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PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol: UH

1. PROJECT TITLE IP-MAJ-707 ISN 1260 Integrated Pest Management (IPM)		2. PROJECT NUMBER 625-0928	3. MISSION/AID/W OFFICE USAID/Ouagadougou
		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) 686-82-C	
		<input checked="" type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION	

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING A. Total \$ 29,200,000 B. U.S. \$ 25,280,000	7. PERIOD COVERED BY EVALUATION	
A. Firm PRO-AG or Equivalent FY 78	B. Final Obligation Expected FY 81	C. Final Input Delivery FY 82		From (month/yr.) 2/78	To (month/yr.) 9/81
				Date of Evaluation Review See Block 8A	

B. 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.)	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTION TO BE COMPLETED
<p>The IPM evaluation was completed in mid-September 1981 and translated into French by mid-October 1981. USAID, FAO and the CILSS countries were given 60 days (November - December 1981) to review and comment on the evaluation findings (71 recommendations - see attached report). In mid-January 1982, the three parties met in Ouagadougou to review the recommendations in order to implement changes. At the January meeting, USAID, FAO and CILSS agreed upon the majority of the recommendations; however, the issue of a consolidated project direction was deferred until the CILSS Council of Ministers meeting in late January 1982. Unfortunately, the CILSS Council of Ministers was unable to come to a decision on the consolidation issue. AID/W has informed the CILSS that if a decision cannot be reached by March 15, 1982, the project will end in September 1982 (PACD). As of this submission, no decision has been made.</p>		

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

<input checked="" type="checkbox"/> Project Paper	<input checked="" type="checkbox"/> Implementation Plan, Ag. CPI Network	<input type="checkbox"/> Other (Specify)
<input checked="" type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	
<input checked="" type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify)
<input checked="" 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 checked="" type="checkbox"/> Change Project Design and/or
	<input checked="" type="checkbox"/> Change Implementation Plan
C.	<input checked="" type="checkbox"/> Discontinue Project

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

Robert Hellyer - USAID/Ouagadougou
(see Evaluation Report - Attached)

12. Mission/AID/W Office Director Approval

Signature: *Richard C. Meyer*

Typed Name: Richard C. Meyer

Date: 4-5-82

CILSS CROP AND POST HARVEST PROTECTION PROGRAM

Evaluation team report

(Draft)

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I. FOREWORD

The CILSS-FAO-AID Integrated Pest Management Research - Regional Food Crop Protection Evaluation Team assembled in Washington, D.C., on July 15, 1981, for meetings and briefings on July 16-17. The Team departed for Africa on July 17, arriving in Ouagadougou, Upper Volta on July 18. The subsequent itinerary proceeded as follows:

- *July 20-25: planning meetings in Ouagadougou
- *July 26-August 20: completed team visits to four - Guinea-Bissau, Mali, Senegal, Upper Volta - of nine countries
- *August 21-22: midpoint review and planning meeting in Dakar, Senegal
- *August 23-August 30: completed team visits to the remaining five countries - Cameroon, Cape Verde, The Gambia, Mauritania, Niger.
- *August 31-September 13: consultations, report writing and compilation of supporting data. Also held preliminary meetings with CILSS-FAO-AID principals.
- *September 14: formal briefing of CILSS-FAO-AID principals followed by discussion and exchange of views.
- *September 14-16: editing and compilation of final draft report in English; delivered to AID Ouagadougou for further action in accordance with the agreed Terms of Reference
- *September 17: team departed Ouagadougou with assigned mission accomplished.

The Team draws the reader's attention to a variety of editorial style and language in the report narrative; some differences in organization may also be noted. These resulted from a conscious Team decision, because of stringent time schedules, to give priority to substance over form. For the record, individual Team members concentrated their principal efforts as follows:

- *Dr. Thomas C. Irvin, Overall Future Management and Direction of . . . Program
- *Dr. Dale Bottrell, Regional Food Crop Protection (Annex A of CILSS Crop Protection Program)
- *Michel Lantagne, Construction and Equipment for Integrated Pest Management Research (Annex B)
- *Parke D. Massey, Financial, Budgetary and Management Systems for IPM
- *Dr. Patricia Matteson, Integrated Pest Management Research (Annex B)
- *Sereme Moussa, collaborated on Integrated Pest Management Research
- *Richard Strong, collaborated on economic and socio-economic sections of both Annexes A and B.

- *Channing Fredrickson, although not a formal Team member, provided valuable advice and commentary on various technical and administrative portions.
- *Charles Wilding-White, provided valuable financial-administrative outlines prior to an unfortunate accident which forced his withdrawal from Team activities.

All Team members had opportunity to review and comment on all portions of the report. This served as a useful crosscheck and, in some instances, drew forth valuable commentary and critique. To this extent, at least, all members are prepared to acknowledge the general direction of the report's recommendations. The Team enters a caveat, however, with regard to the forthcoming translation into French: until selected Team members, i e., Drs. Matteson and Irvin, are afforded an opportunity to review and comment, that text should not be considered an approved Team document.

The Team notes the valuable contributions made by Ms. Valentina Gontscharow and Ms. Marie de Lattre, Team translators/interpreters. Both were, in fact, much more. Their perceptions and observations along with their tireless participation in the report preparation and delivery activities added substance to the Team's efforts and enabled several members to forego administrative chores and devote valuable time to essential substantive matters.

A mission of this nature, involving many organizations, countries and individuals, cannot be successful without cooperation. We have included at the end of this report, a list of the people with whom the Team had opportunities to work, exchange ideas and learn. A special note of thanks goes to all those associated with CILSS, FAO and MID at all levels; their time and knowledge were vital to Team accomplishments.

Ouagadougou, September 16, 1981.

Dr. Thomas C. Irvin, Team Leader
Dr. Dale R. Bostrell
Dr. Patricia Matteson
Sereme Moussa
Richard Strong
Michel Lantagne
Parke D. Massey

II. EXECUTIVE SUMMARY

General

In the wake of the 1968-1973 drought, six (later increased to eight) Sahelian countries formed the Permanent Inter-State Committee for Drought Control in the Sahel (generally referred to as CILSS) to represent the member countries in deliberations with the major assistance donors on matters of economic and social development. CILSS placed high priority on agricultural development toward the goal of achieving self-sufficiency in food crop production.

In the mid-1970s, CILSS with assistance from the Food and Agriculture Organization (FAO) and the U.S. Agency for International Development (AID) formulated a comprehensive program for Crop and Post-Harvest Protection. Anticipating this Program, AID launched a Regional Food Crop Protection (RFCP) Project in 1975 assisting five Sahelian and two neighboring West African countries. Ultimately, this project served goals and objectives outlined in the CILSS Program for reinforcing the development and expansion of national plant protection services.

CILSS-FAO-AID deliberations also produced the framework for a second project aimed at providing the Sahelian farmer with the best available methods for crop protection through pest control. This initiative grew out of the CILSS Program's stress under Annex B on a project for Integrated Pest Management (IPM) Research. When commenced in February 1978, this AID-funded project would assist all the member countries of CILSS.

In April 1981, CILSS-FAO-AID policy makers decided to engage a team of experts to evaluate the administrative and technical progress under the RFCP and IPM projects. Curtly stated, the evaluation objectives stressed a review of management structures, technical capabilities and coordination-liaison relationships as related to both projects. The Team was required to produce a set of recommendations that would (a) serve as guidelines for design team work on an RFCP, Phase III and (b) provide a basis for revision and restructuring IPM Research. In the paragraphs that follow are short descriptions of the current status of technical affairs in the RFCP and IPM Projects followed by highlights of the review of their respective administrative and financial progress.

RFCP Project - Evaluation Findings

Phase I of the Regional Food Crop Protection Project, authorized on June 20, 1975, provided \$3.125 million for a four-year period. A three year extension of the project, known as Phase II, authorized on March 19, 1979, provided \$8.323 million. Phase II will terminate on June 30, 1982.

The stated purpose of the RFCP Project was to encourage and facilitate the extension of IPM concepts and techniques to small food crop farmers. Countries presently included in Project funding and the year in which they joined the Project are as follows: Senegal (1976), The Gambia (1976), Cameroon (1976), Cape Verde (1976), Mauritania (1976), and Guinea-Bissau (1978). Chad joined the Project in 1976 and participated until March 1979. In addition, the Project has funded academic training of four Malian students in the United States.

The RFCP Project has supported a range of activities with emphasis on building up the national plant protection (NPP) services' infrastructures. This has been accomplished through: (a) university training in crop protection for NPP Service personnel, regional training facilities at the Project's regional centers in Yaounde and Dakar, and in-country training for government officials, NPP service personnel, extension agents, and a limited number of farmers; (b) increasing the NPP services' staff of technicians and crop protection (intervention) brigades; (c) supplying the services with vehicles, pesticide application equipment, and certain other equipment; and (d) and sponsoring construction required for office, teaching, laboratory, and storage facilities. In addition, the Project has sponsored work to determine the losses caused to food crops by various pests, pest surveys to determine the kinds and seasonal abundance of pests on selected crops, a limited amount of research on alternative methods of pest control, and some work on extension of pest management techniques to farmers.

The Project unquestionably has succeeded in strengthening the organization, training, and equipping of the NPP services in each of the participating countries. It also has increased awareness throughout the Sahel and surrounding areas of the importance of pest problems and the need for crop protection.

The Project has failed, however, to show significant progress in developing and strengthening a system for extending IPM technology to farmers. This is a serious deficiency and one that must be corrected. Otherwise, new IPM technology that may evolve under the complementary CILSS IPM Project (also AID-funded) will remain confined at the experimental level and never reach the intended beneficiaries, the small farmers.

The evaluation showed that the RFCP Project has focussed heavily on the use of pesticides and the primary beneficiaries to date have been the NPP services; these services generally are not involved in any aspect of crop protection other than intervention with pesticides. It was concluded that the potentially most harmful impediment to IPM in the Sahel and surrounding area is a continuing proliferation of extension and intervention efforts which favor increased pesticide use. Experience from around the world has shown that once the chemical control strategy has been adopted the chances for IPM are severely reduced. As presently structured, the RFCP Project is fostering a climate favorable to increased use of the chemical control strategy.

Recommendations are offered which, if adopted and followed by the design team, will restructure the RFCP Project during Phase III as required to develop programs and policies that aim toward a cohesive regional effort in IPM development and execution with much less emphasis on unilateral chemical control means.

CILSS IPM Project Evaluation Findings

The CILSS Integrated Pest Management Project was created to strengthen national research capability toward developing appropriate IPM techniques for extension to farmers. To this end, Phase I was started to build laboratories and other infrastructure, establish an IPM research program, evaluate crop losses and the relative economic importance of pests, set up a surveillance system on the occurrence of major pests, and develop a system of demonstration and extension.

Because of administrative and management problems, project activities did not commence until about September, 1980. Chad has not been a project participating country since its civil war, and administrative conflicts have frozen operations in The Gambia. In Mauritania, Senegal, Cape Verde, Mali, Upper Volta and Niger, modest scientific programs are in their first season. Construction has begun only in Senegal. Most national programs trained observers in 1981, and either established observation posts or chose their sites. Thus, progress is just beginning and an extension of Phase I to June, 1985 will be necessary to attain project objectives.

The evaluation produced general recommendations on research orientation and staffing. Problems with adequate provision of funds for training counterparts were addressed. Means were recommended to ensure coordination of regional crop protection training, an adequate extension effort, and better regional and international liaison, both within the project and between the IPM Project and other plant protection programs.

Coordinated Project Management - Evaluation Findings

The Evaluation Team recommends against merging the two projects at present. Rather, we have suggested a certain synchronization supplemented by closer coordination and linkage among the AID project managers and their CILSS-FAO and national colleagues. As a first step, we recommend that Phase III of RFCP commence in June 1982 (enough budgetary resources are available to finance this modest extension of Phase II). Redirection of the IPM project should be complete by that same date. Both projects would then run in tandem through June 1985, allowing for three successive field campaigns for IPM Research and corollary re-orientation of NPP services toward integrated pest management principles and methods (extension of IPM will require the allocation of funds in addition to the planned \$25.3 million).

Our recommendations on management address all three principals: CILSS-FAO-AID. We recommend that AID organize a joint IPM/RFCP office in AID Upper Volta, transferring RFCP direction and resources from Dakar. We assume a firm link between both projects through this joint office. On the CILSS side, we recommend the transfer of the Regional IPM Office with its Sahelian and FAO staff from Bamako to Ouagadougou and the appointment of the Regional Director by the CILSS Executive Secretary (or following an arrangement already working between CILSS and the World Meteorological Organization for AGHYRMET). As concerns FAO, we recommend that CILSS and AID agree to vest in FAO the technical direction of the IPM Project

to include budget and financial management responsibilities. We note also FAO should increase and accelerate its endeavors to recruit and appoint field personnel.

Recommendations:

Overall recommendations, 71 in number, are found in Section VIII of the Report. Those individual recommendations provide greater detail and substance in support of the following five general recommendations

1. An AID-CILSS-FAO Management Team should be organized to carryout the two coordinated and mutually supporting projects in food crop protection. This Team should consist of a strengthened CILSS Director's office, an adequately staffed USAID joint project office and an FAO advisory component at regional and national levels with increased project execution authority and responsibility.

2. Phase III of the regional food crop protection project should be redesigned to emphasize the delivery to subsistence and food crop farmers of effective and economic integrated pest management systems, developed by the IPM project. This should be accompanied by a consequent reduction in intervention with pesticides except in an IPM framework.

3. The Integrated Pest Management Project should be closely linked to the RFCP project with emphasis on producing, through research and training, IPM systems that will feed into the RFCP project's work with extension services, crop protection services and individual farmers.

4. AID-CILSS-FAO must mutually develop life of project and annual budgets that reflect agreed project execution schedules and agreed activities. Financial management must be made an effective tool at the disposal of the management team.

5. At working levels, USAID-CILSS project managers and FAO advisors should institute coordinated approaches to day-to-day problems of project administration and technical operation.

III. WHAT IS IPM?

Integrated Pest Management is the maintenance of pest populations at economically insignificant levels with a minimum of environmental disruption through the use of a variety of techniques based on an understanding of the ecology of the pests and the field environment. The role of pesticides is minimized in favor of such methods as the use of resistant crop varieties, the introduction and augmentation of the natural enemies of pests, and changes in the cropping system that work to the detriment of pest species.

The concept of integrated pest management is explained further in APPENDIX 1.

Though the term Integrated Pest Management -- or IPM -- was coined only recently, the use of certain IPM techniques can be traced back many decades. In fact, traditional farmers in Africa have practiced a form of IPM for centuries. Through trial and error, natural selection, and keen observation, the traditional farmers developed cropping systems that "integrated" certain fundamental IPM components. For example, the highly laborious system of paddy rice culture along the river systems probably evolved, in part, because it was the most practical system to manage weeds. The procedures of submerging weeds into puddled soil, transplanting seedlings old enough to compete successfully with late-germinating weeds, and flooding are known to be effective in weed management. The selection and use of local varieties of crops possessing insect pest or disease resistance, interplanting and rotating

different crops, natural environmental and biological control factors, burning, use of various aromatic herbs or plant oils to protect the grain in storage, and destruction of harvest residues -- these and various other traditional methods are known to reduce some pest populations and may be desirable IPM components. A goal of IPM development in subsistence agriculture -- characteristic of Sahelian agriculture -- is to preserve those traditional methods of pest control known to be effective and to conduct research on improving their use.

There are no absolute guidelines for integrated pest management. An IPM program must be tailored for the crops and pest complexes of a given area, and execution of the program may vary from year to year depending on numerous variables (e.g., yield potential and value of the crop, price and availability of fertilizers, labor, and other inputs, and sociological constraints). However, the successful development and execution of any IPM program requires certain essential steps. These steps are listed in the reference Guidelines for IPM Development and Execution which appear in APPENDIX I.

IV. OVERVIEW - CILSS CROP AND POST HARVEST PROTECTION PROGRAM

The Permanent Interstate Committee for Drought Control in the Sahel (CILSS) was formed in March 1973 by six Sahelian countries - later expanded to eight - in the aftermath of the disastrous 1968-1973 drought. The Committee's purposes included preparation for any future emergencies, insurance of staple foods production and acceleration of economic and social development. In the latter context, Committee member nations inventoried their own resources, but more importantly, looked to the international donor community, part of which had organized itself by early 1976 into the Club du Sahel.

The United States responded to the Sahelian plight by launching a ten-year crop protection program in early 1976 (planning actually began in 1974) to assist CILSS member nations and neighboring countries with similar drought problems. This institution building project focussed on the national crop protection services through the medium of technical advice, practical and academic training infrastructure, and equipment, including vehicles.

Later the same year, AID, FAO and CILSS launched a major collaboration and coordination program: Government Consultation and Post-Harvest Protection Needs in the Sahel. Successive meetings and design team activities led to adoption by the CILSS Council of Ministers in April 1977 of a Comprehensive Program for Crop and Post Harvest Protection. Combined strategy and program proposals underwent review and approval by the Club du Sahel in May-June 1977. The details achieved elaboration in six principal projects:

- A. Strengthening of National Plant Protection Services (Annex A);
- B. Research on and Development of Integrated Pest Management for Basic Food Crops (Annex B);
- C. Migratory Pest Control
Regional Locust Control (Annex C);
Grain-eating Birds Control (Annex D);
- D. Improved Post Harvest Crop Protection (Annex E);
- E. Improved Rodent Controls (Annex F);
- F. Center for Documentation and Training (Annex G).

The U.S. Regional Food Crop Protection project represented the first major effort under the terms of Annex A; other donors also began individual projects without overlap or duplication. The CILSS-FAO-AID Project on Integrated Pest Management Research comprises the single most ambitious activity in this field and is the largest such undertaking anywhere in the world today. Two well-known regional organizations are implementing projects on behalf of CILSS under Annexes C and D - OCLALAV (working on the desert locust (*Schistocera gregaria*) and grain-eating birds (*Quelea quelea*)) and OICMA (concentrating on the migratory locust (*Locusta migratoria*)); FAO is assisting with technical support and UNDP is supporting funds to both organizations. Annexes E and F are under study for funding support by the general donor community. Annex G, based primarily at the Sahel Institute, is receiving support from the Dutch Government for the training activities, while development of documentation capabilities is under donor consideration.

The Terms of Reference agreed by CILSS-FAO-AID in Ouagadougou on April 27-28, 1981 direct Evaluation Team efforts to the two AID-financed projects undertaken in the framework of Annexes A and B. The evaluation mission was to "determine progress achieved, identify constraints encountered during implementation of project activities and prepare appropriate recommendations concerning the technical, administrative, financial and operational aspects having a direct bearing on an effective project implementation. The activities of the mission will be guided by the following Terms of Reference. However, the mission is at liberty to examine and comment on any other question deemed essential for project evaluation".

At this point, some general comments are in order. All major participants - CILSS-FAO-AID - have deviated from their traditional roles as foreseen in the extensive planning that preceded this mutual project activity, especially on IPM Research (Annex B).

- CILSS through the mediums of the Regional Management Unit and the Regional Technical Coordination Unit has become profoundly involved in day-to-day operations of the Regional Project Directorate, whose responsibilities have yet to be defined or described. This preoccupation with Annex B has diverted the RMU and the RCTU from their responsibilities under the co-called Management Protocol for the formulation of overall policy and procedures for all Annexes and the monitoring of progress under all Annexes through regular systems of reports and coordination;

- FAO's limited role of identifying and engaging international expert advisors - both long- and short-term - falls far short of the broad-gauged technical assistance foreseen in all IPM research planning documents. FAO personnel - regionally- and nationally-based - are serving principally as advisors on technical matters, but are not performing key operational functions in training, design and delivery of infrastructure, selection of equipment and vehicles and, more important, developing the local skills and projects for the benefit of Sahelian farmers in member countries;
- AID has reduced its association with IPM research from that of a major Club du Sahel donor to day-to-day involvement in every order - large and small - of administrative, financial, technical and operational decision making. In the process, CILSS and FAO and, more important, national programs are laboring under burdensome regulations and procedures.

The combined, total effect of the changes of roles of the major partners is a technical assistance project of major regional significance slowly falling through the cracks. Authorized for funding by AID in 1977 and agreed between AID and CILSS in February, 1978, the IPM Project has long since passed its third anniversary, yet it can hardly be described as more than just underway. Some \$9.9 million have been obligated, but the disbursement rate is miserably low.

