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Regional Food Crop Protection (Phase II)

Project 625-0928

PROJECT PAPER

UNCLASSIFIED

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: AFR/DR. <sup>J. W. Koehring</sup> John W. Koehring

SUBJECT: Proposed Project - Regional Food Crop Protection (Phase II)  
625-0928

Problem: Your approval is required to authorize a joint grant of \$1,796,200 from the SH appropriation and \$706,900 from the FN appropriation during FY 1979 to the bilateral countries designated below for the execution of the Regional Food Crop Protection Project (Phase II) (625-0928). Your approval is also required for the proposed life of project funding of \$5,971,300 (SH) and \$2,351,300 (FN) as well as a vehicle waiver described below.

Discussion: (A) The purpose of this project is to encourage and facilitate the extension of integrated pest management (IPM) concepts and techniques to small food crop farmers in the Sahel. This will be accomplished by training agents for, and providing material support to, the various national plant protection services participating in this project. Those countries included in this project are Senegal, Mauritania, Gambia, Cape Verde and Chad in the Sahel and Guinea-Bissau and Cameroon outside the Sahel. The project builds upon an initial phase of activity (Sahel Food Crop Protection Project 625-0916) which was authorized in FY 1975. Project activities are undertaken in response to a request by CILSS to participate in its regional plant protection program and are consistent with the objectives of the various host countries and AID offices to increase food production (by decreasing food losses to pests). The direct beneficiaries of the activities in this project will be the various national plant protection services which will gain a cadre of extension agents trained in IPM techniques as well as material support to undertake active IPM extension campaigns. The ultimate beneficiaries will be the small food crop farmers who will be able to utilize these newly provided IPM techniques to reduce food losses to pests now estimated to run as high as 40% of the yield.

(B) AID funding for this project will be drawn from SH and FN appropriations as detailed in the chart below to support those activities which are specifically Sahelian and those falling outside the Sahel. FY 1979 funding requirements are projected to total \$2,503,100, with life-of-project requirements totalling \$8,322,600.

(\$000)

	<u>FY 79 First Year</u>	<u>LOP FY 79-81</u>
Commodities	566.5	1812.8
Technical Assistance	673.8	2153.9
Participants	494.6	1722.5
Other	768.2	2633.4
Total	2,503.1	8322.6
Local Cost Financing (non-add)	(1,371.0)	(4460.0)
Host Country Contribution	1,117.8	4048.1
<b>Grand Total</b>	<b>3,620.9</b>	<b>12,370.7</b>

The breakdown between SH and FN funding is as follows:

	<u>FY 79</u>	<u>LOP</u>
SH	1,796.2	5,971.3
FN	706.9	2,351.3

The initial FY 1979 obligation will be \$1,500,000 from SH funds and \$250,000 from FN funds. Remaining requirements of \$296,200 (SH) and \$456,900 (FN) are to receive priority attention from AFR/SFWA and AFR/DP.

(C) Socio-economic, technical and environmental considerations: The first phase of activity upon which this project was based has been evaluated and has proven to be socially, technically, and economically sound. Environmental implications, especially in regard to use of pesticides, have been reviewed in an Environmental Assessment and are in conformance with AID Regulation 16. No future analyses are considered necessary. A full description of those activities to be undertaken in the context of the project to assure correct storage and application of, and training, in use of pesticides are detailed in Annex D of the Project Paper. There are no issues in any of the recipient countries in regard to human rights at this time.

(D) No special covenants or conditions have been deemed necessary in this project. However, a waiver for vehicle procurement from Code 000 to Code 935 will be required to assure effective project implementation. This waiver requirement, totalling \$409,500 for vehicles, is detailed on pages 31-32 of the project paper. Additionally, there may be a future waiver requirement from Code 000 to Code 935 for the procurement of \$521,000 of certain types of sprayers. AID/W is presently investigating U.S. sources to determine whether appropriate U.S. made equipment can be obtained.

Implementation of project activities on a bilateral basis will be done by the national plant protection service of the participating country. Regional activities such as training taking place in Dakar and Yaounde will

be implemented by the National Plant Protection Services of Senegal and Cameroon respectively. Implementation on the part of AID will be through a PASA with the USDA for the provision of the technical assistance required for project execution. Coordination with the IPM Research element will be under the auspices of the Executive Committee for the CILSS Crop Protection Program established by protocol within the Sahel Institute.

(E) The ECPR met February 9, 1979, to review the minutes of the Project Review held January 9, 1979. As there were no specific issues requiring resolution, principal points of discussion focused on:

- (1) linkages between this project and IPM research activities to be undertaken by CILSS and the FAO.
- (2) funding breakdown between SR and FN appropriations.

This project appears in the Congressional Presentation for FY 1979 (Africa Programs, p. 62). A Congressional Notification regarding FN funding was submitted and expired on February 2, 1979.

(F) The Officer responsible for project implementation in the field is Channing Frederickson, USAID, Dakar. The AFR/DR backstop officer is James Graham.

Recommendation: That you sign the attached PAF II and thereby authorize both the proposed project and the requested waivers.

Clearances:

AFR/SFWA:JKelly (K. Burke for in draft)

GC/AFR:AWilliams (draft)

AFR/DR/SFWAP:JRMcCabe (draft)

AFR/DR:NCohen (draft)

AFR/DR/ARD:QBenbow (draft)

AFR/DR/ARD:SKrause (draft)

AFR/DR/ENGR:FZobrist (draft)

AFR/DR/SDP:JNixon (draft)

AFR/DP:CWard (draft)

AFR/CAWA:JWedberg (draft)

SER/CCM:PEagan (draft)

L. W. Haven North

AFR/DR/SFWAP:JGraham; ch: 3/13/79:X27886

**PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART II**

**Country:** West Africa Regional - Sahel, Cameroon and  
Guinea-Bissau

**Project:** Regional Food Crop Protection (Phase II)

**Project No.:** 625-0928

Pursuant to Part 1, Chapter 1, Sections 103 and 121 of the Foreign Assistance Act of 1961, as amended, (the "Act") I hereby authorize grant financing in Fiscal Year 1979 of not to exceed Two Million Five Hundred and Three Thousand One Hundred United States Dollars (\$2,503,100) (the "Authorized Amount") to assist in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project consists of training agents for and providing material support for the National Plant Protection Services of the seven countries participating in the project, Senegal, Mauritania, Gambia, Cape Verde and Chad in the Sahel and Cameroon, and Guinea-Bissau outside the Sahel (hereafter referred to as the "Project"). The purpose of the Project is to encourage and facilitate the extension of Integrated Pest Management (IPM) concepts and techniques to small food crop farmers in the Sahel, by building upon the developments under phase I of the Project and linking the Project with IPM research activities to be undertaken by CILSS and the FAO. Project activities include further construction and training at the two regional training centers in Yaounde and Dakar.

I approve the total level of A.I.D. appropriated funding planned for the Project of not to exceed Eight Million Three Hundred and Twenty-Two Thousand Six Hundred United States Dollars (\$8,322,600), Grant, including the amount authorized above, during the period FY 1979 through FY 1981. I approve further increments during that period of Grant funding up to \$5,819,500 subject to the availability of funds and in accordance with A.I.D. allotment procedures. Not more than \$5,971,300 of the Grant shall be funded from Section 121 funds and not more than \$2,351,300 of the Grant shall be funded from Section 103 funds.

I hereby authorize the initiation and execution of Project Agreements by the officers to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate.

Y.C.

a. Source and Origin of Goods and Services.

(1) Except as authorized in paragraph c below, and except as A.I.D. may otherwise agree in writing, goods and services financed by A.I.D. under this Project for Senegal, Mauritania, Cameroon, and Guinea-Bissau shall have their source and origin in the Cooperating Country or in the United States.

(2) Except as authorized in paragraph c below, and except as A.I.D. may otherwise agree in writing, goods and services financed by A.I.D. under this Project for Cape Verde, Chad and Gambia shall have their source and origin in countries included in A.I.D. Geographic Code 941.

(3) Ocean shipping financed under this Project shall be procured from the United States or the participating countries, except as A.I.D. may otherwise agree in writing.

b. Conditions Precedent.

Prior to the first disbursement of funds under the Project for each construction activity, or to the issuance of any commitment documents with respect thereto, Senegal or Cameroon, respectively, shall furnish to A.I.D. the following, with respect to such construction activity, in form and substance satisfactory to A.I.D.

(1) Detailed plans, specifications and construction schedules with respect to such activity;

(2) A description of the arrangements made for providing construction services for such activity, including an executed contract for construction services with a firm acceptable to A.I.D. unless such services are being provided by force account; and

(3) A description of the arrangements made for providing engineering supervisory services for such construction activity, including an executed contract with a firm satisfactory to A.I.D. unless such services are being provided by agencies of Senegal or Cameroon, respectively,

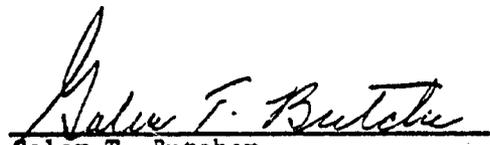
c. Waivers.

Notwithstanding paragraph a above and based upon the justification set forth on pages 31-32 of the Project Paper:

(1) I hereby approve a waiver of the requirement under Handbook 1, Supplement B, that commodities procured with funds granted to countries other than RLDCs shall have their source in the United States, to permit procurement by Guinea-Bissau of 9 Landrovers and 2 Toyota pickups at an approximate cost of \$132,500 and by Mauritania of 10 Landrovers, 2 Toyota pickups and 1 Volkswagon pickup at an approximate cost of \$152,000.

(2) I hereby approved a waiver of the requirement under Handbook 1, Supplement B, that commodities procured with funds granted to an RLDC shall have their source in countries in A.I.D. Geographic Code 941, to permit procurement by Cape-Verde of 9 Landrovers at an approximate cost of \$112,500 which have their which have their source and origin countries included in A.I.D. Geographic Code 935.

(3) I have concluded that special circumstances exist which justify waiver of the requirements of section 636(1) of the Act; and I hereby certify that exclusion of procurement of the project vehicles from countries included in A.I.D. Geographic Code 935 would seriously impede attainment of United States foreign policy objectives and the objectives of the Foreign Assistance Program.

  
Goler T. Butcher  
Assistant Administrator  
for Africa

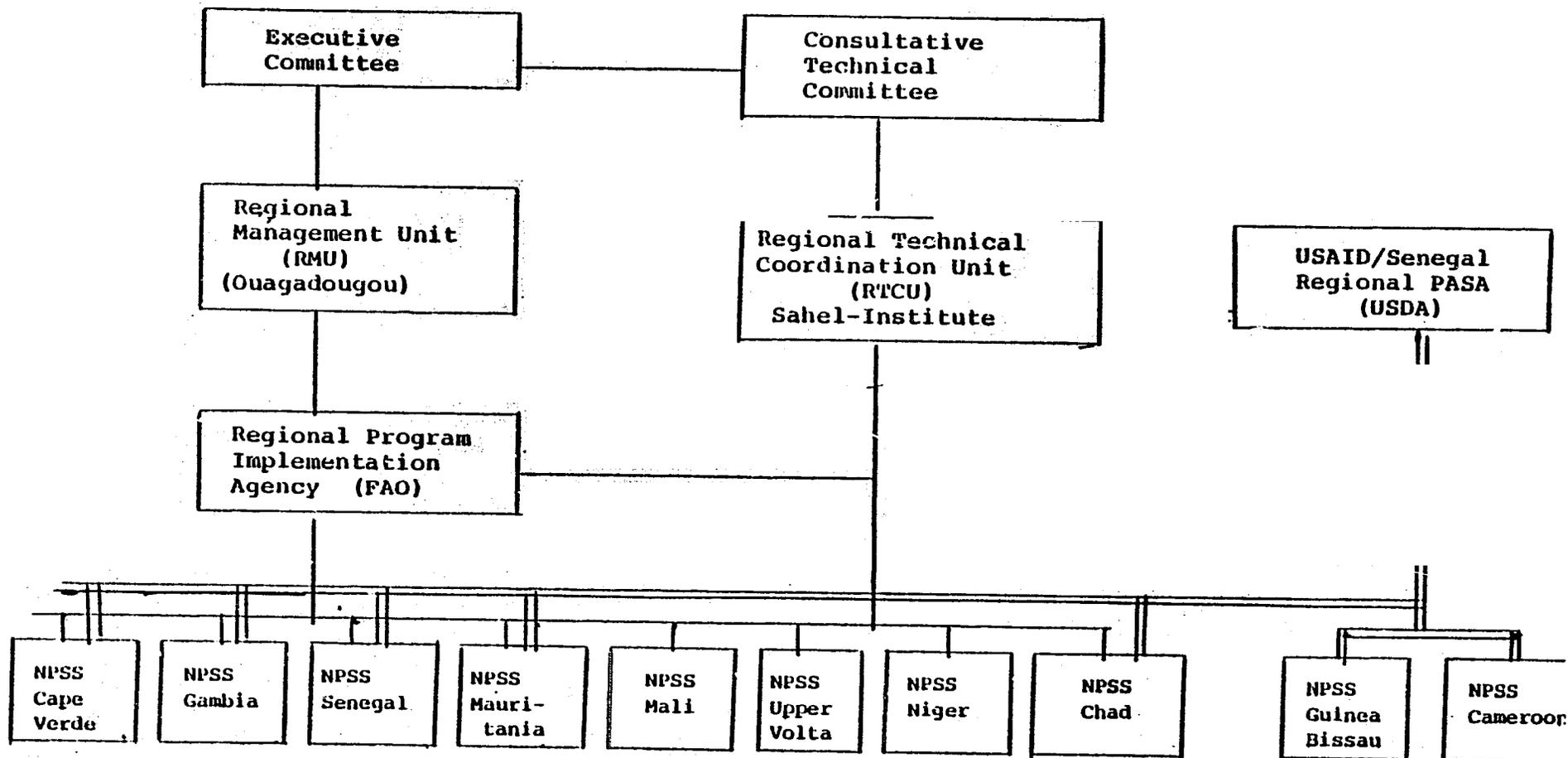
MAR 19 1979

Date

GC/AFR:AWA/1/ams:th:3/12/79:X27886



CILSS PLANT PROTECTION PROGRAM



— MANAGEMENT - CILSS-IPM RESEARCH  
(Annex B) (625-0928)

== MANAGEMENT - REGIONAL FOOD CROP  
PROTECTION (PHASE II)  
(Annex A) (625-0928)

AGENCY FOR INTERNATIONAL DEVELOPMENT

**PROJECT PAPER FACESHEET**

1. TRANSACTION CODE  
 A ADD  
 C CHANGE  
 D DELETE

2. DOCUMENT CODE  
 PP  
 3

3. COUNTRY/ENTITY  
 Sahel Regional

4. DOCUMENT REVISION NUMBER

5. PROJECT NUMBER (7 digits)  
 625-0928

6. BUREAU/OFFICE  
 A. SYMBOL AFR  
 B. CODE 06

7. PROJECT TITLE (Maximum 40 characters)  
 Regional Food Crop Protection-Phase II

8. ESTIMATED FY OF PROJECT COMPLETION  
 FY 8 | 2

9. ESTIMATED DATE OF OBLIGATION  
 A. INITIAL FY 7 | 9  
 B. QUARTER 2  
 C. FINAL FY 8 | 1  
 (Enter 1, 2, 3, or 4)

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$) -

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	1132	1371	2503	3863	4460	8323
GRANT	1132	1371	2503	3863	4460	8323
LOAN						
OTHER U.S.	1. Peace Corps	21	63	84	116	363
	2.					
HOST COUNTRY		1118	1118		4048	4048
OTHER DONOR(S)						
TOTALS	1153	2552	3705	3979	8871	12850

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY 79		H. 2ND FY 80		K. 3RD FY 81	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) SH	100	070		1796		1937		2238	
(2) FN	100	070		707		877		768	
(3)									
(4)									
TOTALS				2503		2814		3006	

A. APPROPRIATION	N. 4TH FY		O. 5TH FY		LIFE OF PROJECT		12. IN-DEPTH EVAL. SCHEDULED
	C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	
(1) SH					5971		MM YY 1   2   8   0
(2) FN					2352		
(3)							
(4)							
TOTALS					8323		

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 = NO  
 2 = YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE  
 Original signed by Norman Schoonover

TITLE  
 Director, USAID/Senegal

DATE SIGNED  
 MM DD YY  
 1 | 2 | 1 | 6 | 7 | 8

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

Regional Food Crop Protection -- Phase 2

TABLE OF CONTENTS

	<u>Section</u>	<u>Page</u>
PART I	<u>Facesheet Data</u>	2
PART II	<u>Project Description</u>	3
PART III	<u>Project Analyses</u>	
	A. Technical	6
	B. Economic	8
	C. Social	10
	D. Administrative	12
	E. Environmental	17
PART IV	<u>Financial Plan</u>	19
PART V	<u>Implementation Plan</u>	22
PART VI	<u>Evaluation Plan</u>	29
PART VII	<u>Special Conditions</u>	31
<u>ANNEXES</u>		
A.	Logical Framework	33
B.	Economic Background	38
C.	Technical Background	45
D.	Environmental Assessment	47
E.	Budget Tables	52
F.	Training	57
G.	Peace Corps in Food Crop Protection	68
H.	Programs Addressing CILSS Initiatives	69
I.	SFCP Evaluation Summary	76
J.	Project Design Team	91
K.	Vehicle and Equipment Requirements	92

## PART II: PROJECT DESCRIPTION

Nearly 90% of the population of the Sahel depends on subsistence farming for essential food needs. By far the most important subsistence production in the Sahel is millet and sorghum, with other grains (corn and rice), legumes and manioc of some varying importance in parts of the region. Subsistence farming families live poorly in the extreme, their food needs dependent on the vagaries of annual rains. Disastrous drought years from 1968 to 1973 brought the plight of Sahelians to world attention, and dramatized the hazardous existence they endure. Their subsistence crops are not only affected by uncertain rainfall; they also suffer depredations of insects and other pests which are estimated to take a toll between 30 and 40% of potential food harvested and eventually available for consumption. Any substantial reduction of these losses has obvious importance to Sahelians who depend on their own food harvests for survival. This project was initiated in late 1975 to help Sahelians<sup>(1)</sup> find ways to reduce pre and post-harvest crop losses from pests, and thereby reduce their risks of hunger or famine. Projected as a ten year program, the Sahel Food Crop Protection Project (SFCP) was approved in 1975 for an initial phase of 4 years, with continuation phases to be justified by project redesign at the end of each phase. Based on the experience of Phase I and the demonstrated continuing need and feasibility, this Project Paper is a design for a recommended U.S. continued assistance for implementing Phase II, a three year extension.

The background of this project was detailed in the PP for Phase I, and will not be repeated here. (See Sahel Food Crop Protection Project Paper - 625-0916, approved 6/28/75). A more recent development, having important implications for this project, has been an initiative on the part of eight Sahelian countries for a broader regional effort in food crop protection over a longer time frame. This program is being coordinated by the Permanent Interstate Committee for Drought Control in the Sahel (CILSS), and donor countries and organizations are being invited to finance the various initiatives comprising the program. How the CILSS initiatives will affect the RFCP project, and measures which are designed to insure effective complementarity are discussed in several parts of this Project Paper. (For a full discussion of the CILSS program, see March 23, 1977 document "Plant Protection in CILSS--Member Countries--Action Proposals").

Phase I of SFCP has been a period of planning with national plant protection services, organizing initial training of specialized staff,

- 
- (1) This Project includes participation of two countries (Guinea-Bissau and Cameroon) which are outside the area commonly referred to as Sahel. Their condition is similar to that of the Sahelian countries in respect to subsistence farming, and they are included as other "Sahelians" in this Project Paper discussion. However, the title of the project is now changed to "Regional Food Crop Protection" (RFCP) to reflect the broader geographic scope.

purchase of technical equipment and vehicles, and construction of training and other facilities. These activities aim at strengthening national plant protection services of the participating countries in their responsibilities for the following:

1. Flexibly responding to pest infestations with effective measures of control;
2. Training crop protection cadre, extension cadre and farmers in practical applications of pest management technology;
3. Sharing and utilizing regional and international research results, techniques and policies with respect to crop protection.

Phase I implementation has achieved the most important elements essential for embarkation on Phase II, although the project suffered delays due to language training needs for advisors, delays in recruiting advisors, construction slippages and difficulties in getting delivery of all required commodities on a timely basis. A summary of achievements of Phase I is presented below. A detailed discussion of the Phase I achievements and problems is in Annex I. The PP design team is satisfied that the results of Phase I verify the feasibility of the project and the desirability of its continuation within the long term plan.

#### Some Achievements in Phase I Sahel Food Crop Protection Project

This project was conceived in October 1974 after the return of Administrator Parker from a tour of the Sahelian countries. After several years of drought 1974 saw a season of good rains and promising bumper crop of food grain. Unfortunately the weather conditions also favored the pests and epidemics of grasshoppers, locusts, leaf chewing insects, birds, etc. took an estimated 40 percent of the yields for that crop season.

A team of four entomologists, proposed the framework for the regional project which received further support from an international meeting held in Washington Dec. 11 and 12, 1974. The meeting was attended by representatives from FAO, the locust organizations, OCLALAV and OICRA, Canadian International Development Agency, Center for Overseas Pest Research, International Development Bank UNDP, IRAT and consultants from the University of California contract on Pest Management and Environmental Protection.

The conference unanimously recommended that each Sahelian country develop its own institutional capability to maintain surveillance and control of crop pests. A project identification document was prepared by USAID and distributed to the Sahel countries and other donors. All posts responded enthusiastically and the final project was prepared and negotiated with the recipient countries.

Project agreements were signed with Senegal, Chad and Cameroon in early 1976 and with The Gambia and Cape Verde in September of the same year. Mauritania entered the project in August 1977 and Guinea-Bissau in October 1978.

In developing the project agreements with each country, the agreements were tailored to meet the particular needs of each Crop Protection Service and the PIO/C's and PIO/P's were prepared accordingly.

At the present time except for Guinea-Bissau, vehicles have been received, entomological and laboratory supplies, reference materials, training materials including visual aids have been ordered and received by the participating countries.

Four long-term participants are now in the U.S. for degree course work leading to a full Bachelor of Science degrees in Entomology. Since other candidates have been nominated and are expected to start similar training in the U.S. in 1979.

The Crop protection Directors of Cameroon, Chad, Cape Verde, Senegal, Mauritania and The Gambia participated in a U.S. Study Tour to observe and review the latest integrated pest management techniques in the U.S. As most of them were educated in France, Belgium or the U.K., the experience was enlightening and prompted all of them to request additional short course and observation travel in the U.S. where our technology in IPM is much advanced.

The Director of the Training Center in Yaounde participated in a series of training and management programs at the Virginia Polytechnical Institute, University of Maryland and the USDA Plant Protection and Quarantine Center. He also visited on the same trip (partly sponsored by the U.K.) COPR, Imperial College and The Tropical Stored Products Institute.

