management in Peru. Conducted by Drs. Ray F. Smith, J.L. Apple and others. Documented in a trip report.

(5) Colloquium on bird control attended by Dr. G.R. Maxwell, State University of New York; colloquium sponsored by the European and Mediterranean Plant Protection Organization; documented in trip report.

(6) 13th Meeting of the Inter-African Phytosanitary Council in Accra, Ghana, in 1977. Attended by Dr. D.F. Bateman; documented in a trip report.

(7) Planning trip to Senegal and Nigeria in December, 1977, by Dr. E.H. Glass of Cornell University to discuss the feasibility of holding a pesticide management workshop in West Africa; documented in a trip report.

(8) Ad Hoc Government Consultation on International Standardization of Pesticide Registration Requirements in Rome, October, 1977. Attended by Dr. V.H. Freed, Oregon State University; documented in a trip report.

(9) Trip in October and November, 1977, to Colombia by Dr. J.B. Mann, University of Miami to review the pesticide analyses program; documented in a trip report.

(10) Trip to Peru to study viral diseases of citrus by Dr. J.M. Wallace, University of California-Riverside. Documented in a trip report.

(11) Workshop on pest and pesticide management in Thailand conducted by Dr. David Pimental of Cornell, Dr. Ian Tinsley of Oregon State and Dr. Ray F. Smith. Documented in a trip report.

(12) Study of potential pest management strategies in Haiti by Dr. J.W. Smith of Texas A & M University. Documented in a trip report.

(13) International plant protection library. The project has established an International Plant Protection Library in its headquarters at the University of California, Berkely, It contains documents, reprints, books, and journals dealing with agriculture in developing countries of the world. It contains information on pesticides, plant diseases, pest control, ecology and the environment, the world food situation and related international institutions. Files of clippings are also maintained dealing with various social, political and cultural aspects of many different countries. The library has several thousand documents. It is invaluable in briefing teams for work in the several LDCs.

(14) Pest management news. In September of 1975 the project began to publish a periodical newsletter with the title of Pest Management News. The publication contains articles concerning pest management problems and programs, pesticide management and other items of interest to plant protection specialists throughout the world. The newsletter is currently being sent to about 2,500 people and organizations around the world, 60 per cent of which are international. There have been nine issues published, the last of which was March, 1978. The project is considering an edition in Spanish.

(15) Participation in other international meetings. The Project has attached considerable significance to attendance at various important international meetings and conferences by project staff and consultants. Such activity affords for liaison and contacts to develop between the Project and officials of various international organizations such as FAO, UNDP, etc., that have responsibilities for planning and implementing pest management programs. In 1977, for example, there was project attendance at 13 such international meetings in 10 different countries. Attendance at these meetings are documented in trip reports at Project Headquarters in Berkeley, California.

h. List of progress and annual reports

The Project has prepared progress and/or annual reports as follows:

(1) Anonymous, 1973. Progress Report of the UC/AID Pest Management and Related Environmental Matters Project. July 1, 1971 to January 15, 1973. (Referenced as Project Publication Number 33.)

(2) Anonymous, 1975. Annual Report, UC/AID Pest Management and Related Environmental Protection Project (1974-75). (Referenced as Project Publication Number 34.)

(3) Anonymous, 1976. Annual Report, UC/AID Pest Management and Related Environmental Protection Project (1975-76). (Referenced as project Publication Number 35.)

(4) Anonymous, 1978. Summary of Activities for 1977 of the UC/AID Project in Pest Management and Related Environmental Protection. (Referenced as Project Publication Number 36.)

i. List of project publications

The following list of publications of the Project has been compiled from information and publications provided to the Review Team. The numbers assigned are purely for the convenience of the Review Team.

(1) von Rumker, R., and F. Horay, 1972. Pesticide Manual; Part I: Safe Handling and Use of Pesticides and Part II: Basic Information on 35 Pesticide Chemicals. Department of State and AID Special Manual.

(2) von Rumker, R., and F. Horay, 1972. Pesticide Manual; Part III: Specifications. Department of State and AID Special Manual.

(3) Freed, V., 1976. Pesticide Manual; Part I: Safe Handling and Use of Pesticides (Chapter on Handling, Transportation and Storage of Pesticides - replaces chapter on Department of State and AID Specal Manual.)