Evaluation serves as a tool of management to identify problems and offer solutions. Evaluation offers the practical manager an opportunity to rectify planning errors and decisions, abandon ineffective methods and plot new courses. The Evaluation Team is asked in the Terms of Reference to "examine the delays..., analyze the causes and prepare recommendations". One major problem - possibly the major problem - in the IPM Project is that the delays and their causes are indelibly imprinted in the minds and documents of the principal parties. Those causes in themselves, in fact, constitute a constant irritant. At every juncture, the Evaluation Team members encountered litanies of name-calling, blame-laying and finger-pointing. CILSS functionaries at all levels are confused and frustrated by seemingly endless bureaucratic appetites for documentation, followed by waivers, followed by more documentation. FAO technicians are frustrated by the absence of clear guidelines that chart their courses of action and define their roles and relationships - both basic prerequisites for effective international agency performance. AID Mission Directors and Project Managers are either passive in their views or overly engaged in day-to-day minutiae, depending on their proximity to the loci of problems. AID tradition does not fit well with "regional activities"; AID managers and technicians understand bilateral projects and take comfort in them even in the face of changing local policies. Expanding such changes to a regional level only confuses and diffuses issues in the AID manager's mind.

The challenge to the Evaluation Team was found in the search for ways to adjust, restore and revise relationships in an

endeavor to spark momentum in Annex B activities and ensure close integration of ultimate research results with Annex A objectives. The potential results that may be realized from the Team's recommendations can achieve those two goals. The challenge now lies before CILSS-FAO-AID to reconcile all past differences, institute new ways and deliver the benefits of both major project undertakings to the Sahelian farmer.

V. REGIONAL FOOD CROP PROTECTION (CILSS ANNEX A)

A. Participating Countries

The Regional Food Crop Protection (RFCP) Project - Phase II - is an outgrowth of the Sahel Food Crop Protection (SFCP) Project. The SFCP Project was authorized in 1975 for a period of four years (625-0916 in the AID system, approved on June 28, 1975) and is referred to as "Phase I" of the present project.

Phase II is a three-year extension of the Project and was authorized on March 19, 1979 (625-0928 in the AID system). This phase will terminate on June 30, 1982. (See APPENDIX II, Table 3)

Six countries are presently funded by the Project: Senegal (1976), Cameroon (1976), The Gambia (1976), Cape Verde (1976), Mauritania (1976), and Guinea-Bissau (1978) (dates in parentheses indicate when the countries joined the Project under Phase I). Chad joined the Project in 1976 and participated until March 1979 when AID terminated its agreement with Chad because of the country's war. In addition, the Project has funded the academic training of four Malian students in the United States.

B. Purpose and Background to Phase II

The purpose of Phase II was stated in the AID Project Paper, as follows:

1. To encourage and facilitate the extension of IPM concepts and techniques to food crop farmers by:
 - a. Strengthening the organization, training, and equipping of the National Plant Protection (NPP) services in each of the participating countries

b. Developing and strengthening a system for extension to farmers of IPM concepts and techniques, using training and demonstration, and

c. Utilization of national agricultural extension cadre and agricultural 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.

2. To strengthen the capacity of the NPP services to anticipate pest infestations, resurgences, and other pest crises through surveillance and applied technology capability.

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.

AID personnel evaluated progress of the Project near the conclusion of Phase I in 1978. The evaluation appeared in the RFCP Project Paper. The evaluation showed the most significant accomplishment during Phase I to be the building up of the NPP services' infrastructures. This was achieved by training NPP service personnel at U.S. universities, increasing the services' staff of technicians and crop protection brigades, supplying the services with vehicles, pesticide application equipment, certain other equipment, and sponsoring some construction required for office, teaching, laboratory, and storage facilities.

A major activity of Phase I involved constructing two regional training centers, at Dakar, Senegal (completed in February 1979) and Yaoundé, Cameroon (completed in October 1979). Phase I

also sponsored various in-country and regional short courses, seminars, and workshops on the application of pesticides and other topics related to crop protection.

The RFCP Project Paper for Phase II stated that Phase I... "had 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 slippage, and difficulty in getting delivery of all required commodities on a timely basis".

The Project Paper emphasized that Phase II would focus more on gearing up training and other activities as required to encourage and facilitate the extension of integrated pest management concepts and techniques to small food crop farmers.

C. Status and Problems

1. Training

Training, structure! for extension agents, NPP service personnel, and trainers such as those at the Dakar and Yaoundé' centers, was emphasized in the Project Paper to be a high priority of the RFCP Project. In addition, the importance of in-country and regional seminars, workshops, and conferences was emphasized.

Academic Training: The Project is sponsoring academic training for participants at several levels, as shown in Table 1. Seventeen participants have already received or are presently receiving training towards the B.S. level; two towards the M.S. level; and two towards a two-year program. The B.S. and M.S. level participants have pursued or are

TABLE 1

ACADEMIC TRAINING IN CROP PROTECTION SPONSORED BY THE RFCP PROJECT

<u>Participants Country</u>	<u>Number of Participants Trained at Level Indicated</u> ^{1/}		
	<u>B.S.</u>	<u>M.S.</u>	<u>Two-year Program</u>
Senegal	3	1	
Cameroon		3	
The Gambia	4		2
Guinea-Bissau	2		
Mauritania	4		
Mali	3	1	
Cape Verde	1		
	<hr/>	<hr/>	<hr/>
Total	17	5	2

^{1/}Of the 24 participants, 20 are still in training; three have graduated; one trainee withdrew. B.S. and M.S. degrees have been or are presently being pursued at Oklahoma State University, University of Florida, and University of Georgia; and two-year programs at Amadu Bello University (Nigeria).

presently pursuing degrees in entomology, plant pathology, or general crop protection at the University of Florida, University of Georgia, or Oklahoma State University in the United States. Two participants are pursuing a two-year program in plant protection at Amadu Bello University in Nigeria. It is too early to judge the success of this aspect of training. Only three of the trainees have graduated: one B.S. level, The Gambia; one M.S. level, Senegal; and one M.S. level, Cameroon. All three have returned to their countries where they are participating in RFCP Project activities in some capacity.

Regional Training: The regional training centers at Yaoundé and Dakar are staffed (refer to 6 below for description of staff) and equipped to effectively handle a variety of training activities. Facilities include teaching classrooms and laboratories, reference collections of preserved pests and beneficial organisms (natural enemies) used for laboratory exercises, reference libraries, and kitchen and dormitory facilities. Each center possesses a language capability in both French and English, and the Dakar center also has capability for training in Portuguese. Each center can effectively handle about twenty trainees at one time.

The Yaoundé training center produces a newsletter which reports on training activities at the center as well as a range of topics on pest management.

The Yaoundé center, "Le Centre Régional de Formation Phytosanitaire de Yaounde" (CREFPHY), has been utilized almost exclusively for training Cameroonians (refer to Table 2). Trainees have ranged from field supervisors with the NPP service to agricultural ministry officials and professors at the national agricultural institutes and schools.

The Dakar training center, "Le Centre Régional Formation Phytosanitaire de Dakar" (CREFPHYD), has been somewhat more involved in regional training than the Yaoundé center has been. The training at Dakar has been developed for a range of trainees: NPP field and administrative personnel, agricultural agents, agricultural school instructors, and field technicians, and some of these have been non-Senegalese. Yet, as seen in Table 2, neither the Yaoundé or the Dakar center has attracted many trainees outside of Cameroon or Senegal. However, the centers' staffs have occasionally travelled to the other RFCP Project countries and assisted the national staffs carryout various training programs

In 1980, the Dakar center was utilized for training purposes 28 of the 52 weeks. The Yaounde center was used about the same percentage of time.

The centers have produced many useful training materials, viz., fact sheets, 35 mm slide sets, and short course syllabi related to pest identification and crop protection. In cooperation with selected resource specialists, the centers are presently developing several comprehensive manuals and handbooks on special topics (weeds, pesticide management, plant protection) which will be used in training. The centers plan to initiate a

TABLE 2

REGIONAL TRAINING SPONSORED BY RFCP PROJECT THRU SEPTEMBER 15, 1980^{1/}

Approximate Number of Trainees Participating in Course Indicated

DAKAR TRAINING CENTER

<u>Trainee's Country</u>	<u>Basic Insect Identification and Crop Protection (2 weeks)</u>	<u>Pesticide Use and Safety (5 days)</u>	<u>Introduction to Research Facilities (Incentive Course) (5 days)</u>	<u>Pesticide Applicator Certification (2 weeks)</u>
Senegal	38	200		
The Gambia			12	
Guinea-Bissau				35
Mauritania	10			
Mali	2			
Cape Verde	<u>2</u>			
Total	52	<u>200</u>	<u>12</u>	<u>35</u>

YAOUNDE TRAINING CENTER

<u>Trainee's Country</u>	<u>Biology and Control of Insects, Agricultural Fair (1 day)</u>	<u>Plant Protection Management and Equipment Use (length of course varied)</u>
Chad		7(?)
Cameroon	<u>120</u>	<u>340</u>
Total	120	340

^{1/} In addition, both centers are now developing full course modules as well as slide sets and information sheets on specific pests. The training section has also sponsored two international seminars at Dakar, one on pesticide management in 1979 and one on biological control of pests in West Africa in 1981.

cooperative effort with the Communications Section of Sahel Institute (INSAH) in the development of additional training materials in crop protection.

Project participants generally agree that the Dakar and Yaoundé centers are not making much effort to train personnel residing in RFCP Project countries other than Senegal and Cameroon. They emphasize the need to boost training efforts on the regional level to meet training requirements of the other countries. Further, they believe that the centers should collaborate more with various national and international organizations involved in training related to that being done at the centers. They emphasize the importance of such efforts in stimulating greater regional awareness and interest in IPM and in improving collaboration among the various national and international organizations.

The RFCP Project has sponsored two regional seminar/workshop conferences on special topics (pesticide management, biological control) which have been enthusiastically received by the participants.

In-country Training: Training for government officials, NPP service employees, extension agents, and farmers in their own countries has varied from country to

country. As already noted, the Dakar and Yaoundé centers have assisted, especially in Senegal and Cameroon. The regional centers' staffs have also assisted in some of the other in-country training efforts. But most of the training outside of Senegal and Cameroon has been performed by the Project's Country Project Officers (refer 6, Project Staff, below), their homologues, and the NPP services.

Most in-country training has aimed to increase the capacity of the NPP services and extension agents to handle pesticides properly. This has been accomplished through short courses on pesticide safety, storage, and proper calibration and use of pesticide application equipment. Need for proper identification of the pests has been emphasized. The training has included field demonstrations on the application of pesticides and recognition of pest damage.

Farmer training at the village level has received minimal attention to date. Greatest progress has been made in The Gambia, but it has been modest there.

The in-country training has focussed heavily on use of pesticides. Few of the training efforts have involved the farmers themselves, but the limited efforts also have focussed heavily on use of pesticides. The training has not been structured so as to increase the capacity or readiness of the extension services or the NPP services for mainstreaming IPM technology that may eventually evolve from the CILSS IPM Project. The primary beneficiaries of the in-country training have been the NPP services and these services generally are not involved in any aspect of crop protection other than intervention with pesticides.

2. Surveillance and Crop Loss Assessment

Surveillance of pests and assessment of their damage to the crops have been supported under Phase II of the RFCP Project. These activities are essential to IPM development, as discussed in Appendix 1. Without information on the abundance of the pests and the relation of the pests and their damage to the crops, at what point remedial action (pesticide application or other intervention) is called for, or whether it might be delayed or entirely omitted cannot be established.

Surveys to determine the major kinds of pests and their seasonal abundance have been carried out in certain food crops in some of the RFCP countries. Most of the countries have now developed representative collections of specimens of pests (mostly insects) attacking these crops. Field scouts have reported difficulty in

filling out the pest survey forms, and this has hampered success in quantifying the pest surveys.

Studies on crop loss assessment have been carried out at several locations. In Cameroon, the studies have concentrated on quantifying losses caused by grasshoppers, sorghum smuts (plant disease agents), and the parasitic weed Striga on sorghum. In The Gambia, studies have been conducted to determine the impact of insect pests on yields of sorghum, millet, maize, rice, and groundnut (peanut). Similar studies have been carried out on millet in Senegal. However, the results are too preliminary to reach conclusions concerning the relationship of insect pest damage and yield loss for the crops being studied. Further, it is questionable if the experimental method now being used can be expected to produce realistic results. The method involves the use of field plots, situated side by side, subjected to different treatments of pesticides. This method has wide application but the choice of experimental design is critical. Further, it is known that the use of some insecticides on some crops may give increased yields, or the treatment may decrease the yields, independently of the insect pest infestations. Therefore, the yields of the control (check or untreated) plots may be disadvantaged, or advantaged, regardless of the pest densities that develop in them.

Another known error in experimental design involves the use of field plots situated side by side without sufficient space between any two plots to buffer insecticidal spray drift from one to the other. The insecticidal drift may not be sufficiently potent to kill the pests in the control plots, but it may kill insect natural enemies residing in them and thus unleash the pests that the natural enemies regulated; this would give treated plots a yield advantage.

To get realistic results from the crop loss assessment work, researchers must seek the advice of such disciplines as statisticians, crop physiologists, biological control experts, and others. It is particularly important that crop economists be consulted about the economic realities of the work. In The Gambia, an economist from Purdue University in the United States has assisted on the work on crop loss assessment.

3. Extension

The RFCP Project Paper stated that a purpose of the Project was "to encourage and facilitate the extension of IPM concepts and techniques to food crop farmers by developing and strengthening a system for extension to farmers of IPM concepts and techniques, using training and demonstration". To date, the Project clearly has failed to show that this objective is being seriously pursued in any participating country except The Gambia, where a modest effort has been made to involve farmers in extension activities related to IPM. The Project has made no significant progress in the area of developing and strengthening an extension delivery system which would be required for mainstreaming IPM technology to farmers. This is a serious deficiency and one that must be corrected. Otherwise, new IPM technology that may evolve under the CILSS IPM Project will remain confined at the experimental level and never reach the intended farmer beneficiaries.

The CILSS IPM Project evolved under the idea that, parallel with the research effort, an IPM delivery system would be evolving too, under the RFCP Project. Presently, the national extension services are not geared up to handle IPM delivery, and there is a serious lack of properly trained extension personnel (refer to discussion on extension in the CILSS IPM Project evaluation report herein).

Some of the Project participants argue that an extension system for IPM delivery cannot presently be perfected, because the CILSS IPM Project first must produce model IPM examples which can be used for extension purposes. It is certain that research is an essential ingredient and development of a truly effective extension IPM delivery system will require a boosted-up and continuing IPM research effort.

Nevertheless, some of the information required to begin a modest IPM effort in West Africa already exists -- certainly, the ecological principles are already well known and can form an important foundation for any extension effort in crop protection. Further, as discussed above (refer section, Use of the Term IPM in This Report), traditional African farmers are now using various techniques known to be effective in IPM programs.

The single most potentially harmful impediment to IPM in West Africa is proliferation of those extension and intervention efforts which encourage farmers and the NPP services to adopt the simpler chemical control strategy. Experience from around the world has shown that once the chemical control strategy has been adopted the chances for IPM are severely reduced.

4. Research (other than crop loss assessment work)

Some research has been conducted under the RFCP Project, even though the Project Agreement did not specify that the Project would engage in research. This work has produced some encouraging results. For example, in Cameroon, research has been conducted on (1) control of smuts of sorghum using a water treatment to the seeds as opposed to insecticides, (2) use of treatments with neem tree leaves, palm oil, and groundnut oil as possible controls to protect cowpeas in storage, (3) study of insect infestations on cowpea varieties

showing various levels of insect pest resistance, and (4) integrated control of the parasitic weed Striga on sorghum, using a combination of biological, cultural, and physical techniques. This research produced results which, if properly incorporated into farmer extension and demonstration efforts, may have beneficial impact.

Other research under the project has also shown promise. One important research effort just getting started involves the testing of the protozoan parasite, Nosema, against grasshoppers in the Sahel. This biological control agent has shown considerable promise as a low-cost control of grasshoppers in dry zones of the United States. Perfection of the technique in the Sahel would promise to lessen the dependency on costly chemical pesticides for grasshopper control.

The RFCP Project participants are to be commended for their research efforts.

Though the primary role of the RFCP Project is to develop training and extension programs, its involvement in some aspects of applied (adaptive) research is desirable. It is important that steps are taken to ensure effective coordination of the research with the research being developed under the CILSS IPM Project. Also, the work on biological control of grasshoppers should be carefully coordinated with any similar work being pursued by OCLALAV and OICMA.

5. Pesticide Policies

Under the RFCP Project, AID authorized the use of certain pesticides available to the NPP services from non-AID sources. Environmental and human health implications of pesticide use in the RFCP Project were reviewed in an Environmental Assessment as required by AID's Pesticide Procedures, part 216 of the Agency's Regulation 16.

Reserved for future use.

TABLE 3MAJOR PESTICIDE DONORS IN THE SAHEL, GUINEA-BISSAU, AND CAMEROON

U.S. Agency for International Development

Office of Special Relief Operations of the Food and Agriculture
Organization of the United Nations

Government of Sweden

Canadian International Development Agency

European Economic Community

Fonds d'Aide et de Cooperation (France)

Gesellschaft Für Technische Zusammenarbeit (Germany)

Various nations of the Organization of Petroleum Export Nations

depend heavily on outside donors as a source for the pesticides applied by the brigades. Some farmers also apply pesticides to their crops, but perhaps 95% or more of all treating to the food crops is facilitated by the NPP services.

Most of the countries in the Sahel and surrounding area have no legislation to effectively control pesticide use. The Government agencies are not equipped to monitor and to ensure human and environmental protection from the pesticidal treatments. Further, these agencies are not prepared to carryout field monitoring in order to determine when treating with pesticides is economically justifiable.

It is doubtful that AID's Regulation 16 is having much beneficial effect in the RFCP countries. This situation would not be expected to change unless the non-AID donors and the host governments abandoned their own pesticide policies and adopted those specified under Regulation 16.

6. Project Staff

Specific job descriptions of the project staff appeared in the RFCP Project Paper.

The Regional Project Manager (RPM), located at AID-Dakar, provides overall guidance to the regional project. He is an entomologist. His deputy is also located at AID in Dakar.

In-country Project activities are guided by a Country Project Officer (CPO). One CPO is assigned to and presently located at each of the countries of Mauritania and Senegal. The CPO position in Cameroon was vacated in June, 1981. A replacement has been named and will report to Cameroon in early 1982. He presently is being

trained in French in the United States. One CPO handles both Guinea-Bissau and Cape Verde and is located in Guinea-Bissau. There presently is no CPO in The Gambia. The previous CPO for The Gambia completed her contract with AID in August, 1981. All the CPOs are entomologists.

The CPOs work under a USDA-PASA arrangement with AID. Some CPOs report that they are not certain as to who their boss really is and who is responsible for evaluating their job performance. The following were listed among the possibilities: the RPM, the AID Mission Director of the country in which they reside, the AID Mission Director in Dakar, and the USDA in the United States. No clear performance rating plan is known to the CPOs contacted. In each of the RFCP Project countries, the CPO has a homologue who is housed in the NPP service. The CPO works full time for the RFCP Project but the homologue generally devotes much less time to it.

Regional training is directed by a Regional Training Officer (RTO) located at Yaoundé, and an Assistant Regional Training Officer (ARTO), located at Dakar. The RTO and the ARTO work under a USDA-PASA arrangement with AID. They are entomologists. The training centers at Yaounde and Dakar are managed by national directors, and several national instructors assist the directors to implement training programs.

In Yaoundé, an American personal services contractor, a plant pathologist, with AID also serves on the instruction staff. The RTO, ARTO, and the Yaoundé and Dakar centers' staff form the core training staff for the

regional Project. In-country training is facilitated by the CPOs, their homologues, other national participants of the Project, and the Regional centers.

As already noted, the Project is presently sponsoring university training for twenty crop protection specialists. It is assumed that once these individuals have completed their training they will return to their countries and participate in the Project in some staff capacity.