The Director of the Dakar Training Center is in an M.S. program since January 1978 at Oklahoma State University and has returned to Dakar until the September 1979 semester to complete the requirements for master's degree.

The First Annual Conference of project counterparts including Crop Protection Chiefs and all American staff was held in November 1977 at the Institute of Tropical Agriculture in Ibadan, Nigeria. In addition to project management and other topical reviews, the IITA introduced them in a series of lectures and field trips to their programs and research activities related to pest management. The second annual conference will be held the week of February 19, 1979 following the Pesticide Management Seminar scheduled for February 12-16, 1979 in Dakar.

The construction of the Dakar Training Center is completed and the inauguration of the Center by the Minister of Rural Development and the U.S. Ambassador is scheduled for February 20, 1979. The Yaounde Training Center is expected to be completed in September, 1979. In Cameroon a temporary facility was acquired and to date 150 students have been in "short courses". This group included 3 Chadians and 3 women.

There has been some input into field training and demonstrations through the activities of the Country Project Officers. An example is in The Gambia where integrated pest management 100 hectare plots were established in the 1978 crop season. Field days were held after the season to show farmers in the Mixed Farming Units the results. They look promising and are presently being compiled. This will be repeated in The Gambia and as many other countries

as possible to obtain cost/benefit ratios and convey the results and demonstrations to the farmers.

The new CILSS initiatives referred to above bring opportunities for much more effective achievements for this project, since they include research into techniques and measures for integrated pest management. This will provide opportunities for countries to share the most advanced technology, and, indeed, to participate actively in the research and validation process. The research project is being financed by the U.S. under AID Project 625-0928 CILSS Integrated Pest Management and Research (see Project Paper, approved on December 8, 1977). Specific measures have been designed into implementation of Phase II of RFCP, in this PP, for close and frequent collaboration between personnel of RFCP and on other related research and technical programs. Annex H outlines plant protection resources available to National Plant Protection Services from the forthcoming CILSS-sponsored program, from other multilateral projects, and from national efforts with bilateral assistance. In addition to those included in Annex H, research underway or outreach programs of the International Institute for Tropical Agriculture (IITA), Ibadan, Nigeria, of WARDA, and CMVS provide further valuable resources for certain crops. Coordinating measures incorporated in this project should insure that facilities, equipment, and training inputs for the various projects, and particularly in relation to IPM research, are complementary, do not duplicate or conflict, and are appropriately time-phased. It should also assure that the results of IPM and other related research are quickly and effectively available for application and extension to farmers.

An entomological laboratory is needed in Northern Cameroon to support NPP activities. This need probably would be met under the IPM research program in other countries, but must be met by this project in Cameroon, not included in the CILSS-sponsored program.

#### Relationship of the CILSS Integrated Pest Management Research Project to the Regional Food Crop Protection Project

The development of the Integrated Pest Management Research Project (IPM) the current Regional Food Crop Protection Project was considered as one of the extension arms for reaching the small farmer. The information and new technology emanating from the research activities will be disseminated through the Sahel Institute and directly to the Plant Protection Services in each country. Regional conferences and seminars held by the research personnel will involve the representatives of the CILSS countries which in most instances will be the Directors of the Plant Protection Services and the training centers. This in turn will be extended to the agricultural extension services and through outreach activities to the ultimate beneficiary, the small farmer. An example of integrated pest management technology already developed may be cited from research undertaken at the Institute for Agricultural Research at Bambey, Senegal. It has been determined that by judiciously timing the planting date of millet, the heavy attacks of *Mesalia* (sp.) (Spike Head Borer) can be avoided. There are no doubt many examples such as this which research will develop which can be implemented by the small farmer at no input cost to him and will result in substantial reduction of crop losses.

The CILSS IPM project will develop and validate new technology in integrated pest management. The achievements of IPM research will be applied in individual countries only through an effective national plant protection service. Therefore

the efforts made through the Regional Food Crop Protection Project to develop and strengthen effective Plant Protection Services will have a direct impact on the successful application of IPM research in the Sahel countries.

Other parts of the CILSS program offer opportunities for U.S. contribution through RFCP, notably in training. These are discussed in Part III D and in Annex F.

Inputs for Phase II will amount to \$12.9 million over the three year period (see Part IV). Of this, \$8.3 million will be financed by the U.S. through project grants for advisory services, commodities and equipment, and for local operating costs. \$4.1 million will be financed by participating governments for salaries and support costs of pest management officials and specialists, instructors and extension service cadre, facilities and land made available for project activities, and essential equipment and commodities. Peace Corps is expected to continue providing services of volunteers at an estimated cost of \$500,000 over the three years.

By the end of Phase II, the project is expected to show significant indications that its purpose is on the way to being achieved. The evolutionary nature of the technology which will obtain over Phase II period makes it difficult to apply target figures for crop loss reductions to be achieved. However, the state of the technology at present gives assurances that the project can result in reaching crop savings at least equal in value to annual project costs during this period. The Project Logical Framework (see Annex A) indicates that at the end of Phase III, the project is designed to have resulted in an adequately organized, staffed, and trained plant protection service in each participating country. While the degree will vary country-by-country, in general the following long range benefits should accrue from the intervention of this project:

- a) A validation of the application practicability of the results of IPM research and of the benefits of applied new technology.
- b) A comprehension and appreciation by subsistence farmers as to integrated pest management options and technique which are most feasible and appropriate for them to utilize.
- c) An appreciation by participating governments that integrated pest management techniques and initiatives are economically sound and that the efforts of food crop farmers in IPM can have significant impact on total food production, and economic well - being in the countries.
- d) A measurable reduction of food crop losses of respectable significance to food production of individual countries, achieved at an appropriate and acceptable cost over an appropriate time frame.
- e) A professionally qualified and competent plant protection service in each country, capable of supervising and facilitating pest management initiative of the small farmers on an continuing basis, at a greatly reduced on-going cost per farmer per year.

The end of Phase II is expected to show substantial progress toward the ultimate purposes and goal.

In summary, the experience of SFCP in Phase I and the continued and growing concern of the participating countries strongly recommends the continuation of this project (re-titled RFCP) into a Phase II; and that this continuation should include complete coordination and complementarity with the IPM Research and other CILSS projects. This Project Paper has been designed accordingly.

### PART III: PROJECT ANALYSES

#### A. TECHNICAL ANALYSIS

Integrated pest control is a pest management system that in the context of the associated environment and the population dynamics of the pest species, utilizes all suitable control techniques and methods in as compatible a manner as possible and maintains the pest population below that causing economic injury.

In the Sahel countries participating in this project, traditional agriculture for food crops is still characteristic with labor intensive, small fields sparsely planted with seeds of mixed genetic types. The mixed culture also provides some protection against climatic adversity and attacks by new pests because of an inherent heterogeneity.

Over many centuries, man's food crop plants have become adapted through natural selection to a multitude of ubiquitous pests; however, to obtain increased yields, introduced technology, e.g., new varieties, fertilizers and cultural practices, helps contribute significantly to increased plant pest problems as they enhance the susceptibility to disease or attack by insects.

Many developing countries have received both the benefits and the devastating effects of introduced technology. The rapidity by which these practices have been adopted and the increased production which resulted have been most gratifying. Thus motivated by the increased production with the new practices, many developing countries and international organizations have placed increased emphasis on the development of new agricultural technology. These modernizing practices, which also enhance the potential for destructive pest attacks, are often being introduced without proper attention to a crop protection component of agricultural development programs. The changed agro-ecosystems resulting from the introduction of new methodologies produce shifts in and very often an intensification of pest and disease problems. In many development programs this hazard is not properly taken into account and crop losses are becoming more severe as the modern practices are introduced.

Without bold measures to protect the food crops of developing nations the production gains recently realized could vanish, and certainly the inherent potentials not fully realized.

The integrated control strategy employs the idea of maximizing natural control forces and utilizes other pest management tactics with a minimum of environmental disturbance when threshold injury level threatens. Adverse weather factors, while a powerful repressive force, cannot always be relied upon to suppress major pests. The use of natural enemies and plant resistance are basically compatible and supportive in the integrated control strategy. Cultural control, a third basically compatible tactic, is commonly used in ways to expose the pests to adverse weather, to disrupt their natural development, to increase the action of natural enemies,

or to increase the crop's resistance. Pesticides, although not always compatible with the use of natural enemies, often can provide a reliable immediate solution to a problem. Thus pesticides are an important and necessary element in integrated control programs. Therefore, the objectives of this project become clear, through the development of an adequate crop protection response capability to protect food production gains. To achieve this requires a significant effort in training and retraining of crop protection and pest management specialists, who in turn will be involved in the outreach efforts to bring IPM to the small farmer. This is being undertaken by the project with a strong emphasis on training. The development of new technology by the CILSS research project for integrated pest management will be utilized and incorporated into the training courses at both the Dakar and Yaounde training centers.

Annex C discusses in greater detail the technical approaches involving entomological, phytopathological and related activities for strengthening food crop protection in the Sahel.

## B. Economic Analysis

The basic economic rationale for crop protection in West Africa consists of the major place of grains in the economy and diets of the areas, the tendency toward scarcity and the actual import of grain, the scale of current pre- and post-harvest losses, and the possibility of reducing such losses.

Perhaps 13-15 million of the total 20.4 million people in the project countries are in households primarily engaged in producing grain. While production data are fragile, total production of millet, sorghum, corn, rice, and cowpeas may average about 2.4 million tons annually. Production has been gaining slightly in relation to population in Senegal and Cameroon but has been falling in relation to population in other countries.

Estimates of losses are widely varied. Thirty percent pre-harvest and 10 percent post-harvest losses for major grains in these countries would seem to be conservative. Viewed in terms of meeting consumer needs, complete avoidance of 30 percent loss would increase harvested grain 42.8 percent, and avoidance of 10% loss would increase grain for consumption 11.1 percent. This leverage also applies to more moderate and realistic improvements.

Total value of major grains at the farm level in the project countries may be about \$360 million based on estimated production, and a farm value of \$140 per ton for millet, sorghum and corn, and \$200 per ton for rice and cowpeas. This represents a major part of total subsistence and cash income to many millions of people.

Tangible results of this project will come primarily through a multi-step process, since the primary thrust is institution building and training. Staff of the initial target group, the plant protection services, will have direct contact and impact on some food producers. Training also will be provided the generalist agricultural extension agents outlined on page 13, and staff of the plant protection services will follow up with them with specific recommendations and/or materials. Extension agents will have direct and indirect contact with larger numbers of producers. The major impact on crop and post-harvest losses must come through actions by farmers themselves resulting from the diffusion process. Probably only a modest part will come from direct "fire-fighting" activities of the national plant protection service staff.

Accepting this indirect process, each percentage reduction of pre-harvest losses, expressed a relation to production absence of such losses, represents 34,285 tons, and \$7,140,000 at the estimated production level and prices. Each successive percentage reduction of post-harvest losses similarly represents \$4 million.

Project costs will be \$12.85 million in the three-year Phase II, or \$4.3 million per year. It is considered realistic and conservative to expect project activities to lead through the (primarily indirect) processes

outlined to losses at least equivalent to costs by the end of Phase II. Start-up and institution building costs not recaptured by that time must be amortized through benefits beyond Phase II. More thorough economic analysis should be feasible soon, and is an integral part of the economic analysis in the CILSS-IPM project. Economic benefits of the two projects, and of the project to reduce post-harvest losses (CILSS Annex E) in that context, will be difficult to separate.

Higher payoffs from crop protection programs should be expected later for three reasons. First, the project strategy based on training and institution building will bring increasing results. Second, actions based on recommendations derived from research and carefully observed field demonstrations should be more effective. Third, and related, additional lines of research and development actions should be expected gradually to remove yield constraints. The economics of various production constraints are interrelated. This interrelationship is recognized and reflected in the integrated pest management approach adopted in this project.

Calculation of economic thresholds for the application of control measures is an integral part of the intended alert and extension system for crop protection. This approach will assure that each control action is at least believed to be economically justified. Plant protection officials, assisted by advisors, have begun to accumulate calculations of economic thresholds.

Thus, the project is focused on perhaps the largest single economic activity in these countries, and a major problem therein. The potential for gain is large. There is basis to expect benefits at least equal to annual costs by the end of Phase II, but this cannot be analytically demonstrated in terms of a series of areas covered, yield increases, costs, etc.

The close relationship to other development activities was noted. We cannot expect the best results from other activities unless pest losses are reduced. This does not imply the necessity that all categories of constraints must be removed uniformly; an appropriate technology approach or working on targets of opportunity is compatible with the project.

The economic case for the project is thus convincing although it cannot be documented thoroughly at this time.

### C. SOCIAL ANALYSIS

In this project, the target group is the large number of small farmers who produce primarily for on-farm consumption. These farmers may also engage in cash crop and livestock production as well as other economic activities as the opportunities arise. Given his economic standing, this type of subsistence-level farmer in the Sahel tends to be motivated by two main considerations. First, he wishes to produce adequate food for himself and for his dependents; second, he wishes, as far as possible, to avoid any risk that his food production will fall below the required amount, or that he will be committed to expenditures for crop inputs which he will be unable to meet.

Since the primary specific intention of this project is to raise the living standards of the mass of farmers at the subsistence level, the project is compatible with both of these motivations. On the one hand, its aim is to increase crop production by introducing a more widespread control of crop pests. On the other hand, the availability of techniques and materials envisaged by the project for combatting upsurges of pests mean that the risk of decreases in production resulting from unexpected depredation will be reduced. Likewise, the project seeks to increase the availability of food for consumption by reducing post harvest losses. To summarize, the crop protection measures developed in this project address both concerns by assisting the farmer to ensure that his expenditures for inputs will not be negated by uncontrollable disease and pest infestation.

In order to realize the project objectives, no fundamental changes in village-level socio-economic structures are required. Since the project concentrates on food crops there should be no relative improvement or worsening of social or economic positions within the group of subsistence level farmers. Similarly, the impetus given by the project to subsistence farming is unlikely to be so great as to eclipse the status of cash cropping. Thus, the project should lead to an overall improvement in the long-run in the position of arable farming in the Sahel without evoking a negative response from cash cropping farmers. Such a change does not appear to conflict with the objectives of any of the national governments concerned and is fully consistent with the regional objectives of the CILSS/Club du Sahel.

At the farmer level, the suggested pest control techniques which are extended in this project must represent an acceptable combination of profitability and risk reduction to the small farmer. In certain circumstances, a change in cultural practices at little cost to the farmer may assist in controlling a pest; in others he may have to purchase pesticides and equipment. In some instances a subsidy on one or both of these purchased items may be necessary if they are to be used to the optimum technical degree.

Moreover, the application of the crop protection measures to be developed in this project should spread labor requirements for men and women more evenly throughout the growing season. While the labor and time of both men and women may be saved, it appears unlikely that the introduction of new varieties and cultural practices or pesticides will cause hardship through unemployment. In the case of insect vertebrate pest and disease control, for example, it seems likely that some of the labor saved by

avoiding "extensive" agricultural practices will be required to deal with additional harvesting, processing and transport. In weed control, it is possible that the introduction of improved control methods could displace considerable quantities of labor currently used for hand-weeding. On the one hand, this may represent the removal of a labor peak in the agricultural cycle which has been preventing expansion of farmer activities. On the other hand, it may involve the displacement of casual labor with consequent hardship. Thus, the use and effects of pest control measures will be the subject of close economic and sociological monitoring throughout the life of this project, in close collaboration with the IPM Research project of CISS (625-0928).

Since food crops are usually cultivated by females (and males dependent upon total area planted) incremental time and labor units are provided by women, as well as men. Under conditions where survival is the goal (and all subsistence farmers are concerned with this) time and labor are provided as necessary to ensure survival. This is exactly the situation existing in the rural areas of the participating countries. Under these conditions, additional time and labor is forthcoming as necessary. Once crisis conditions are no longer present, crop protection measures become time and labor saving devices.

Land tenure patterns are not an issue in this project. Since the project involves cultural controls it will work within the existing village land tenure systems in which the nuclear and/or extended family is the basic production and land tenure unit. Over the long run, there may be an indirect benefit in terms of land tenure which might be attributable to the project. For example, the commercialization of a few crops in agriculture which has occurred in the recent past may have given considerable economic strength to the cultivators of these crops, with the result that they are able to expand their holdings and displace cultivators of subsistence crops. Any potential concentration of land in the hands of cash-crop producers is therefore likely to be forestalled by the increase in economic power to subsistence farmers envisaged by the project.

Active farmer participation is required in order to accumulate accurate data on food crop losses, evaluate the contribution of crop protection measures and demonstrate the benefit of pest management to the farmer. In order to establish the appropriate organizational framework to achieve the required level and type of farmer participation, the National Plant Protection Services project activities are integrated into the most appropriate ongoing agricultural production extension organizations, including kinds of training required for farmers and agricultural staff. In this way the project objectives are achieved through demonstration and practical training at the farm-level which is directly and positively linked to the subsistence-level farmer's overall agricultural activities.

#### D. ADMINISTRATIVE ARRANGEMENTS

Implementation of the project involves the national plant protection services of the participating governments; U.S.D.A. through a Participating Agency Service Agreement with AID; an AID regional coordinating activity; Peace Corps, and administrative sections of USAID, Peace Corps and U.S. Embassies in the countries. Backstopping in the U.S. is in the Bureau for Africa and DSB in AID, and APHIS of U.S. Department of Agriculture.

U.S. staffing, in the field during Phase I and projected through Phase II is summarized in the following table.

(man-years)

	U.S. Long Term (PASA and AID)			Peace Corps Volunteers				
	Phase I	CY 79	CY 80	CY 81	Phase I	CY 79	CY 80	CY 81
Regional coordination*	2.0	2.0	2.0	2.0				
Regional training	1.5	2.0	2.0	2.0	1.5	2.0	2.0	2.0
Senegal					2.0	2.0	2.0	2.0
The Gambia*		0.5	1.0	1.0	0.5	1.0	2.0	3.0
Mauritania		0.5	1.0	1.0		0.5	2.0	2.0
Cape Verde		0.3	0.6	0.6				
Guinea-Bissau		0.2	0.4	0.4			2.0	2.0
Chad**	1.0	0.5			0.5	2.0	2.0	
Cameroon	0.5	1.0	1.0	1.0	1.0	2.0	2.0	

\* Senegal program supported by regional coordination and by the Gambia Country Program Officer.

\*\* Chad program to be supported from Cameroon.

National plant protection services in the participating countries are relatively new entities, still growing in size and in technical expertise. In numbers of people, they are as follows (as of December, 1978):

	<u>National Direction and Technical Specialists</u>	<u>NPP Outreach Cadre</u>	<u>Agricultural Ext. Generalists (agents)</u>
Senegal	4	2	520
The Gambia	5	40	200
Mauritania	2	2	120
Cape Verde	3	6	75
Guinea-Bissau	2	0	100
Chad	6	0	100
Cameroon	9	40	655

The column in the foregoing table relating to agricultural extension agents is for personnel actually outside the administrative structure of the national plant protection services. They are shown here since they are a key outreach element in the governments' actions to extend food crop protection technology to the subsistence farmers.

Phase I has shown the national plant protection services and the host country support organizations generally to be capable of implementing the assistance elements provided under this project. A major purpose of the project being to strengthen those services, it has been the policy in Phase I to depend on existing organizations for implementation actions to the greatest degree practicable, rather than doing their administrative and technical functions for them. For the most part, Phase I has been concerned more with things the services needed in order to perform better their technical missions (buildings, demonstration facilities, including visual aids, laboratory and entomological supplies and reference materials, vehicles, etc.), although important attention has also gone into technical skills which needed upgrading within the services.

Phase II will continue giving attention to both elements of national services' needs, but with increasing attention to training requirements for skills up-grading. Another element to be addressed during Phase II is the organization structure and staffing as it relates to current and changing missions of the NPP services. This project may have limited influence over any structural and staffing deficiencies, but they will be identified and discussed with NPP directors, who will be encouraged to insure they are given adequate consideration in national planning and budgeting exercises.

Another special emphasis during Phase II will be given to those extension services which directly interact with farmers, and to providing

them with appropriate and adequate expertise in food crop protection techniques. As indicated earlier, this will be the major outreach for helping the target beneficiaries of the project, the subsistence farmers.

With the advent of the broader program of CILSS, this project takes on new importance and potential for Sahel countries, since the training facilities and capacity of RFCP will be available for CILSS "action" elements additional to Annex A—Strengthening National Crop Protection Services (IPM research, migratory pest control, rodent and bird control, post-harvest food protection, etc.). In this regard, RFCP can contribute substantially to meeting the objectives of CILSS Annex G-2. A close coordination will take place particularly with the CILSS Sahel Institute to encourage utilization of the RFCP regional training facilities. The Regional Project Manager and Regional Training Officer will be the primary RFCP officials for this coordination.

Cameroon and Guinea-Bissau are not members of CILSS. However, by participation in RFCP, important coordination and liaison is expected to be possible, and to take place. Indeed, the CILSS proposals refer to the regional crop protection training centers (one of which is in Yaounde) as important elements in implementation of CILSS programs. Arrangements for continued utilization of these centers for Sahelian training are provided in Phase II for RFCP.

The meshing of the Regional Sahel Food Crop Protection project with the CILSS IPM project will occur in a variety of ways.

1. Country Project offices will have direct contacts on field problems with IPM specialists through arrangement made by the RPM for assistance required in developing or validating new methods or procedures. Copies of correspondence/reports will be provided to the RTO.
2. Information transfer designed for use by National Crop Protection Services and Cooperating agencies in Cameroon and Guinea Bissau that would involve government employees or farmers in the learning of new knowledge or skills and are distributed to the Project for that purpose will be through arrangements made by the RTO (after review by the RPM.) These arrangements will be coordinated through contacts between the Regional Training Center Directors, the CPO's, the Directors of the National Crop Protection Services and other country participating agencies.

Further discussion of individual country priorities and plans is contained in Part 7.

To assist in technical implementation of the Sahel Food Crop Protection Project, AID/W signed a Participating Agency Service Agreement (PASA) with the United States Department of Agriculture (USDA) in September 1975. The PASA specified the Animal and Plant Protection Service (APHIS) as the resource agency in USDA.

Crop Protection Specialists (Country Project Officers) were requested initially for Dakar, Senegal; Yaounde, Cameroon; and NDjamena, Chad. Additionally, a Regional Training Officer (RTO) was requested to provide training support throughout the Regions. Following usual clearances and language training, the CPO for Dakar and the RTO for Yaounde reported to posts in September 1976.

Recruitment problems, including medicals and language training delayed filling the NDjamena and Yaounde CPO slots until July 1977 and July 1978 respectively.

The PASA includes provision for consultants as requested by the Regional Project Manager (RPM). Technical backstopping and PASA coordination are provided by APHIS staff in Washington. PASA personnel are under the direct supervision of the RPM.

The main thrust of the PASA technicians is aimed at bringing about improvement in the National Plant Protection Services through training of personnel, building sound infrastructure capabilities, and conducting field demonstrations of economical, effective and environmentally acceptable techniques of pest management. This is accomplished through direct interface with National counterparts.