(4) Glass, Edward H., et al., 1971. Plant Protection Problems in Southeast Asia. UC/AID/PM Multidisciplinary Study Team Report.

(5) Koehler, C.S., et al, 1972. Plant Protection Turkey, Iran, Afghanistan, Pakistan. UC/AID/PM Multisciplinary Study Team Report.

(6) Cavin, George E. et al., 1972. Crop Protection in the Mediterranean Basin. UC/AID/PM Multidisciplinary Study Team Report.

(7) Sasser, J.N. et al. 1972. Crop Protection in Senegal, Niger, Mali, Ghana, Nigeria, Kenya, Tanzania and Ethiopia. UC/AID/PM Multidisciplinary Study Team Report.

(8) Caltagirone, L.E. et al, 1972. The Crop Protection Situation in Guatemala, Honduras, Nicaragua, Costa Rica, Panama and Guyana. UC/AID/PM Multidisciplinary Study Team Report.

(9) Echandi, Eddie, et al., 1972. Crop Protection in Brazil, Uruguay, Bolivia, Ecuador and Dominican Republic. UC/AID/PM Multidisciplinary Study Team Report.

(10) Apple, J. Lawrence and Ray F. Smith, 1972. A Preliminary Study of Crop Protection Problems in Selected Latin American Countries. UC/AID/PM Preliminary Report.

(11) Zimdahl, R.L. ed., 1973. Weed Science in the Developing Countries of the World. UC/AID/PM Summary Report.

(12) Day, Boysie E., 1972. Pest Management and the Efficient Use and Safe Handling of Pesticides in South Vietnam. UC/AID/PM Special Report.

(13) Yates, W.E., et al., 1974. Analysis of Pesticide Use in Pakistan. UC/AID/PM Multidisciplinary Study Team Report.

(14) Wilcoxson, R.D., et al., 1975. Plant protection in Bangladesh. UC/AID/PM Multidisciplinary Study Team Report.

(15) Mitchell, W.C., et al., 1977. The Mediterranean Fruit Fly and its Economic Impact on Central American Countries and Panama. UC/AID/PM Multidisciplinary Study Team Report.

(16) Davies, John et al., 1972. International Survey on Pesticide Use. UC/AID/PM Panel on Pesticides (out of stock).

(17) Koehler, C.S. and Ray F. Smith, 1974. Reference Books in the Plant Protection Sciences. UC/AID/PM Special Compilation.

(18) Barr, Barbara A., Carlton S. Koehler and Ray F. Smith, 1975. Crop Losses - Rice: Field Losses to Insects, Diseases, Weeds and Other Pests. UC/AID PM Special Report.

(19) Bottrell, D.G., C.B. Huffaker and Ray F. Smith, 1976. Information Systems for Alternative Methods of Pest control; With emphasis on problems and needs of crop protection specialists in developing countries. UC/AID/PM Special Report.

(20) Anonymous, 1976. The Agromedical Approach to Pesticide Management. Compilation of papers presented at previous UC/AID Pesticide Management Seminar/Workshops. (Available in Spanish also.)

(21) Anonymous, 1977. Acronym List of International Organizations Related to Agriculture, Economic Development and Pest Management.

MISSING PAGE NO. 10

(32) Mann, Jon B., 1978. Manual for Training in Pesticide Analysis. University of Miami subcontract with University of California/USAID.

(33) Anonymous, 1973. Progress Report of the UC/AID Pest Management and Related Environmental Matters Project. (July 1, 1977 to January 15, 1973).

(34) Anonymous, 1975. Annual Report, UC/AID Pest Management and Related Environmental Protection Project (1974-75).

(35) Anonymous, 1976. Annual Report, UC/AID Pest Management and Related Protection Project (1975-76).

(36) Anonymous, 1978. Summary of Activities for 1977 of the UC/AID Project in Pest Management and Related Environmental Protection.

(37) Anonymous, 1978. History and Background, UC/AID Project in Pest Management and Related Environmental Protection.

(38) Smith, J.W. and Lionel Richard, 1978. Potential pest management strategies for Haitian agriculture - developing the ecological base.

APPROVED:

_____
W. G. Eden

_____
Allen Hankins

_____
Jim Erikson

_____
Maureen Hinkle

_____
Boyd Whittle

_____
Victor Lateef