7. Relationships with CILSS

The RFCP Project is a contributing component of the CILSS Plant Protection Program (Annex A, Strengthening of National Plant Protection Services).

The RFCP Regional Project Manager has been designated as the technical backstop Officer for the CILSS Plant Protection Program. In this capacity, he is to represent the RFCP Project at various CILSS meetings and to facilitate exchange of information with CILSS Project personnel.

Annex B (the Integrated Pest Management Project), Annex G1 (Establishment of a Regional Unit for Information on the Protection of Crops and Harvests), and Annex G2 (Establishment of a Regional Unit for Training in Plant Protection) especially are closely related in scope to the scope of the RFCP Project. Annex B is the primary arm for IPM research in the Sanel. The objective of Annex G1, which is being coordinated by the Sahel Institute at Bamako, is to develop and disseminate extension information related to crops and harvest protection. The objective of Annex G2 is to establish a regional unit (Headquartered in Kolo, Niger) for training plant protection field assistants and laboratory technicians.

The Canadian International Development Agency (CIDA) has established programs for assistance in crop protection in Niger and Upper Volta under Annex A. CIDA provides technical assistance, training, equipment, pesticides, and funding for construction as required to build up infrastructures in plant protection.

In 1979 and 1980, invitations were extended to the Training Officer at INSAH and FAO's Technical Advisor to the CILSS IPM Project to participate in annual RFCP Project training conferences organized for the Project's principal staff and the participating countries' NPP service directors. Unfortunately, their participation did not materialize and valuable linkage opportunities were lost as a result.

D. Recommendations for Phase III

1. Design

For Phase III, the Project should be redesigned by a team composed of the following:

- A Sahelian agronomist with experience in developing and implementing improved agronomic practices for small food crop farmers
- A Sahelian Representative of the CILSS IPM Project
- A Project design and management specialist
- An IPM researcher with experience in developing and implementing IPM programs for small food crop farmers in underdeveloped regions
- An IPM communications specialist with experience in developing and implementing training and extension programs in underdeveloped regions

- A Socioeconomist with experience in evaluating the costs and benefits of pest control technology in underdeveloped regions

2. Purpose

In designing Phase III, the Project should be structured according to the Logical Framework appearing at the end of this section of the report.

The overall objective of Phase III should be "to develop training programs and delivery systems that will lead to increased use of socially, economically, and environmentally sound systems of IPM for small food crop farmers which de-emphasize the use of chemical pesticides". Specific objectives should be:

- a. To conduct socio-economic analyses as required to determine the costs and benefits of IPM systems being developed under the CILSS IPM Project.
- b. To demonstrate on the fields of small food crop farmers and to mobilize (via all appropriate mechanisms, NPP services, extension services, SAFGRAD, etc.) IPM techniques and systems shown to be effective in the CILSS IPM Project.
- c. To develop, in collaboration with Annex G2 of the CILSS Program, certification criteria and training programs required for an "OAU-FAO Certified Training Program for Plant Protection Managers"; and, to develop other regional and in-country training programs as required to mobilize the concept and application of IPM.
- d. To develop, in collaboration with the various work groups being established under the CILSS IPM Project, the following publications (refer to the evaluation report of the CILSS IPM Project for

a discussion of the work groups):

- A manual on natural enemies of pests of food crops in the Sahel and surrounding area, their role in controlling pest populations, and their utilization in the IPM systems.

- Surveillance guidelines for pest management in food crops in the Sahel and surrounding area.

- A manual on guidelines for the implementation of proven IPM systems for food crops in the Sahel and surrounding area that de-emphasize the use of chemical pesticides.

- Short, public-awareness fact sheets and pamphlets for distribution to extension agents, NPP service personnel, government officials, and farmers on the principles and application of IPM, uses and limitations of pesticides, alternatives to pesticides (especially proven traditional control methods), and other special topics related to protection of crops and harvests. (This work should be carried out collaboratively with participants of Annex G2 of the CILSS Program).

e. To secure effective coordination of Project activities with all Annexes of the CILSS Program.

3. Participating Countries

The primary participating countries of Phase III should be Cameroon, Cape Verde, Guinea-Bissau, Mauritania, Senegal and The Gambia. The team in charge of designing Phase III should critically examine the capacity of each country for carrying out specific roles; each country should be assigned only those roles most appropriate to the capacity of its existing infrastructure.

Cameroon and Guinea-Bissau are not participating in the CILSS IPM Project. The design team should determine and specify the kinds

of IPM research which should be undertaken in Cameroon and Guinea-Bissau as required to most effectively boost IPM development in those countries. RFCP Project funds should be designated for this purpose if necessary.

The design team should determine the desirability of participation by Mali and Chad in Phase III. Also, Annex A efforts underway in Niger and Upper Volta should be examined and steps effected to ensure that those efforts are carefully coordinated with Phase III of the RFCP Project.

4. Project Staff

The AID Regional Project Manager for Phase III should reside in Ouagadougou. He/she should possess a Ph.D. degree in one of the pest management sciences, exhibit proven project management capability, and demonstrate excellence in past performance in developing and executing programs in IPM. His/her position is essential to success of the Project, and AID should take immediate steps to recruit (and to sponsor language training if necessary) the best possible candidate for this position. (The relation of the Regional Project Manager to the overall CILSS Plant Protection management component at Ouagadougou was described in VII A and B.

The Project should have a Regional Training and Extension Officer located at both Dakar and Yaoundé, responsible for executing regional training and extension activities. The need for CROs in the Project should be determined by the Phase III design team. The core Project staff of CPOs should include at least one agricultural economist. The team should explore ways (via USDA-PASAs with USDA's Agricultural Research (AR), Extension (E), and Economics, Statistics, and Cooperative Services (ESCS) agencies and also U.S. universities) for recruiting short-term consultants as required to assist in the socio-economic evaluations and other special topics pertaining to IPM.

The design team should clearly show the lines of authority and job descriptions for all project staff members, and procedures for reporting and job performance evaluations should be specified (refer above for discussions concerning these aspects).

The design team should carefully determine the existing indigeneous capacity for IPM development and execution in each Project country and devise ways for most effectively utilizing talents of the national participants. Efforts should be taken to capitalize on these talents and to minimize participation of expatriates when possible.

5. Training

Academic: The design team should identify universities and training centers in Africa, Latin America, and Asia that could be recommended for training at the pre-B.S. level. The usefulness of academic training in the United States should be critically examined.

U.S. academic institutions participating in regional and in-country training programs on IPM methods and practices should include material or instructional staff addressing basic management techniques for middle-level civil servants. Subject matter should recognize that most trainees are francophone trained with strong emphasis on theory as contrasted to practice; latter has more relevance to duties and responsibilities of plant protection and IPM functionaries.

Regional: The Yaoundé and Dakar training centers should be appropriately upgraded with staff as required to mobilize training in IPM in all the Project countries. The centers should develop greater Portuguese language capacity as required to meet training requirements in Cape Verde and Guinea-Bissau.

The centers should cooperate more closely with the WARDA training Center in Liberia, IITA, ICIPE, SAFGRAD, University of Ibadan and other national and international organizations involved in training in crop protection. The Project and these other participants should participate in the CILSS Crop Protection Training Group described in the CILSS IPM Project Evaluation report.

The design team should give guidelines on other ways to ensure effective cooperation between the Project training centers and other relevant training activities.

The Training Liaison Officer of the CILSS IPM Project should be appointed as "Training and Extension Liaison Officer" to the RFCP Project and invited to participate in all Training and Extension activities of the RFCP Project.

The Project, in collaboration with Annex G2 of the CILSS Program, should commission (at the beginning of Phase III) a team identified by FAO's Plant Protection Service in Rome to prepare, within six months, guidelines on certification criteria for the development of an "OAU-FAO Certified Training Program for Plant Protection Managers". The training program should be developed, at least initially, for medium- to high-level officers in the NPP services. Eventually, a certified training program for field supervisors would be desirable and should be explored.

The guidelines should be structured specifically for African conditions in consultation with the Organization for African Unity. The Yaoundé Center should initiate the appropriate training program as specified in the guidelines. The intensive training

(about three months in duration) would focus on all aspects of plant protection - legal, regulatory, pesticide management, IPM, etc.

The certified graduates would be professional plant protection managers and certified for various roles in the NPP services. The design team, in consultation with FAO and OAU, should determine if this training program to be carried out in Cameroon should be extended to include African countries outside the RFCP Project - Sahel region.

In-country: The design team should specify all kinds of training needs in the countries and devise means for best utilizing the regional training centers in complementing the in-country efforts. All training should be structured as required to mobilize IPM delivery systems in the shortest time possible.

6. Surveillance and Crop Loss Assessment

All work under Phase III in the area of surveillance and crop loss assessment should be carried out collaboratively with the CILSS IPM Project and structured through the Project's working group, being established on surveillance and crop loss assessment (refer to the CILSS IPM Project Evaluation Report).

7. Extension

The highest priority of the Project should be to develop extension delivery systems for augmenting effective IPM techniques. Therefore, in designing Phase III, the design team should clearly specify all extension activities required to achieve this goal and key them into the extension work group being developed under the CILSS IPM Project.

In collaboration with participants of Annexes B and G1 of the CILSS Program, RFCP Project participants should develop the training and extension publications listed above (refer Purpose above).

8. Research

The design team should clearly specify the kinds of research to be sponsored during Phase III. The focus should be on applied research carried out under actual conditions of the farmers' fields. The design team should show how the Annex A and Annex B research participants can best be linked up via the work groups being developed under Annex B.

9. Pesticide Policies

Support of RFCP Project activities related to pesticides or pesticide application should be restricted to

- a. applied research on selective use of materials showing promise because of their ecological selectivity
- b. cost/benefit analyses to determine the costs and benefits of pesticides to small food crop farmers, and
- c. extension efforts which emphasize pesticide hazards and procedures to minimize these hazards. The design team should develop strict guidelines on the use of pesticides in Phase III of the Project.

Until data are available to clearly show the economic and social advantages of using pesticides on food crops in the RFCP Project - Sahel region, the Project should discourage any activities leading toward increased use of pesticides.

The design team should encourage the cooperating donors involved in pest management and pesticide support activities in the RFCP Project

- Sahel region to develop cohesive policies and programs for pesticide regulation and management in this region. The role of CILSS-RMU should be considered in carrying forth with this initiative.

10. Relationships with CILSS and Various International Organizations

The design team should specify all appropriate means for ensuring effective collaboration between Annexes A, B, G1, and G2, including through work groups, committee activities, and meetings. The Annexes' sponsorship of conferences, workshops, and seminars on special topics related to crop protection should be encouraged.

The CILSS Plant Protection Program should employ one person to work full time to ensure effective collaboration among the national and international organizations involved in food crop protection and protection in the Sahel and the surrounding area. This person should work out of CILSS-RMU in Ouagadougou.

Reference material for design team's consideration:

- Evaluation of Regional Food Crop Protection Project -
Phase II, Cameroon component, conducted by USAID-Yaounde
(unofficial draft prepared in June or July 1981).

PROJECT LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
<p>Project Goal:</p> <p>To increase the capacity for food production and reduce existing food deficits through the introduction of integrated pest management (IPM) measures which de-emphasize the use of chemical pesticides.</p>	<p>- Measures of Goal Achievement:</p> <p>Systems of IPM that draw primarily from non-chemical means have been mobilized in the affected region and are having a measurable significant impact on increasing and sustaining food crop yields.</p>
<p>Project Purpose:</p> <p>To develop training programs and delivery systems that will lead to increased use of socially, economically and environmentally sound systems of IPM for small food crop farmers which de-emphasize the use of chemical pesticides; specific objectives are:</p> <p>(1) to conduct socio-economic analyses as required to determine the costs and benefits of IPM systems being developed under the CILSS IPM Project;</p> <p>(2) to demonstrate on the fields of small food crop farmers and to mobilize (via all appropriate mechanisms, NPP services, extension services, SAFGRAD, etc...) IPM techniques and systems shown to be effective in the CILSS IPM project.</p> <p>(3) to develop, in collaboration with Annex G-2 of the CILSS program, certification criteria and training programs required for an "OAU-FAO Certified Training Program for Plant Protection Managers"; and to develop other regional and in-country training programs as required to mobilize the concept and application of IPM.</p>	<p>- Conditions expected at end of project:</p> <p>- The social, environmental and economic costs and benefits of the IPM systems are known.</p> <p>- Appropriate delivery systems for mobilizing IPM have been developed and have been adopted by the NPP Services and extension services.</p> <p>- A certified OAU-FAO training program is in operation and the regional and in-country efforts are meeting training requirements in all of the RFCP Project - Sahel region.</p>

(4) to develop, in collaboration with the various groups being established under the CILSS IPM project, the following publications:

. A manual on natural enemies of pests of food crops in the Sahel and surrounding area, their role in controlling pest populations, and their utilization in IPM systems;

. Surveillance guidelines for pest management in food crops in the Sahel and surrounding area;

. A manual on guidelines for the implementation of proven IPM systems for food crops in the Sahel and the surrounding area that de-emphasize the use of chemical pesticides;

. Short, public awareness fact sheets and pamphlets for distribution to extension agents, NPP service personnel, government officials, and farmers on the principles of IPM, uses and limitations of pesticides, alternatives to pesticides (especially proven traditional control methods), and other special topics related to protection of crops and harvests (this work will be carried out collaboratively with Annex G-2 of the CILSS Program).

(5) To secure effective coordination of Project activities with all Annexes of the CILSS Program.

- All of the publications have been developed and made available to their intended audiences.

- Effective, permanent coordination has been achieved.

IMPORTANT ASSUMPTIONS

MEANS OF VERIFICATION ⁵⁰

GOAL

- That host government continues giving priority to agriculture production and to food crop protection.
- That price policies of host governments are conducive to food crop production.
- That crop protection practices are adaptable and acceptable to farmers
- * See Footnote A.
- 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.

- National production statistics.
- RFCP project evaluations.
- IPM research and other CILSS measurements of losses of food crops due to pests.
- Machinery exists for national plant protection service staff to get feedback from farm families.

PURPOSE

- That personnel will be assigned to NPP services, and available for academics and practical training.
- That extension, agricultural service, farm unit, and other personnel (male & female) will be available for training, sufficient in numbers and adequate in qualifications.
- That personnel receiving training will be available to conduct method demonstration exercises and outreach activities with farmers.
- That farmers (male & female) accept suggested protection measures.
- That conditions in subsistence farming areas are sufficiently stable to permit unrestricted extension activities.

- NPP staffing pattern and inventory.
- Project reports and records.
- Implementation and work plans
- RFCP project evaluations.

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.

PROJECT LOGICAL FRAMEWORK

NARRATIVE	OBJECTIVELY VERIFIABLE INDICATORS
Outputs	Magnitude of Outputs
<p>1. Improved structure and admin.capacity : A well-organized and staffed NPP service is functioning in each participating country.</p>	<p>NPP service is developed in accordance with plans as specified in the project agreements.</p>
<p>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.</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>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.</p>	<p>Commodity and facility requirements have been provided, and extension and other outreach activities conducted in accordance with project agreements.</p>
<p>4. National plant protection service ways and means to measure changed practices and physical results.</p>	<p>Footnote B 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"> - That project inputs are appropriate and sufficient to achieve desired outputs 	<ul style="list-style-type: none"> Project Agreements RFCP project evaluations
<ul style="list-style-type: none"> - That project inputs are timed according to priority needs, and delivered as planned 	<ul style="list-style-type: none"> Project reports

VI. ANNEX B - STATUSA. Participating Countries/Agencies

1. Sahelian Agencies

CILSS (Comite Permanent Inter-Etats de Lutte contre la Secheresse dans le Sahel - Permanent Inter-State Committee for Drought Control in the Sahel) is the Grantee under the Integrated Pest Management Project, an international activity within the CILSS Program for Crop and Harvest Protection. CILSS was formed by the Heads of State of Cape Verde, Chad, The Gambia, Mali, Mauritania, Niger, Senegal and Upper Volta. The CILSS Council of Ministers consists of Ministers of Rural Development or Agriculture from the respective Member States. The Executive Secretariat, located in Ouagadougou, Upper Volta, constitutes the permanent administrative structure of CILSS, executing decisions, negotiating with donors for economic and social development assistance and coordinating programs among member countries. CILSS presumably has juridical personality and is recognized throughout its member states and cooperating nations. The Executive Secretariat staff is small and is organized into Directorates for Plans and Projects, Administration and Finance, Documentation and Information, and the Non-Governmental Organizations.

The so-called Management Protocol for the Program for Crop and Harvest Protection authorized the Executive Secretary to organize a small Regional Management Unit to carry out decisions of the Program's Executive Committee. This unit is located at the Ouagadougou site of the Executive Secretary.

The RMU Director is Secretary of the Crop and Harvest Protection Program's Executive Committee and is mandated to monitor all program components. In fact, however, the RMU concentrates almost exclusively on activities under Annex B - Integrated Pest Management. Key RMU personnel are a Director, a financial manager, a procurement advisor and an agricultural advisor (whose exact duties in RMU are not clear). The financial advisor is responsible for financial and operations support for all project components, regional, sub-regional and national. The procurement advisor receives from the various entities requests for purchase of material and equipment not purchased locally, prepares documents (PIO/C), secures USAID Upper Volta approval and forwards them to the Afro-American Purchasing Center, New York, for procurement and delivery action. In short, all financial and material support for all Annex B project elements is generally vested in the RMU.

The three principal partners associated with Annex B - CILSS, FAO, AID - have consistently avoided describing a Regional Project Direction Office. The so-called Management Protocol does not mention such an entity. The CILSS-FAO Synthesis Document mentions a Project Coordinating Center to be located in Bamako, states that an Annex would be written, describing the Center; the annex was never written. What is referred to as the "Regional Project Direction" is a satellite of the Sahel Institute in Bamako, Mali, without real structure, authority or resources. Equally as undefined is the relationship between this "Direction" and the national and sub-regional components, addressed below. In the absence of a regional form and substance, most national components

defer to the RMU which exercises fiscal and budget management authority over the donor resources for Annex B.

In some respects, the problems run even deeper. The administrative burdens, imposed upon the Regional Direction (CILSS) by the hierarchical structure of internal CILSS relationships, limit efficiency and stifle initiative within the regional technical team. Such limitations explain the difficulties, even impossibility, of normal movement within the regional area by experts and the restrictions on communication, even on purely technical matters, between the principal FAO advisor and FAO personnel at national levels. The same applies with regard to liaison and coordination between the regional office and the national components on matters of common administrative and operational interest.

It is principally through a spirit of friendly cooperation that some technical progress and direction have been achieved in national programs.

On a regional level, the "Direction" does not review (with FAO aid) and approve national budgets, procurement of contracts, thus no permanent record files are maintained at the regional level. Nor does the "Direction" have a budget of its own; it depends on the RMU for funds.

National and Sub-Regional Components

Activity under Annex B was planned for all CILSS member countries and, sub-regionally, for the Senegal and Niger River and the Lake Chad Basins. All Chad programs have been temporarily suspended and donor support is available only for the Senegal Basin at present. In five countries - The Gambia, Mauritania,

Cape Verde, Upper Volta and Niger - Annex B and Annex A activities fall within the purview of the incumbent Director of Crop Protection Services. In Senegal and Mali, IPM operations are organized separately, in the Ministry charged with national research programs. Because the CILSS Executive Secretariat communicates only with the Minister member of the Council, Annex B messages often go astray, undelivered and unnoticed. The Senegal Sub-Regional project awaits AID approval of a negotiated contract between CILSS and GERDAT. This contract mentions technical coordination with the "Regional Project Directrice" which only reiterates the need for a clearly defined "regional" entity with clearly defined duties, responsibilities, resources and organization.

National project directors beg or borrow accounting services from their own or another local agency. To date, although some personnel have been hired (secretaries, chauffeurs, laborers), some office equipment obtained and some FAO advisors assigned, mostly country project staffs are working without adequate assigned space, supplies, equipment, and, usually, vehicles.

Most national IPM offices also have problems of some order with the CILSS Management of Annex B. Communications with the Regional Office in Bamako, both electronically and physically (by air), are difficult. In practice, such messages could only be passed on to Ouagadougou to the RMU. Frequently, local AID Missions are asked to transmit messages as insurance against telex or telephone breakdowns. The overwhelming percentage of problems relate to budget management, release of advances

and replenishment. Months can go by with no action and finally budget levels are approved after execution. In part, these holdups in RMU are due to slowness in AID/Upper Volta processing IPM paperwork. In part, the problems arise from inadequate instructions to national components or arbitrary elimination or reduction of live items by RMU and/or AID.