In addition to their work in host countries, the specialists have participated in developing programs in The Gambia, Mauritania, Cape Verde, and Guinea Bissau.

A total of \$493,600 was obligated under the PASA from FY 1976 through FY 1978.

Administrative feasibility issues for Phase II have been taken into account in this project revision, and are reflected in the assumptions identified in the logical framework (Annex A). They will vary in importance, country by country, but are considered sufficiently resolvable or unimportant to justify proceeding with Phase II as designed. They include these more significant issues.

1. Is the national commitment to food crop protection adequately demonstrated in annual budget allocations to the national plant protection service, due consideration being given to national overall funding limitations and other priorities?
- A. The experience during Phase I has been that participating governments have satisfactorily met the funding requirements of the expending NPP services. These concerns and commitments have been demonstrated through their participation in CILSS action planning. The demonstrated benefits to be achieved during Phase II are expected to further strengthen the national commitments to continued national plant protection services.

2. Is the government's agricultural extension service sufficient in numbers, and does it adequately interact with subsistence crop farmers?
- A. As shown in the foregoing tabulation, each participating country has a substantial cadre of agricultural extension generalist personnel, now totaling 1770 for RFCP countries, and scheduled for further expansion in coming years. The present cadre will have received some training on IPM technology by the end of Phase II. We may estimate that each agent will reach 10 subsistence farmers per year with crop protection advice and established demonstrations, and that the 90 NPP outreach cadre will reach 20 each. The permanent cadre will thus be able to reach nearly 20,000 farmer families annually with IPM technology by the end of Phase II, and each family has about one hectare of grain. If potential yield is 1000 kg per hectare, and the IPM technology recommended saves 10 percent of that production, or comparable education of post-harvest loss, there would be an annual "first generation" saving of 2,000 tons. The NPP and extension strategy provides an expanding system for additional training and demonstrations. Farmers provided initial demonstrations are expected to explain practices and thus train additional farmers. Through the multiplier effect of this training and diffusion process, the recommended practices should spread rapidly to touch more farmers. As the new technology becomes refined and tested, the impact of outreach activities in reducing food crop losses will be further enhanced.
3. Are conditions in the areas where subsistence farmers live sufficiently stable for extension agents to operate?
- A. With the exception of northern and eastern Chad, this is not currently a problem.
4. Does the country have enough qualified trainee candidates for the training available under the project (including those with adequate language facility)?
- A. This has been a problem in all non-English-speaking countries during Phase I. Currently the NPP services have identified otherwise qualified candidates and put them into ICA English Language Training. We anticipate that this will be less of a problem during Phase II.
5. Can A.I.D. and U.S.D.A. recruit the required numbers of technical advisors, having necessary language facility, by the times scheduled in Phase II?

The time frame for recruiting additional and replacement advisors has been carefully reviewed with the PASA coordinator. The actual experience of Phase I has been taken into account in scheduling new recruitment, and the design team is assured that the Phase II timing is feasible as planned.

## E. ENVIRONMENTAL ANALYSIS

In the past man has learned to live with pests and he must continue to do so in the foreseeable future. Most pests are highly versatile adversaries and capable of adapting to their hosts, their environment, and man's best efforts to gain control. Even with opportunities for research, as envisioned under the IPM Research project and new technologies, perfect control cannot be expected, much less eradication.

The new concepts of pest management include the integrated approach to pest control which this project will address itself to. Normally without interference from man, plants and pests traditionally coexist in a natural balance due to ecological factors in the environment; however, with man's propensity to disturb this balance by his material needs and the establishment of new varieties, monoculture cropping, the careless introduction of new pests, the balance becomes upset. Pests under these conducive situations create intolerable injuries and losses.

There are many new techniques developed for integrated pest control, i.e. varietal, cultural, biological, sterilization and sex attractants, to name a few. But even with these practices conditions develop whereby pests multiply explosively because of inevitable shifts in the environmental conditions regulating pest development, changes in physiological resistance, etc. All the evidence suggests that pesticides will need to be extensively utilized in the future. They provide the crop insurance that permits the farmer to invest in other production inputs, i.e., good seeds, fertilizers, irrigation and mechanization. Pesticides are part of integrated management, which needs to be further refined to meet the growing requirements for food and fiber.

The countries concerned in this project have not made extensive use of pesticides which is reflected in the substantial crop losses, especially in millet, sorghum, maize, cowpeas and others. At the same time the environmental side effects have also been minimal as a result of underutilization of pesticides. The greater part of the pesticides involved in increasing food crop protection in the Sahel will be the insecticides; however, the use of fungicides, herbicides, nematocides, fumigants and rodenticides will be increasing in the ensuing years, particularly in large-scale cash crop production.

As stated previously, the decisions on pesticide use are to be based upon assessments of the need for use. Assessments based upon scientific survey of major economic pests will evaluate the degree of economic damage by a given pest or types of pests tolerable to a specific area of agriculture, and determine the need for one or more pesticides to control the pest problem based upon a cost/benefit analysis.

Under conditions found in the Sahel it is not possible to effectively protect farm workers from the effects of the more highly toxic pesticides, i.e., most of the organophosphates and many related compounds, although

these are the very chemicals on the EPA approved list due to their biodegradability and minimum disturbance to the environment and non-target species of wild life.

Therefore, wherever possible recommendations and training of Sahelian crop protection personnel will bear in mind to demonstrate and utilize those products which are relatively safe to humans, wild life and the environment in general. These recommended pesticides will adhere to the new Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) as amended.

The expertise under the PASA with the USDA will develop the theme of integrated pest management and will be an integral part of the project endeavor to minimize pesticide usage and as a result avoid adverse environmental side-effects.

Those pesticides purchased by ministries of agriculture or provided them in emergency conditions by OSRO are not subject to review under AID Regulation 16, however, any project assistance for their use is subject to such review. Therefore, an Environmental Assessment of the risks and benefits of providing assistance for the use of certain pesticides has been prepared and is attached as Annex D. Such pesticides will continue to be used by national plant protection services and include pesticides which may have a significant environmental impact, particularly if they are improperly used. It is incumbent upon the project, therefore, to provide assistance and training in their use with the aim of minimizing any known adverse environmental effects and ultimately convincing national personnel that more environmentally acceptable materials should be used. The Regional Project Manager and the PASA advisors are encouraging the use of more environmentally acceptable chemicals, i.e., those registered by the USEPA for the same or similar uses. However, such substitutions involve long-range educational programs on the adverse.

All pesticides procured with project funds will be for research or limited field evaluation purposes by or under the supervision of project personnel, under the provisions of para. 216.3(b)(2)(i) and hence are not subject at this time to the pesticide procedures set forth in 216.3(b)(i). As the results of these evaluations become available during the course of project operations, recommendations for particular identified uses will be subjected to the provisions of para. 216.3(b)(i) prior to making recommendations to appropriate national plant protection services for such uses.

#### PART IV: FINANCIAL PLAN

As financial tables (Annex E) show, most cost will be borne by AID during Phase II, but with substantial and increasing country contributions. In several countries other donors and Peace Corps are making substantial inputs (see Part III D).

The practice of using bilateral project agreements for inputs which are unique to individual countries (vehicles, technical equipment, in-country training, etc.) was established during Phase I, and will continue in Phase II. Advisory funding under the PASA with USDA, and funding for regional administration and coordination functions are not included in the project agreements. All funding for the project will be from appropriations for Sahel Development Program (SDP) except for project agreements with Cameroon and Guinea-Bissau, which are funded through Food and Nutrition appropriations. Recent legal limitation on the use of Sahel Development Project (SDP) appropriations make it necessary to use other funding for continued non-Sahelian activities of this project. This will apply to those country activities for Guinea-Bissau and Cameroon which are non-CILSS countries. Some of the activities in Cameroon are regional in nature, and are in support of Sahel country programs.\* This particularly includes the Regional Training Center in Yaounde, the Regional Training Officer who is the chief Training Advisors for RECP, and the Country Project Officer for Cameroon and Chad. These two advisors are headquartered in Yaounde. At issue is the apportionment of project costs for the Regional Training Center and for the advisors as between SDP funding and Food and Nutrition (FN) appropriations. Current funding will be depleted within a very few months, and FN and SDP FY 1979 appropriations must be the source of funds for continuing activities for the first year of Phase II. (Costs of Sahel participants trained at the Yaounde regional training center are funded through project agreements with the Sahel countries.)

The country contributions shown in Annex E tables, and some that are unvalued, are government expenditures. Other costs will be incurred by farmers and by merchants or marketing systems in the case of actions to reduce post-harvest losses. The first financial question is whether the saved grain at harvest, and eventually saved for consumption, is valued higher than total costs. Economic analysis concluded this was probable, but could not provide solid documentation.

Next, at the government level, how will the additional values be recaptured to pay government cost? In some cases this will be through reduced need for imports at government cost. But both in this case and those simply involving internal supplies, the question finally is one of the combined adequacy of the income stream and of the revenue collection systems in each of the seven countries. This problem is shared with many other development activities that produce benefits primarily in the private sector and do not produce a substantial income stream flowing directly to the treasury. This is a policy issue outside this single project.

\*The design team recommends that SDP project allotments be made to the RPM, and that FSN allotments go to Cameroon and Guinea-Bissau, as appropriate.

The primary financial support of the project at the government level thus becomes essentially a projection and two assumptions. The project is financially feasible to governments to the extent that (1) economic benefits to society exceed costs, (2) the governments can design and administer revenue collection systems that meet the needs of expanding recurrent costs, and (3) governments will be willing to appropriate necessary funds to meet the actual costs.

Each participating government has indicated its intention to appropriate necessary funds, and will enter into annual agreements covering this item.

At the farm level, producers must (1) secure an increase in production valued more than the total increased costs (money and in kind) to the producer himself of the changes resulting in such increased production, and (2) the producer has money income at least equal to the increased money cost. Gaining the required amount of increased production appears to be the simplest standard to meet. More difficult will be the challenge of converting enough increased output to cash to pay costs of equipment, chemicals and any hired labor involved. The target group is largely subsistence producers, frequently having nutritional deficiencies, and commonly served by weak marketing systems. Governments may try to reduce cash needs of subsistence producers by subsidizing inputs for recommended practices. This, of course, further strains the fiscal ability of governments.

The financial support at the farm or marketing firm level thus also becomes a projection and an assumption. The projection is that recommended practices will produce benefits in the form of increased grain valued higher than costs the farmer or marketing firm incurs. The assumption is that the farmers will be willing to sell the required amount and that buying points are conveniently available.

The data in the economic analysis concerning benefits and costs in selected local situations illustrate the framework in which financial costs must be captured. Those illustrations do not provide documentation in the aggregate, of course. This will require many further case analyses and application of statistical methods to estimate total returns and costs. This probably will be most appropriate within the CILSS-IPM Project.

Each country annual budget used in preparing project cost estimates included a small allowance for contingencies, in most cases less than five percent of the total. This is an allowance for both unforeseen items and under-estimation. This approach is considered superior to making higher estimates throughout the items. A contingency allowance was not applied to regional technical services (primarily PASA). Experience indicates lapses probably will cover any under-estimates.

Other contributions will be substantial. Peace Corps volunteers are on post in Senegal and The Gambia, and have been informally requested for NFP activities in Cameroon, Mauritania and Chad.

Other donor activities furthering institution building of national services include these countries and international programs:

- Cape Verde: German entomologists; FAO advisors; OSRO pesticides; Portuguese aid.
- Mauritania: UNDP support of training at Kaedi Agricultural School; OSRO pesticides; OCLALAV; French bio-control of scale on date palms.
- Senegal: French pathologist; German aid; OSRO pesticides; ORSTOM; FAO advisors; OCLALAV; ICRISAT and IDRC.
- The Gambia: FAO advisor; OSRO pesticides; OCLALAV.
- Guinea-Bissau: Portuguese, German and FAO aid.
- Cameroon: French, OAU and FAO aid.
- Chad: French, German and FAO aid and support; OSRO pesticides; OCLALAV.

(For further discussion and identification of the above organizations see Annex H).

Dollar equivalents for some of the contributions of other donors were not available to the design team. In some cases donors and host countries are reluctant to supply these figures. It is hoped the project economist on the CILSS-IPM project will be able to secure all appropriate data to complete comprehensive economic analysis for IPM plus national plant protection services.

In conclusion, the project is designed to enhance host country development efforts and budgetary capability. Cost to farmers can be realized, particularly if marketing systems become stronger. Most regional costs will be borne initially by AID, but with increasing relative country contributions. Primary country operating costs will be assumed by participating countries with plans for them to assume full costs at least by the end of proposed Phase III.

PART V: IMPLEMENTATION PLAN

1. The implementation actions of sequential importance in this project are those for identifying institutional needs for personnel, facilities and equipment for the national plant protection services and helping the national services to meet those needs. Advisors assigned for given countries (country project officers), the Regional Project Manager in Dakar and the Regional Training Officer in Yaounde and Dakar, all have critical roles in these functions. In general, a sequential pattern has been followed during Phase I, but has often varied because of start-up unknown, optimistic assumptions for implementation time-frames which did not materialize, and lack of key elements in some countries which required tailored priorities and timing. The project has now matured in experience and facilities to the point that a more formally timed annual plan of actions should be feasible and is desirable. It is established as follows for Phase II, starting with calendar year 1979:

-July-September-

Regional Project Manager (RPM) develops and provides to the Country Project Officers (CPO) the strategy and format for the next calendar year Annual Work Plan. (A meeting of CPO's may be desirable for this purpose).

CPO discusses the Work Plan with his counterpart, the Director of the National Plant Protection (NPP) Service, reaches agreement on needs for the coming year which can be assisted under this project, including short and long term training, facilities and equipment. Prepares Annual Work Plan, reviews with USAID in country and transmits to RPM.

RPM reviews work plans for clarity, adequacy and feasibility. Transmits copies to Regional Training Officer (RTO).

RTO reviews work plans for long and short term training, and prepares annual training plan for coming year.

RPM prepares for annual staff meeting which will include all CPOs and RTO; and will address current year activities, project evaluation, specific planning for next year and preliminary consideration of needs beyond that year. Transmits schedule and instructions to attendees.

-October-December-

RPM conducts annual staff meeting of CPOs and RTO. (AID Project Liaison Officer for CILSS/IPM Research is invited as observer). Accomplishments, problems and future plans are reviewed, and country work plans are approved for project agreements and implementation. RTO discusses training needs and plans, and approves for each country. RPM gives instructions on format and content of monthly progress reports, to be submitted by CPOs during the course of the year. Annual Project Evaluation exercise is conducted (see Part VI).

-January-March-

CPO, in collaboration with his counterpart and USAID, drafts Project Agreement for assistance to be provided for calendar year. Transmits to RPM.

RPM approves Project Agreement and informs CPO.

CPO prepares documentation for implementing work plan, including PICO equipment specification, etc. Training and other elements of the work plan are actually implemented at various times over the year as scheduled in the approved work plan. Progress reports are prepared and submitted monthly to the RPM and RTO.

2. The described actions and sequence will be repeated for each year of Phase II except as experience requires modification by the RPM.

3. Additional key implementation elements of the project are less appropriate for time scheduling and phasing. They are treated here according to the project officer having primary responsibility:

A. Country Project Officer

1. Assists and advises NPP Dir. in development of standard entomological techniques for the national service, including national reference collection of major pests, an appropriate reference library, standards for collecting, mounting, labeling and preservation of specimens, etc. Collaborates closely with CILSS/IPM and other technical and professional advisors in the country in this function.
2. In collaboration with NPP Dir., monitors performance of plant protection specialists in their operations. Assists and advises NPP Dir. in organizing and implementing demonstrations, field day sessions and workshops.
3. Assists and advises NPP Dir. in organizing and conducting national campaigns to combat epidemic pest situations. Collects, and forwards to appropriate institutions for identification, those pest species having potential of being introduced into U.S.
4. Assists and advises NPP Dir. in developing standards for environmentally acceptable pesticides, utilizing U.S. Reg. 16 of EPA as general guideline. Assists NPP Dir. in encouraging and drafting appropriate legislation and procedures.

5. Discusses with NPP Dir., drafts and submits to RPM a monthly report of operations and activities for the country in accordance with format and content prescribed by RPM.
6. Assists and advises the NPP Dir. in administering the collecting of pest-caused crop loss evidence and measuras, and the reporting and assessing of these; and in utilization of FAO methodology to insure standardization and uniformity in this function.
7. Performs necessary administration functions relating to project implementation, including arrangements for participant training (except those arrangements which are a function of the training officer, if one is present in the country), receipt and inspection of AID procured equipment and supplies, etc.
8. Peace Corps volunteers (PCV) are assigned to national plant protection activities in several of the countries (see Part III D). CPO assists the NPP Dir. in assigning and orienting them and in technically supervising their activities, in close collaboration with the country Peace Corps Directors.

NOTE: In countries where training centers exist, center directors may have a primary or partial role in some of the above activities. In such situations, the CPO advises the NPP director as he cooperates with the training center director.

B. Regional Project Manager

He will be concerned with various implementation matters over the year, including these:

1. Attention to reports of pest infestations of major significance and urgency, securing details, evidence, specimens, etc., evaluating the data and the country plans or action taken for emergency response, advising CPO on possible sources of expert consultants, and funding possibilities within the project.
2. Frequent and close collaboration with CILSS/IPM Research Project senior advisor, and AID Liaison Officer for that project to exchange information on project activities and complementary arrangements within CILSS countries of CP and IPM Research.  
(Note that the Regional Project Manager for RFCP has been and will continue to be technical backstop officer for the IPM Research Project. In this capacity, he will

be attending appropriate CILSS meetings during the year, and will in other ways be kept informed of IPM Research, activities and coordination needs).

- 3 Collaboration with CIDA with regard to Canadian and U.S. assistance in CILSS countries in strengthening national pest management services, per Annex A of CILSS Action Proposals for Plant Protection in CILSS Member Countries. Evaluation of degree to which Canadian and U.S. assistance meet the needs and objectives of Annex A.
- 4 Periodic visit to RFCP Project countries to backstop any particular problems, to make personal observations, and to attend significant conferences of national plant protection services.
- 5 As appropriate and requested, represent the U.S. and RFCP in international meetings on pest management problems and solutions, including such as FAO Global IPM Program conferences, meetings of Club

C. Regional Training Officer

1. Assists and advises the RPM in establishing a program of regional training to include the construction of two Regional Training Centers (Yaounde - Dakar) and the establishment of center staffs that can carry out human resource development activities related to improving the National Crop Protection System.
2. Assists Country Project Officer and the Director of the National Plant Protection Services to identify training needs and then assists them in identifying methods for reducing these needs. Identifies work carried out by men, women and children, and assists in designing programs that reaches these persons. The accession will consider training by family units.
3. Assists National Crop Protection Services in establishing self-help capability by identifying and helping them arrange for training conducted by sources from within country or from available international sources.
4. Assists the Directors of the Regional Training Centers in coordinating their programs with each other to maximize use of resources and personnel.
5. Assists the RPM in arranging conferences/workshops of regional impact to coordinate project activities and the training of CPO and their counterparts.
6. Works with the Directors of National Extension Systems and Agricultural Education to develop training programs for their use.

7. Works with Directors of National Research Services and International Organizations to obtain "Expert" assistance in the development of training materials when local expertise is unavailable.
  8. In collaboration, assists Country Project Officers, their counterparts and Regional Training Center Directors in designing and implementing information distribution systems that include radio, newsletters, field days, demonstrations and workshops.
  9. Assists Directors of National Crop Protection Services and CPMs in project designs that will involve the training of Crop Protection cadres.
  10. Reviews with the RPM requests for training assistance and funds to assure compliance with project objectives.
  11. Prepares monthly a report of activities to indicate activities and progress of the project's training component.
  12. Assists Regional Training Center Directors in identifying regional and host country crop protection training needs, instructional methods to be employed, time lines for implementation and evaluation of training outputs at target audience level.
  13. Assists PCVs who are directly involved in training either at the Regional Training Centers or as part of a Regional Training Center outreach activity in learning how to carry out appropriate training.
  14. Assists USDA training backstop in resolving program issues to insure U.S. academic/non-academic participants will receive the training required.
  15. Supervises the assistant Regional Training Officer who supports the RTO in carrying out the activities previously indicated.
4. Work plans relating to individual country needs are the basis for the budget figures found in Annex E. They will be subject to much refinement, as greater advisory assistance is provided during Phase II, and closer collaboration with NPP services will take place (see sequential implementation steps outlined above). Country by country, the general situation is this (see more detailed discussion in Annex I).

- The Gambia: Together with Cameroon, The Gambia program has shown the greatest advance due to SFCP inputs during Phase I. Gambia is in a position to utilize additional training, vehicles and operating support most effectively in extending new IPM concepts to farmers through extension services. A full-time CPO is planned for early in CY 1979.

- Mauritania: One of the least-advanced national plant protection programs, assistance to this service starts from nearly a zero base, with crucial needs for training, vehicles, and operation support in general. A paucity of technically and linguistically-qualified candidates for long-term training will be a major problem in getting the Mauritania NPP operational.

- Senegal: The NPP service lacks nearly half of its required top-level staff, and there have been problems in finding qualified candidates for long-term training (one currently is in the U S.). Phase II will continue to work with the NPP director in helping to determine optimum methods of training to expedite filling the crucial positions. Some training may be provided at the regional center in Dakar. Third country training would be another option. Equipment and commodity inputs for the Senegal program will be provided as the strengthened service is capable of effectively applying them.

- Guinea Bissau: This, again, is a nearly non-existent national program and the NPP service is starting from zero base. This largely reflects the priority in recent years to resolving political instability in the country, which left few options for promoting national programs in food crop production and protection. RFCP will help in identifying and time phasing assistance needs for an orderly development of NPP service and activities. Portuguese is the official language, as in the case of Cape Verde, which limits the utility of regional training at the Dakar Center. It is hoped that special programs for the two countries might be scheduled, to justify provision of translating and interpreting for the participants. Also planned are outreach specialized training teams from Dakar which can conduct appropriate training in these countries.

- Cape Verde: (See discussions for Guinea Bissau above).

There is a strong national concern and commitment for food crop protection in this country. The NPP service is lead by a very competent and aggressive young official, who has provided excellent direction to the NPP activities which were assisted through SFCP Phase I. These have been limited, however, due to a lack of middle level and field extension cadre to effectively employ and utilize inputs. Activities during Phase I included the anticipation of facility needs for a larger NPP service, and basic transportation and equipment requirements. Phase II will continue to address development needs of the NPP service with appropriately time-phased training, equipment and operational support.

- Cameroon: A very aggressive, committed national plant protection service has enabled SFCP Phase I to be especially effective in applying training, equipment and other inputs into highest priority activities of the service. Notably, attention is being given to the northern (Sahel-like) area of the country, where food crops of major concern are millet, sorghum and cowpeas. Cameroon has a large cadre of agricultural extension personnel (see table above) which will be the major interface with food crop farmers. As in the case of The Gambia, the advanced structure of the NPP service and the demonstrated national commitment to the program makes Cameroon especially able to utilize additional critical assistance (further training, vehicles, and other operating support) for early successes in IPM outreach to the farmers.

- Chad: The program here suffers from two significant handicaps. As in the case of Mauritania, the existing NPP service is poorly staffed and weak. Strengthening the NPP operational capacity through training is an obvious priority, but qualified candidates for long-term training are hard to come-by. The second major handicap to Chad operations is the political unrest and guerilla activities which makes much of the country inaccessible for extension activities and distracts the national government from major concern for food crop protection. Given these problems, it appears to be premature to have a full-time CPO assigned to Chad. It is proposed during Phase II to cover the RFCP activities for Chad by the advisory personnel in Cameroon and elsewhere. This decision will be reviewed annually at the time of RFCP project evaluations.

5. As was noted in the original Project Paper, the SFCP project did not provide assistance to Mali, Upper-Volta, and Niger because these Sahelian countries were being assisted by the Canadian International Development Agency, CIDA (See Annex H). While re-designing RFCP for Phase II, the design team heard indirectly and informally that CIDA assistance in the Sahel was under re-consideration, and programs in those countries might be needing assistance from alternative sources. Time constraints did not permit RFCP project officials or the design team to verify that this might be the case. No provision has been included in Phase II for expanding the area of project coverage to additional countries, although such an arrangement may become desirable. Since RFCP funding and advisory requirements will be formally reviewed annually, the design team suggests that requests for inclusion of other countries for assistance be considered at those times.

## PART VI: EVALUATION PLAN

This project has exceptional complexities and unknowns: the variations of individual country needs and priorities; selecting the most effective methodology and initiatives in an evolving and changing technology; a variety of specialized and general assistance agencies participating in related activities; etc. Under these conditions, the implementation of this project requires flexibility of approach, options of trial and error, and inclusion of formal processes to review and modify strategy and inputs to adapt to changing realities and priorities. Project evaluation at regular intervals becomes an essential element in these processes. The implementation plan (Part V) makes provision for this.

Evaluation of the project includes two major concerns:

1. The degree to which it is successful in providing the desired, identified and programmed inputs to build institutional capability to train and advise extension service.
2. The effect of those inputs toward preparing extension agents and farmers to try technologies which can reduce food crop losses due to pests.

The first concern is obviously the simpler, since it relates to specific work plans as detailed in project agreements.

The second concern is substantially more difficult to measure and evaluate. It calls for gathering base-line data in representatively valid samples, against which production/crop losses can be compared at the end of the measurement period. Personnel in the national plant protection services are, in most countries, insufficient, and inadequately trained at present to do a satisfactory job of data collection. Fortunately, however, this is an early high priority concern with the IPM Research Project, which will be helping the Sahel countries to achieve capability during the initial months of RFCP Phase II. The IPM project will be collecting, for its own purposes, macro data which should be fully usable for RFCP evaluation purposes. For the non-CILSS countries (Cameroon, Guinea-Bissau) the training in and collecting of field data will be handled through the demonstration activities of the national services. The regional training centers will help in keeping plant protection managers and specialists apprised of techniques in data collection which evolve through the IPM Research Project, or through other appropriate activities, such as IITA programs. The training centers will train national plant production staff in interpretations and application of data.

The importance of evaluation in the form and content of the project during the Phase II period makes it imperative that the annual exercise be prepared with care and with appropriate expertise. RFCP is an institution-strengthening program. Collaboration of the national plant protection services in project evaluation is a necessary element, since these services must develop competence to measure their progress and to identify requirements to modify their methodology, and outreach activities. Unless they develop and demonstrate competence in this, their activities may become

ineffective, and their influence in national planning (including the ability to secure national funding for plant protection activities) may be jeopardized. For this reason, the RPM will, through the CPOs, solicit the views and participation of the NPP Directors in developing the strategy for the annual RFCP project evaluation. Consideration will be given to feasible ways to include on the evaluation team an appropriate representative of the host countries (perhaps a regional training center director).

The evaluation team should include a representative of USDA and someone with special expertise in field data collection and measurement (perhaps an agricultural economist). It would be advantageous to include someone from the advisory team for IPM Research, if an individual could be made available for this purpose, or else to include the AID Liaison Officer who is associated with that project. Coordination of the evaluation team should be by the RPM. The PP design team is not suggesting that the above arrangements should be fixed, but proposes them as illustrative of what might be appropriate for this important exercise. Funding provided in Phase II budget should be sufficient to finance the costs of the evaluations.

The evaluation for 1979 will doubtless have limited data for measuring success, but a much more satisfactory measure should emerge by 1980. Therefore, it is proposed that the 1980 evaluation exercise be in greater depth, and that it include participation of an evaluation specialist from AID/W or an AID regional office.

PART VII: Special Conditions

A. The regional training centers in Yaounde and Dakar each will be expanded during Phase II, to include housing for staff. Construction will be phased over the three years as follows:

1. FY 79 for Yaounde training centers, \$185,000 is programmed for five family units.
2. FY 80, an additional \$65,000 for the Yaounde center for fencing the training center area and a small warehouse for application equipment and demonstration supplies.
3. FY 80, \$86,000 for the Dakar center, to provide a house for the training center director and his family, and for fencing around the housing area.
4. FY 81, \$86,000 for the Dakar center for four additional staff family units.

Additionally, in FY 80, \$80,000 is programmed for the NPP service for operations in Northern Cameroon, to provide an entomological laboratory for IPM activities.

A REDSO engineer has visited both of the regional training sites and has approved the design, prepared by Génie Rural of the housing units and fencing. Detailed specifications and cost estimates were included in the design plans. A condition precedent to obligating funds for the other construction programmed for Phase II will be the review and certification by REDSO of detailed design specifications for those activities. This will insure full compliance with the legal provisions of FAA Section 611(a)(1).

B. Phase II adds further specialized equipment and supplies required for NPP services in their training and outreach activities. Vehicles, sprayers, certain laboratory equipment and entomological supplies will be added as the services expand their capacities and their field operations

Similar items have been provided during Phase I, for which a procurement source waiver from Geographic Code 000 (U.S. only), to Geographic Code 936 (Special Free World) has been in effect.

Although the same conditions still prevail in some instances, the recent efforts of American supplier to expand their activities into African markets recommend that a blanket Code 935 waiver should not be requested for these acquisitions. Instead the list of equipment needed has been reviewed with SER/CCM and it has been determined that waivers would initially be requested only for those items which, based on recent information, can still not be obtained from U.S. suppliers. Waiver requests for these items and the supporting justifications are given below. For the remainder, offers will be solicited from U.S. suppliers and Code 935 waivers will be requested only if it becomes evident that no U.S. source and origin item is available for a given equipment or that the in-country support desired cannot be assured.

In the case of vehicles, it has been determined that source and origin waivers are required to permit procurement from Code 935 countries, of the following items (See Annex K):

Vehicles for Guinea-Bissau	9 Landrover, 2 Toyota pickups
Cape Verde	9 Landrovers
Mauritania	10 Landrovers, 2 Toyota pickups, 1 VW pickup

Justification:

The vehicles listed above will be used for field transport of personnel and equipment, often in highly inaccessible areas. As such, the wear and tear caused by the terrain and the climate will necessitate frequent maintenance and the prompt availability of spare parts. Failure to provide such support and the resulting halt in field mobility would not only hinder project implementation but could, in many instances, cause severe damage to ongoing project activities. Regrettably AID's experience, as supported by REDSO/WA studies, has been that U.S. vehicle manufacturers do not have adequate maintenance and spare parts support in these countries. Several foreign, i.e. non-US vehicle manufacturers, however, do have such facilities both in Dakar and other regional centers of convenience and by virtue of the constant demand for their services, have viable spare parts and maintenance availabilities to support their vehicle sales.

Therefore, a waiver of AID's source and origin rules is required to permit the procurement of these essential project vehicles from non-US, i.e., Code 935 countries.

pickup, 5 Citroen pickups, and three small field tractors; 630 knapsack sprayers, 2700 ULV sprayers, 1880 Dusters, and 40 exhaust sprayer.

Total approximate value of these is \$1,370,000, of which \$925,000 would be funded from SDP appropriations and \$445,000 from Food and Nutrition. As indicated in the request for the current waiver, the above equipment and supplies are an essential aspect of this project as service facilities and spare parts for U.S. vehicles and equipment are not readily available in this area. Peugeot and Landrover vehicles are widely used in this region, and private dealers can provide spare parts and service facilities with a minimum of delivery time. In addition, past Bureau experience with U.S. equivalent vehicles has proven unsatisfactory under rural African driving conditions. Even with special modifications (suspension systems and engine modifications), it has been virtually impossible to keep U.S. vehicles functioning properly or to improve performance where they have been used (Masai Livestock and Range Management, and Seed Multiplication and Distribution projects). Use of Peugeots and Landrovers would help assure satisfactory repair and maintenance conditions. In light of these circumstances, "special circumstances" exist for which a waiver of Section 636(i) of the FAA is justified. The chemicals and laboratory equipment are of a type presently used and available in the area. In addition, the country crop protection personnel are trained and familiar with these commodities.

In summary, then, the subject vehicles, commodities and equipment are essential to implementation of this project, are not available by the required date from one authorized source, and non-AID foreign exchange is not available for this purpose.

For the above reasons, it is concluded that exclusion of procurement from the sources requested above would seriously impede attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program. Approval of the covering Action Memorandum for this project by the AID Administrator will constitute approval continuation of this waiver through Phase II.

C. Statutory criteria as outlined in AID Handbook 3 App 5c have been taken into account in preparing this PP revision. The situation is similar to that which obtained at the time of the original PP. Additionally, the design team found that the completed statutory criteria checklist attached to IFM/Research Project Paper (625-0928) for the most part was identical to the situation for RFCP Phase II. All criteria are met in this PP, or provisions made for conformance.

ANNEX A  
PROJECT LOGICAL FRAMEWORK

Project Title: Regional Food Crop Protection (RFCP) - Phase II

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
<p><b>Program or Sector Goal:</b></p> <p>To increase the capacity for food production and reduce existing food deficits through the introduction of integrated pest management (IPM) measures to subsistence and other food farmers.</p>	<p><b>Measures of Goal Achievement:</b></p> <p>Field and stored food crop annual losses are reduced by the end of Phase II in an amount equal to or greater in value than annual project costs.</p>
<p><b>Project Purpose:</b></p> <ol style="list-style-type: none"> <li>1. To encourage &amp; facilitate the extension of IPM concepts &amp; techniques to food crop farmers by:               <ol style="list-style-type: none"> <li>a) Strengthening the organization, training and equipping of the National Plant Protection (NPP) services in each of the participating countries.</li> <li>b) Developing and strengthening a system for extension to farmers of IPM concepts and techniques, using training and demonstration.</li> <li>c) Utilization of national agric. extension cadre and agric. training facilities as elements in the above system, including training of those cadres in IPM concepts and techniques, and incorporating such training in institutional curriculums.</li> </ol> </li> <li>2. To strengthen the capacity of the NPP services to anticipate pest infestations, resurgences and other pest crises through surveillance and applied technology capability.</li> <li>3. To strengthen the capacities of the NPP services to combat and control pest infestations of major threat to food crops, which are beyond the control capacity of individual farmers.</li> </ol>	<p><b>Conditions Expected at End of Project:</b></p> <ul style="list-style-type: none"> <li>- National Plant Protection Services fully staffed, equipped, supplied, and operational in each participating country.</li> <li>- Training facilities in place with training programs conducted on a scheduled basis.</li> <li>- Demonstration and control areas selected, and exercises conducted regularly.</li> <li>- Organization is at Bamako for measurement, analysis, adjustment and dissemination of findings, recommendations.</li> </ul>

Data Prepared: December 1978

IMPORTANT ASSUMPTIONS	MEANS OF VERIFICATION
<p style="text-align: center;"><u>GOAL</u></p> <p>-That host government continues giving priority to agriculture production and to food crop protection.</p> <p>-That price policies of host governments are conducive to food crop production.</p> <p>-That crop protection practices are adaptable and acceptable to farmers.</p> <p>*See Footnote A.</p> <p>-Subsistence farmers will plant selected crops in considerable amounts regardless of price policy re crops, but use of pest control techniques will reflect input costs farmers can afford.</p>	<p>- National production statistics.</p> <p>- RFCP project evaluations.</p> <p>- IMP research and other CILSS measurements of losses of food crops due to pests.</p> <p>- Machinery exists for national plant protection service staff to get feedback from farm families.</p>

PURPOSE

<p>-That personnel will be assigned to NPP services, and available for academic and practical training.</p> <p>-That extension, agriculture service, farm unit, and other personnel (male &amp; female) will be available for training, sufficient in numbers &amp; adequate in qualifications.</p> <p>-That personnel receiving training will be available to conduct method demonstration exercises and outreach activities with farmers.</p> <p>-That farmers (male &amp; female) accept suggested protection measures.</p> <p>-That conditions in subsistence farming areas are sufficiently stable to permit unrestricted extension activities.</p>	<p>- NPP staffing pattern and inventory</p> <p>- Project reports and records</p> <p>- Implementation and work plans</p> <p>- RFCP project evaluations</p>
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Footnote A: The achievements of the project goal, as stated, imply a direct operational effect on food crop losses as a result of interventions of this project. In fact, the achievement of the goal will be indirect since it will be through successful application by farmers of validated technology which is provided through the project.

X46

## PROJECT LOGICAL FRAMEWORK

Project Title: Regional Food Crop Protection (RFCP) - Phase II

NARRATIVE	OBJECTIVELY VERIFIABLE INDICATORS
<p>Outputs:</p> <ol style="list-style-type: none"> <li>1. Improved structure and admin.capacity: A well-organized and staffed NPP service is functioning in each participating country.</li> <li>2. Improved technical expertise: The NPP service has received training in IPM concepts and techniques; the NPP service has developed and implemented a system for training agric. extension cadre in IPM concepts and techniques, and has installed IPM training in agric. training institutions.</li> <li>3. Improved outreach and technical effectiveness: The NPP service has been equipped with facilities, technical equipment and supplies, vehicles and operating funds sufficient for implementation of its assigned missions; Subsistence and other food crop farmers have been given demonstration and training in IPM concepts and techniques.</li> <li>4. National plant protection service ways and means to measure changed practices and physical results.</li> </ol>	<p>Magnitude of Outputs:</p> <p>NPP service is developed in accordance with plans as specified in project agreements.</p> <p>NPP specialists, agric.extension cadre, etc. in numbers specified in project agreements have received training. Training institutions are including IPM in curriculums.</p> <p>Commodity and facility requirements have been provided, and extension and other outreach activities conducted in accordance with project agreements.</p> <p>*Footnote B</p> <p>Inclusive feedback mechanisms are in place and operating. Monitoring system produces conclusions and recommendations.</p>

\*Footnote B: The stated outputs for the project are not quantified in the logical framework. They will vary country-by-country depending on the level of experience and expertise, the adequacy of staffing and budget support for the NPP and extension services, the accessibility of the food crop farmers, etc. The needs for individual countries will be analyzed annually at the time of preparation of annual work plans and country project agreements. The evolving results of IPM Research under the CILSS program will have some implication for inputs and outputs needed in RFCP for individual countries.

IMPORTANT ASSUMPTIONS	MEANS OF VERIFICATION
OUTPUTS	
<ul style="list-style-type: none"><li>- That project inputs are appropriate and sufficient to achieve desired outputs.</li><li>- That project inputs are timed according to priority needs, and delivered as planned.</li></ul>	<ul style="list-style-type: none"><li>Project Agreements</li><li>RFCP project evaluations</li><li>Project reports</li></ul>

INPUTS

Source and Input Group	YEAR			
	(U.S. Fiscal; Country Calendar)			
	1979	1980	1981	TOTAL
	(\$000 or equivalent value)			
<u>A.I.D.</u>				
Advisors	673.8	761.3	718.8	2153.9
Training	494.6	621.5	607.0	1722.5
Vehicles, transportation	566.5	547.3	699.0	1812.8
Operating equip., facilities	520.3	479.4	369.4	1369.1
Miscellaneous	248.5	191.2	195.2	634.9
Inflation	0.0	212.3	417.1	629.4
A.I.D. Sub-Total	2503.1	2813.0	3006.5	8322.6
<u>PC</u>				
Volunteers assigned	84.0	183.1	212.4	479.5
<u>Host Governments</u>				
Personnel	370.9	461.0	557.0	1388.9
Training	87.4	101.0	131.0	319.4
Buildings, maintenance	250.6	181.4	59.7	491.7
Vehicles, operations	229.8	307.8	354.1	891.7
Commodities	104.6	103.5	115.0	323.1
Miscellaneous	74.5	82.0	91.5	248.0
Inflation	0.0	123.7	261.6	385.3
Host Government Total	1117.8	1360.4	1569.9	4048.1
<u>Other Donors</u>				
Substantial inputs but values not available. See Part IV.				
<u>TOTAL</u>	3704.9	4356.5	4788.8	12850.2

## ANNEX B

### ECONOMIC BACKGROUND

Economic analysis of this project involves the position of grain in the economies of the project countries and how the project relates to that position. Following this, the micro analysis will show procedures employed to select specific control measures that are viable. Some illustrative data will be provided.

Economic analysis for the project is handicapped by scarcity of reliable data.

#### Macro considerations

The population of the seven project countries was 20.4 million in 1977 (table 1). Over four-fifths of the people still were engaged in agriculture in 1975, with estimates as high as 90% in Chad. The persons engaged in agriculture included those producing cash crops and livestock. This is an important consideration in Mauritania, where nomadic herding may still greatly exceed crop production, with the substantial production of peanuts in Senegal and The Gambia, cotton in Chad, and coffee and cocoa in Cameroon, all as export crops. Nearly all those engaged in agriculture attempt to produce the grain they and their dependents consume. Thus, crop production is a substantial activity in the households of perhaps 15-16 million people in these countries, and provides the primary (subsistence) income for perhaps 13-15 million.

Estimates of grain production in these countries are fragile at best, and virtually non-existent for Guinea-Bissau and Mauritania. Table 2 provides a set of such estimates for sorghum and millet, corn, rice, and cowpeas, the primary initial targets of the crop protection program. Total production may average in the neighborhood of 2.4 million tons annually (2,397,000 tons in the set of data in table 2). Two-thirds of this is sorghum and millet. Recent studies and data series have shown an adverse relationship between trends in food production and population in the Sahel area as a whole, and most individual countries. Senegal and Cameroon appear to be increasing food output about as fast as demand, but both have substantial imports of rice and wheat. The Gambia and Mauritania also have large deficits. These general observations are from recent issuances of FAO, the U.S. Department of Agriculture, International Food Policy Research Institute, and the Center for Research on Economic Development, University of Michigan. There is great need for the increased quantity of grain available for consumption represented by the results of effective crop protection. This can be viewed in terms of increased availability of food, in terms of saved foreign exchange or need for concessional and grant shipments, or in terms of improved real income of producers, both on the subsistence level, and through marketing.

FAO and U.S. specialists have provided many loss estimates in the

process of planning the larger multi-project CILSS plant protection program. The economic analysis of the Phase I project (AFR 625-916, June 1975) presented estimates in some detail, with ranges for each crop in Cameroon, Chad, Mauritania and Senegal. Without retracing this detail and more recent computations, it appears the technical specialists have tended to settle on a global estimate of 30-40% pre-harvest losses and 5-15% post-harvest losses in these largely low humidity areas. Technical commentary indicates further that recent and probably changes of production practices will lead to increased pre-harvest losses, in the absence of protection efforts. Similarly, post-harvest losses may increase in the process of increased commercialization, in the absence of measures to improve sharply the facilities, management methods, and application of chemical controls as required in commercial channels. Thus, the technical people appear to be telling us to use a global estimate of 40% pre-harvest losses for planning purposes, and perhaps 10% post-harvest losses.

Economic analysis must note recent controversy between crop protection specialists and economists over procedures in deriving such estimates. The essential issues involve alleged double counting, and failure to include crop failures due to drought, windstorm, fire, etc. following the application of control measures. For example, U.S. Department of Agriculture reports once made confident statements about loss levels in the U.S. Such estimates now are more tentative, pending the application of new procedures.

The procedures used in deriving the preceding technical estimates have not been analyzed. It is the judgement of this economic analyst to be conservative, and reduce the estimates for this analysis to 30% pre-harvest, and 10% post-harvest. Much improved estimates will become available during the Phase II project, primarily from the related CILSS-IPM Research project (AFR 625-0928).

These estimates are more impressive still, viewed in terms of meeting final consumer needs. A theoretical complete avoidance of 30% loss would represent an increase in harvested grain of 42.8% ( $100/70$ ). Carrying this forward, complete avoidance of 10% post-harvest loss would represent an increase in grain to consumers of 11.1% ( $100/90$ ). Compounding these would represent 58.7% more consumable grain ( $0.90 \times 0.70$  equals 63.0% of potential grain for consumption;  $100/59.5$  equals 158.7%). While this project does not pretend to eliminate losses, the exercise is more than academic in that such "leverage" also pertains to lesser accomplishments.

The estimated total production and population data also may be used to derive an estimate of total contribution of grain to incomes. Millet, sorghum, and corn may be valued at roughly \$140 per ton at the farm level, and rice and cowpeas at \$200, and this results in a total estimated value of about \$360 million annually. This represents \$21.40 per year distributed among 16.8 million people in families engaged in agriculture, in Table 1. This is a substantial part of the incomes of farmers in the area, and still higher for the millions who do not produce livestock or export crops.

The principal analytical use of the value and loss estimates is to derive an idea of the possibility of benefits exceeding costs of the project and field application of recommendations. Readers will recognize that the fragile data and series of preceding assumptions do not permit solid estimates. Each successive percentage reduction of pre-harvest losses represents 34,285 tons, and \$5,140,000 at the assumed farm value. Each successive percentage reduction of post-harvest loss represents \$4 million.

Project cost in Phase I was \$4.1 million, and projected Phase II cost is \$12.850 million. The Phase II costs represent \$4.3 million per year. It is considered realistic and indeed conservative to expect project activities to result in at least the required percentage reductions of losses by the end of Phase II. If we assume the start-up and institution building costs have not been realized annually in benefits to that point, benefits beyond Phase II should be expected to amortize those costs. If farm prices should be 25 percent higher, that much less reduction of losses would be required, and conversely, if prices were lower.

Price data at the farm level are extremely weak. The sources reviewed in preparing this section offer a wide selection of prices for choice. Better data should be expected in a few years, resulting from specific efforts in several of these countries to build a stronger economic capability. Meanwhile, subject to many reservations, it is necessary to choose a set of prices to continue this analysis.

An internal rate of return analysis may be appropriate after a time, as part of the economic analysis included in the CILSS-IPM project.

This reference serves to remind that while this project can stand alone, it is more meaningful and potentially powerful in association with the analytical approach emphasized in the IPM project. The best payoffs are expected when recommendations and actions derived from research are available. Indeed, the web of relationships spreads much farther, including other elements of production and marketing related research and institution building.