Under its statute, the Sahel Institute has as an objective "the execution and management of research programs of regional interest". The Executive Secretary of CILSS has honored this through a letter (May 1980) conveying supervision and control over the Regional Project Direction to the Director General of the Institute. The Institute's authority was used to appoint the current Directress who in practice reports to the Institute's Director of Research and Acting Director of the Regional Technical Coordination Unit, a creation of the so-called Management Protocol. The Regional Office uses the following address:

CILSS-Institut du Sahel
Projet Lutte Integree
B.P. 1530
Telex: 432 INSAH
Bamako, Mali

Neither INSAH nor the RTCU have received any project funds nor are their responsibilities and functions set forth in any tripartite project documents.

2. Agency for International Development (AID)

Management responsibility for AID rests with a Project Officer in USAID/Upper Volta. He is supported by the Office of the Controller, supervised by the Mission Director; the Mission has no supply advisor. The Project Officer has some training in entomology. He received no management training or training in

AID procedures upon his assignment. He is responsible for advising the Grantee (CILSS) on administrative and financial execution of the project. Actually, his time seems taken up entirely by problems of finance and supply. The USAID Controller's view of the project is essentially negative; it demands limited time and personnel attention but is not really a part of the Mission's program. The Mission Director points out that the project was delayed by AID/Washington review and negotiation on an essential implementing contract with the UN Food and Agriculture Organization (FAO). A Project Officer was not recruited and assigned until the project was over two years behind schedule. For understandable reasons, Mission management's attitude toward the project is one of frustration.

As a service to AID's Upper Volta Project Officer, bilateral AID Missions occasionally support the project through engineering reviews or supply assistance. As a practical matter, local AID staffs look upon this project, as they do on most regional projects, as a nuisance and a waste of important AID local staff time. In the absence of responsibility, local Missions have no staff or other resources for support of regional projects, thus they consider them an imposition.

The Regional Project Manager has modest project support funds, which are inadequate to cover frequent travel and associated coordination requirements. As a result, direct contact between the Project Manager and the IPM national components has been sporadic, and the Project Manager has maintained very little contact with participants of Annex A and the other Annexes of the CILSS Plant Protection Program. By the same token, some local

AID Missions insist that the absence of such contact and orientation contributes to their indifference. These Missions designate so-called Liaison Officers to comply with basic AID Regulations, however, these officers generally become involved only when specifically asked to fulfill a limited task.

3. The United Nations Food and Agriculture Organization (FAO)

FAO is under contract with CILSS to provide advisory and other services to the project. In addition to providing technical experts to advise at regional, sub-regional and national levels on the execution of the program, FAO also provided assistance in technicians also perform research and train in research methodology the preparation of regional and national operating plans; FAO /

A contract between FAO and CILSS, approved by AID, was a Condition Precedent to first disbursement under the grant. The various operations plans were Conditions Precedent to subsequent disbursement. The CILSS-FAO contract was originally signed on September 1, 1978, seven months after the Grant Agreement was signed although the Project Paper, prepared in 1977, described negotiations as essentially complete. The contract was approved by AID Project Implementation Letter on September 29, 1979. Delay in approving the contract was the single cause for the snowballing delay in the project which has developed.

4. Tripartite Association

The relationships between the three principal parties make up the basic design structure of the project. AID is the financial agency. By a Project Agreement signed between CILSS and AID and by subsequent amendments, U.S. \$9,900,000 of AID funds have been committed: U.S. \$6,000,000 to cover the contract between CILSS and FAO, U.S. \$2,900,000 for local project costs and U.S.

\$1,000,000 as yet unallocated. As of now, although budgets are being revised, life of project cost is estimated at U.S. \$25,280,000

FAO	\$12,796,000
Local costs	12,007,961
Contingency	476,039.

5. Conditions and Problems Encountered

The basic elements of the project design are sound. Funds are channelled through a regional international entity to country and sub-regional program facing a common problem in a shared environment. An international specialized agency is contracted to provide essential advisory and operational expertise. A central coordinating office is set up. It is only when the details of daily operations are examined that one finds problems. These problems are: (1) there is no project direction, consequently the FAO experts assigned to this Direction Office are not using their talents effectively; (2) in trying to give CILSS a management capability, the RMU, which should be a management, policy guidance and supervisory office, became involved in day-to-day management operations; (3) the national components without either effective guidance or management support have been prevented from starting their programs.

6. Recommendations

(1) The UGR must be taken out of day-to-day operations of the IPM project. It should be given the task of developing administrative, management and financial guidelines for all CILSS/^{crop protection} projects, existing or planned, dealing with international donors and supporting crop protection, pest management and drought response. The UGR should monitor, on behalf of the Executive Secretary, all projects in the CILSS Crop Protection Program.

(2) The Regional Project Office, directly reporting to the CILSS Executive Secretary, must be given authority, staff and resources to manage the project effectively.

This office should have a national components section.

a sub-regional components section (as they develop) and an administrative/finance office. The Director should have an Assistant Director, who is the senior FAO advisor to the project. Among the assistant's most important responsibilities should be liaison with FAO Rome to assure that programmed resources, both back-up at headquarters and personnel recruited and assigned to the field, are available on a timely and effective basis. Assigned to the Regional Project Office and playing an important part in project management and support should be an FAO administrative and financial expert, programmed for 1982 in the revised FAO budget.

(3) The USAID IPM Project Office should become a part of the recommended office for IPM/RFCP projects activities.

B. Project Implementation (Technical)

1. Status/Problems

a. Relevance of Project Objectives

The project paper and plan of operations list these project objectives:

- long-term:

- to increase food crop production in the Sahel by reduction of crop losses due to insects, plant diseases, and weeds.

- short-term:

- to strengthen national research capability toward developing appropriate IPM technical packages to be provided to extension structures so that the farmer may gain maximum profit from his farming activities. This will be accomplished by:

- . establishment of a surveillance system on the occurrence of major pests;
- . evaluation of crop losses and the relative economic importance of pests;
- . establishment of the research capability to develop integrated pest management techniques, including the analysis and evaluation of traditional cropping systems and crop protection methods;
- . establishment of demonstration study areas to study and demonstrate the benefits to be drawn from integrated pest management;
- . development, in close collaboration with plant protection services, of a mechanism to implement results at the farmer level.

The term "Integrated Pest Management" (IPM) as used in this report refers to the maintenance of pest populations at economically insignificant levels with a minimum of environmental disruption. This is done through the use of a variety of techniques based on an understanding of the ecology of the pests and the field environment. The role of insecticides is minimized in favor of such methods as the use of pest resistant crop varieties, the introduction and augmentation of the natural enemies of pests, and changes in the cropping system that work to the detriment of pest species.

APPENDIX 1, "Reference Guidelines for IPM Development and Execution", discusses the steps involved in establishment of the IPM program.

Recent donor support of Sahelian crop protection services, including the RFCP Project, has resulted in a startling increase of pesticide use on food crops. Government personnel distribute pesticides or provide free applications on farmers' fields, and an attitude of dependence on pesticides is growing in both groups.

Although neither farmers nor national governments can afford to adopt a technology that does not pay for itself, the costs/benefits of using imported pesticides on food crops in the Sahel are untested and doubtful. Pesticide use often entails environmental and health hazards which Sahelian countries are not equipped to monitor or deal with. Perhaps most important, heavy use of pesticides, especially insecticides, has even accentuated pest problems in many regions of the world. Pests have developed resistance to once-effective chemicals and destruction of their natural enemies has led to rapid and more

severe outbreaks as well as the achievement of pest status by other usually innocuous species.

The project aims at the development of effective low-cost pest management systems based on the evolved advantages of traditional cropping and pest control practices plus the maximal use of additional non-chemical means of pest control. Pesticides are applied judiciously and only when necessary. This approach is much the most appropriate in the Sahel and the only way to achieve rational, economic, and environmentally sound pest control over the long term.

b. Staff

(1) Regional

Especially at the beginning of the project, strong technical coordination is necessary to insure proper IPM orientation of activities, adequate liaison between national programs and regional uniformity of approach. Regional staff were recruited as follows:

Project Director	: May 1980
FAO Principal Technical Expert	: February 1980
FAO Training/Liaison Officer	: October 1980
FAO bioclimatologist	: January 1981

Recruitment of the FAO socioeconomist was deferred because of a general feeling that no extension-oriented activities are necessary until the project has developed a pilot IPM system to test on demonstration study areas in Phase II. In fact, the raw

material for an IPM program exists in the Sahel already, in the form of well-adapted cropping systems and traditional methods of pest control. These can be evaluated and used as the basis for an immediate extension effort. This will be done by field staff of the Phase III RFCP Project starting in 1982. With none of its extension personnel in place, the IPM project as presently conceived will not be able to key into this effort and coordinate activities in anticipation of its own Phase II demonstration study program.

There is much socioeconomic preparatory work to be done before effective demonstration study efforts can begin. The Demonstration/Liaison Officers who will be collecting information on the economic performance of pilot IPM schemes and their acceptance by farmers must understand such factors as:

- land tenure and its implications for extension of new farm practices;
- village level social structures, labor distribution, sex roles, and identification of ultimate decisionmakers;
- traditional lines of communication at village level;
- attitudes against change;
- cost of production of target crops in subsistence terms;
- farmers' perceptions of principal constraints on production;
- farmers' experience with, and perceptions of, previous extension efforts in their areas.

The rationale behind traditional cropping systems must also be understood, as valuable information for IPM researchers and so that care is taken to preserve their desirable features when pilot IPM systems are designed. None of this basic socioeconomic work is currently being provided for in Phase I of the IPM Project.

(2) National

FAO experts in IPM, entomology, plant pathology and weed science are being recruited for national research teams. Progress has been slow, and only 10 of 22 posts are presently filled (see Appendix 3). FAO has encountered difficulties finding candidates, especially for certain specialties such as crop loss assessment and weed science. Requirements of French-speaking capability and 3 to 7 (usually 5) years of experience aggravate these difficulties by unduly limiting the pool from which expertise can be drawn. IPM progress and research are particularly well developed in some anglo-phone countries. Agricultural researchers already 5 years into their career are often reluctant to move overseas, and it might be better to recruit people earlier on.

No farming systems/agronomy input has been foreseen for the project, though work will be centering on traditional cropping systems - including intercrops - and one of the most effective IPM techniques is to change cropping systems to the detriment of pests.

IPM should be fully integrated into the local production system. Its efficiency can be measured by its adaptability and its

harmony with Sahelian farming conditions. Traditional farming systems have evolved over millenia for coping with crop production problems, including pest damage. Changing them without careful forethought could lead to unexpected ecological upsets and more severe pest problems, especially as the major food crops and their pests coevolved in the Sahel toward a stable system. It is possible that "modern" agriculture can not hope to improve upon the existing system, given the magnitude of Sahelian agricultural constraints. For these reasons, and for maximum applicability at the small farmer level, these traditional systems should be the starting point for IPM research.

A variety of cropping patterns, including intercrops of many sorts, occur in the Sahel. Ecological conditions and pest problems differ in monocrop and intercrop situations. Experiments in intercrops are complicated by plant species interactions such as competition for water, light or nutrients, and enhancement of soil fertility by nitrogen-fixing legumes. These affect plant physiology and morphology, which in turn influence the severity of pest problems. Field microclimate, availability of space, food supply and food quality for pests all vary with the cropping system. Thus, pest control research in diverse cropping systems is difficult and there must be agronomic input as well as a cooperative effort between entomologists, plant pathologists and weed scientists.

The most important contribution of agronomists to IPM, however, lies in beneficial modifications of cultural practices. Changes in crop rotations, planting dates, field sanitation, soil tillage, etc....

that work to the detriment of pests are a very important IPM tool.

Crop loss assessment is the main priority of Phase I of the IPM Project (see Work Program-Research). IPM research can and is proceeding without that data, but crop loss assessment methodology must be developed soon. Only a minimum cadre of two crop loss assessment experts is being recruited, in spite of the necessity of accomplishing much excellent work in the three cropping seasons remaining in Phase I.

In most of the countries, the chief of the crop protection service is the leader of the national contingent. These functionaries are expected to continue their previous programs while assuming project counterpart responsibilities. However, they are too busy with official duties and pesticide interventions during the cropping season to participate as full time researchers. This is inappropriate because the project aims to build a fully-staffed, continuing and effective research program that will remain after FAO experts leave.

c. Training

One of the main goals of the IPM project is the training of Sahelian research personnel:

- Within the project, national counterparts benefit from the cooperation and counsel of the FAO experts;
- Training in other Sahelian countries, in African institutions, or overseas is funded through scholarships.

There will be problems meeting project goals in the short and medium terms because of insufficient provision of scholarships and lack of candidates for training.

(1) Senior Technical Staff

Three scholarships have been provided to train counterparts for regional FAO staff, but the funds allotted may be insufficient.

Some countries simply don't have enough trained researchers to provide counterparts for the national-level FAO experts. The M.S. level or above is necessary, so that they will have had some formal research experience. Eleven of the 24 counterpart positions have been filled, and candidates have been tentatively identified for five more (see Appendix 3). There are still no candidates for 8 positions, and the plans of operation did not provide sufficient funds to train more. This was left to "bilateral aid", which has not materialized. In Niger, Egyptian and Canadian researchers are being regarded as counterparts, for lack of qualified Nigerians. Since they will return to their own countries, this does nothing toward the goal of improving Sahelian research capability.

(2) Middle-Level Staff

Observers are the only middle-level staff trained within the project at present (see Appendix 3). They are to collect meteorological and pest data at observation posts. Senegal, Mauritania, Mali and Niger trained observers in 1981. The curriculum and teaching

methodology were based on models developed by the FAO regional training/liaison officer and then adapted to the level of participating local personnel.

Some programs reported difficulty having the full complement of observers allotted to them by the national agricultural services. Educated cadre is meager and they are in demand by many projects as well as national ministries.

Beginning this year, middle-level crop protection technicians are being trained under Annex G-2 of the CILSS Crop Protection Program, "Regional Unit for Training in Plant Protection". Four Gambian students began a two-year course at Ahmadou Bello University in Zaria, Nigeria, in June 1981. A two-year training course for 3 crop protection technicians per CILSS country per year begins at IPDR, Kolo, Niger in September 1982. Training for 2 laboratory technicians per CILSS country per year begins in October 1981 at l'Institut Universitaire de Technologie, Dakar, Senegal. This program will help alleviate the lack of plant protection technicians over the long term, and its graduates should be used in the IPM Project.

Government plant protection trainees spend a year's internship with the crop protection service after finishing course work at national agricultural training schools. A government scholarship is provided. Because crop protection services in the Sahel are generally oriented toward pesticides, these trainees enter government service without IPM experience or instruction.

(3) Coordination of Curricula and Information Exchange

At present, no effective liaison has been established between the plant protection training programs in national agricultural schools and those in the RFCP and IPM Projects, other regional projects such as SAFGRAD, and Annex G-2. This is regrettable, as a regional IPM effort is to be mounted that requires some standardization of curricula and the proper orientation. Also, no mechanism has been developed for promptly and continuously assimilating new information and pest control methods developed by IPM Project research. This is true both for the existing training programs and for the extension network.

d. Work Program

Due to administrative and managerial problems discussed elsewhere, modest work programs were started just this year in Mauritania, Senegal, Cape Verde, Mali, Upper Volta and Niger. Activities are very limited because no equipment and few vehicles have yet been procured for the national programs.

(1) Research

A summary of previous plant protection work has been compiled in each country for orientation and as a basis for research planning. The experts are doing initial surveys and collection of field pests and their natural enemies, and gathering limited information on traditional pest control methods.

There are no field experiments in Mali and Upper Volta this year because experts had no vehicles. National programs in Mauritania and Senegal are to be commended for their enterprise in overcoming

this difficulty, fielding experimental and observation efforts with borrowed vehicles and borrowed and improvised equipment. The FAO expert in Mauritania devised a light trap for farmers' fields constructed of inexpensive local materials: a kerosene lamp suspended over a plastic tub of water in a shelter of sticks and thatch.

This report will discuss only the few experiments that the team was able to fully discuss during their evaluation mission, or for which detailed experimental plans were available. These were in Mauritania and Senegal.

Crop loss assessment is a major priority of Phase I. Essentially, these experiments aim at measuring the varying populations of reputed pests in the field, and finding the amount of actual crop damage/loss caused by each species at each level of infestation. Then project observers can survey farmers' fields and come up with a realistic estimate of how much loss is being caused by the insects they see. The key pests - the ones that consistently occur in high enough numbers to cause economic losses - can be singled out for research and control. Technicians will have economic criteria to decide what degree of control of the various species should be aimed at, and if intervention with pesticides will be cost-effective, when other control methods do not suffice. One of the problems with present pesticide use in the Sahel is that extensive spray campaigns have been undertaken without such information.

Project crop loss assessment experts are not yet in place, but the IPM researchers have begun investigations. In Senegal and Mauritania, promising experiments are planned on crop losses and

economic injury levels associated with scarab and meloid beetle attack on flowering sorghum and millet. A simple exclusion technique is being used, with net cages around flower heads to control or prevent infestation. In Mauritania, a version of traditional control method for these pests is being tested. Farmers light fires around their fields to attract and destroy night-flying insects which come to the firelight; the experiment involves massive light trapping. All these studies are timely because much farmer's field insecticide use in the Sahel is aimed at these insects, although their pest status has not been examined closely. 1980 results from a limited experiment with sorghum in Senegal cast doubt on the actual destructiveness of scarabs.

The evaluation team was able to observe a second category of entomology experiments fielded in Senegal and Mauritania. These involve use of traps to monitor insect pest populations while insecticides are used to protect crops during various stages of development. The object is to determine the periods of most acute insect attack and crop loss. There were oversights in the design of these experiments that limit their usefulness. Furadan was among the insecticides employed, and its use, as well as that of some other systemic pesticides, is known to cause a yield increase irrespective of the killing effects the chemicals may have on pests. The effect on natural enemies in control plots of pesticide drift and reduced immigration from adjacent sprayed plots was not being taken into account. Both these factors cause yields on control plots to appear relatively lower than they actually are. Closer observation of the entomology of the test plots would have been useful. Pests were being counted and borer damage systematically measured, but no attempt was made to separate the effects of

different pests on final yield, and for many phytophagous species the sampling does not provide for a clear correlation between numbers, damage and final yields. Natural enemy observations were relatively neglected, though they are very important in IPM research.

In Senegal, there was an interesting experiment with late planting of cowpea to escape attacks of a caterpillar, Amsacta maloneyi. Other experiments addressed host plant resistance, pest biology and population dynamics, sampling techniques and minimum pesticide trials.

IPM Project policy is that farmers are to be involved as much as possible in the study and development of IPM methods. This provides farmer input concerning attitudes and awareness of pest problems and traditional pest control methods. It also usefully augments the work of observers and is a step toward identifying a body of farmer-cooperators for future research efforts and the eventual extension of IPM. In both Senegal and Mauritania, pilot farmers have been taught to observe and collect insects on their fields.

In Senegal, some experimental plots were on agricultural stations and work concerned monocrops, as monocrop systems predominate there. Agricultural station experiments are easier and yield less variable results, but the results are also less applicable to real farms and have not involved farmers in the demonstration/study process. The importance of farmer's field experimentation with the

whole array of traditional cropping systems cannot be overstressed, even though it is relatively difficult (especially where intercrops are concerned).

Counterparts who are already members of national research efforts are generally continuing their previous programs. This can run counter to the IPM goals of the project, since Sahelian crop protection research has emphasized various aspects of pesticide use. The appropriateness of pesticide-oriented work is questionable in the Sahel, where farmers generally can not afford to finance even one application. Although pesticides can play a role in IPM systems, it is important to orient project counterpart research toward nonchemical methods of pest control, wherein pesticides are only an incidental research tool.

The West Africa Rice Development Association has applied to USAID for funding of a regional IPM program for rice. The CILSS IPM Project presently includes rice research, and there is some potential duplication of effort. This was recognized, and the Project Director and the FAO Principal Technical Advisor held discussions with WARDA in order to avoid problems.