Crop protection can contribute to food security. Variations in annual losses appear to magnify rather than offset variations from other causes. Many pests thrive in dry weather. Any person experiencing the effects of drought plus grasshoppers in the U.S. plains area in the 1930's can testify to the economic losses plus psychological demoralization resulting. No attempt will be made to place a value on this factor for the project.

#### Micro considerations

The distribution of reduced benefits will be much different from the implied uniform distribution in the macro analysis. Plant protection will first seek ways to avoid catastrophic or at least major losses.

Another consideration is the relative difficulty of teaching, and cost of applying an effective control. Finally, while the project is primarily institution building with respect to National Plant Protection Services, the organization, staffing and training are not expected to reach all farmers, grain merchants, and others who must apply the measures during Phase II, and perhaps not until late in Phase III.

Thus, the overall results will in fact consist of an accumulation of specific and frequently localized actions.

The benefits of each practice in each situation at the farm or marketing level must exceed costs. While any individual action need only produce benefits slightly exceeding costs, many actions must produce larger benefits in order to cover the broader institutional costs, including ongoing operational costs.

Control measures that involve inputs the farmer must buy, and to some extent also additional work, must produce benefits sufficient to overcome the farmer's desire to avoid risk. Much analysis of near-subsistence situations indicates that because of this a substantial ratio of benefits over costs is needed initially, perhaps 3:1 in cases of perceived risk. This situation confronts the issue of price incentives to producers. Price policies in most of West Africa have unfortunately provided weak incentives to produce for market. Governments sometimes offset this condition at least in part by subsidy to specific inputs. This practice appears justified at least for the initial years for crop protection measures. The recommendation probably would be different in the context of a major overhaul of price and fiscal policies.

Yields also are constrained by other production factors than losses to insects, diseases, and weeds. High cost control measures such as repeated sprayings may be justified on corn in the U.S. that will yield 5 tons per hectare, but not justified on corn that may yield 800-1000 kg per hectare following effective control of one or two pests.

The Integrated Pest Management approach, further in combination with other research, land improvement, and other development actions offers the most logical way to relieve the circle of present constraints. This will be a slow process, but the primary one that is visible. The rationale of this project is linked to IPM; training provided appears to emphasize this logic; and present expatriate technicians have solidly adopted the approach.

The calculation of economic thresholds for control actions is a part of current pest management approaches. This is highly relevant to this micro analysis. The application of this approach will assure that each recommended control action is at least believed to be economically justified.

As an example of economic analysis of tests and demonstrations the Crop Protection Service in The Gambia provided the following data for seed dressing with thioram on millet. The estimated yield increase

on ten separated trials was 217 kg/ha. The value of the increase was \$U.S. 58.00 at a "present market rate" representing \$267 per ton. Reducing this to a more realistic estimate of \$U.S. 140 at the farm shortly after harvest would provide \$30.40. The only cash outlay was \$0.15 for the chemical. While the calculations were generous to the treatment in several respects, the results nevertheless were spectacular.

It may be noted that the entire discussion has made no mention or provision for price elasticity of demand. This is justified on a macro (national) basis as long as the country is importing substantial amounts of grain, and the demand of one country is a minute portion of the world supply. The value of grain in terms of utility or price may fall in a local situation as the supply increases, particularly if the marketing system is weak. The effects of this situation simply were not estimated.

#### Small Scale Farmers: The Poor Majority

Income levels in rural areas are consistently lower than in urban areas. Nearly all grain producers who are the intended beneficiaries in these countries fall within current definitions of the poor majority.

Strategy of this project, especially through its emphasis on integrated pest management, stresses low cost solutions wherever possible. Project activities further emphasize extension and training reaching the producer. While these elements do not guarantee that results will be entirely as economic and attainable and actually employed by small farmers as large, the project strategy is considered the best known.

#### Role of Women

Women are recognized to play a major, often dominant role in grain production in these countries. The implementation of this project therefore offers a means of improving their livelihood, and the productivity of work they do.

The project deals with a major problem within the largest single economic activity in these countries. There is basis to expect large benefits from the project activities, and that benefits will at least equal annual costs by the end of Phase II, with larger returns to come later.

**TABLE 1**  
**Economic Data**  
**Regional Food Crop Protection Countries**

Country	Est. 1977 Labor Force		GNP per
	Population in Agriculture		Capita
	(000)	(percent)	(\$ US 1975)
Cameroon	7,851	82	290
Cape Verde	300	80	120
Chad	4,200	91	120
The Gambia	534	84	180
Guinea-Bissau	973	80	133
Mauritania	1,293	85	320
Senegal	5,260	76	360

Source: AID Congressional Presentation FY 1979  
(priority source), or CIISS Country Plans of  
Operations for Integrated Pest Management  
(GNP in agriculture).

TABLE 2

Area and Production of Principal Food Crops  
Regional Food Crop Protection Countries

COUNTRY	Sorghum/Millet		Corn		Rice (paddy)		Cowpeas	
	Hectares (000)	Production (000 MT)						
Cameroon	404	366	312	377	21	24	117.6	68.7
Cape Verde	0		30.0	21			15	2.3
Chad	925	550	9.5	10	40	42.5		(5)
The Gambia	58	42	5.0	10	22	27.5		(2)
Guinea-Bissau		12		4		80		3
Mauritania		40	4.5	(0)		4.0		3.5
Senegal	943	511	47.8	53	82	115.1	58.4	24.4
<b>TOTAL</b>		<b>1521</b>		<b>475</b>		<b>273.1</b>		<b>1079</b>
								<u><u>2397</u></u>

Note: Midpoint used where source document provided a range.

Source: CILSS Country Plans of Operations for Integrated Pest Management (1975-76 data). Senegal sorghum, millet, corn, and rice data from Situations Economiques - DPGA, Government of Senegal, reproduced in "Senegal in Figures," 1977 (1976 data). Cape Verde data from "Cape Verde Assessment of The Agricultural Sector," General Research Corp., 1978, p. 101. Data represent conditions of average rainfall at planting time, with normal deficiencies thereafter; thus, do not represent average experience. Beans substituted for cowpeas. Cameroon data from Annuaire de Statistiques Agricoles, Rep. of Cameroon, 1974-75. "Haricots" substituted for cowpeas.

Guinea-Bissau: FAO Production Yearbook 1976, "Pulses" for cowpeas.

ANNEX CTECHNICAL BACKGROUND1. Significance and potential of the Integrated control approach:

Man shares the world ecosystem with numerous animal and plant species some of which are injurious. These species require constant and oftentimes expensive attempts to control insects, diseases and weeds which impair man's health and his supplies of food and fiber.

During the past three decades synthetic organic pesticides have been the principal weapon against pests and many gains have been made toward increased yields of many crops in many parts of the world, particularly in the developed countries. Pesticides also provide tremendous possibilities for increasing agricultural production in the developing world. Fortunately the overuse of pesticides which has occurred in the developed countries has not been a factor in the developing countries due to lack of resources of the small farmers and lack of the appropriate technology.

The over-reliance on chemical pesticides has (a) created well known pollution problems, (b) made some pests more abundant, (c) changed the status of species and (d) developed pest resistance to pesticides. Therefore, this clearly demonstrates the need to carefully re-examine the widely used approach of chemical control to conserve some of the traditional cultural controls and allow for new controls to be introduced into the pest management system.

In a few crop situations, a combination of non-pesticidal techniques alone has proved fruitful in greatly improving yields. The integrated control approach recognizes, however, that in most situations the abandonment of pesticides completely, would seriously decrease crop yields and increase the widening gap between world food supplies and requirements.

The challenge for this project and its staff is to develop a system whereby relevant techniques and methods of control are used in a compatible fashion, with a minimum reliance on toxic chemicals which need to be integrated in such a way as to minimize the harmful side-effects. In this context there are two important needs: first, to select pesticides with the least impact on the non-target environment; second, within the realm of pest control, to apply them efficiently in order to spare their natural enemies, whose destruction creates pesticide induced pest outbreaks and the resultant characteristic impermanence of chemical control methods. And here it is especially true of the Sahel where ecological conditions favor control by natural enemies.

In the implementation of this project the integrated control techniques go much deeper than a package of compatible pest control systems. Rather it is an ecological approach which seeks to bring into play every element which may be of value. These may be techniques such as use of natural

enemies, or regulatory systems, control of planting date, pesticide use, limitations on movements of infested produce and many other factors. Integrated pest control will depend for success on the cooperation of all concerned with food crops in any manner, although peripheral. So field workers, farmers, plant protection personnel, (technicians from host and expatriate governments in agriculture and public health) marketing and produce offices and the general public have a role to play in the integrated pest control approach. Everyone concerned needs to have some appropriate knowledge of the basic principles and application of this approach.

## 2. Basic concepts:

The success of establishing integrated control practices is most likely to be assured by concentrating a wide range of expertise through the project personnel in the form of demonstrations and training, thus achieving the necessary breakthrough to prove the practicability of a new approach; thus creating the confidence for adoption to widespread application. The Sahel Food Crop Protection project recognized these needs and has been promulgating every effort to institute these concepts.

The integrated control approach conceived by this project has been further advanced by the CILSS/IPM program and will eventually make farmers and extension services aware of, and familiar with, the new techniques and approaches in addition to providing a framework for appropriate research. The strategy will be open-ended, i.e., new techniques will be tested and introduced and those less effective will be withdrawn. Therefore, the CILSS/IPM project has a vitally important role to play to research new techniques and methods of control in a continuing process to provide to the extension and plant protection services the newly developed technology.

A very predominant emphasis has been placed on training in the project in order to ensure the adoption of integrated pest control techniques by the farmer.

The course material prepared for the training centers stresses the IPM approach to the control of pests in the Sahel.

Environmental Assessment

1. Description of Proposed Action

Under this project A.I.D. proposes to furnish assistance for the use of certain pesticides available to the plant protection services of Sahelian countries from non-A.I.D. sources. This assistance will take the form of supplying certain items of equipment (sprayers and dusters), as well as motor vehicles, and providing training to national personnel in the safest and most effective methods of application.

A. The U.S. Environmental Protection Agency Registration Status of Pesticides Used by National Plant Protection Services.

Although all pesticides which may become available to these services in the future cannot be identified at this time, those which have been recently used in Senegal, The Gambia, and Cape Verde are listed in Tables 1, 2, and 3, together with their U.S. registration status. As the training program is developed and expanded, these lists will be up-dated to reflect the pesticides which will be used in future programs and similar lists will be prepared and up-dated for other participating countries. A detailed description of the training to be provided under the project is provided in Annex F to the Project Paper, pages 57 through 67.

B. The Basis for Selection of the Pesticides by the National Plant Protection Services

The basis for selection of the pesticides by the national plant protection services is largely fortuitous in the sense that an undetermined fraction are furnished to them by the Office of Special Relief Operations of FAO, the remaining requirements being met from national resources. In the past, these pesticide uses have been selected largely on the basis of their lack of acute toxicity to users, their relatively low cost and their broad spectrum of effectiveness and there has been little consideration of their possible environmental impact and long term effects upon human health. However, it is a stated objective of the RFCP to turn this situation around and, in the context of integrated pest management programs, to promote the use of more environmentally acceptable substitutes which will also have less long term effects on human health.

2. Relationship of Proposed Action to Plans for Land and Resource Use

This aspect is discussed in the Technical analysis of the Project on pages 6 and 7 of the Project Paper and further elaborated in Annex C on pages 45 and 46 of the PP.

3. Reasonably Foreseeable Impact of Proposed Action on the Human Environment and Assessment of Positive and Negative Effects

Utilization of insecticides, fungicides and rodenticides, intended to kill invertebrates, plant pathogens and vertebrates, always contributes

Table 1. List of Pesticides used in Senegal During 1976-77.<sup>1/</sup>

TRADE NAME and FORMULATION	QUANTITY	COMMON NAME	USEPA STATUS
<u>Insecticides</u>			
HCH 25%	686.419 T <sup>2/</sup>	BHC	Cancelled October 19, 1976 RPA2 Nov. 19, 1976
Thimul 35 EC	13.521 L <sup>3/</sup>	endosulfan	general use
Cerathion 50 EC	5,295 L	malathion	general use
Fenitrothion	2,900 L	fenitrothion	general use
Peprothion	100,000 L	DDT 64% + endosulfan 18% + methyl parathion 18%	cancelled general use restricted use
<u>Rodenticides</u>			
Raticide	580.445 T	chlorophacinone (2.5%)	general use

<sup>1/</sup> Unofficial information from draft report of 9/22/78

<sup>2/</sup> T = Metric tons

<sup>3/</sup> L = LITERS

Table 2. List of Pesticides used in The Gambia during 1977

TRADE NAME and FORMULATION	QUANTITY	COMMON NAME	USEPA STATUS
<u>Insecticides</u>			
Aldrin 40 WP	30 Kg	aldrin	cancelled PR Notice 71-4 Mar. 18, 1977
HCH 25% D	9,250 Kg	BHC	cancelled Oct. 19, 1977 RPAR Nov. 19, 1978
Basudin 60 E	700 L <sup>1/</sup>	diazinon	general use <del>cancelled</del>
Carbaryl 85 WP	240 Kg	carbaryl	pre-RPAR review
Diazinon 10 G	3,060 Kg	diazinon	general use
Didigam EC	5,340 L	DDT 20% + lindane 2%	cancelled PR notice 71-1 Jan. 15, 1977 RPAR June 20, 1977
Fenitrothion 50 E	1,615 L	fenitrothion	general use
Malathion 50 E	2,200 L	malathion	general use
<u>Rodenticides</u>			
Ratilan Blocks	25,300	coumachlor	not registered in U.S.
<u>Experimental Insecticides</u>			
<u>Applied to Cotton</u>			
Endosulfan 50 WP		endosulfan	general use
Carbaryl 85 WP + DDT WP 75 +		carbaryl DDT	pre-RPAR review cancelled PR notice 71-1, Jan. 15, 1977
Dimethoate WP 20		dimethoate	general use RPAR Jan 1978
Permethrin 10 EC		permethrin	emergency registration only for cotton in 8 cotton states
Cypermethrin 10 EC		?	?

<sup>1/</sup> L = Liters

bl

Table 3. List of Pesticides used in Cape Verde during 1977

TRADE NAME and FORMULATION	QUANTITY	COMMON NAME	USEPA STATUS
<u>Insecticides</u>			
Folichlon EC 50	--	fenitrothion	general use
Agrothion EC 50	--	fenitrothion	general use
Dipterex SP 95	1000 Kg	trichlorfon	general use (pre-RPAR review)
Perfektion EC 40	2000 L	dimethoate	RPAR Jan. 6, 1973 (general use)
Thuricide HP (Sandoz)	--	<u>Bacillus thuringiensis</u>	general use
Hexapoudre WP 25%	--	BHC	cancelled Oct. 19, 1971 RPAR Nov. 19, 1976
Unden WP 1X	80 T <sup>2/</sup>	propoxur (Saygon)	general use
Volaton EC 50	1000 L	phoxin (Baythion)	general use
Basudin EC 50	--	diazinon	general use
Lebaycid ULV 1000	2000 L	fenthion (Saytax)	general use
Dipterex SP 80	--	trichlorfon	general use (pre-RPAR review)
Morestan WP 25	500 Kg	oxythioquinox	general use
Inogos 50	500 L	dichlorvos	pre-RPAR review (general use)
Phostoxin	400 Kg	phosgene	restricted use
<u>Fungicides</u>			
Calixin	--	tridemorph	general use
Polyram-Combi WP	--	metiram	general use
Baylaton	500 Kg	triadimefon	general use
<u>Rodenticides</u>			
Prentox	--	warfarin	general use
Racumin	500 Kg	coumatetralyl	general use

<sup>1/</sup> L = Liters

<sup>2/</sup> T = Metric tons

162

to the occupational hazard of the user as well as to the general contamination of the human environment as a result of the inherent toxicities of these materials. However, in this instance, where less than 10% of the users are literate, the hazard is increased immensely, despite the relatively low toxicity of the most heavily used pesticides. These Third World nations will continue to expand their agricultural technology, which inevitably means the increased use of pesticides, with the accompanying increase in yields and decrease in production costs--the beneficial impacts sought by RFCP. Eventually, pesticide use may include the use of herbicides provided such use is found to be economically justified.

A. Acute and Long Term Toxicological Hazards, Either Human or Environmental, Associated with the Proposed Uses and Measures Available to Minimize Such Hazards

Typically, any pesticide can impose an environmental insult when introduced in an unmitigated fashion, as in excess, to an improper site, an accidental spill, or deliberate dumping of excess tank-mix or dust. Insect resistance to insecticides as well as disruption of target and non-target ecosystems are predictable results of frequent and continued use of the same chemical against the same species particularly when the more persistent broad spectrum pesticides are used without taking these factors into account. Because the use of insecticides in the Sahelian areas has been minimal, resistance is not likely to be observed within the next decade. This would certainly be the case if heavy reliance on chemical control can be avoided by the continued introduction of non-chemical methods. The costs of chemical control in this subsistence economy are not likely to lead to significant reliance on insecticides by small farmers.

Mitigation of the identified adverse impacts can be achieved through the continued RFCP training program of small farmers. Simple educational programs in the safe use, handling, and storage of pesticides are absolutely essential when dealing with an illiterate audience, as found in the Sahel.

Mitigation of potential adverse impacts can be achieved by the continued educational program discouraging the use of the persistent organochlorine compounds, namely DDT, aldrin, dieldrin, and ultimately EHC. Due mainly to the economics involved, this will not easily or quickly be done, particularly when immediate or visible adverse effects are not detected by the users. The gradual substitution of insecticides that have USEPA registered uses and equivalent efficacy will be retained as a primary target of the RFCP.

B. The Effectiveness of the Pesticides for the Proposed Use

As stated in the project paper previously, the use of any pesticides is based upon assessments of the need for use. Assessments based

to include washing of hands prior to eating, not smoking during application operations, washing of contaminated clothing, spraying or dusting with the prevailing wind at the operators back or side, etc., never into the wind, and similar simple preventive or avoidance tactics.

G. The Availability and Effectiveness of Non-Chemical Control Methods

There are a number of techniques which the project intends to utilize in its training and demonstration activities and these relate to the original goal of the project to establish integrated pest management as the means to reduce crop losses. With the advent of the new CIILSS Integrated Pest Management Research Project, a resource of new techniques and procedures for IPM will be applied to the outreach programs in each of the Sahel countries.

H. The Country's Ability to Regulate or Control the Distribution, Storage, Use and Disposal of Pesticides

Pesticide control legislation is essential in the mitigation of both identified and potential adverse impacts. Such legislation is lacking in all RFCP countries, as far as can be determined, with the exception of Senegal. A draft of pesticide legislation has just recently been submitted to the Gambian Parliament where it is in process of enactment. This draft is well written and could readily serve as a model for the remaining RFCP countries. Encouraging the adoption of pesticide legislation should become a secondary target of RFCP in dealing with the overall long-range philosophy of pesticide utilization in food crop production. Pesticide storage facilities at Dakar, Senegal, and Yundum and Jenoi, The Gambia, are quite satisfactory for short or long-term storage. Concrete floors are above surface water levels, roofs are sound without leaks, and adequate natural ventilation is provided through windows or ventilators. Similar storage facilities have been constructed in Cape Verde and other facilities are under construction in Mauritania, Chad, and Cameroun. Spills or leaks of pesticide containers are minimal, in that such containers are emptied and used on a priority basis. There is no evidence of equipment washing or accumulation of empty containers at the storage facilities, in that mixing and container disposal occurs in the field at the site of application. Planned storage facilities for the remainder of the project will follow these initial designs.

Wastes and excess or out-of-date pesticides will accumulate and ultimately require disposal. Because designated disposal sites are not available the next best disposal system will be their use in pest control applications which expose the materials to natural photo- and bio-degradation, making full utilization of what would otherwise be essentially wasted. Any other method of pesticide disposal, including incineration, is undesirable under the conditions found in the Sahel area.

upon scientific survey of major economic pests will evaluate the degree of economic damage by a given pest or types of pests tolerable to a specific area of agriculture, and determine the need for one or more pesticides to control the pest problem based upon a cost/benefit analysis.

C. Compatibility of the Proposed Pesticides with Target and Non-target Ecosystems

This is already covered in the foregoing under A.

D. The Conditions Under which the Pesticides are to be Used, Including Climate, Flora, Fauna, Geography, Hydrology, and Soils

The objectives of the RFCP are to increase yields of Sahelian food grains which constitute principally sorghum and millet, crops grown in cultivated areas where wildlife does not occur. Hence, effects of the proposed uses on native wildlife will be minimal. Furthermore, all project areas fall in the tropical zone and the associated high temperatures and generally arid conditions lead to a more rapid photo-chemical breakdown of pesticide residues than takes place in most temperate climates.

E. The Extent to Which Pesticide Uses by National Plant Protection Services are a Part of an Integrated Pest Management Program

The principal thrust of RFCP is to develop the integrated approach to pest management utilizing a combination of techniques to control pests and thereby minimizing the use of pesticides, particularly those pesticides which are now commonly used by national plant protection services. Until we have a better understanding of the plant pest and disease complex limiting the productivity of each crop, we cannot expect to see any extensive use of non-chemical methods for plant pest and disease control. However, as this information is developed as the result of project activities, as well as under the CILSS-IPM project being executed by FAO, practical non-chemical control measures will be introduced as they are identified and tested over the life of the project. Under the best conditions, therefore, we can expect to see a concomitant decrease in the use of chemical pesticides.

F. Methods of Application, Including the Availability of Appropriate Application and Safety Equipment.

Except for a few motorized knapsack sprayers and exhaust sprayers mounted on pick ups, the great majority of sprayers and dusters used are hand operated. User hazards associated with field application of low concentrations of DDT, aldrin, dieldrin, BHC, and lindane are minimal and do not require special protective equipment and devices. However, all of these materials have the potential for causing acute effects if they are improperly used. Hence, the project places great emphasis in its training programs upon proper dilution rates and methods of application which will minimize user exposure i.e., personal sanitary measures

I. Provisions Made for Training of Users and Applicators

The project paper discusses the training component of the project on pages 57 to 67.

J. Provisions Made for Monitoring and Use of Pesticides

The country project officers (PASA) are charged with the responsibility to conduct field demonstrations including the determination of the population dynamics of major pests of food crops, the setting up of demonstration plots, the determination of injury threshold levels, the need for pesticide use and ultimately to achieve the end result; the cost/benefit ratio of an integrated pest management system. Frequent visits to pesticide storage centers will assure proper handling, storage and use of pesticides.

4. Reasonable Alternatives to Proposal Action

The only reasonable alternative to the proposed action would be to confine assistance to the use of only those pesticides which are registered by the USEPA for the same or similar uses. However, such a restriction would ignore the fact that a number of pesticides, which have been cancelled by the USEPA, are generally available in these countries and will probably continue to be available for some time to come. However, there is probably a larger body of scientific knowledge on the risks and benefits of use such pesticides and methods of ameliorating such risks than on all other pesticides combined. Indeed, to close our eyes to this situation and to deny to these countries our experience and knowledge in ameliorating these risks would result in far higher levels of environmental contamination than will result from the informed, judicious use of these materials by well-trained personnel who are familiar with the consequences of indiscriminate pesticide use.