(2) Surveillance and Forecasting

The network of observation posts is being built so that the IPM Project can collect data on pest infestations and meteorological conditions. Using crop loss assessment data, observers can estimate losses to pests in surrounding fields, and decide whether infestations are above economically injurious levels.

Ultimately, the idea is to correlate the meteorological and biological data to develop pest population models and forecasting techniques, perhaps using remote sensing. This is difficult and takes much time and sophistication. The more immediate value of the observation post system may be for research - the study of migratory pests, for example - and advising farmers.

The Project Director and the FAO Principal Technical Expert travelled to AGRHYMET to coordinate observation activities for the two projects. During 1981, observation sites were chosen and observers trained in Mauritania, Senegal, Niger and Mali. Observers are in place in the former three countries, and Mauritania and Senegal have also trained a small cadre of farmer-observers (see Appendix 3).

The project paper proposed monitoring the environmental impact of pesticide use. In 1981, a start was made with a 2-man FAO mission that surveyed sites in 4 Malian agroecological zones and collected information on pesticide use and the potential of plant protection activities to do environmental damage. There are, or will be, pesticide residue analysis laboratories in Dakar and Bobo-Dioulasso.

Observation posts will sometimes be used by personnel of more than one organization. In Senegal, for example, the crop protection service is building some of them. There is also a general policy of placing them, where possible, at the same sites where national agricultural staff are based. Past surveillance efforts have been

completely oriented toward pesticide intervention, and there may be some conflict over the role intended for the posts.

(3) Extension

Great importance must be placed on ensuring the appropriateness of IPM methods and the effectiveness of the extension effort. The success of the IPM Project will be measured by the degree to which farmers accept and use the IPM methods it is to develop. If those methods are not completely adapted to farmer's cropping systems, technological level, and perception of pest problems, the entire effort is doomed.

IPM methods should be:

- easily understandable by farmers;
- reliable;
- undemanding of any special labor support, equipment, or other expense compared to other methods.

A Demonstration/Liaison Officer and a national counterpart are to be posted in each country by the IPM Project - probably in Phase II. They will be attached to a system of farmers' field demonstration study areas. These fields have a dual purpose. Researchers will use them to develop and test new IPM methods. The Demonstration/Liaison Officers, under the supervision of the FAO socioeconomist, will use them to evaluate the methods economically and organize demonstration activities for collecting comment and advice from farmers. The object is to make sure that IPM systems developed by the project are effective and

acceptable - that, as far as possible, they can "sell themselves".

Demonstration study areas can be used to determine general acceptability of IPM technology, but for thorough testing and extension, these techniques should be fed into the national agricultural networks for multilocal trials, demonstration and extension.

Within the structures of the Sahelian countries, there is no extension service per se, or if the extension service exists, it is new and not yet established. Usually, the "organismes d'encadrement" (support services) provide for extension.

For instance:

- Mali : the "operations de développement"
- Niger : the "projets de développement"
- Senegal : the "sociétés de développement"
- Upper Volta : the "Organismes Régionaux de Développement" (ORD)

In all Sahelian countries, these "organismes d'encadrement" are directly under the control of the technical service of the National Direction of Agriculture. This service is in charge of crop production and controls the extension service, when it exists, like in Mauritania. In the CILSS countries, the Crop Protection Service is generally is under the control of the National Direction of Agriculture. This service is a technical support, at the national level, of the "organismes d'encadrement". Extension of crop protection techniques is done by these "organismes d'encadrement".

Agricultural extension in the Sahel has had little significant impact on the project's target crops. Emphasis is given to cash crops,

rather than food crops. Extension agents are often ill-trained and badly paid, and thus not properly motivated, and some countries have very few. This weakness of the Sahelian food crop extension apparatus poses a serious problem for the achievement of the project's goals.

Successful IPM extension will depend on close cooperation between the IPM project (research) and the national agricultural and crop protection services (extension and training) at all levels from the farmer's field up. This is especially pressing if, as recommended elsewhere in this report, crop protection service chiefs are not also the leaders of the project national research teams.

Research is often separated from the Ministry in charge of crop production and protection:

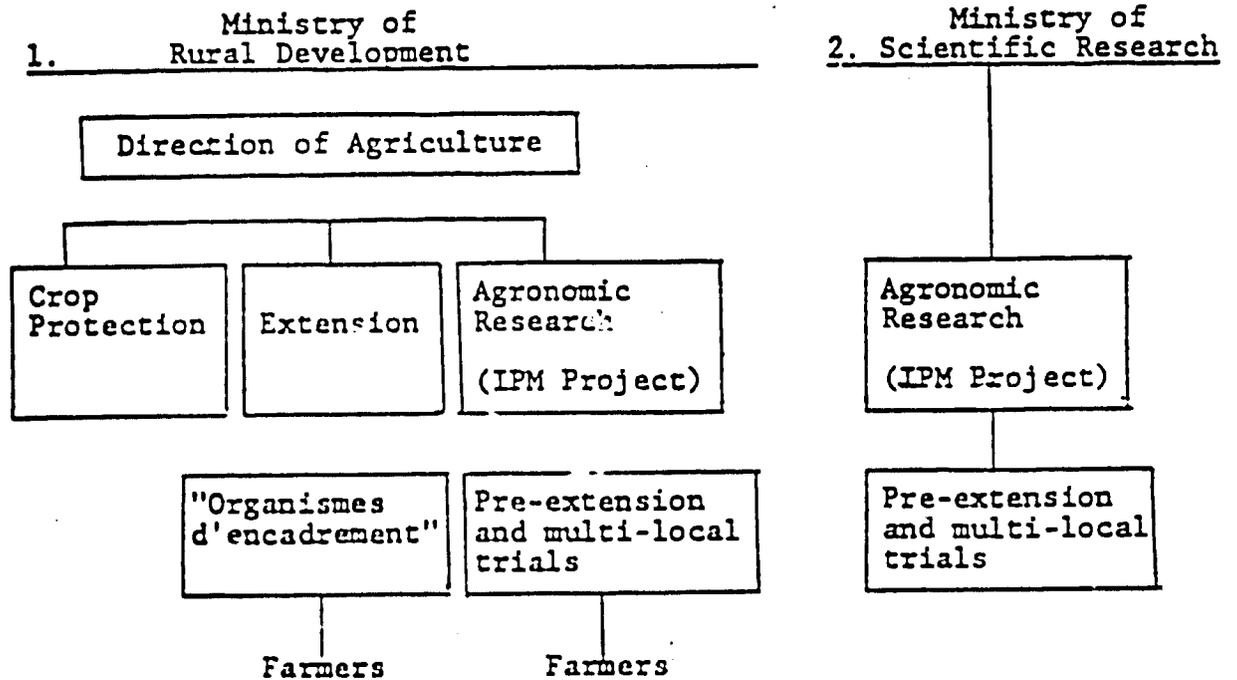
Research under the control of the Ministry of Rural Development:

- . The Gambia
- . Cape Verde
- . Mauritania
- . . Mali

Research under the control of a ministry other than the Ministry of Rural Development. Usually the Ministry of Scientific Research:

- . Upper Volta : IVRAZ
- . Niger : IRAN
- . Senegal : ISRA

The following organigrams can be deduced from the above statements:



In Figure 1, we see that coordination of research and extension is easier because the structures are under the control of the same direction in the same ministry.

In the situation portrayed in Figure 2, coordination of research and extension is hindered by the lack of formal ties.

The national IPM programs have a Coordinating Committee that is meant to bridge this gap. It is to include representatives of research, crop protection and extension organizations and should coordinate and supervise project activities at national level. IPM methods developed by the IPM project are thus meant to pass smoothly into the national extension network. In reality, membership in this committee varies considerably from country to country, and those chosen do not always ensure desired liaison.

At present, no mechanism exists to take the information developed by the various annexes of the CILSS Crop Protection Program and incorporate it into effective extension aids (leaflets, radio spots) for use at the national level. At the beginning of the program, the Project Committee recognized in an "Issues Paper on Plant Protection in CILSS Countries" that Annex G-1 (Regional Unit for Information on the Protection of Crops and Harvests), which provides a centralized facility for crop protection information and the production of extension aids, is "fundamental to the successful implementation of the plant protection program and especially to the IPM Project (Annex B)". The Committee recommended that, failing other donor interest, AID should be prepared to fund it. Today a much less ambitious version of Annex G-1 remains unfunded, and the proposal has been submitted to USAID and to BADEA.

e. Coordination of Project Activities

Thus far, project research has been coordinated through two annual meetings, one to review the previous year's results and one

to plan for the coming cropping season. At the May, 1981 Nouakchott meeting, however, the concept of permanent project working groups for entomology, plant pathology and weed science was adopted, and leaders for the former two groups nominated.

f. Regional and International Liaison

At present, a multitude of national, international and regional plant protection programs operate in the Sahel with no common forum for exchanging information. Interviews with representatives of many organizations during the course of the evaluation revealed that only an imperfect coordination is achieved through personal contacts and attendance at numerous meetings. This inevitably leads to duplication of effort and loss of time and money.

Interviews also revealed that the Biological Control Conference held by the RFCP Project at Dakar in February 1981 had been enthusiastically received and very effective at informing participants about regional biological control activities.

Besides FAO participation in the IPM Project, the CILSS Plant Protection Program has no official means of liaison with other international plant protection programs and regional IPM projects.

2. Recommendations

a. Relevance of Project Objectives

The growing inappropriate use of pesticides in the Sahel and their uncritical acceptance by governments and the public has made the need for IPM research, training and implementation more pressing than ever. The project deserves CILSS support and further AID funding.

b. Staff

The empty FAO socioeconomist's post in the regional project staff should be filled. This person should begin studies of socioeconomic factors that affect the extension of IPM systems in the Sahel. Through common membership in the IPM project working group for Evaluation and Extension of IPM Systems, he/she will cooperate with RFCP project personnel to create an effective, functioning program. Thus there will be an appropriate structure already in place when pilot IPM systems are ready for evaluation at the beginning of Phase II.

The project socioeconomist should be a travelling ombudsman with a broad portfolio who would perform as a facilitator and catalyst since he/she and the Demonstration Liaison Officers would have access to both the working group within the project and research and extension people with host country governments.

Current language and experience requirements for FAO experts should be relaxed so that outstanding young researchers in appropriate specialty areas, including new PhDs, can be sought

out as candidates. Intensive French language training should be made available for non-Francophones.

Farming systems agronomists should be recruited for the project. Their expertise is needed for centering IPM research on traditional cropping systems, for assisting with intercrop experiments, and because modification of cultural practices is one of the major tools of IPM.

The employment of an additional crop loss assessment expert should be considered, perhaps for Cape Verde, where basic food crops (corn, Phaseolus, and vegetables) differ from those in the rest of the Sahel and crop protection research currently lacks this component.

All research counterparts, especially the leaders of the national contingents, should be full-time researchers of Sahelian nationality.

c. Training

Funds provided for training counterparts for FAO regional staff should be reviewed to determine if they are sufficient.

CILSS, FAO and AID must arrange for bilateral funding to train research counterparts, as was foreseen in the Country Plans of Operation. This has not materialized, and lack of counterparts will hinder attainment of the project's institution-building goal.

When future government plant protection employees finish their course work at national agricultural schools, they spend a year's

internship in the crop protection service with a government scholarship. National governments should be asked to place these students with the IPM project for six months of that period, as research technicians. This would provide the project with skilled help at only the cost of their operating expenses, and would help sensitize future government agricultural functionaries to the IPM approach.

A permanent CILSS Crop Protection Training Working Group should be established, chaired by the Director of Training of the Sahel Institute. It should include training officers from the IPM project, the RECP project, Annex G-2, national agricultural schools and other organizations such as WARDA, ICIPE, IITA and SAFGRAD. Staff of Annex G-1 should also participate. The purpose of the group would be regional coordination of crop protection training and the efficient adoption of new IPM methods and information into Sahelian crop protection curricula and the extension network.

The regional Training/Liaison Officer of the IPM project should be responsible for developing clear and well-organized "teaching packages" describing new IPM methods and information developed by project researchers. These should be given to crop protection training programs of every sort through the CILSS Crop Protection Training Working Group. The new information can

then be incorporated into curricula all over the Sahel.

The regional Training/Liaison Officer of the IPM project and the project working group on Evaluation and Extension of IPM Systems should design IPM extension aids such as leaflets and texts for rural radio programs. These can then be produced by Annex G1 and distributed for use in national extension programs.

d. Work Program

Experiments should be carried out in farmers' fields, with traditional cropping systems. The tendency to avoid experimentation in intercrops, because it is more complicated, should be resisted - the whole array of traditional systems should be addressed.

To achieve the goals of the IPM project, counterpart researchers should work with non-chemical methods of pest control.

USAID should support the recent WARDA program in rice IPM. The CILSS IPM project should give responsibility for rice to WARDA as far as possible and hire agronomists or other missing but useful staff into rice researchers' posts.

Pesticide residue monitoring activities foreseen in the Project Paper should be implemented rapidly. Project observers and cooperating farmers should participate in an ongoing sampling program in the field environment and for food-stuffs. This will be especially important in the proposed sub-regional river basin projects since pesticides tend to be heavily used for intensive rice culture and information on water pollution and impacts on fish and wildlife in these environments

is inadequate.

Past surveillance efforts have been completely oriented toward pesticide intervention. To facilitate a regional conversion to an IPM approach, the very different function of IPM project observation posts must be firmly defined and strictly adhered to: observation, sampling, and advice to farmers. These activities should be regionally planned and standardized by the IPM project working group for Crop Loss Assessment, Surveillance, Forecasting, and Environmental Monitoring.

IPM techniques developed and tested at demonstration study areas will be given to the national agricultural networks for multilocal trials, demonstration and extension. Because Sahelian extension systems tend to be weak, the IPM extension effort should be supported and shared by staff of the RFCP project and the IPM project. These staff will cooperate at the farmer's field demonstration level and work with national agricultural agents. Extension liaison between the two projects will be accomplished through joint membership in the IPM Project work group, Evaluation and Extension of IPM Systems.

Successful IPM extension will also depend on higher-level cooperation between national research establishments (which include the IPM project) and the national agricultural and crop protection services. This can be done through (a) appropriate

composition of IPM Project Coordinating Committee, and (b) seminars.

Coordinating Committee

Composition

To allow meetings on a regular basis, it is necessary to reduce as much as possible the number of members of the Committee. The national structures of the CILSS countries differ slightly from one another. Without imposing a design, it would be desirable to have representatives of the following services:

1. Direction of Agriculture
2. Extension Service
3. Crop Protection Service

4. Agronomic Research Service
5. Service in charge of supporting the farmers (Service charge de l'encadrement des paysans).

Functioning

Meetings at least twice a year: one before the cropping season, one at the end of the cropping season, and as necessary. The main meetings should take place in the principal research stations.

A written report of these two meetings, signed by the chairman, should be sent to the regional director of the project.

Once the members are chosen and approved by the Minister or Ministers, the Committee should meet when invitations are sent to the members by the chairman.

In its present mode of functioning, the Committee has suffered from administrative constraints that have delayed and even prevented certain meetings.

Seminars

The IPM Project regional Training/Liaison Officer and members of the national IPM project contingents should organize annual seminars for high- and middle-level officials of the agriculture and crop protection services. This would inform them about the worth and progress of the research effort, help them to understand the goals and philosophy of IPM and keep them knowledgeable about new IPM techniques that are to be extended to farmers.

8. Annex G1, "Regional Unit for Information on the Protection of crops and Harvests", should be funded by USAID if no other donor is available. This Annex addresses two of the major problems of the IPM Project: inadequate information exchange between Sahelian crop protection researchers, and a weak and underfunded Sahelian extension system. This program will produce a research newsletter and crop production slide packages for regional distribution, and could also print the proceedings of important research conferences. Its second role is to take the information developed by the CILSS Crop Protection Program and devise effective extension aids (leaflets, radio spots) for use on the national level.

e. Coordination of Project Activities

Expanding and refining the working group concept could facilitate the coordination of more project activities, channel input from expert consultants, and ensure liaison with the RCFP Project on the operational level. The following groups might be usefully formed, with the chairman of each named by the Technical/Administrative Advisory Committee. The chairman would be responsible for coordinating regional activities, preparing reports, and for liaison with the regional project staff. Staff from both the RCFP and IPM Projects would participate as appropriate.

Crop Loss Assessment/Surveillance/Forecasting/Environmental Monitoring

- Members:** Crop loss assessment experts, bioclimatologist, selected observers; IPM experts, entomologists, plant pathologists, farming systems agronomists, and weed scientists when appropriate.
- Beginning Year 1:** Activity
- Crop loss assessment experiments to identify key pests and correlate size of field pest populations with magnitude of crop loss on both traditional and improved crop varieties.
- Implement surveillance network: training of observers, staffing of observation posts.
- Development of standardized regional surveillance techniques and data sheets. Development of data collection and analysis procedures.
- As environmental program develops:** Train observers to take environmental and local foodstuff samples for pesticide residue monitoring program.
- Beginning year 2:** Constant refining of surveillance techniques.
- Beginning year 3:** Produce a manual: Surveillance guidelines for pest management on food crops in the Sahel.
- Phases II and III:** Continue above activities.
- Based on biological and meteorological data collected in Phase I, begin to develop and test population forecasting models and techniques, and determine the role of remote-sensing in area-wide surveillance.

Biological Control

Members:

Biological control experts; IPM experts, entomologists and weed scientists when appropriate, CIBC, etc.

Beginning Year 1:

Activity

Collection and observation of natural enemies of pests. Development of identification expertise. Study of their biology and ecology. Study of their population dynamics with relation to those of pest species.

Beginning Year 2:

Detailed elucidation of the role of natural enemies in pest population control and regulation. Investigation of means of enhancing their effectiveness. Investigation of ways to use microbial pesticides.

Beginning Year 3:

Produce a manual: Natural enemies of pests of food crops in the Sahel, their role in controlling pest populations and their utilization in IPM systems.

Modification of Cropping Techniques for Better Pest Management

- Members:** Plant pathologists, weed scientists, farming systems agronomists; IPM experts and entomologists when appropriate, representatives of plant breeding organizations such as CIMMYT, ICRISAT, SAFGRAD, IITA.
- Beginning Year 1:** **Activity**
- Study traditional cropping systems and agronomic practices, their distribution, and the rationale behind these patterns.
- Study the influence of various cropping practices on the incidence of insect pest, disease, and weed problems.
- Evaluate pest-resistant crop varieties for incorporation in IPM systems.
- Beginning Year 2:** Experiment with the manipulation of cropping techniques to minimize pest infestation.
- Beginning Year 3:** Produce a manual: Sahelian food cropping techniques and their role in pest management.

Integrated Pest Management/IPM Systems

- Members:** IPM experts; other researchers as appropriate.
- Beginning Year 1:** Activity
Collect detailed information on traditional crop protection methods. Evaluate their effectiveness and possible improvements/adaptations.
- Beginning Year 2:** Study the compatibility and integration of IPM techniques identified by project researchers.
- Beginning Year 3:** In cooperation with other project researchers, define prototype IPM systems for testing in Phase II.

Evaluation and Extension of IPM Systems

- Members: FAO socioeconomist, Demonstration/Liaison Officers (in Phase II), RFCP project extension personnel, FAO Regional Training/Liaison Officer
- Beginning Year 1: Activity
- Baseline socioeconomic surveys.
- Collection of information on traditional cropping systems and traditional pest control methods, to give to the farming systems agronomists and the IPM experts.
- Establish liaison and coordination with national agriculture extension and crop protection agents.
- Begin extension of presently available traditional and nontraditional IPM techniques.
- Beginning Year 2: Refine extension techniques.
- Beginning Year 3: Design extension aids to be produced by Annex G1 and distributed to national extension personnel.
- Produce a manual: Extension of IPM techniques to small farmers in the Sahel.

To be most effective, researchers and extension experts should have advice from international experts outside the project. Each already has the funds to request one consultant every year. The working groups could enhance the value of this if each group used some of the consultant funding to invite an eminent worker in an especially relevant field - crop loss assessment or inter-cropping, for example - to become a permanent consultant. This person could visit the Sahel once or twice a year to review activities, results, and plans and offer ideas and advice, thus stimulating and guiding the work with greater knowledge and involvement than a temporary consultant could have. Other outstanding international workers can be identified at conferences or through publications and asked to participate in working group meetings, as needed. Consultants could lend authority to the working group by signing the annual work plans.