5. Reasonably Foreseeable Adverse Environmental Impacts which cannot be Avoided

There will undoubtedly be a small build-up of residues of the more persistent pesticides in various environmental media. However, the maximum levels which will be attained will be far below those which have been reached in many of the developed countries since the economics of pesticide use in the countries included in the project will not support the levels of use which have been reached in the past by the developed countries.

6. Relationship Between Local Short-Term and Long-Term Effects

Local short-term effects were discussed under paragraph 5, above. However, as time goes on and more environmentally acceptable substitutes

for the more persistent broad spectrum pesticides are identified by the project and used by the national plant protection services, the residue levels in various environmental media can be expected to decline.

7. Irreversible and Irrecoverable Commitments of Natural or Cultural Resources

None

8. Policy Offsets to Adverse Environmental Effects

By providing the proposed training, particularly as it relates to the use of the more persistent pesticides, and as developed in the Project Paper under Section B, Economic Analysis on pages 8 and 9, a significant reduction of food losses can be achieved thus increasing the availability of basic food commodities and decreasing the need for importation of such commodities.

Summary

As this project moves forward to Phase II, the approach remains the same with respect to environmental concerns and pesticide usage. The concept of integrated pest management is paramount to the goals of the project and has the total commitment of the national Directors and others in the host country Ministries to develop integrated pest management systems to the extent possible. The host country personnel are also acquainted with Regulation 16 and they have been informed that the uses of certain pesticides such as DDT, aldrin, and dieldrin have been cancelled by the USEPA. They have also been informed of the regulatory actions which have been initiated by the USEPA against BHC and lindane, together with the long-term toxicological and environmental hazards which are associated with the use of these compounds.

Nevertheless, such ministry personnel strongly believe that the immediate benefits to be derived from the use of these pesticides in terms of increased agricultural productivity greatly outweigh any possible adverse environmental effects. Such effects as may occur will be confined to the countries where the pesticides are used since they will not be used on export crops. Bearing in mind the strong emphasis being placed upon the safe and effective use of these materials, pending the identification of more environmentally acceptable substitutes, the incremental added environmental risks associated with the use of these pesticides in the RCFP are considered to be negligible and outweighed by the benefits of their use on the major food crops.

ANNEX EBUDGET TABLES

Tables provided in this annex include:

- Table 1 - Summary Cost Estimate and Financial Plan
- Table 2 - Costing of Project Outputs
- Table 3 - Projection of Expenditures by Fiscal Year
- Table 4 - Project Inputs by Location and Year.
- Table 5 - Funding Attribution by Appropriation Category

TABLE I

SUMMARY COST ESTIMATE AND FINANCIAL PLAN  
( US \$ 000)

REGIONAL FOOD CROP PROTECTION PHASE 2 -  
PROJECT PAPER

Source	AID Grants		Host Country		Other(s)*		TOTAL
	FX	IC	FX	IC	FX	IC	
Use							
Advisors/Operating Pers.	1472.4	681.5		1388.9	115.9	363.6	4022.3
Training	1136.0	586.5		319.4			2041.9
Bldgs & maintenance	200.0	303.0		491.7			994.7
Vehicles and O & M	82.0	1314.8		655.5			2052.3
Other Operating Costs	750.3	1166.7		807.3			2724.3
Inflation factor	222.3	407.1		385.3			1014.7
Contingency							
<b>TOTAL</b>	<b>3863.0</b>	<b>4459.6</b>		<b>4048.1</b>	<b>115.9</b>	<b>363.6</b>	<b>12850.2</b>

\* This column is for estimated cost of Peace Corps volunteers assigned to Plant Protection activities in countries participating in this project. There is substantial other donor assistance which complements AID assistance, but it cannot be accurately valued at this time (see part IV of PP).

TABLE 2

COSTING OF PROJECT OUTPUTS/INPUTS ( \$ 000)

## REGIONAL FOOD CROP PROTECTION PROJECT PHASE 2

Source and Input Group	1 Structure	2 Expertise	3 Outreach	TOTAL
<u>AID</u>	( \$ 000 or equivalent value )			
Advisors	430.7	861.6	861.6	2153.9
Training		1722.5		1722.5
Vehicles, Transportation			1812.8	1812.8
Operating equip., facilities			1369.1	1369.1
Miscellaneous			634.9	634.9
Inflation	30.0	215.0	384.4	629.4
AID Sub-Total	460.7	2799.1	5062.8	8322.6
<u>PC</u> Volunteers assigned		200.0	279.5	479.5
<u>HOST GOVERNMENTS</u>				
Personnel	140.0		1248.9	1388.9
Training		319.4		319.4
Buildings, maintenance	300.0		191.7	491.7
Vehicles, operations			891.7	891.7
Commodities	30.0		293.1	323.1
Miscellaneous	25.0		223.0	248.0
Inflation	40.0	35.0	310.3	385.3
Host Government total	535.0	354.4	3158.7	4048.1
<u>OTHER DONORS:</u> Substantial, but values not available (see Part IV)				
<b>TOTAL.</b>	<b>995.7</b>	<b>3353.5</b>	<b>8501.0</b>	<b>12850.2</b>

TABLE 3

PROJECTION OF EXPENDITURES BY FISCAL YEAR  
( US \$ 000 )

REGIONAL FOOD CROP PROTECTION

PROJECT PAPER  
(Phase II Inputs)

Fiscal Year	AID Grant	Host Country	Peace Corps	TOTAL
1979	1,000	1,000	84	2,084
1980	3,000	1,300	183	4,483
1981	3,000	1,500	213	4,713
1982	1,323	248		1,571
<b>TOTAL</b>	<b>8,323</b>	<b>4,048</b>	<b>480</b>	<b>12,851</b>

TABLE 4

## REGIONAL FOOD CROP PROTECTION PROJECT-PHASE 2

PROJECT INPUTS (\$000) BY LOCATION

	AID Grant	Host Country	Peace Corps	TOTAL
Regional Direction *	2485.4			2485.4
Cameroon	524.2	245.1	60.0	829.3
Cape Verde	543.8	485.0		1028.8
Chad	487.0	135.0	54.0	676.0
The Gambia	642.9	530.0	72.6	1245.5
Guinea Bissau	621.3	516.0	48.0	1185.3
Mauritania	801.9	139.0	54.0	994.9
Senegal	397.3	489.0	72.0	958.3
Dakar Training Center	550.5	196.0	72.0	818.5
Yaounde Training Center	638.9	927.7		1566.6
Sub-total	7693.2	3662.8	432.6	11788.6
Inflation	629.4	385.3	46.9	1061.6
<b>TOTAL</b>	<b>8322.6</b>	<b>4048.1</b>	<b>479.5</b>	<b>12850.2</b>

\* includes costs of advisors assigned to countries under the PASA, regional coordination and training officers, and their ancillary in-country support costs.

772

TABLE 5

Regional Food Crop Protection Project (Phase II)  
Funding attribution by appropriation category \$'000

	FY -79		FY 80		FY 81		TOTAL	
	SII	FN	SII	FN	SII	FN	SII	FN
Cameroon		260.5		380.6		279.6		920.7
Guinea-Bissau		306.3		380.2		403.3		1089.8
*Regional Operations (PASA)	520.4		632.5		771.2		1924.1	
Dakar Training Center	196.5		223.5		162.7		582.7	
**Yaounde Training Center	140.1	140.1	115.9	115.9	84.8	84.8	340.8	340.8
Cape Verde	176.8		203.5		211.4		591.7	
Chad	167.0		151.8		213.1		531.9	
Mauritania	201.3		260.3		416.7		878.3	
Gambia	284.8		192.7		210.6		688.1	
Category Totals	1796.2	706.9	1936.3	876.7	2238.8	767.7	5971.3	2351.3
TOTAL		2503.1		2813.0		3006.5		8322.6

\* Regional Operations category to be supplemented by a proportional contribution from Cameroon and Guinea-Bissau which has been included in the FN funding for those countries.

\*\* Yaounde Training center to receive half funding from SII and half funding from FN.

ANNEX FTRAINING

1. The Regional Training Centers in Yaounde and Dakar serve several functions in improving the crop protection systems in Cameroun and in the Sahel:
  - a. To work with government employees in learning new crop protection skills.
  - b. To assist in the development of crop protection schemes that require employees to change current methods or to implement methods/procedures that have not existed before.
  - c. To develop an information system for the interchange of crop protection information among crop protection workers.
  - d. To assist the crop protection services in identifying farmer and crop protection problems and evaluating the impact of training on farmer abilities to solve their own pest problems.
  - e. To assist the crop protection services in improving their abilities to plan safely and effectively implement and evaluate crop protection projects that are carried out both independently and cooperatively with other agencies.
  - f. To actively facilitate cooperation between African Countries, in training and related crop protection activities.
2. With these general goals in mind the following specific activities have been planned for the Yaounde Center:
  - a. Workshops - special problem (single and multiple subject). Examples include topics such as cassava mealybug, and cowpea protection.  
 Intent - One special crop protection workshop each year. Participants to include Crop Protection Research, the National Crop Protection Service and the Extension Service.

- b. Training Course - Crop protection facts and principles. A three-week course in applied entomology and plant pathology to include pesticides safety in transport, storage, use and disposal.

One program in 1979 with three to be held each year thereafter,

- c. Grain Storage - a short course to be developed to improve Government ability to manage the protection of grain stores. Development is planned for 1979 with a workshop held each year thereafter. Developed as a separate course for extension agents will be a program on improving farmer ability to combat pest problems in farm storage.

d. Special Projects:

- (1) Cowpea grainstorage - One day program for extension agents. Agents will be trained to implement special training activity at market places for farmers and merchants and to carry out on-the-job training at selected farms.

- 1979: 2 training programs for extension agents
- 1980: 6 training programs for extension agents
- 1981: 12 training programs for extension agents

- (2) Witchweed - one day program for extension agents. Agents will be trained to recognize this weed, and explain to farmers what it is and the control methods available.

- 1979: 2 training programs for extension agents
- 1980: 6 training programs for extension agents
- 1981: 12 training programs for extension agents

- (3) Equipment maintenance and safe operation. Moped training will be provided in the demonstration areas where such equipment is assigned,

- 1979: 2 training programs for chiefs of post (extension supervisors first line)
- 1980: 6 training programs for chief of post

- 1981: 12 training programs for chief of post
- e. Training course - 1 week program on crop protection that is given to field supervisors. This program is a continuation of a program already in existence
- 1979: 4 programs
  - 1980: 2 programs
  - 1981: 1 program
- f. Special projects
- (1) 1979 - Develop for the Plant Protection Service an employee's manual explaining regulations covering use of equipment, trouble shooting of equipment problems, work responsibilities, reporting, public relations, etc.
  - (2) - 1979: Crop Protection newsletter - two issues  
- 1980: four issues  
- 1981: six issues
  - (3) Pest fact sheets - Development of field hand book on food crop pest control is end objective.  
- 1979: 2 fact sheets  
- 1980: 4 fact sheets  
- 1981: 8 fact sheets
  - (4) Crop protection mini courses that can be implemented by supervisors. These will be based on flip charts and or slide sets. Topics will generally be single subject issues. Supervisors will be trained to implement these programs in special 1/2 to 1 day workshops.  
- 1979: 1 program developed/implemented  
- 1980: 2 programs developed/implemented  
- 1981: 2 " " "
  - (5) Pesticide warehouse manager's course  
- 1979: under development  
- 1980: 2 programs (prototype)  
- 1981: 4 programs
  - (6) Pesticide application certification for govern-

ment employees

- 1979: under development
- 1980: Prototype
- 1981: implemented

(7) Crop protection field days for farmers/government workers

- 1979: under development
- 1980: 2 field days
- 1981: 6 field days

(8) Techniques pest survey training

- 1979: under development
- 1980: 2 programs
- 1981: 4 programs

(9) safety and first aid - safe driving - pesticide poisoning

- 1979: under development
- 1980: prototype
- 1981: 10 programs

(10) Management - Project planning

- 1979: under development
- 1980: prototype
- 1981: 6 programs

(11) Evaluation and problem identification

Development of paper surveys/interviews at supervisory, worker and farmer levels to identify work responsibilities, work system interference, crop protection problems and adoption of crop protection techniques advocated.

- 1979: Implementation of problems - identific-

ation survey in two demonstration areas.

- 1980: Implement of problem identification survey in 3 demonstration areas.
- 1981: Implementation of problem - identification survey in 4 demonstration areas.  
Implementation of training evaluation survey in 1979 and 1980 demonstration areas.

(12) Information distribution

- (a) publication
- (b) posters
- (c) radio programs
- (d) newspaper columns

All these items are considered important. Development in terms of numbers provided is difficult to project accurately since these are provided in relationship to planned use, information available, and the field activity being undertaken by the national Crop Protection Service and other cooperating agencies.

The methodology is being learned and the capacity to produce is under development. Capability to use the various media effectively to reach government employees and farmers with crop protection information is the objective for 1979-1981. Training program activities are designed to develop project planning and implementation skills; assist in the development of specific crop protection activity assignments for field extension workers; involve farmers in the problem identification and project planning phases; recognize the major role of African women in food crop agriculture ; develop the mechanism for government agency cooperation in attacking food crop pest problems ; and to develop the skills and mechanisms for Cameroon (and other participating countries) to carry on their own improvement and development when the project terminates.

3. Forward plans for the Dakar training center include these elements:

a. Course Development

This may take several forms:

(1) The development of traditional classroom programs that present facts and principles in subjects such as plant pathology, entomology, nematology, etc.. These programs are generally presented by permanent training center staff since the topics are generally considered to be relatively non-complicated and require more time to carry out than is available from specialists. These programs generally require relatively lengthy periods of time (3 weeks or more) and are generally carried out when students are available for prolonged periods of time. In the countries participating in the project, this will vary somewhat but generally will occur from November through June of the following year. Since students will not generally be available for protracted time period during the rainy season it will be difficult to relate classroom activities to actual field activities, and in some cases impossible, (An effort to do so is explained in paragraph b) that follows). An example is the basic crop protection in the Sahel Course which is already under development and expected to be implemented beginning November 1978.

(2) Short courses of a day or so to be held during the rainy season to reinforce and apply classroom learning to field activities. These would generally be carried out by the same instructors who carried out the classroom training previously discussed and would consist of a program that would go to the student in selected central locations to minimize the amount of time the employee is taken from his field activities. An example is the follow-up planned for the basic crop protection in the Sahel Course referred to earlier.

(3) Development of special programs that are highly structured and designed to be implemented by instructors other than those assigned permanently to the training centers. Generally, these would be developed by the training center staff with the technical assistance of specialists. (Bambey,

FAO, OCLALAV, ORSTOM). In turn, these programs would be implemented by other training centers and agricultural schools, after instructors were trained in the program's implementation in a special program carried on by the developing staff and involved specialists. An example of this activity is the Nematode Course currently under development by the training center staff and ORSTOM.

(4) Special workshop programs of a week or so designed to be either one time or annual events. Examples of this include annual/semi-annual meetings of project staff, the crop loss assessment workshop (this program has been under discussion as a cooperative effort with the Canadian), management seminars, State of the Art Programs, Equipment Operation and Maintenance Workshops, etc..

(5) Back-up support for programs organizations that plan to use training center facilities but will require either no or minimal participation in the program by the instructional staff.

(6) Miscellaneous activities which include production of publications, posters, slide-sets, newsletter, administration of correspondence courses.

b. Establishing Special Training Programs.

Since training staff and resources are limited it must be recognized that the training center is not capable of doing all things for all people. Consequently, requests for special training will be made 12 months in advance, and will be subject to review by the training center. Generally, acceptance will be based on staff time available, budget, size of audience, and whether the problem to be solved by the training is one common and significant in all or most of the participating countries.

c. General Procedure for Establishing the Training Center Program Schedule.

It is proposed the training center schedule for carrying out courses and program development be developed by the Director(s) of the school. This program will then be discussed with those who contribute financially to the school's operation, (USAID, Senegal Government, etc.). After this the program would be presented to the participants in the Sahel

Food Crop Protection projects annual meeting for review and questions. Advance copies of the proposed program schedule would be sent to Crop Protection Service Directors and U.S. Country Project Officers 30 days in advance of such meetings. A budget would be submitted within 60 days after the annual meeting.

d. Potential audience

Generally the audience is viewed as Government employees who work in some aspect to protecting food crops from pests. It is also recognized that the farmer is a major audience. However, sheer numbers and language means the emphasis of training center programs will be directed toward improvement of National Crop Protection Services help Government employees help farmers and the following figures are designed to help the reader understand who is viewed as being the audience served by the training center and how many there are. As Government employees leave their jobs and are replaced or new positions created the audience grows over time. Consequently the following figures are viewed as conservative.

	<u>Agents</u>
<u>Senegal</u> - Plant Protection Regional/Dakar Staff	7
- Direction of Agriculture Dept, (Extension Agents)	34
- Direction of Agriculture (Assistant Extension Agents)	120
- SAED	50
- SO.DE.VA.	140
- SOMIVITEX	40
- SOMIVAC	80
<u>Mauritania</u>	
- Crop Protection Service	13
- Class Kaedi	25
- Agriculture Extension System	
<u>The Gambia</u>	
- Plant Protection Service	60
- Extension Service	200
<u>Guinea-Bissau</u>	
- Crop Protection/Extension	40

Cape Verde

- Full time Crop Protection 8
- Agriculture Extension Agents 150

Note: Since plans call for program development to be incorporated into Agricultural School Courses, the audience is actually larger than the above figures indicate.

e. PROGRAMS SCHEDULING FY 79

The following proposed course schedule outlines the FY 79 training course schedule proposed by the Training Center. Courses I-IV is the 4 week basic crop protection in the Sahel Course to be held at the Dakar Center. Courses V-VI are a 3 week version that will travel to Mauritania and The Gambia. The successful implementation of this schedule is subject to a number of variables such as availability of a Senegalese Director, instructors, resolution of budget, etc..

Course I - 16 people:	Senegal	6 Nov.-1 Dec. 78
Course II - 16 people:	12 Senegal	8 Jan.-2 Feb. 79
	2 Cape Verde	
	2 Mauritania	
Annual Meeting of Project Staff/ Pesticide Workshops		12-16 Feb. 1979
Course III - 16 people:	12 Senegal	5-30 March 1979
	2 Mali	
	2 Guinea Bissau	
Course IV - 16 people:	Senegal	9- Apr.-4 May 79
Nematode Workshop		9-20 April 1979
Course V - 16 people:	in Kaedi Maurita.	21 May-8 Jun. 79
Course VI - 16 people:	in The Gambia	18 Jun.6 Jul.79
Crop Loss Assessment Workshop		15-20 July 1979
Series of 1 day Workshops (10)		July-August

Course Outline for Crop Protection in Phytopathology.

1. Introduction to plant pathology
2. Bacteria as plant pathogens
  - (a) morphology
  - (b) genera of parasitic bacteria
  - (c) symptoms of bacterial diseases
  - (d) bacterial diseases and hosts in Senegal.
3. Fungi as plant pathogens
  - (a) morphology
  - (b) reproduction
  - (c) classification: Phycomycetes, Ascomycetes, Basidiomycetes, and deuteromycetes

- (d) symptoms of fungal diseases
- (e) fungal diseases and hosts in Senegal.
- 4. Viruses as plant pathogens
  - (a) morphology
  - (b) Symptoms of viral diseases and viral transmission
  - (d) control of viral diseases
  - (e) viral diseases and hosts in Senegal.
- 5. Nematodes as plant pathogens
  - (a) morphology
  - (b) classification
  - (c) nematodes life cycle and reproduction
  - (d) control of nematodes
  - (e) nematodes and hosts in Senegal.
- 6. Phanerogamic parasites
  - (a) Striga
  - (b) Alactoria
  - (c) Cistache.
- 7. Penetration and infection of pathogens.
- 8. Disease development.
- 9. Multiplication of pathogens and their dissemination.
- 10. Effects of environment and nutrition on disease development.
- 11. Development of disease epidemics.
- 12. Types of damages and symptoms induced by bacteria in field and in storage.
- 13. Types of damages and symptoms induced by fungi in the field and in storage.
- 14. Types of damages and symptoms induced by viruses in the field and in storage.
- 15. Types of damages and symptoms induced by nematodes in the field.
- 16. Types of damage and symptoms induced by parasitic plants.
- 17. Control of plant disease:
  - (a) quarantins
  - (b) cultural methods
  - (c) biological methods
  - (d) physical methods.
- 18. Chemicals used for plant disease control

### Course Outline

- I. Introduction
  - (A) What is an insect?
  - (B) Why study insects?
    - 1. Numbers of insects
    - 2. Roles of insects
      - a. beneficial
      - b. destructive.

## II. General Entomology

- (A) Structure and physiology
  - 1. external anatomy ) Grasshopper as example
  - 2. Physiology )
- (B) Life cycles
- (C) Classification
  - To important orders (11)
  - To important families in certain cases.

## III. Pest Control

- (A) Types of Controls
  - 1. biological
  - 2. cultural
  - 3. resistant varieties
  - 4. chemical control
    - a) pesticide classification
    - b) formulation
    - c) application equipment
    - d) safety.
- (B) Economic Concept of Control (when to apply)

## IV. Insect Pest of Senegal

- (A) Pre-harvest ) For each crop:
  - 1. arachide ) (1) description of major pests
  - 2. millet ) (2) symptoms of injury
  - 3. sorghum ) (3) controls.
  - 4. rice )
  - 5. vegetable crops)
- (B) Post-harvest.

## ANNEX G

### PEACE CORPS PARTICIPATION IN FOOD CROP PROTECTION ACTIVITIES

In August of 1978, the Peace Corps directors and associate directors for Agricultural Development from all the Sahelian (CILSS) countries met in a meeting in Dakar to which a representative of RFCP project was invited to discuss possibilities for P.C. involvement and cooperation in RFCP and the Food Crop Protection Project.

Since August of 1978, PCVs have been working with the Senegalese Agricultural Development Service to increase the capacity of field advisors in entomology and plant pathology. This work has been instrumental in developing the Agricultural Development Center in Dakar. A newly arrived PCV is now assigned to a similar position with the Gambian Crop Protection Service. Several PCVs are involved in plant control work in Niger and more are expected to be assigned to the Niger Crop Protection Service in the near future.

In discussions with the directors of the Crop Protection Services of Senegal, Mauritania, Mali, and Niger, they have expressed a strong interest in using PCVs in their countries. Senegal, Chad and Upper Volta have also expressed similar interests. The host country governments are being consulted regarding this.

The principal objectives of the RFCP are as follows:  
 P.C. staff will provide entomology and plant pathology and varying numbers of these disciplines and also some language and cross-cultural training. RFCP staff will also provide technical training through the existing centers in Dakar and elsewhere. During the course of the above mentioned discussions the host governments clearly saw the need for assistance in what is the most important crop in the Sahel, i.e., increased millet and sorghum production. The RFCP will be working with survey and threshold determination and pest control in the grain storage.