Both the RFCP and IPM Projects do extension, surveillance and research, which should be as closely coordinated as possible. The working groups would be the ideal venue. Staff of both projects should participate toward a well-conceived joint regional effort, with benefit of expert advice.

f. Regional and International Liasion

1. An annual CILSS Plant Protection Research Conference that unites all organizations-national programs and regional and international projects - could be the regional forum for information exchange that is lacking at present. Means should be explored to present these conferences. They might be organized by the RTOU or the Communications Department at the Sahel Institute,

The theme of the conference could change from year to year though it should remain comprehensive in scope in order to justify wide participation. This would reduce the proliferation of smaller conferences and thus also reduce travel expense for researchers who would wish to attend several different ones that a central regional meeting might absorb. Proceedings compiled and printed by Annex G1 could serve as a valuable reference and a record of regional plant protection activities.

The conference could be held just before or after the Consultative and Executive Committee meetings, and in the same city, since many interested parties would wish to attend both. Sahelian researchers could plan their program for the approaching cropping season more effectively for having participated.

At present, the CILSS Plant Protection Program has little official liaison with other international plant protection programs and regional IPM projects. This role could be played by an international liaison officer operating out of the RMU. This person could attend international meetings and committees related to IPM and keep project personnel informed. Lists of upcoming conferences and other items of interest could be placed in the CILSS plant protection newsletter published by Annex G1.

PROJECT DESIGN SUMMARY

IPM Research 625-0928

LOGICAL FRAMEWORK

Narrative Summary	Objectively Verifiable Indicators
<p>Program on sector goal</p> <p>To increase food crop production in the Sahel by production of crop losses due to insects, plant diseases and weeds through IPM technology.</p>	<p>Measures of goal achievement</p> <p>Food crop loss due to pests in the Sahel will decrease. The first phase of the project will accumulate baseline data and research inputs for production of crop loss during subsequent phases.</p>
<p>Project Purpose :</p> <p>To strengthen research in the Sahel to develop appropriate IPM technology to be extended to small farmers.</p>	<p>End of project status :</p> <p>Pilot IPM programs designed for every country in the Sahel by a fully-staffed effective regional research effort the funding for which is arranged for between international donors and hosts governments. Pest surveillance and crop loss assessments conducted as a routine practice.</p>
<p>Outputs :</p> <ol style="list-style-type: none"> 1. Establishment of a research program to develop integrated pest management systems. 2. Evaluation of crop losses and pest incidence. 3. Establishment of a surveillance system to monitor major pests. 4. Counterpart training 5. Laboratories and observation posts in place 6. Extension mechanisms developed to implement results at the farmer level 	<p>Magnitude of output :</p> <ol style="list-style-type: none"> 1. N.A. 2. N.A. 3. N.A. 4. 170 5. 7 labs ; 70 posts 6. to be developed

Means of Verification	Important assumptions
<p>a. Annual evaluations of losses of Sahel food crops attributable to pests, the technique for which is to be developed by this project.</p>	<p>Assumptions for achieving goal targets :</p> <p>a. that exogenous variables will not seriously disrupt food crop yields in the Sahel.</p>
<p>a. Annual budget and program documents of international donors, and hosts governments. b. Annual program evaluation documents.</p>	<p>Assumptions for achieving purpose :</p> <p>a. That international coordination of pest management activities will be sufficient to achieve project targets. b. That integrated pest management programs are cost effective.</p>
<p>a. CILSS reports b. Annual AID evaluations of project implementations activities. c. Field visits. d. Monitoring by USAID's. e. Host country quarterly management reports f. Production of IPM manuals for use with Sahelian food crops.</p>	<p>Assumptions for achieving outputs :</p> <p>a. That sufficient number of personnel are available to be trained and retained.</p>

PROJECT DESIGN SUMMARY

IPM Research 625-0928

LOGICAL FRAMEWORK

Narrative Summary	Objectively Verifiable Indicators
<p>Inputs :</p> <p>Technical assistance Commodities (lab equipment & vehicles) Construction of laboratories and observation posts. Training Other costs</p>	<p>Implementation Targets :</p> <p>Refer to financial plan</p>

Means of Verification	Important assumptions
	<p>Assumptions for providing inputs :</p> <ol style="list-style-type: none">a. That inputs from all sources will be provided according to the schedule.

C. Project Implementation (Administrative)

1. Program Budget Management

a. Status

As AID fiscal year 1981 closes, a year that in some measure coincides with the project's first operational year, two or more budget and financial planning exercises are going on simultaneously. USAID and the financial section of UGR have just reviewed and approved the FY 1981 budgets for the various components and approved the advances for the fourth quarter. The UGR financial officer has also conducted a review with the project directors and accountants of Niger, Mali, Senegal and the Regional Director's Office to refine financial procedures and to establish budgets for the year October 1981-September 1982. When budget data is obtained from The Gambia and Mauritania (data is in from Cape Verde and the Upper Volta), the material will be submitted to USAID for approval and to justify replenishment of advances for the first quarter of FY 1982. However, according to the original project financial plan, FY 1982 was to have been the last year of the project, not the second. Assuming originally planned end of project results can be obtained within approximately the originally planned time span despite a two-year delay, new life of project budgets are now being prepared extending through June 1985. These tentative and unofficial budget forecasts, have been prepared at the request of the evaluation team. They do not include new elements of project cost; they will undoubtedly need some adjustment to meet more recently perceived project needs; they do not include an inflation factor and they recognize that total project life will

be extended. The estimated prepared by CILSS/UGR and the FAO have been combined and appear in APPENDIX They indicate a total extended life of project cost of over \$33,000,000.

b. Conditions and Problems

Preparation of FAO budgets for the life of the project does not seem to have involved any major problems of financial or other management planning. This cannot be said of the local currency budgeting process. Preparation of the annual budgets for the national project components, for the Regional Director's Office, for the UGR itself, and the approval of those budgets by USAID are preconditions under the present system to the establishment of quarterly requests for advances, replenishment vouchers, local construction plans, local procurement, international procurement, personnel recruitment and operational plans.

Attachment 1 to Project Agreement Amendment No. 5 dated March 25, 1980 established, in effect, budget ceilings for each of the project components for the first year of project operations. It also established a life of project budget breakdown as between FAO and CILSS costs. The first year's funds, obligated at this time, were also broken down by expenditure category. One

decision, apparently taken as a matter of financial convenience to AID, was to defer any allocation of funds for construction until subsequent project years. This decision was later reversed at the request of the CILSS Ministers and at the expense of the allocation for material and equipment purchases. There does not appear to have been any planning as to real needs, possible accomplishments and relationships between expenditure items and project plans and operations.

During August and September 1980, the UGR submitted to USAID budgets for the national components for the "first year" of operations. These budgets tended to coincide with the 1981 fiscal year. The budget requests were usually accompanied by a request for a first quarter's advance of funds. Although, with the exceptions of Chad and the subregional project, national components received their first advances in the first quarter of FY 1981, these annual budgets were not provisionally approved until Project Implementation Letter #20 of January 5, 1981.

This "provisional" approval of the first year's budget distressed the various grantee agencies. That such an approval still permitted operations, operational planning, the replenishment of advances and the purchasing of goods and services was alien to their training and experience with Francophone financial practices. These feelings were deepened by the unfortunate delays encountered in processing requests for advances and authorization for local purchases. The FY 1981 budget was finally approved by Project Implementation Letter # 36, dated August 24, 1981.

A detailed review of the year's budget was attached. This letter, thoroughly discussed between the USAID Project Officer and the grantee financial manager before it was finalized, is an example, however belated, of how joint budget planning should be carried out and should have been carried out earlier.

This letter also urged CILSS to press FAO for financial reports on its outstanding advance. More important, it pointed out the importance of an early submission of the FY 1982 budget.

c. Recommendations

(1) AID must decide within a very few months if it intends to extend the life of the project beyond the end of FY 1982. As indicated in our overall conclusions, we believe that this is the only rational decision. In such case, the budgets prepared by FAO and CILSS and summarized in Appendix II should be quickly reviewed and revised, as necessary, to reflect the operational and management improvements and changes being made. This three year and nine month budget should be established as the basic financial planning documentation for the conduct of the project until June 1985;

(2) With the data already on hand, and with inputs to come in from other project components, the USAID Project Officer, the CILSS financial manager, the Regional Project Director and the senior FAO technical advisor should meet immediately to finalize the FY 1982 budget. This should be viewed as a first step in centralizing budget responsibility in the Regional Project Office (CILSS).

As soon as that budget is prepared, and agreed upon by the four parties listed, its component parts should be communicated to the national entities by the Regional Director. This should not wait for USAID approval, already shown to be a fairly meaningless formality. The components should be advised that the agreed budgets are the basis for annual financial planning and that they should proceed to submit their quarterly reports and requests for advances accordingly;

(3) Budgeting and financial management should be centralized in the Regional Director's office. Any UGR responsibility in planning, as for operations, should be advisory and general, applicable to all projects and at a CILSS-wide policy level. The Director's office should be strengthened by adding a financial manager, with a typist and a clerk and a procurement specialist. FAO should fill the position of administrative and financial advisor and assign him to the regional office.

2. Financial Management and Accounting

a. Current Status

All project accounting for the Regional Management Unit, for the Regional Director's Office and for national components is based on a system that supports a quarterly replenishment of local currency advances. The system was designed by USAID, Ouagadougou, sometime in 1979. With the project long delayed for other reasons, the system was officially transmitted to the CILSS Regional Management Unit (UGR) by Implementation Letter on April 11, 1980. It has been thoroughly discussed with the UGR accountant during the previous month. During May, 1980, a three-man team from USAID/Controller and UGR visited Mali, Senegal, Mauritania and The Gambia to instruct local project accountants in the system. The UGR accountant made subsequent visits to Niger and Cape Verde and has worked continuously with the Upper Volta accountant.

The basic accounting document is the daily expense journal. As each expenditure is made an entry is made showing payee, check number, date, amount and budget line item. This journal is summed monthly and quarterly and provides the data for the quarterly financial statement and the quarterly budget status report. The invoices paid, the basis of the journal entries, are marked with the check number and filed (in folders or file boxes) where they should be available for audit.

Each accounting station also maintains a receipts journal although it seems to take various forms. In several cases it consisted almost entirely of a folder containing bank advices of credits to the

advance and periodic bank statements. Banks in the Sahel do not provide their clients with cancelled checks.

Although no instructions on the subject have been received by the accounting stations several of them have set up petty cash accounts. One uses the petty cash accounts of another agency which he also serves as bookkeeper. A system of accounting for travel advances seems to be functioning adequately.

To replenish the advance, the national component or other accounting station prepares on the 15th of the last month of the quarter a telex to the UGR financial office in Ouagadougou reporting its financial situation and requesting the next quarter's advance. The telex shows the cash balance at beginning of the quarter, cash requirements for next quarter by line item and net cash advance required. The telex data is keyed to the numbered line items on the basic documents which are accordingly prepared by the UGR and transmitted to the USAID Project Officer. The latter prepares a voucher (Form 1034) and submits it to the USAID Controller. The documents are reviewed and approved in an appropriate amount (adjustments made to date have usually been elimination of planned expense for construction or for local major procurement for which Conditions Precedent have not been met or waivers are pending). A check in the amount of the advance(s) is requested by USAID/Controller from Paris. Upon receipt the check is transmitted to the UGR for deposit in a local "transit account". From this account the UGR arranges bank transfers to the individual national components or to the regional directorate.

Primarily because of delays built into the system and some unimaginative or unresponsive management in USAID, the system has broken down. Replenishments of advances have consistently been received at the end of the quarter, not the beginning. Local accountants and Grantee sub-project directors have had to ration travel, purchase of supplies and equipment, recruitment of local personnel, etc. The resultant slowdown in project activity would have been disastrous had not the project been delayed by other deficiencies in management, notably construction, procurement and personnel recruitment.

b. Conditions and Problems

As noted, the breakdown in processing of requests for advances has resulted in project delays which will get worse. The system does not take into account the built-in delays. Telex to UGR, transcription onto financial form, transmittal to USAID, review by Project Officer, preparation of Form 1034, review by controller, request to Paris for check issuance, receipt of check by USAID, transmittal to UGR, waiting period for check to clear, transmittal from Volta International Bank (BIV) to local bank, notification by local bank to national component of credit to account. With the best goodwill in the world, this is a two-month process.

Delays in USAID reviews have stretched the built-in delay to about three months. Funds have been made available only after the end of the period for which they were required. The fifteen-day advance statement of expenditures and requirements has become meaningless and only adds another element of confusion. When does the financial operations quarter begin or end?

The journal entry system does not provide the sub-project manager or his accountant with immediate information of line item balances in either quarterly advances or annual budgets. There is no encumbrance entry. A purchase appears on the books when paid for, not when ordered.

The accountants at national component level are not assigned to the project. They are borrowed from various national government agencies (Ministry of Agriculture, Research Stations, vehicle repair facility are examples). They receive no incentive pay or other incentives. On the contrary, their other responsibilities always take priority. Some of them have sacrificed energy and free time to fight the frustrations of a non-functioning system.

The financial report that supports requests for advances are simple statements of disbursements. They are supposedly backed up by the expense journal, the filed vouchers and receipts, bank statement and check stubs. However, an improper disbursement could be made, reported and covered by a new advance long before any audit of basic documents takes place. As a minimum, quarterly financial statements prepared at the accounting station should be submitted by mail (as they now are as followups to the telexed data) and accompanied by a bank statement and a list of payees.

The USAID Controller's offices, looking only at submitted documents and apparently not project success oriented, does not seem to realize the impact on project execution of delays in replenishing advance. It was stated by one individual that if the total expenditures during the quarter had been more than covered by cash at the beginning, plus cash received, no problem had existed. Unfortunately because

of all the other delays, the statement while insensitive to the problem, was not entirely wrong. An example is contained in the following table:

National Component, Bamako (Mali)	
Period: March 15, 1981 - June 15, 1981	
Unit:	210 = \$1.00
First advance from USAID, Nov. 1980	19,083,600 CFA
Expenditures up to March 15, 1981	<u>6,486,830</u>
Cash balance	12,596,770
Requested funds 3/15-6/15	116,234,700
Construction and equipment	<u>-108,097,200</u>
Planned operating costs	8,137,500
Actual expenditures 3/15-6/15	4,252,560
Cash balance on June 15, 1981	<u>8,344,210</u>

Of the actual expenditures none were for construction and only a nominal amount was spent on material and equipment. In fact, Conditions Precedent not having been met, no such expenditures would have been possible during that period.

However, expenditures on other line items was only about one half of that planned. Part of this was underachievement of planned goals. However, part of this was a deliberate decision not to incur obligations for newly hired personnel, travel, locally purchased office equipment and supplies, etc. until the replenishment had been received. Unfortunately, as of June 15, 1981, no replenishment had been made at

the operation level and no explanation for the delay received.

Operations had been restricted despite the apparent post hoc availability of essential funds.

c. Recommendations

The current system should be strengthened by the addition of an encumbrance journal. This could be a simple recording of orders placed, by line item and an entry showing balance under that line item of either the budget allocation or planned expenditure for that period.

The period for financial reporting and replenishment advances should be the calendar quarter. The 15th day of the month of the quarter should only be the alert day on which each accounting station advises the project management of what it expects to disburse during the subsequent quarter and the amount of advance required. At project management level a tentative estimate of quarterly requirements, based on annual budgets, history of quarterly disbursements and planned expenditure actions for the subsequent quarter should already have been agreed upon with the AID Controller and the funds already in place and available in the transit account. AID Controller and Grantee project management should reconcile their own forward planning with the alert messages and forward, on the first day of the quarter, the required replenishment to the advance. Financial reports, probably due in about fifteen days after the end of the quarter just passed, should be used to review expenditures, plan for the next quarter and, on occasion, might justify the processing of no-pay vouchers or adjustments between accounting stations, if advances get out of hand. The overriding principle must be to assure, at the beginning of the period, availability of funds essential to the orderly conduct of project activity.

The estimate of real financial needs, the preparation of accurate financial reports, the maintenance of adequate financial records all require the assignment of full-time accounting personnel at each financial reporting and disbursement station. Since financial activity reflects other administrative activity, the persons assigned to the accounting function at component level should also be involved in procurement documentation, recording the use of expendable supplies, reordering as necessary, checking on periodic vehicle maintenance, reviewing payrolls, etc. For all the above it is recommended that at each national or sub-regional component a project funded administrative assistant/accountant be hired to relieve the national project manager of the day-to-day workload of administrative detail as well as to assist him in meeting his basic management responsibilities. Consideration should be given to some sort of one-time gratuity or other compensation to part-time accountants who have already provided unpaid service.

Internal audits of each component should be conducted by the Project Directorate at least annually. These audits should have a multiple purpose: to reveal irregularities, discover malfunctions in the system, assure use of funds for project purposes, and, most important, as continuing training in financial administration at the national level. An external audit firm should do a full project audit at about the end of CY 1982.

The present separate accounts for each national component should be replaced by a global account for CILSS Project Directorate. Close working relationships should be established between USAID Controller, USAID Project Officer and CILSS Project Directorate Financial Manager. With such an arrangement in place, USAID eliminates it

sub-accounting, CILSS financial management becomes effective and a simple set of memorandum financial reports can keep the three project principals, CILSS-FAO-AID, informed on project progress as reflected in financial reporting.

It should be noted here that these recommendations are fully consistent with the broader recommendations we have made concerning general project management and financial management and budgeting. Basically, the existing accounting and funds transfer system meets the needs of the project. We have proposed (a) strengthening accounting staff at the component level, (b) putting day-to-day financial responsibility in the office of Project Director, (c) adding an encumbrance journal, (d) using internal audit as both a control and training tool, and (e) reducing the multiplicity of USAID controller sub-accounts. All of this supports and is premised upon the recommended project management improvements. The accounting recommendations could stand by themselves and are essential to the continuing execution of the project. They have greater value as part of the team proposals for a coherent package of management recommendations, each supporting and being supported by the others.

3. Procurement

a. Current Status

There are three major procurement elements in the project: vehicles, laboratory equipment and equipment for the field, for offices and for observation posts. Procurement in the United States, mostly vehicles and laboratory equipment, is carried out by the procurement specialist at CILSS/UGR headquarters in Ouagadougou. He follows standard PIO/C procedures with USAID clearing off and signing the PIO/C. The Afro-American Purchasing Center in New York carries out procurement action under contract to CILSS. Local procurement is carried out on an ad hoc basis by the national components. Their basic procurement authority is the annual budget and the subsequent quarterly advance of funds. They have purchased office equipment, motor bikes and, on the basis of Code 935 waivers, some motor vehicles at the local level.

The procurement plan calls for lists to be prepared by national components and submitted to CILSS for a yearly procurement schedule. This applies to both local and offshore purchases. Confusion has existed between CILSS and the project Directorate over processing these lists. CILSS wanted lists routed through the Project Directorate for review of tradenames, catalog numbers, specifications, and prices. The Directorate wanted lists to go directly to CILSS based on prior FAO review. In addition, lists have been submitted from a variety of sources.

This misunderstanding, plus the delay in getting equipment lists from the other national components, has delayed project procurement by about two years. It is also illustrative

of a consistent failure in the project implementation process. All procurement planning should have been completed before the Conditions Precedent were met and PIO/Cs drafted, ready to be issued immediately upon signature of the PIL which would approve documentation submitted in satisfaction of the Conditions Precedent.

As of August 31, 1981, PIO/Cs have been issued covering laboratory equipment for Upper Volta, Niger, Mauritania, Mali and Senegal. The total estimated cost is estimated at \$431,000. A PIO/C has been issued for an environmental chamber for Senegal at an estimated cost of US \$27,823. Four AMC jeeps, three for Upper Volta, one for Mali, were on order with a total estimated cost of US \$56,800. Total procurement action from U.S. source/origin thus totalled US \$515,623 as of the above date. No procurement actions involving Chad or The Gambia have started. A list of required equipment for Cape Verde was received on August 28, 1981 and a PIO/C is currently in preparation. No procurement action and no procurement planning is underway for any of the sub-regional components.

Procurement of motor vehicles has been a special case. The various plans of operations indicate a minimum vehicle requirement on hand by the end of the first year of 17 four-wheel drive vehicles and 14 sedans. As of August 31, 1981, two four-wheel drive and 7 sedans were in place, 4 AMC jeeps were on order, and waivers had been granted to permit the local purchase of an additional six four-wheel drive vehicles.

In Senegal, another special situation, indicative of the overall problem, has developed concerning the proprietary procurement of US vehicles. A sole source waiver concerning 18 Chevette sedans has resulted in the purchase of vehicles through the GMC dealer in Dakar. The Senegal project director is very dissatisfied with after-sales service. By personal experience and observation, a member of the Evaluation Team shares this view. A gear box burned out because during routine servicing, lubricant was drained from the transmission and not replaced. The service facilities were completely shut down for two and a half mid-day hours on a weekday. The service department is reportedly indifferent to the complaints of customers.

The Project Grant Agreement contained the standard provision requiring procurement of US made vehicles but noting that waiver to this provision is possible. It was soon discovered that either no vehicles of US manufacture were adapted to local conditions, or that they were not available on a timely basis through local representatives, or that the local representatives were not in a position to provide adequate service. Requests for waivers got tangled up in a backstopping misunderstanding in AID/W (two corollary projects have the same project numbers). Waivers officially requested in November 1980 were not received until April 1981. Not only were six months lost, but the passage of time made two of the waivers obsolete. In Cape Verde, the Ford four-wheel drive vehicle was not desirable and the servicing problems of the Chevette in Senegal had surfaced. As a result, new waiver requests will now have to be processed.

Procurement at the local level, such items as desks, chairs, office and field equipment, etc. suffered primarily from the financial administration problems. Necessary purchases have been deferred because funds have been late in arriving. No evidence has been found of local procurement plans, there have been no general guidelines issued and there is no central record of what has been procured or what remains to be procured.

b. Problems

The one overriding procurement problem is the lack of a procurement plan. The plan of May 1980, modifying the annex to the project paper, sets forth certain procurement policies and responsibilities. It also describes work still needed to start the procurement process. Various procurement lists have been prepared. Some time-phasing has been planned. Some waivers have been sought, but no coherent list of upcoming waivers has been prepared. The pieces of a procurement plan exist. They have not been pulled together.

As far as vehicles are concerned, procurement waivers are the essential problem. As noted, a waiver had been obtained to permit the sole source procurement of all-terrain vehicles for Cape Verde. On September 3, 1981, after much correspondence and delay, a formal request for a new waiver was submitted to USAID by CILSS/UGR. It asks authority to buy Peugeot diesel four-wheel drive pickups. Similarly, a new waiver will be required if Senegal is forced to give up on Chevetttes through poor dealer response. Three AMC jeeps are on order for Upper Volta, under a sole source waiver. Two more four-wheel drive and two passenger vehicles are still on the

procurement list, but no waivers have been requested because no procurement decision has been made. A similar situation exists with respect to Niger.

c. Recommendation

As soon as possible after the completion of the budget exercise described above but probably no later than the first quarter of FY 1982, a procurement plan should be drawn up for all material and equipment except vehicles. This plan should be based on a who-does-what-when program. It should start with the preparation by each project component, regional, national and sub-regional, of a list showing what has been requested of the procurement assistant, what has been received, what is expected when, what is still needed and when should it be ordered. These lists should be consolidated, reviewed and approved by the Regional Manager (CILSS) with FAO advice. The program should then go to the procurement specialist for execution. The latter should keep the components and the Regional Director advised on procurement progress and actions and should prepare a materials receipt and checking program. Attention is invited to the Team Engineer's comments with respect to prospective savings on laboratory and field equipment as noted in sub-paragraph 4 f below.

Each of the national components should prepare lists of what they have bought, what they need, costs incurred or to be incurred, when are items needed. They should indicate sources of local procurement and how they were selected or will be selected. They should show how procurement needs have been

or will be shown in their budgets and requests for funds. These programs should again be consolidated, reviewed and approved by the Project Directorate and transmitted to USAID to support requests for funds.

A separate procurement plan should be drawn up for motor vehicles. A chart, available at CILSS/UGR, which was prepared by the procurement assistant, should be the model for this plan. This plan should show vehicles on hand, on order, required, when required, broken down by type. It should show what waivers have been requested, which received, which awaited and which should still be requested. When completed, this plan should show what motor vehicles remain to be procured, their source/origin and who will procure them with what funds, when and upon what authority. Waiver requests should be supported by objective data obtained from visits to dealers and service facilities and interviews with recent purchasers and fleet users. Data should be collected on fuel consumption and service and repair downtime. Assistance in supply management of vehicles should be available from REDSO/Abidjan.

CONSTRUCTIONa. STATUS

The following text presents the construction program on a country-by-country basis, based on the original planning indicated in the respective Country Operation Plan (C.O.P.).

CAPE VERDE

Construction plans, bids and detailed cost estimates for all planned buildings have been prepared. AID is in the process of giving its final approval for construction to begin. Work is to be done by force account either directly by Ministry of Rural Development (MDR) or a recently created construction cooperative.

THE GAMBIA

Construction plans and invitations to bid have been prepared for all buildings.

Detailed cost estimates have not yet been done. The program has not progressed for more than a year due to the problem which occurred with respect to the payment of the architect's fees. The situation is yet to be resolved.

UPPER VOLTA

Construction plans, ^{documents} contract, and detailed cost estimates have been prepared for all planned buildings except for the entomological laboratory at Kamboinse for which only a drawing has been prepared.^{1/} The other planned buildings are:

1 plant pathology laboratory (Farako-Ba)

1 weed laboratory (Saria)

1 insectary (Kamboinse)

11 observation posts. (AID has approved for invitations to bid)

^{1/}The construction of that building deferred due to funding problems.

MALI

The following buildings were to be built according to the annex of the C.O.P.:

- 1 laboratory in Sotuba
- 1 insectary
- 1 shelter for generator
- 10 observation posts

Sotuba's laboratory: A contractor has been selected. The contract is in the process of being approved by various Ministries and will be shortly sent to AID for its approval.

Insectary and shelter: A drawing has been prepared but not further progress.

Observation posts: Nine of the ten planned posts have been built from other budgets (not AID). For the remaining post, construction plans are prepared.

MAURITANIA

Drawings only have been prepared for the planned buildings, namely an office laboratory for Nouakchott and six observation posts. Invitations to bid have yet to be prepared. The laboratory site has received conditional approval by AID with a condition that a detailed plan for the stabilization of sand dunes be submitted to AID. To be done shortly. No progress has been made on the observation posts.

NIGER

A contractor has been selected for the construction of the Maradi Office block. AID has requested that some clauses be added to the contract before they can give their final approval for the contract to be awarded.

Plans and specifications have been prepared for the seven observation posts and submitted for AID approval. AID has requested supplementary information (cost estimates for each post and plan for execution).

SENEGAL

Construction has started for the entomological laboratory at Niore du Rip and the plant pathology laboratory in Djibelor. About 50% of the work is completed.

A plan has been prepared for the laboratories to be built in Richard-Toll. In fact this plan integrates into one building two separate laboratories that were to be built in Richard-Toll.

One entomological laboratory for the Senegalese component of IMP and one weed laboratory for the Senegal River Basin Sub-Regional component. No further progress has been made on this laboratory. *

SUB-REGIONAL

Annex 9 of this project has not started yet. Consequently, the building component of that annex has not yet received much attention. So far, only preliminary construction plans for all planned buildings have been prepared. They have to be revised or finalized and sent to AID for approval prior to preparation of contract documents. It is worth noting however that buildings or construction is planned only for the Senegal River Valley component and not for the Niger River and Chad Lake Basins.

b. CONSTRUCTION NEEDS AND BUDGETS

The team has reviewed the construction needs and is essentially recommending that the construction indicated in the C.O.P.'s be maintained. Details of the proposed construction programs are given in the financial budget tables of this report. We have also added to the list a few small additional

* Final decision has to be made on whether to build the laboratory in Richard-Toll or Fanaye before planning can proceed further (see subparagraph g (3) below.)

buildings which would be required, namely:

Mauritania: 2 observation posts
 Senegal: 4 observation posts
 1 screen house
 1 insectary

Only one observation post is required for Mali instead of the ten previously indicated in the COP because nine have already been built by the Malian government under other budgets.

Senegal has expressed additional needs for 12 houses (5 for researchers and 7 for technicians). However, on account of the very high cost of the revised construction budget for the project, the team did not consider it appropriate to include these houses in the revised budget. We adopted the same attitude for the 3 observer's houses requested by Gambia. It is to be noted that the revised construction budgets include a contingency fund (10%) and funds for architect/engineers fees (10%) which were not included in the original COP's budgets.

The revised budget for the proposed construction program amounts to U.S. \$3.1 million (valid up to Mid 1982). This is much higher than the original budget indicated in the Project Agreement which was U.S. \$1.521 million. Since no details about the construction program were given in the project agreement (nor in the project paper), it is very difficult to explain such a difference in cost. It can be partly explained by inflation costs, which run about 20% year times three years delay with equals or a revised estimate of US \$2.5 million. Adding 10% for physical contingencies and 10% for architect/engineers fees, costs that might not have been included in the original estimates, would raise the original estimates for the construction program for the entire project to \$ U.S. 3 million which is very close to the actual revised estimate. Likewise, the difference in the total construction cost estimate as obtained from the COP and the amount indicated in the Project Agreement could be explained in great part by inflation alone. Total construction budgets as per the COPs (in which

details of the planned construction program for each country are given) is U.S. \$2.3 million. Considering that about 2 years elapsed between the 2 series of budgets, inflation itself could explain an increase of the order of U.S. \$0.6 million. The small additional difference of U.S. \$200,000. could easily be explained by adding up small items that could not be anticipated such as water/electricity supply, etc.

c. ESTIMATE OF CONSTRUCTION COSTS

The latest available cost information supplied to the evaluation team engineer has been used to revise cost estimates for the proposed construction program. Cost estimates for about 2/3 of the proposed buildings are based on detailed cost analysis done from the materials list derived from the respective construction plans. The bulk of the estimated costs for the last third of the planned construction was obtained by either using approximate cost per unit area in the case of buildings or from educated "guestimates" based on costs of similar structures in areas where they are planned, such as for water towers, wells, pumping station, etc. We believe that our overall cost estimates (either on a country basis or for the total construction program) are most likely within 15-20% of real costs when completed.

It was not possible to get cost estimates for construction planned in the GAMBIA. As a consequence a value judgment was made by the team engineer based on building costs in Senegal adjusted for the of type of buildings required in the Gambia.

The estimated costs for observation posts are the least accurate. This is due to the fact that they will be built in rather isolated areas for which no cost/records for similar structures are readily available. In addition, cost will vary a great deal depending on whether invitation to bid is done on a national scale (i.e. one contract for all observation posts for any given country) or decentralized at the local level. In addition level of

of competition and construction materials used will play an important influencing role in the costs of the buildings.

1.- Level of competition:

Observation posts are rather small and relatively inexpensive structures that most likely will not attract many bidders and unfortunately at this stage it is impossible to know how many contractors will be interested. For such simple structures cost may quite well vary by as much as 50% or more depending on the level of competition.

2.- Construction materials to be used:

The general rule in the actual planning of the design of the observation post is to build them "en dur", e.g., concrete block walls, instead of "banco amélioré" (locally-made sun dried clay bricks or blocks covered by a cement mortar rendering on the outside, one wall is up). In our opinion, observation posts built with "banco amélioré" could likely cost half that of the same structures built with concrete blocks, provided that (good) clay is available at a reasonable distance from proposed construction sites. However, because the possibilities of using cheaper local material could not be fully explored, cost estimates reflect the use of concrete blocks. In view of the simple nature of these observation posts and the already high cost of the construction program as a whole, "banco amélioré" should be used whenever possible.

d. DELAYS IN THE CONSTRUCTION PROGRAM

To a great extent, delays in the implementation of the construction program can be attributed to the following 3 major reasons:

- a) general delays in implementing the project as a whole
- b) AID's regulations pertaining to construction work
- c) lack of input from local AID engineers

1.- General delays

This is by far the major reason for the delays in the construction program. Reasons for delays in the implementation of the whole project have been discussed elsewhere in this report and will not be covered here. It is sufficient to mention here that project implementation only started after the annexes to the C.O.P. were signed, e.g., 2 years after the signature of the Project Agreement. During that time, implementation of the construction program was impossible.

2.- AID's regulations

The administrative and financial management of this project must comply with AID's regulations. This means that an AID engineer has to give a series of approvals before work can actually start in the field as indicated below:

- 1 - Site visit and approval
- 2 - Approval of plans
- 3 - Approval of contract documents
- 4 - Approval of contractors
- 5 - Approval of contracts

Due to long distances that are involved in such a centrally managed regional project and considering that all communications between AID's project manager and any of the 8 countries involved has to transit through CILSS, it can easily be realized that such an administrative procedure requires a lot of time. In fact it can take between 4 to 6 months to go through the process for any single construction. Considering the simple nature and relatively low cost of many of the planned buildings we do not see the need for so much AID intervention in the construction process. We are of the opinion that AID control should be limited to approval of contracts.

3.- Lack of input from local AID engineers

The IPM project is a regional project covering 8 Sahelian countries. It

is centrally managed by AID in Ouagadougou. The AID project management staff consists essentially of a single professional who is not an engineer nor does the magnitude of the construction component of the IPM project justify an engineer. Consequently the services or inputs of the local AID engineer posted in Ouagadougou are requested when ever necessary (for site visits approval of plans etc.) for the entire project. However, because of bilateral responsibilities and activities, little time is available for the IPM project, especially when visits to suggested construction sites involved extensive travelling. This situation obviously creates delays which are not negligible in the IPM construction program.

As an alternative, the team recommends that local AID engineers share the responsibility with the Ouagadougou engineer. We recommend that, as appropriate, the local engineer be entirely responsible for IPM construction in his country of assignment. We feel that their actual work load would permit them to take that extra responsibility without causing any major problems. AID has local engineers in the following project countries: Niger, Upper-Volta, Mali, Senegal (also handles Mauritania, Cape Verde, and the Gambia). We are convinced that this decentralization of responsibilities will accelerate considerably the implementation of the construction program.

e. ENGINEERING DESIGN

After reviewing all construction, the team engineer is of the opinion that by and large designs are well done and adapted to the local environment. However, 3 points deserve to be highlighted in this discussion:

Although design drawings for insectories and screenhouses have been prepared by the respective countries where they were originally planned (as per C.O.P.), it appears that there is still a great degree of uncertainty about the proper design. Consequently it would appear important that this

whole question be reviewed under the supervision and co-ordination of the Regional Project Directorate. The actual plans describe structures that appear more substantial than really required and therefore unnecessarily expensive.

The second issue relates to the problem of using local materials for the construction of the observation posts (See comments above on "en dur" versus "banco amélioré").

The last issue concerns the ceiling design of 2 laboratories presently being built in Senegal. A reinforced concrete slab (cast in place) will act as a ceiling for these buildings. A corrugated asbestos-cement roof will be installed above (with a free air space in between) the concrete slab ceiling. There is no doubt that the design of the roof is excellent and will provide very good thermal insulation for the buildings. It is nevertheless unusual to use a concrete slab ceiling under such a well designed roof. A traditionnel plywood or presswood ceiling would certainly be as functional as a concrete slab and would be much cheaper. This issue should receive special attention for the design of the laboratory planned for Richard-Toll (or Fanaye).

f. COMMODITIES

The budget for commodities for the project as a whole was estimated at U.S. \$3,040 million in the Project Agreement. Adding all commodity budgets of the individual COPs results in value of U.S. \$2.306 million, or U.S. \$700,000 less than the Pro. Ag. amount. Furthermore, a detailed review of individual COP budgets shows laboratory and field equipment costs to be too high in most COPs.* Substantial reductions and a saving on the order of U.S. \$300,000 may be achieved by a professional re-evaluation of the real laboratory and field equipment needs for the entire project. Thus we

* Mauritania appears to be the only country for which budgets for laboratory and field equipment were in fact underestimated. The team recommends adding \$10,00 to each one of these two items.

recommend that the Regional Project Directorate laboratory and field equipment needs as soon as possible. Only items required for project success should be included in the COP for each country.

The difference between the revised commodity budget and the one presented in the Pro. Ag. might very well exceed one million dollars. These savings could be applied to cover shortfalls in the construction program.

8. SPECIAL PROBLEMS

1.- Upper Volta and IRAT

An informal agreement had been worked out between IRAT and the National IPM Project Director of Upper Volta for IRAT to construct 2 small laboratories and one insectary (Farako-Ba and Saria). IRAT prepared plans, specifications and cost estimates. AID approved them and IRAT undertaking the work. However, a contract was never signed (and work never started) because of new regulations pertaining to the award of public contracts in Upper Volta. Considering that IRAT is a non-profit quasi-governmental organization which would have built these buildings at cost for the benefit of the project, we are very surprised to realize that apparently no special effort was made by Voltaic authorities to consider a waiver and allow IRAT to do the work. This problem is reported here for the sole purpose of suggesting that all means be applied whenever possible to reduce construction costs.

2.- Observation Posts - FAR Method of Reimbursement

Fixed Amount Reimbursement (FAR) is a method under which the amount of reimbursement is set in advance, based on cost estimates revised and approved by AID.** This seems to be a suitable method to simplify AID's administrative

** It is to be noted that under the FAR system reimbursement is not based on actual costs. If they turn out to be less than estimated, AID's contributions will not be reduced. However, if there are unforeseen cost increases, these are borne by the recipient.

and financial procedures and requirements for construction work. Moreover, it appears well adapted to situations where construction is carried out using force account. This method is currently being considered for Cape Verde.

In our opinion, it would also be desirable to adopt this system for all observation posts planned for this project. They are rather simple and inexpensive structures located in isolated areas and it is doubtful that national invitation to bid will attract any contractors. Likewise, if done at the local level, these will probably not attract more than one contractor, if any at all.

Consequently, it should be very desirable to use the FAR method in building observation posts or any other small structures located in isolated areas.

3.- Senegal - Should a laboratory be built in Richard-Toll or Fanaye?

A combination weed science and entomology laboratory (Senegal and sub-regional project components, respectively) was planned for Richard-Toll, Senegal, and then a local decision was taken to locate it at Fanaye, 60 km away. Researcher's houses will be built at Richard-Toll, and they have expressed opposition to living in Fanaye because there are no proper facilities, shopping, etc.

The World Bank is coordinating the planning of a large agricultural project at Fanaye, which at present is a very small research station with 2 sheds and some fields and no water or electricity. The project will start in early 1982 for a total investment of U.S. \$130 million over a 6 year period. U.S. \$15 million will be spent on construction at 6 research stations, about 1/3 of it at Fanaye. No new investment is planned for Richard-Toll, which is already a well-established agricultural research station with all necessary facilities.

Technicians told us that there is no reason to favor one site over the other scientifically. We recommend that the IPM laboratory be built at Richard-Toll because:

- Technicians should not be required to commute 60 km between home and work. It is a waste of time, money, energy that should be going into work;
- Water and electricity are already available there, whereas the pace of development of the Fanaye site cannot be predicted confidently and infrastructure may still be lacking when laboratory has been built;
- Plant protection research present or planned at Richard-Toll, including WARDA and a GTZ entomology laboratory for 6 researchers, provides an excellent opportunity for fruitful professional collaboration.

h. RECOMMENDATIONS

1.- That AID approve the proposed construction program and budget. The proposed budget (\$U.S. 3 millions) far exceeds the amount (\$ U.S. 1.5 million) programmed in the Program although the construction program is essentially the same. Increases in costs are mainly due to high inflation factors (20% per year), during the 3 years' delays in project implementation. The revised construction budget still represents less than 10% of the total investment required by the project.

2.- That AID's engineers at the local level be held directly responsible for the implementation of the IPM construction program planned for their respective country of assignment (plus some adjacent countries in the case of Senegal).

3.- That AID simplify its regulations with respect to construction work on account of the simple nature and relatively low costs of the planned buildings.

4.- That the FAR method of reimbursement be adopted whenever possible and especially for the observation posts.