The RFCP staff is accompanied by a P.C. staff manager has met with the host government chiefs in Mali, Mauritania, The Gambia, Niger, and Senegal concerning this proposal. All have responded favorably and the final job description, etc. left in the hands of the host country.

The RFCP should both be excellent vehicles for furthering the RFCP and AID - host country cooperation in the Sahel. The RFCP project officers and the PP design team are encouraged to continue to foster and Peace Corps interest in volunteer participation in crop protection activities; and believe that such participation will have a very significant impact toward success of RFCP during Phase II.

## ANNEX H

CILSS and Other Plant Protection Activities\*1. CILSS Plant Protection Program

Although the principles of integrated pest management permeate the entire program and there is an obvious need for a systematic flow of information between all of the elements of the overall program, projects within the program which deal with locusts, birds, rodents, and stored crop protection address pest problems which are in large measure distinct from those being attacked by the integrated pest management project. The methodology which is being developed under the latter for pest surveillance and loss assessments, however, will be applicable to the other projects.

On the other hand, two of the projects in the overall program, strengthening of National Plant Protection Services (Annex A) and the Information/Documentation/Training Services Unit (Annex G), are closely linked with the Integrated Pest Management Project (Annex B). National plant protection services are involved, at some level, in all aspects of implementation of the IPM project. Annex G provides an indispensable centralized facility to insure needed interchanges between individual elements of the program, between this program and other research efforts in Africa or elsewhere, and between research and outreach via the backstopping of national programs or the training of national cadres.

Annex A proposes assistance in improving the operations of the national plant protection services throughout the full range of their activities including the organization of pest control programs. It calls mainly for the provision of technical assistance, infrastructure development, equipment and material support and pesticide supplies.

On-going or planned projects already meet much of the five-year assistance requirement indicated in Annex A.

- a) The AID Sahel Crop Protection Project provides for the technical assistance and training needs inter-alia of Senegal, Cape Verde, Gambia, Mauritania and Chad, as well as two non-CILSS countries, Cameroon and Guinea Bissau. Some equipment support is also being furnished to these countries. The project includes the construction and establishment of two regional training centers - one in Dakar and one in Yaounde. Training at these centers will focus on the areas of pesticide use, toxicology, equipment maintenance, efficacy tests, pesticide legislation, etc. but they are broadly prepared to develop courses to meet identified needs. These centers will be used as a training resource for the Integrated Pest Management Project. The initial phase of the Sahel Crop Protection Project is scheduled for completion in 1978. Continuation of the assistance is projected for two additional three year phases.

\*not from CILSS IPM Research PP, Annex BII.

- b) The Canadian International Development Agency (CIDA) has set up programs for assistance in crop protection in Niger and Upper Volta and is planning a comparable effort in Mali. CIDA aid goes directly to the national plant protection services and provides technical assistance, professional and technical training, equipment, pesticides and funding for the construction of physical facilities to expand the field infrastructure of the national services. This assistance fills substantially all of the five-year needs indicated in Annex A for Niger and Upper Volta and will probably do the same for Mali.
- c) It is expected that the German assistance program will provide many of needs indicated in Annex A for Cape Verde.

This assistance to national plant protection services will enable them to expand both the scope and the reach of their activities and, working in large measure through national extension services or other outreach instrumentalities, to more effectively provide the delivery system through which pest and disease control practices and programs are extended for the farmer.

Annex B is more specifically focused on research into and development of applicable techniques of integrated pest management, the development of a methodology and system for making crop loss assessments and determining economic loss thresholds of pest infestation and strengthening the linkages between plant protection research and extension. In support of these primary aims, it includes involvement in data gathering, surveillance, testing, field trials, and demonstrations in actual farm situations. In these latter functions, Annex B operated through the same governmental entities as Annex A - the distinction being that Annex B concerns itself with the development of integrated pest management practices or intervention packages while Annex A is concerned with their dissemination to influence production.

Annex G is recognized as an essential support function to all elements of the overall program. The Information, Documentation and Training Services Unit provides the means through which research results can be promptly and effectively disseminated on a regional basis, in a manner and by methods easily comprehensible to the most affected user. It further fulfills the need for a centralized and comprehensive center of documentation for all those working on crop protection activities in the Sahel. Finally, it responds to the CILSS priority for Africanization of the program through timely planned and execution of training activities at all levels. It is intended that this unit be a part of the Sahel Institute and that detailed design of the project be completed by the end of 1977. This design effort will more clearly define the role and functions of the unit and the manner in which it will interface with other elements of the program.

## 2. UNDP/ICRISAT Cooperative Program for the Improvement of Sorghum and Millet

The objectives of this program are:

- to develop non-photo periodic sorghum and millet varieties having a shorter growing cycle to be better adapted to shorter rainy seasons. The varieties have to be resistant to grain moulds that will develop during the wet season.
- to undertake studies on conservation of soil fertility and soil moisture. Marketing systems will also be studied to ensure the availability of necessary inputs.
- to carry out research on diseases such as rust and ergot as well as on striga, a weed causing considerable losses.
- to improve and to promote certain other crops including cowpea and groundnuts by strengthening existing programs.

The total program provides for the stationing of 10 research workers, including 1 entomologist and 2 phytopathologists, to be stationed at Bambey (Senegal), Ouagadougou (Upper Volta) and Samaru (Nigeria). The major role of the entomologists/phytopathologists will be the study of resistance of newly introduced varieties to pests and diseases.

In the integrated pest management program, varietal resistance is one of the factors considered of major importance to ensure a reduction of pest impact. Two aspects have to be considered in particular 1) the early testing of the susceptibility of any new plant material to major and minor pests, 2) the selection of resistant varieties.

## 3. SAFGRAD (Semi Arid Food Grain Research and Development Project)

This project directly complements the UNDP/ICRISAT project by providing additional research/study staff from ICRISAT, IITA, and American Universities. It also supports extension service activities through the stationing of an Accelerated Crop Production Officer (ACPO) in each of the 18 participating countries. The project intends to increase production of food crops in Africa by considerable strengthening of research plans and liaison between research and application.

Close collaboration with the ICRISAT/SAFGRAD activity will be established to take full advantage of the work undertaken and to avoid duplication of effort.

4. AGRHYMET (World Meteorological Organization Program on Training and Application in Operational Agrometeorology and Hydrology in the Sahel)

The objectives of the AGRHYMET program are to aid the Sahelian countries in strengthening their national meteorological and hydrological services to allow them to play an effective role in the use of meteorology and hydrology for the benefit of national economic development. This use should especially further the rational utilization of lacking water resources and contribute to the increase of agricultural production. It should reduce production costs and diminish as much as possible the unwanted effect of meteorological and hydrological constraints on agricultural production.

Two parallel activities will be undertaken to achieve the objectives:

- strengthening of national services, including building, training of personnel, installation of a network of observation stations, collection of data, transmission and checking of data, analysis of data, diffusion of information.
- the establishment of a regional centre at Niamey that will play a coordinating role - it will participate in the analysis of data collected, in the preparation of information to be distributed, in the development of a regional training program as well as in the evaluation and application of new techniques. The preparatory phase of this program is almost completed and it will become fully operational in 1979. It could also service other related programs starting in 1980. In total there will be 150-170 observation stations.

In crop protection, the correct evaluation of possible damage and the timely planning of control operations will largely be dependent on an effective pest surveillance and at a later stage (after sufficient knowledge has been acquired) forecasting system. The combined use of meteorological information and biological data will be the basis of such a system. Close collaboration with AGRHYMET in the regional plant protection program is essential therefore.

5. Regional Remote Sensing Project (LANDSAT)

This project, headquartered in Ouagadougou, Upper Volta, has already demonstrated that satellite imagery can provide a useful tool for the identification of locust breeding grounds and emphasis now is on integrating sensing methodology within the operational framework of control programs. The usefulness of LANDSAT to integrated pest management will, however, probably be limited, at least during the first few years of the project. Liaison with this project should, nonetheless, be maintained to allow for increased cooperation as more sophisticated techniques become available and research experience grows. It is possible that crop protection specialists who are located in Upper Volta under the IPM project could cooperate profitably with imagery interpretation specialists at the Remote Sensing Center to help determine if high densities of certain pests can be detected by remote sensing.

6. Ahmadu Bello University, Nigeria

A considerable amount of research on various pests is carried out at the Institute for Agricultural Research of the Ahmadu Bello University at Zaria, northern Nigeria. A summary of the results achieved in the latest years as well as the current research program is provided in the CILSS Program document. It is evident that an intense system of information exchange and regular collaboration between the pest management program and the Institute will greatly contribute to achieving earlier and effective results to the benefit of agriculture in the CILSS countries.

7. GERDAT (Groupement d'Etudes et de Recherches pour le Développement de l'Agriculture Tropicale)

GERDAT is responsible for all the agricultural research carried out by eight French research institutes which have their main activity in Francophone Africa. The research carried out on grasshoppers has already been mentioned in the paragraph on pest problems. This research is done within the framework of a three year project. Experience for this has already been gained during similar activities carried out earlier in Madagascar. The major research on food crops is carried out by IRAT (Institut de Recherches Agronomique Tropicale). As far as crop protection research is concerned, three research workers (entomologist, phytopathologist and weed control specialist) are working with the Institut Sénégalais de Recherches Agronomiques at Bambey. One entomologist is stationed at Farakoba, Upper Volta. Research workers of IRAT work in close collaboration with their African counterparts and with workers in other disciplines, agronomy and breeding, as has been indicated in the technological analysis.

8. COPR (Centre for Overseas Pest Research), U.K. Ministry for Overseas Development

COPR will continue to work closely with OCLALAV in the grasshopper control activities first begun by OSRO. Three scientists are taking part in the current project which aims at research and development of a grasshopper monitoring and information service as a sound basis for rational control, study of control measures appropriate to local conditions especially at the small farmer level, and training of the plant protection service personnel by participation in above activities. Techniques already developed should find useful application in the IPM project.

9. Texas A&M/USAID Project

USAID supports a research project entitled "Development of Improved, High Yielding Sorghum Cultivars with Disease and Insect Resistance", at Texas A&M University, College Station, Texas, U.S.A. The objectives of this research are as follows:

- 1) To identify and catalog sources of insect and diseases resistance, improved grain quality, and other identifiable agronomic traits in partially converted and converted exotic and other sorghum in the world sorghum collection.
- 2) To develop high yielding, agronomically acceptable sorghums with high levels of resistance to insect, diseases, lodging and environmental stress.
- 3) To develop several agronomically superior breeding lines of sorghum with high levels of resistance to insects, diseases, lodging, environmental stress and having improved quality of grain.
- 4) To develop satisfactory techniques for screening, detection and evaluation of pest resistance in sorghum.
- 5) To collect and evaluate populations of plant pathogens for their range or changes in virulence to sorghum.
- 6) To develop improved integrated systems for managing the arthropod pests of sorghum.

Texas A&M University and the U.S. Department of Agriculture initiated a sorghum conversion program in 1963 where exotic sorghums from the world collections are converted from tall, late maturing, photoperiodically-sensitive types to shorter, earlier maturing, less photoperiodically-sensitive, pest-resistant types. The convergence program is maintained in Puerto Rico while the major breeding effort is located in Texas. Sources of resistance have been found for the following diseases: head smut (Sphacelotheca reilliana), downy mildew (Sclerospora sorghi), anthracnose (Collectotrichum graminicola), maize dwarf mosaic (MDMV), charcoal rot (Macrophomina phaseolina) and a number of common foliar diseases. Resistance also has been located for the sorghum midge (Cantarinia Sorghicola) greenbug (Schizaphis graminum), banks grass mite (Oligonychus pratensis) and various other mites and aphids. Also resistance to lodging has been found in several cultivars. The results of continuing research under this project will be of direct relevance to both the ICRISAT/SAFGRAD activity and the IPM project.

10. ORSTOM (Office de Recherches Scientifiques et Techniques Outre-Mer)

This is another French organization mainly involved with basic research. Dakar is the only centre of ORSTOM in the CILSS countries. At this centre a great deal of attention is paid to crop pests. It concerns especially nematology, rodent research, entomology and ornithology. In these particular fields it could certainly be of great support to the integrated pest management program and close collaboration should be established.

11. OCLALAV (Organisation Commune de Lutte Antiacridienne et Antiaviaire)

This organization is responsible mainly for control of desert locust (Schistocerca gregaria) and grain-eating birds (Quelea quelea). Its work is meant to supplement that of national services. Its scope includes the preparation of technical notes on control methods, contribution to training

personnel, set-up of survey teams and direct intervention in instances where national services are over-loaded or airplanes are required. OCLALAV has been able in this way to assist in grasshopper control.

12. OICMA (Organisation Internationale contre le Criquet Migrateur Africain)

OICMA is responsible for predicting outbreaks of African migratory locust (Locusta migratoria migratorioides) and implementing campaigns for the control of this pest. In the past two years, OICMA, like OCLALAV, has assisted national services in grasshopper control.

## PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

1. PROJECT TITLE  Sahel Food Crop Protection (Phase I Title)			2. PROJECT NUMBER  625-0916	3. MISSION/AID/W OFFICE  AID/SENEGAL
3. KEY PROJECT IMPLEMENTATION DATES			4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY)	
A. First PRO-AG or Equivalent FY <u>75</u>	B. Final Obligation Expected FY <u>78</u>	C. Final Input Delivery FY <u>85</u>	<input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION	
5. ESTIMATED PROJECT FUNDING			7. PERIOD COVERED BY EVALUATION	
A. Total \$ _____			From (month/yr.) <u>Nov. 1977</u>	
B. U.S. \$ _____			To (month/yr.) <u>Dec. 1978</u>	
			Date of Evaluation Review <u>Dec. 11, 1978</u>	

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

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Revise Project Paper for Phase II	Project Officer and Design Team	Dec. 1978
2. Increase staff and PASA participation	Project Officer and USDA/APHIS	ASAP
3. Accelerate participant training	Training Officer Country Project Officers	ASAP
4. Coordinate activity with CILSS/IPM program	Training Officer	Continue to end of project

## 9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

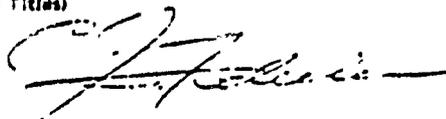
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____

## 10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

A. <input type="checkbox"/> Continue Project Without Change
B. <input type="checkbox"/> Change Project Design and/or <input type="checkbox"/> Change Implementation Plan
C. <input type="checkbox"/> Discontinue Project

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

Channing Fredrickson



## 12. Mission/AID/W Office Director Approval

Signature

Typed Name

Norman Schoonover

### 13. SUMMARY

The 1978 evaluation exercise coincided with the end of Phase I of Sahel Food Crop Protection (S.F.C.P.). This four-year phase has been concerned with preliminary gearing up of the National Plant Protection (NPP) services, both in expertise and in facilities and equipment. A country by country discussion of the identified needs, and assistance inputs which have been provided to address those needs is appended to this evaluation. Also discussed are the identified continuing needs and plans for continuing assistance into Phase II.

The country reports show achievements of SFCP in providing the needed inputs. A major early priority need in all countries was for trained personnel, and it was determined that two locations for training regionally would be the most effective solution to the problem. Training Centers have been started in Dakar and Yaounde for this purpose. The Dakar Center is now completed and training classes will commence in early 1979. The Yaounde Center will be completed in September 1979 with classes commencing soon thereafter. (Several courses are being held already in temporary facilities.)

The project is in too early a phase to be able to verify a global effect in reducing food crop losses due to pests. This will be resulting when the trained cadre have been fully outfitted, and large numbers of food crop farmers have been reached with new technology. Some of this is going on now, but it will accelerate rapidly as we enter Phase II.

### 14. EVALUATION METHODOLOGY

This evaluation occurred on schedule and at an opportune time as the project revision design team were able to participate as well. It had been agreed at the last PES review to hold the next review in Yaounde, Cameroon. The Project Paper, former PES, Country Project Officer Reports, Training Center Documents and oral reports were utilized in the preparation of this evaluation. Country progresses were reviewed in depth. Those participating in this review were the following:

- USAID/Regional Crop Protection Project;

Regional Project Manager	:	Channing J. Fredrickson
Country Project Officers	:	David Perkins Luther Roberts
Regional Training Officer	:	John A. Franklin
U.S.D.A. Coordinator	:	Joseph Gentry
Administrative Assistant	:	John Gruwell

- U.S. Peace Corps

Senegal entomologist : William Overholt

The Gambia entomologist : Celeste Welty

- Project Design Team (observers)

Project Design Officer : Allan Dean

Agricultural Economist : Stanley Krause

15. DOCUMENTS TO BE REVISED include a revised Project Paper for Phase II, new country Project Agreements and implementing documents.

16. EXTERNAL FACTORS

In the course of the first phase of the Project, requests were received from Cape Verde, The Gambia and Guinea-Bissau to participate in the Regional Project. Project Agreements were subsequently negotiated and tailored to the particular needs of each country. Despite the added workload created for the U.S. staff, the progress achieved in Cape Verde and The Gambia as described in the country reports is notable.

It was unanticipated that the CILSS/IPM project would materialize during the first phase and it presented an excellent opportunity to relate the institution building aspects of SFCP to the IPM research project.

An accelerated guerilla action in Chad limited access to some areas, but did not prevent pest management activities from taking place wherever possible and a good beginning has been made in developing staff capability and securing crop loss data on food crops.

Some delays were experienced in obtaining clearances for pesticides to be used in integrated pest management demonstrations. This problem delayed the setting up of programs in several countries. Every effort is being undertaken by the U.S. staff to coordinate pesticide usage with EPA regulations and requesting waivers whenever possible for epidemic or unusual situations.

17. EVALUATION RELATIVE TO GOAL

As indicated in the summary above, the effort of the project in meeting the project goal (restated as "reducing food crop losses due to pests") is expected to be measurable during Phase II, as the inputs provided during Phase I and II begin to result in much more effective operations of the NPP services in the countries, and as the NPP outreach activities extend technology to food crop farmers.

## 18. EVALUATION RELATIVE TO PURPOSE

The inputs and outputs discussed in the attached country reports have already been significant in strengthening the NPP services. However, the greater evidence of effective operations of these services will result after training programs are further along, and other facilities and equipment are in place. To date, the services have showed satisfactory performance relative to expectations, as SFCP project assistance has been applied during Phase I, except in those situations where external factors were a handicap (see 16).

## 19. EVALUATION RELATIVE TO OUTPUTS AND INPUTS

After unforeseen delays during the initial part of Phase I in recruiting advisors, receiving commodities and implementing construction (see 22), SFCP project was able during the last year of Phase I to supply essentially all the inputs programmed for that year, and to achieve the expected outputs. One exception has been a persistent difficulty for countries to find and nominate qualified candidates for short and long term U.S. training. Language competence has been the major problem. For more detailed discussion of inputs and outputs, see the attached country reports.

## 20. UNPLANNED EFFECTS

No unplanned effects were experienced.

## 21. CHANGES IN DESIGN

As indicated in the summary, this evaluation coincides with the project redesign for Phase II. The design team participated as observers in the evaluation exercise, and have taken into account the findings, including lessons learned, in designing Phase II.

## 22. LESSONS LEARNED

The recruitment of the appropriate technical personnel under the PASA is a lengthy process due to recruitment, clearances, and French language training. More lead time should be allowed for this most essential aspect of any project. Ample lead time should also be provided for when ordering commodities, negotiating agreements and contracts.

The establishment of a communication protocol especially in a regional project is very necessary to assure all country Project Officers are informed with regard to events in participating countries. The expediting of all types of communication is an important factor in project activity.

The difficulty in securing candidates for training in the U. S. can be overcome by encouraging potential candidates to enter English language training at our ICA-sponsored Language Training Centers.

23. REMARKS

The total commitments made by the CILSS states, the Club du Sahel, and the long range Sahel Development Program assures that the upcoming Phase II of the Regional Crop Protection Project is well-received by all of the host governments with whom we have bilateral agreements. The commitment of AID in a grant agreement to CILSS for the IPM research project further strengthens the importance of the project and was taken into account in the design of the SDP and is therefore an integral part of the major thrust to reduce food crop losses in the Sahel.

With regard to the acceptance of the new technology by the small farmers see discussion in revised Project Paper, Part III.B and C.

Cameroon: A very aggressive, committed national plant protection service has enabled SFCP Phase I to be especially effective in applying training, equipment and other inputs into highest priority activities of the service. Notably, attention is being given to the northern (Sahel-like) area of the country, where food crops of major concern are millet, sorghum and cow-peas. Cameroon has a large cadre of agricultural extension personnel (see table above) which will be the major interface with food crop farmers. As in the case of The Gambia, the advanced structure of the NPP service and the demonstrated national commitment to the program makes Cameroon especially able to utilize additional critical assistance (further training, vehicles and other operating support) for early successes in IPM outreach to the farmers.

### Cameroon Plans FY 80

For FY 80, development of the Crop Protection Service to increase food crop yields will concentrate on increasing the ability to handle and utilize pesticides effectively and safely, to apply or enhance natural or biological controls, to increase mobility and communication, to improve literature and insect collection reference material, and to train personnel in field work and laboratory diagnosis of problems. Pesticide handling will be improved by \$3,000 in loading and moving equipment and pesticide warehouse accessories. Additional application equipment (\$6,000) and protective clothing (\$3,000) will also be purchased. This will allow expansion of the project into 4 additional demonstration areas (total of 6) in FY 80. Construction of a facility (\$80,000) to house a room for introduction of biological control agents, a quarantine room, an insect rearing room, an insect collection storage and maintenance room, and a laboratory for diagnosis of pest problems will provide Cameroon a central area for implementation of integrated crop protection techniques. Mobility has already been increased by supplying 2 trucks, 8 mobylettes, and 26 bicycles to appropriate levels of crop protection personnel. Three additional light trucks (\$12,000) are needed to haul personnel, pesticides and light application equipment to field sites. Mobylettes (20) and bicycles (35) will be needed to implement integrated control through surveys and reporting. A national insect collection will be started, concentrating initially on pest species and beneficial insects. It will be stated as a unit of 10 cabinets and associated equipment (17,000) and will be housed in the Crop Protection Service diagnostic laboratory. Diagnostic laboratory equipment (\$5,000) will include items such as an autoclave, incubator, centrifuge, and refrigerator for study and diagnosis of plant pathogens. Field training (\$25,000) will concentrate on training of pest survey teams, warehouse personnel, pesticide applicators, and technicians who will do routine laboratory duties. Vehicles are needed to move the equipment and materials of the advanced technology we are introducing. Field vehicles needed include 3 small covered pick up trucks in FY 80 for transport of personnel and

spray equipment to sites where needed, an additional heavier duty pick up truck in FY 80 for a heavy exhaust-operated sprayer, and 3 additional small covered pick up trucks for transport of personnel, chemicals, water and spray equipment on FY 82. Utility vehicles include a small tractor in FY 80 for preparation of field plots and treating within the field, 3 loading and lifting vehicles for pesticide warehouse use in FY 81 and 2 additional field tractors for FY 82. These vehicles will complement the 2 heavier pick up trucks and station wagon already purchased for use in the north.

As the project expands and mobility needs increase, additional mopedettes (10) and additional bicycles (25) will be purchased. These should be available in FY 80 for use in subsequent years.

Laboratory equipment to be requested will be mainly for diagnostic purposes. A binocular microscope capable of detailed micro organism study and a stereo zoom dissecting microscope for use examining arthropod pests will be included. Also, for pathogen diagnosis work, a centrifuge, an incubator, an autoclave, and other microbiological equipment will be needed. Entomological supplies will include 10 insect cabinets with drawers and pinning and labeling equipment to begin the national insect collection of Cameroon, which will become a major diagnostic tool for crop protection.

Field training of farmers and survey teams will be necessary in introducing new techniques such as integrated control and biological control. Expenses involved in accomplishing this goal will include transportation of personnel to be trained to a central training site, if necessary, purchase of training equipment or booklets, supplying of sample materials (prepared or live beneficial organisms, application equipment, protective equipment, mechanical control devices, etc.), use of participating non-AID training personnel, and other field training related items.

Construction will consist of a temporary modification of an existing room in a crop protection facility for use as a biological control quarantine room through FY 80. In FY 81, a permanent multi-use quarantine room (for introduction of beneficial organisms or plant examination for pests) will be constructed. Alongside the quarantine room, under the same roof, will be constructed, a laboratory for diagnosis of arthropod and plant pathogen problems. This laboratory will also have some capacity for rearing beneficial organisms outside the quarantine room. The national insect collection will also be housed in this facility to make it available as a reference to the responsible scientist.

Cameroon Plans FY 81

By this time, the Crop Protection Service would be capable of operating effectively in parts of northern Cameroon. Expansion to other parts of northern Cameroon would require additional input of personnel and of vehicles (3 light trucks, one heavier pick up truck at \$24,000), additional warehouse handling equipment (\$3,500) and protective clothing (\$2,000). Entomological supplies (\$3,000) would include packing and mailing supplies (national and international) for insect identification, and collecting maintenance, and preparation supplies. Mobylettes (30) and bicycles (60) will be increased accordingly as the areas in which integrated control is applied are increased, totaling 30,000. Training of personnel (\$25,000) will continue in FY 81. Training objectives will be the same as in FY 80, but additional personnel are needed to carry out the expanded project.

Thus, integrated pest management, which requires accurate problems diagnosis, adequate consideration and useage of national enemies, safe and effective pesticide handling and application capability, mobility for surveying, reporting and responding with the necessary action, should be operating adequately by the end of FY 81.

CHAD

At the time of initial negotiations with the GOC the Plant Protection Service had just been organized and consisted of a chief, but no professional entomologists or phytopathologists. Plant protection work was being undertaken by field staff of the Department of Agriculture, although this was principally on cash crops such as cotton and ground nuts. It was estimated that crop losses in subsistence food crops occurred each year at an intolerable level.

FY 1980 ACTIVITIES

Government of Chad contribution for the year is estimated at \$49,500 with the Peace Corps contributing an estimated \$24,000. One replacement field vehicle costing \$13,000 will be needed. Various support items including application equipment and demonstration chemicals, pest collecting and laboratory identification materials, and reference literature will cost \$25,000.

Training is a key factor in the success of the Chad program. Long-term training in the U.S. calls for \$34,000 while a short-term participant in the States will cost \$8,000. Third-country training will require \$5,000, while \$20,000 will be provided to send participants for training at the newly established Regional Training Center at Yaounde. Onsite field training and demonstrations will cost \$5,000.

For routine vehicle maintenance and operations an amount of \$20,000 is earmarked.

FY 1981

The Government of Chad's contribution for the year is estimated to increase to \$60,000 while the Peace Corps contribution will remain at \$24,000. Two replacement heavy duty field vehicles and replacement Mobylettes will be purchased for \$65,000. Replacement application equipment, entomological supplies, protective clothing and reference materials are estimated to cost \$17,000.

Long-term training in the U.S. will be continued costing \$17,000. Short-term U.S. training will cost \$8,000. Third country training is estimated at \$5,000 and \$20,000 is allocated for training at Yaounde. An additional \$5,000 will provide for in country field and follow-up demonstration training.

Vehicle operation and maintenance are estimated at \$20,000.

## THE GAMBIA

In 1975 the Government embarked on an integrated five-year program to increase production of subsistence crops by 7.0 percent per annum. With crop losses estimated as high as 40 percent of production due to pests the GOTG requested assistance from the USG to strengthen the capability of the Crop Protection Unit (CPU) to control pests.

Since the original ProAg was signed in August 1976, the staff has been increased from 22 to 60. Six mobile plant protection teams have been equipped and trained. Vehicles and other supplies purchased. A storage demonstration/training depot constructed. Two participants in degree training in the U.S. will ultimately head the Entomology and Plant Pathology discussions, and two others are awaiting long-term training for nematology and extension training. The Director of the CPU participated in a one-month observation training in the U.S. and participated in the annual Conference of the Project held in Ibadan. Two candidates are enrolled in the University of Washington Entomology Correspondence courses.

The Country Project Officer (USDA) undertook field training of all Crop Protection staff in the techniques of pest surveillance and reporting which was done in collaboration with the mixed Farming Centers and farmers. With the foregoing input from the USG, the GOTG has contributed additional financial support in the form of personnel and is constructing an addition to the CPU to include a classroom, library, small laboratory and expanded office facilities. A Peace Corps Volunteer, Entomologist has been assigned to the Gambia and is engaged in training activities under the Direction of the Regional Training Officer.

Initial data from demonstration plots of 100 ha each, set up by the PASA entomologist in conjunction with the CPU, has shown promising results from a pest management program. A detailed report is in preparation. The second Phase of this project activity will continue to capitalize on an expanded, active service. This will be done through continuance of training at all levels, including extension agent training for those not directly related to the CPU additional fields vehicles for transport of chemicals spray equipment and personnel. The services of the Regional Project Manager (entomologist) will continue to be provided. In view of the accelerated program in The Gambia it is planned to pest a full time CPO under the PASA in the Gambia.

## CAPE VERDE

The Islands of Cape Verde are considered in the Sahelian zone and as such have become a member of the CILSS. The Cape Verde Islands have known long years of drought, causing serious consequences for man and livestock. The last period has been most severe and caused serious shortages in the production of corn. Partial production has been maintained as a result of irrigation. Even under these circumstances losses become particularly important.

There is a strong national concern and commitment for food crop production in this country. The N.P.P. service is headed by a very competent and aggressive young plant protection scientist who has initiated many activities and provided excellent direction in the first phase of the project. The Project Agreement was signed in September 1976 since which time commodities such as VW pickups, entomological supplies and sprayers have been purchased, some 30 field staff trained and a building constructed with an office, laboratory, and warehouses, and classroom for the project staff and extension agents. The Director of the service made an observation training visit to the U.S. in May/June of 1978 and a woman participant is presently in the U.S. in English language study in preparation for enrollment in the January semester at University of Florida for degree training in entomology. Phase II of the project will continue the training activities of extension agents at the Dakar Training Center or by an outreach team from Dakar working directly with the brigades in Cape Verde. Other training will include continuation of academic training for an additional candidate for a degree in Plant Pathology. Seven more field vehicles will be purchased during a time phased period to provide mobility on the other islands.

As the cadres and farmers themselves become familiar with the new technology, the need for application equipment will become critical and therefore substantial numbers of ULV sprayers will be provided.

The Cape Verdeans will absorb the salaries of personnel, vehicle operations and maintenance and other operational costs. The German AID Mission is providing laboratories and living quarters for the German entomologists who will be working in conjunction with the IPM project principally on biological control methods. OSRO has been historically providing pesticides on a as need basis. FAO has a plant protection specialist based in Praia to serve as a technical consultant to the Director of the service.

## GUINEA BISSAU

This country suffers substantial losses to food crops due to pests and is a factor well recognized as a major obstacle in overcoming its serious shortfall in food crop production. As a result of the war availability of funds for infrastructure to establish a Crop Protection Service.

The service was actually established in 1977, consisting of a Director (Agronomy Engineer), and one technician (3 years agriculture school) in each of eight divisions. Each technician supervises 3 to 4 agents who work directly with the farmer.

The service lacks vehicles, spray equipment, entomological supplies and intensive training in food crop protection. Many efforts to increase agricultural production in Guinea Bissau are counter-productive resulting in increasing numbers of pests due to poor seed varieties, improper timing of planting, and/or harvesting and inappropriate use of pesticides.

A project agreement was signed between the USG and GOGB in September 1978 in the amount of \$ 150,000 to provide training outside of Guinea Bissau, vehicles, sprayers and spare parts, a warehouse, office, classroom building.

The activity is just beginning to be implemented and will require additional funding for Phase II. It is planned to obtain additional field vehicles in order to have mobile survey and control teams in each division. Vehicles will be added as teams are trained. Outreach training programs and teams from the Dakar Training Center will be periodically making visits as this is a Portuguese-speaking country and most course work in the Dakar Center will be in French.

By the end of Phase II, it is anticipated that a functional crop protection will have been developed, staff will have been trained at the Directorate and field levels, the mobile units will be operational in each division, and numerous small farmers will have been trained

## SENEGAL

Following the recent catastrophic drought and subsequent pest resurgence on arrival of the rains, the Government of Senegal decided to establish the Plant Protection Directorate in 1974.

It was agreed to assist the NPP to expand its staff to include the Director and a chief of each of the following sections: Crop Protection, Zoology, Phytopathology, Legislation Affairs, and Pest Control Pharmacology. At the Regional level there will be a plant protection specialist in each of the seven regions of Senegal supported by three extension agents. These in turn will work with agricultural agents throughout Senegal and extend IPM technology to the farmer. To date, due to the language problems, only one candidate has been found for academic training in the U.S. although there are three candidates attending Universities in France under FAC sponsorship.

The main thrust of the Senegal program has been the construction of a Training Center to regionally train plant protection workers not only in Senegal but those from neighboring countries. See section in revised PP Phase II on training.

Other donors have provided to the GOS pesticides, spray equipment and vehicles, Therefore these commodities have been of minimal importance in our project contributions.

Phase II activities, aside from the Dakar Training Center will focus on strengthening the staff at the Directorate, and the Senegalese training staff for the Training Center. Efforts are being made through the Project Manager to expedite regulatory and registration controls relating to pesticides and quarantine procedures. A pesticide Management Seminar Workshop is being held for the Sahel countries in February and a series of workshops and training courses aside from the Dakar Training Center is expected to have a tremendous impact on the future of pest Management in Senegal.

## MAURETANIA

This country has one of the least developed plant protection programs. Assistance to this service started at virtually a zero base, with crucial needs for training, vehicles, and operating support in general, a paucity of technically and linguistically-qualified candidates for long-term training will be a constraint in getting the Mauretania National Plant Protection Service operational. As a result of several political factors the original project agreement for Mauretania was not signed until August 1977. However progress has been made in procurement of vehicles, entomological supplies and spray equipment. The chief of the service participated in an observational training program in the U. S. A training course in plant protection has been prepared for the Kaedi Agricultural school. Preparation has been made for the posting of a country project officer in Mauretania during FY 1979.

The country has an endemic plague of grasshoppers and several other pests which occur every crop season. The project is so designed to gradually build up the mobile units in order to conduct proper pest surveillance and reporting and undertake adequate control measures as localized infestations occur. As participant training achieves competent extension capability, emphasis will be given to the outreach objectives of the project.

### FY 1980 Activities

National personnel contribution is estimated at \$ 40,000 for the year. Peace Corps contribution is estimated at \$ 24,000. Field vehicles to be purchased with exhaust sprayers include four Land Rovers. One utility vehicle is to be purchased, An expenditure of \$ 5,000 is set aside for the procurement of entomological laboratory and field support equipment and radio communication equipment for the field vehicles. Protective clothing will be purchased. Two participants for long-term training will continue to be funded in 1980. Participants for short-term training are to be selected as well as participants for third country training. Ten participants are anticipated for Dakar Training Center. Follow up for field is anticipated for 6 trainees and demonstration plot costs. The Project will absorb costs of operation and maintenance of the vehicles.

### FY 1981 Activities

National personnel contribution is estimated at \$ 60,000 for the year. Peace Corps contribution is estimated at \$ 24,000. Field vehicles to be purchased include 3 Land Rovers and an additional 3 Land Rovers from host country. Two utility replacement vehicle will be purchased. Additional motorbikes will be added for use of the extension agents. Application equipment for Land Rovers, back pack sprayers, dusters etc. will amount to \$ 70,000. An amount of \$ 7,000 will be spent on entomological laboratory and other field support supplies. Replacement protective clothing will be purchased. Two participants will continue in degree training, and

.../...

two participants in short term U.S. training. Six participants will go to third country training. Twenty participants will attend the Dakar Training Center, Follow up and demonstrative train will continue as required. Vehicle and maintenance costs will be absorbed by the project.

ANNEX JPROJECT DESIGN TEAM

Project Design Officer

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Economic

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VEHICLES		GUINEA- BISSAU	GAMBIA	CAPE VERDE	MAURITANIA	SENEGAL	CAMEROON	CHAD	REGIONAL	TOTALS
<u>LAND ROVERS</u>	79	3		3	3			3		12
	80	3	4	3	4			1		15
	81	3	4	3	3					13
										<u>40</u>
<u>TOYOTA PICKUP</u>	79									
	80	1					1			2
	81	1					1			2
										<u>4</u>
<u>PEUGEOT CARRYALL</u>	79				1		1			2
	80				1	1	2			4
	81								1	1
										<u>7</u>
<u>UNIMOG TRUCKS</u>	79		4							4
	80									
	81							2		2
										<u>6</u>

VEHICLES		GUINEA - BISSAU	GAMBIA	CAPE VERDE	MAURITANIA	SENEGAL	CAMEROON	CHAD	REGIONAL	TOTALS
<u>V.W. PICKS UPS</u>	79				1					1
	80									
	81									
<u>CITROEN PICK-UPS</u>	79									1
	80						3			
	81						2			
										5
<u>SMALL FIELD TRACTORS</u>	79									
	80						1			
	81						2			
										3

11/10

SPAYERS		GUINEA BISSAU	GAMBIA	CAPE VERDE	MAURITANIA	SENEGAL	CAMEROON	CHAD	REGIONAL	TOTALS
<u>KNAPSACK</u>	79	75		50	75			20		220
	80	75		50	80					205
	81	75		50	80					<u>205</u>
										630
<u>U L V</u>	79	400		500						900
	80	400		500						900
	81	400		500						<u>900</u>
										2700
<u>DUSTERS</u>	79		600					80		680
	80		600							600
	81		600							<u>600</u>
										1880
<u>EXHAUST SPRAYERS</u>	79	3	4	3	3			3		12
	80	3	4	3	4			1		15
	81	3	4	3	3					<u>13</u>

6C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

- |   |   |
|---|---|
| <p>1. <u>FAA Sec. 116.</u> Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights?</p>   | <p>Tested pest control techniques will greatly assist the needy farmers of the Sahel to produce more food.</p>  |
| <p>2. <u>FAA Sec. 481.</u> Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?</p> | <p>No.</p>  |
| <p>3. <u>FAA Sec. 620(a).</u> Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?</p>  | <p>No.</p>  |
| <p>4. <u>FAA Sec. 620(b).</u> If assistance is to a government, has the Secretary of State determined that it is not controlled by the International Communist movement?</p>  | <p>Yes.</p>   |
| <p>5. <u>FAA Sec. 620(c).</u> If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?</p>  | <p>No cases are known among the recipient states.</p>   |
| <p>6. <u>FAA Sec. 620(e) (1).</u> If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?</p>   | <p><u>Same as above.</u><br/>This country checklist has been completed to reflect the compliance of the individual member states which are recipients of this regional project. A yes or no answer, if given, is applicable to all participating states. Otherwise, an appropriate explanation is provided.</p> |

PAGE NO. 6C(1)-2	EFFECTIVE DATE November 10, 1976	TRANS. MEMO NO. 3:11	AID HANDBOOK 3, App. 6C
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7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos? No.
  8. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? No.
  9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? No.
  10. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? No.
  11. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters. No.
    - a. has any deduction required by Fishermen's Protective Act been made?
    - b. has complete denial of assistance been considered by AID Administrator?
  12. FAA Sec. 620(q); App. Sec. 504. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default? None of the recipient states is presently in default of any AID loan.
  13. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).) Varies widely among the recipient states but there is no sophisticated weaponry.

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- 14: FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No.
- 15: FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? Varies widely among the recipient states, but all are in good standing in the U.N.
- 16: FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? No.
- 17: FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? No.
- 18: FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.? No.
- 19: FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? No.

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment.

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:

- (1) Making appropriate efforts to increase food production and improve means for food storage and distribution.
- (2) Creating a favorable climate for foreign and domestic private enterprise and investment.

B.1.a. This assistance is being provided pursuant to a comprehensive long-term development plan being developed by the Club du Sahel which includes the recipient organization and its member states. This plan includes, in one form or another, criteria to measure such progress.

Pest control packages be provided to the small farmer and will assist them to avoid food crop losses due to pests, thus increasing food production.

81b

- (3) Increasing the public's role in the developmental process.
- (4) (a) Allocating available budgetary resources to development.  
(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.
- (5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.
- (6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

N/A

d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?

o.

2. Security Supporting Assistance Country Criteria

N/A

a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section?

b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

AID HANDBOOK 3, App 6C	TRANS. MEMO NO. 3:11	EFFECTIVE DATE November 10, 1976	PAGE NO. 6C(2)-1
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6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

GENERAL CRITERIA FOR PROJECT.

- |  |  |
|--|--|
| <p>1. <u>App. Unnumbered; FAA Sec. 653(b)</u><br/> (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;<br/> (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure plus 10%)?</p> | <p>This project was presented in the FY 1979 Congressional Presentation. Any changes would be brought to the attention of the Congress through the normal Congressional notification procedures.</p> |
| <p>2. <u>FAA Sec. 611(a)(1)</u>. Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?</p>   | <p>Yes. See accompanying Action Memorandum and PAF Part II.</p>  |
| <p>3. <u>FAA Sec. 611(a)(2)</u>. If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?</p>  | <p>No legislative action required.</p>   |
| <p>4. <u>FAA Sec. 611(b); App. Sec. 101</u>. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?</p>  | <p>No water-related land construction is intended in this project.</p>   |
| <p>5. <u>FAA Sec. 611(e)</u>. If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?</p>  | <p>N/A.</p>  |

A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate?
- This project includes regional training facilities and is integrated with a regional pest research project.
7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
- The ultimate objective of this project is to improve the technical efficiency of agricultural production by providing tested research through extension to small farmers in the Sahel.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
- Although procurement of commodities (other than motor vehicles) is permitted in Code 941 countries, it is expected that most of the equipment and commodities will be procured in the U.S.
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.
- The countries involved will contribute local services to the extent possible to assist in achieving the project purpose.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?
- There is no U.S. owned excess foreign currency in any of the countries.
8. FUNDING CRITERIA FOR PROJECT
1. Development Assistance Project Criteria
- a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?
- Extension will directly involve poor small farmers whose utilization of tested research packages will provide a direct feedback for adjustment of research priorities.

81

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

- (1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;
- (2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;
- (3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;
- (4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:
  - (a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;
  - (b) to help alleviate energy problem;
  - (c) research into, and evaluation of, economic development processes and techniques;
  - (d) reconstruction after natural or manmade disaster;
  - (e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;
  - (f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

Although this provision is partially inapplicable, the project provides for the following:

Better pest control will permit the Sahelian farmers to increase their income. Extension of tested research packages will enable the small farmers included in the project to avoid extensive losses to pests.

\*118

PAGE NO. 6C(2)-4	EFFECTIVE DATE .. November 10, 1976	TRANS. MEMO NO. 3:11	AID HANDBOOK 3, App. 6C
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81

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

Funding drawn from Section 121 is not required to obtain 25% host country contribution. Funding drawn from Section 103 is properly and adequately supported in excess of 25% from host country contributions to the project.

N/A

Extension of pest control activities will assist in meeting the country's food needs by reducing losses to pests. Although the project relies on expatriates to provide specialized technical services, Africans, including women, will be trained, both on the job and in institutions in the U.S. and Africa, to replace those expatriates during the course of the project.

Project implementation in each country will rely heavily on manpower in that country. Although the project relies on expatriates to provide specialized technical services, Africans, including women, will be trained both on the job and in the U.S. and Africa, to replace these expatriates during the course of the project.

81

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). Does the activity give reasonable promise of contributing to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

The project shows that if crop losses due to pests can be reduced, the value of the project saved is sufficient to contribute both to continuation of the project and to the economy in general.

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

U.S. personnel will be hired under a PASA and considerable U.S. equipment will be procured in the project.

2. Development Assistance Project Criteria (Loans only)

N/A

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

82

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

3. Project Criteria Solely for Security Supporting Assistance

N/A

FAA Sec. 531. How will this assistance support promote economic or political stability?

4. Additional Criteria for Alliance for Progress

N/A

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

5. Additional Criteria for Sahel Development Project

How will this assistance contribute to the long-term development of the Sahel region in accordance with a long-term multidonor development plan?

For that portion of the project drawing funds from the SDP account, this project contributes the second three year phase in extension and training of national plant protection services to work with small farmers to increase food production by reduction of losses to pests and is an integral part of a multi-donor designed and implemented crop protection program.

121

6C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not).

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

- |   |  |
|---|--|
| 1. <u>FAA Sec. 602.</u> Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?   | Equipment procurement will be done in accordance with AID regulations.   |
| 2. <u>FAA Sec. 604(a).</u> Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?   | A waiver for Code 935 procurement of vehicles has been requested for selected recipient states.                                      |
| 3. <u>FAA Sec. 604(d).</u> If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?  | Yes.   |
| 4. <u>FAA Sec. 604(e).</u> If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?   | N/A  |
| 5. <u>FAA Sec. 608(a).</u> Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?  | Yes  |
| 6. <u>WMA Sec. 901(b).</u> (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. | Yes  |
| 7. <u>FAA Sec. 621.</u> If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,  | Technical assistance will be procured from the USDA which has most experience in the development and training of extension services. |

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are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport. Fair Competitive Practices Act, 1974

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

N/A. This is not a capital project.

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Yes

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million?

N/A

C. Other Restrictions

1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

N/A

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

N/A

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the U.S.?

Yes

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction?

Yes, AID regulations on vehicle procurement will be enforced.

5. Will arrangements preclude use of financing:
- a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions? **Yes.**
  - b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? **Yes.**
  - c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? **Yes.**
  - d. FAA Sec. 662. for CIA activities? **Yes.**
  - e. App. Sec. 103. to pay pensions, etc., for military personnel? **yes.**
  - f. App. Sec. 106. to pay U.N. assessments? **Yes.**
  - g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). **Yes.**
  - h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? **Yes.**