5.- That the countries involved make a real effort to reduce construction costs by all possible means including the use of simple (but efficient) design and local material whenever possible.

6.- That the Regional Project Directorate play a more active role in the technical coordination and supervision of construction designs and commodity selection in order to ensure that expenditures are strictly limited to needs appropriate and necessary to the success of the project.

5. Travel

a. Current Status

Travel of assigned FAO experts and their Sahelian counterparts, within the individual countries and within the CILSS area, is funded by the individual country projects from their quarterly advances. Travel is performed by air and by motor vehicle. Since road nets are poor, air travel often means that travelers at their destinations are dependent on borrowed vehicles since renting is difficult. In some areas travel by animal is appropriate and in one case specific provision for inclusion of animal hire in travel regulations has been requested. That comparative cost of camel versus jeep rental and/or operations have not been obtained is sincerely regretted.

Travel is an important element of project expense. Budget projections for the second and third years of operations indicate that travel costs will take up as much as one third of national project budgets. This is true because travel appears in the budgets twice since gasoline and vehicle maintenance, which involve travel, are a separate line item.

Expenses of individual travelers are handled by a travel advance system that was designed as part of the accounting and expenditure system described above. It seems to be working well but has not yet been put fully to the test. A quick review at one accounting station showed a number of outstanding advances. As travel increases more control of advances should be called for. Budgeting for travel does not seem to be a problem. Requirements are known well in advance.

b. Problems

Travelers are paid per diem to cover expenses, theoretically, but where allowances are generous there may be created a travel incentive good for the project. Contrariwise, inadequate allowances (there was complaint from Mauritania) may inhibit important travel, especially travel that involves considerable discomfort. The team has also heard complaints that the FAO expert and his national counterpart are paid per diem on the basis of different allowance scales, fixed by the different organizations involved. The differences are great. The Team suspects that the expert is receiving considerably more than actual cost. In a way this is probably considered a job prerequisite, and, as noted, a travel incentive. As long as the counterpart is not actually out-of-pocket it is hard to see how this problem can find an easy solution.

c. Recommendations

The Regional Project Director and the new FAO financial/administrative advisor should do a quick review of per diem rates to determine whether they are adequate, fair, or, in some cases, excessive. Differences, as they apply to persons under different personnel systems, should not be so great as to create dissension. Otherwise, this is really a condition to be lived with and adjusted to; it's not a problem.

About midway through FY 1982, but after a particularly busy travel period, the travel advance system should be subjected to an internal audit.

The travel regulations should be reviewed to assure that no-one so inclined is discouraged from hiring a necessary camel.

6. Delays in Project Implementation

Scattered throughout this report are comments on the fact that the project is at least two full years behind schedule. The original project grant agreement speaks of a five-year project life. If the project is extended to June 1985, the span between agreement and last disbursement will be seven years and four months. There may be little point in rehashing all the factors and decisions which contributed to this lost time and added cost. However, there were management decisions or management attitudes that contributed to the delay, reinforced the delay and which, if not recognized and dealt with, could cause further slippage in project execution. Probably unconsciously and certainly tacitly, a management style was adopted, at all levels, which stressed subsequent actions rather than parallel actions. There were exceptions, but the case of the CILSS-FAO contract is both illustrative and instructive.

The IPM project was approved on December 8, 1977. The approval process had taken over a year, but given the size and complexity of the project this was to be expected. The Project Grant Agreement was negotiated and signed within sixty days, a creditable achievement. The Agreement called for an important condition precedent to first disbursement, a FAO-CILSS contract

acceptable to AID. A condition precedent to further disbursement called for CILSS member state agreements and operation plans at the national component level. The Project Agreement allowed ninety days (May 1978) and 180 days (August 1978) for meeting these conditions. By September 1978 the CILSS-FAO negotiations were completed and AID's approval was sought. This was the occasion for the first major delay. For various reasons, AID felt that the contract did not sufficiently protect essential donor interest and a lengthy three-sided negotiation ensued. The contract was not approved until September 1979, i.e. one year and four months after the admittedly optimistic terminal date for meeting first conditions precedent established in the Project Agreement.

During this period almost all other implementing action stopped. There was an exception, during late 1978 and during 1979 a FAO-CILSS project design team was preparing country operations plans. Since as noted these were also essential CPs, it is fortunate that this work went on. However, other actions were not pursued, even though they were clearly essential to project implementation and in some cases called for in project documentation. The following are some of the more important of these.

The accounting system, developed in 1978-1979 is not formally transmitted to CILSS until April 1980.

The principal FAO advisor, designated by September, 1979, arrived in February 1980. His counterpart was not appointed until two months later.

The USAID Project Officer arrived in February, 1980. He had been given no AID project management training; he learned by doing and without adequate supervision or support.

A procurement plan, so general as to be only a guide to the preparation of a true procurement plan was not completed until May 1980. To this date, no procurement plan exists. Much equipment was only ordered in mid-1981 and much remains to be ordered.

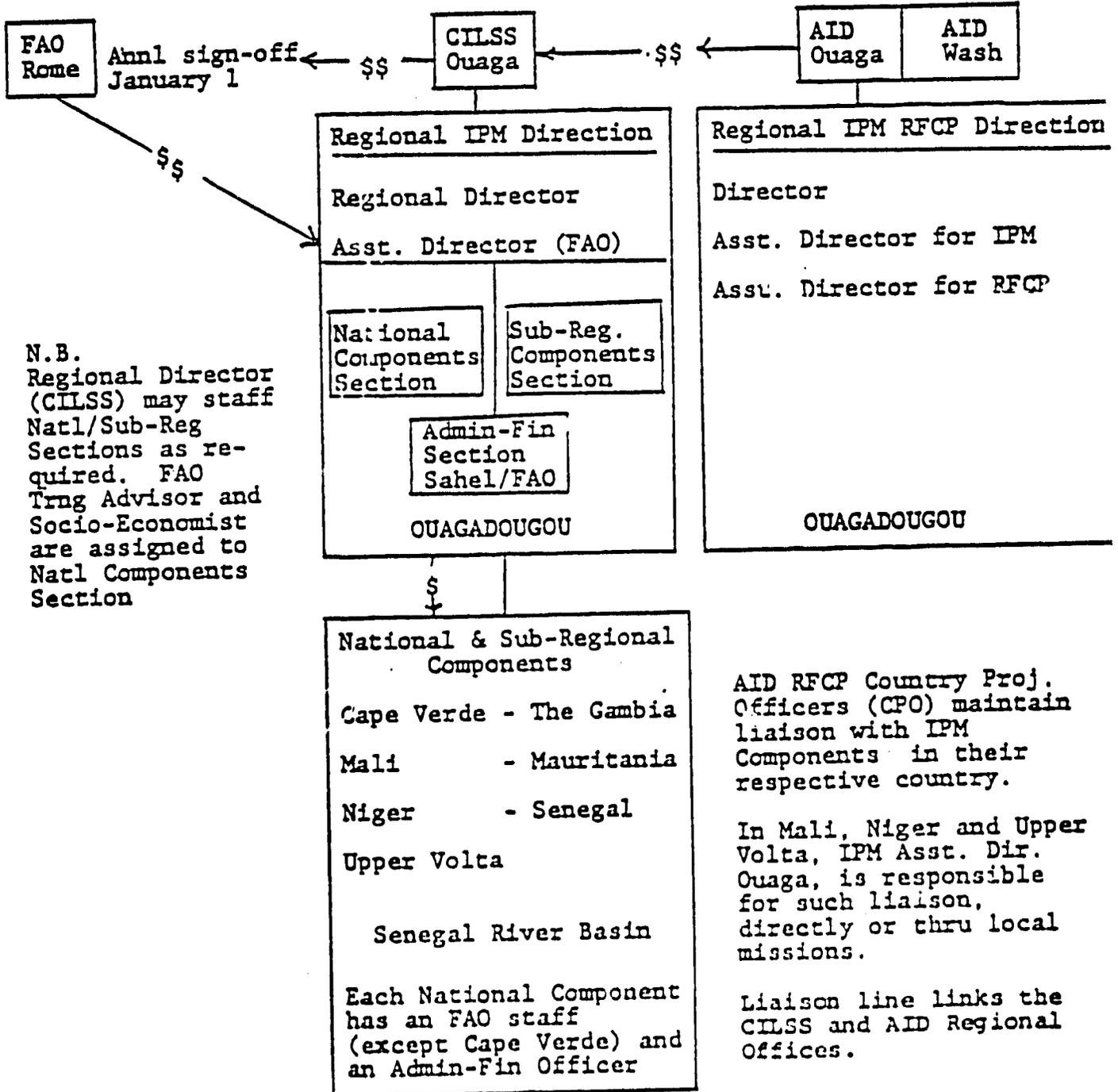
Individual national components did not receive approvals of their budgets until the fall of 1980. They were slow in making essential local purchases, hiring personnel, approving travel, etc... as the advance replenishment system broke down.

Not all of these delays could have been avoided by a system of parallel action. The CILSS-FAO agreement was a condition to first disbursement. No project funds could be committed before its approval. But FAO could have started identifying project personnel; an AID project manager could have been in training. A Letter of Implementation #1 could have been drafted, it turned out to be Project Implementation Letter #23 of May 6, 1981! Procurement lists could have been prepared before the end of 1980. Waivers were known to be needed almost immediately after the Project Agreement was signed. They were not requested for two years.

Recommendation

The Project Management Team, USAID, CILSS, FAO should adopt a conscious policy of parallel management action. If a project implementation action is held up, other actions should continue so that further delays do not follow upon resolution of the first problem. Large engineering or construction projects deal with activity coordination by the use of PERT charts or Critical Path diagrams. Something similar but simpler should be designed for this project. The recommendations on the preparation of budgets and procurement plans which follow are a start in this direction. They should be supplemented by construction and personnel plans.

VII. PROPOSED MANAGEMENT STRUCTURE
 A. CILSS-FAO-AID
INTEGRATED PEST MANAGEMENT PROJECT



N.B.
 Regional Director (CILSS) may staff Natl/Sub-Reg Sections as required. FAO Trng Advisor and Socio-Economist are assigned to Natl Components Section

AID RFCP Country Proj. Officers (CPO) maintain liaison with IPM Components in their respective country.

In Mali, Niger and Upper Volta, IPM Asst. Dir. Ouaga, is responsible for such liaison, directly or thru local missions.

Liaison line links the CILSS and AID Regional Offices.

TECHNICAL/ADMINISTRATIVE ADVISORY COMMITTEE:Responsibility:

Review and evaluate progress under AID-funded projects on CILSS Annexes A and B.

Composition:

One member each from CILSS (Executive Secretariat, Ouaga), FAO (Rome), and AID (Washington); principals agree on three outside members (two IPM technicians; one management/admin.).

Periodicity:

June annually (three weeks).

REGIONAL MANAGEMENT COMMITTEE:Responsibility:

Review and seek resolution of administrative/operational policy issues or differences at regional level; refer major issues to principals for advisory views and further negotiation at regional level.

Composition:

Regional Project Director (CILSS)

Assistant Director (FAO)

Regional / IPM Officer (AID)

Periodicity:

Monthly for regular exchange of views; at call of any of three members for special reasons.

The Proposed Management Structure brings to focus the combined CILSS-FAO-AID activities under Annexes B and A of the CILSS Program for Crop and Harvest Protection. The Evaluation Team, after a thorough review of AID's Regional Food Crop Protection project and the CILSS-FAO-AID IPM project, concluded that these two projects must be closely coordinated at the top regional management level. Otherwise, both projects risk failing in the accomplishment of their goals and objectives which ultimately envision the integration into reinforced national crop protection services of all advanced and tested methods of integrated pest control. The impact of these conclusions requires the following changes:

A. USAID Upper Volta should receive authority to form a Regional IPM-FCP Office to be directed by a senior IPM specialist with experience in managing IPM projects in developing countries. Responsibility for the redesigned IPM project and RFCP, Phase III, will be vested in this office by not later than June 1982 and continue at least through June 1985. Depending upon accrued experience by the latter date, further project activity might be merged into a single project. For the present, however, closer coordination and linkage of the two projects would be accomplished through their management from a single office in Ouagadougou.

B. The above change necessitates the transfer of the RFCP office from Dakar to Ouaga, such transfer to be complete by not later than June 1982. Management of each project -- IPM and RFCP -- should be upgraded to a senior IPM specialist with experience in developing countries. Country Project Officers (CPO) assigned to

FCP work would also be responsible for liaison with national IPM components in their countries of assignment: where FCP does not operate, the Regional IPM Officer would be responsible for such liaison, e.g., Mali, Niger and Upper Volta. Activities in crop protection in those same countries (under the auspices of other donors) would be monitored by the Regional FCP Officer.

C. CILSS and AID should agree henceforth to vest responsibility for technical implementation of the IPM Project in FAO as foreseen originally in the project planning documents (using the formula employed by CILSS in the agreement for AGREYMET with the World Meteorological Organization). FAO should accept the added responsibility for budget management and procurement (not already underway) in accordance with its established procedures, thus alleviating many of the recurring problems in national budget execution. In making such a change, CILSS and AID would thus rely on an internationally established organization with considerable proven success in planning and implementing IPM projects. This experience should weigh heavily in influencing CILSS and AID, particularly considering the highly experimental nature of the IPM project and, therefore, the demand for uniform technical guidance and advisory assistance and the expected success that should eventuate as a result..

D. CILSS should authorize the movement of the Regional IPM Project Direction (CILSS) with its FAO advisory staff from Bamako to Ouagadougou. This would bring together in a single location, the CILSS-FAO-AID managers of all the important work under Annexes A and B of the Crop and Harvest Protection Program. Difficulties in communication and coordination between policy makers, otherwise divided between Ouagadougou, Bamako and Dakar, would be eliminated totally and differences could be rapidly resolved. Concurrent with

this transfer, the Evaluation Team strongly recommends that the CILSS Council of Ministers confer upon the Executive Secretary the responsibility as the appointing authority for the Regional IPM Project Director (CILSS); another option that has merit would be for the Council to authorize the Executive Secretary to follow the formula, suggested in C above (either formulation would respond to the Evaluation Team's recommendation). The Regional Project Direction in Ouagadougou should be located in facilities adequate to accommodate the CILSS-FAO staff and provide liaison office for AID's IPM Officer. This office building should be prominently identified as the "CILSS-FAO-AID Integrated Pest Management Research and Development Project Headquarters".

E. The Executive Secretary of CILSS should recommend that the Regional IPM Project Director (CILSS) serve as an ex-officio member of the CILSS Coordinating Committee for Crop Protection; the Chairperson of that group should also be an ex-officio member of the IPM Coordinating Committee.

F. CILSS-FAO-AID should agree on the designation of a Technical/Administrative Advisory Committee, comprising two members each (one on policy, one on operations) from CILSS (Executive Secretariat), FAO (Rome) and AID (Washington) plus three outside members agreed upon by the three principals (two IPM technicians, nominated by FAO and one management/administration specialist, nominated by AID). These appointments should be made as part of the agreed implementation of the Evaluation Team recommendations in order that members can remain abreast of Annexes A and B activities, particularly IPM, and prepare for annual evaluations to be undertaken in June each year, beginning in 1982. A major document in their deliberations should be a synthesis of the results produced by the combined IPM Working Groups.

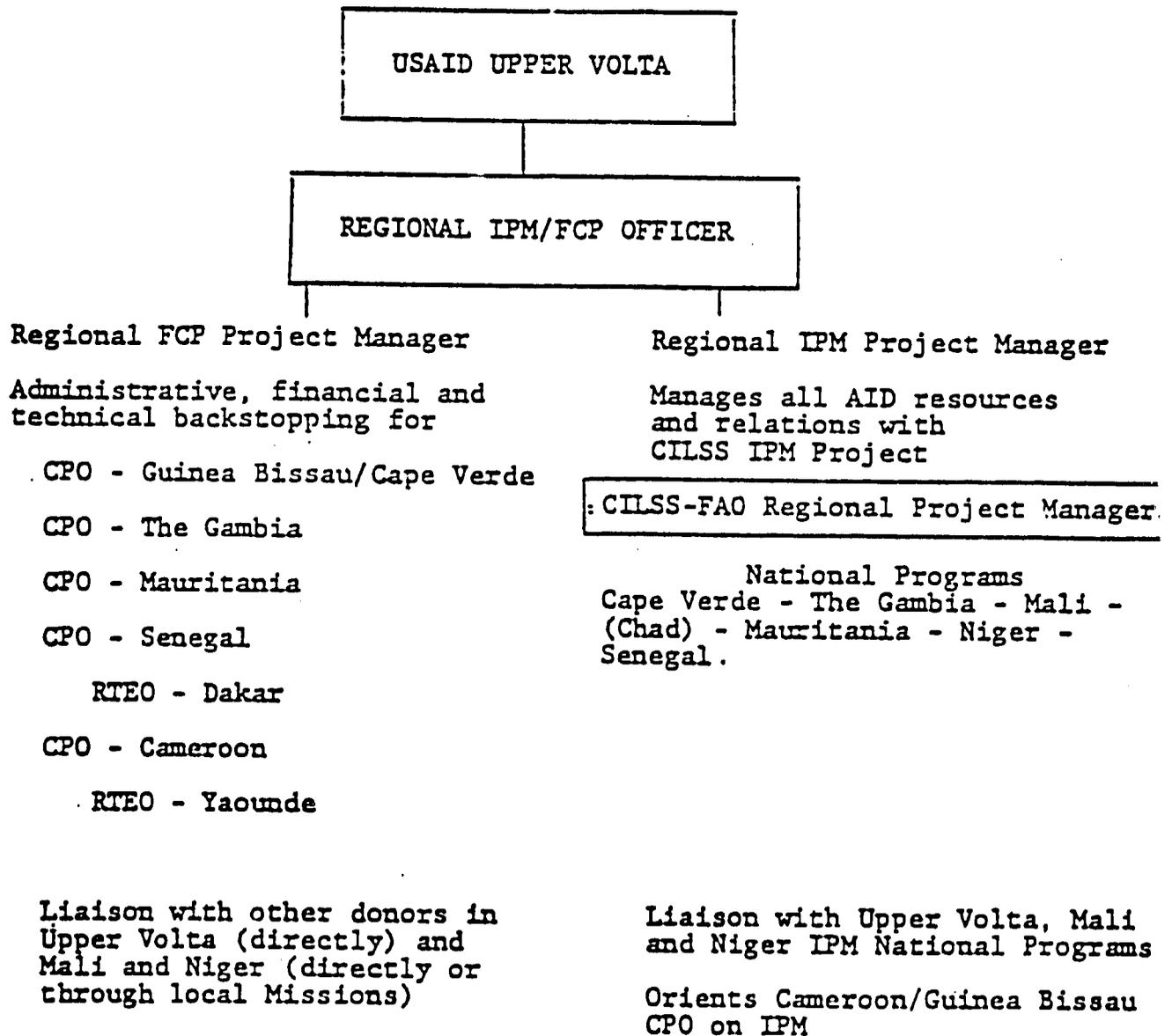
G. CILSS-FAO-AID should also designate a Regional Management Committee, comprising the senior CILSS-FAO-AID representatives for regional IPM activities, to resolve differences growing out of interpretation of existing policy or procedures. The same Committee will facilitate a continuing exchange of views and information among the principals. The Committee shall prepare its operating guidelines for approval by the principals: CILSS Executive Secretariat; FAO Rome; and AID Director Ouagadougou.

H. AID Ouagadougou should engage the TDY services of a management analyst to review and make minor clarifications in the so-called Management Protocol, principally in the organigram showing the relationships between the various annexes of the CILSS Crop Protection Program.

I. With specific regard to the so-called Management Protocol and the roles it describes for the RMU and the RTCU, the Evaluation Team has no problem with the contents of Articles 13-14 (RMU) and Articles 15-16 (RTCU). Nowhere in any of these articles are either of these units charged with any responsibility for project implementation; certainly neither unit is engaged in any manner by those Articles with the administrative and technical management of the IPM Research Project under Annex B. The Evaluation Team contends that Articles 13-14 (RMU) and Articles 15-16 (RTCU) responsibilities with respect to all Annexes of the Crop Protection Program are best summarized in the second sentence of Article 17 a, namely "The RMU and the RTCU assure, at the regional level, coordination, documentation, information dissemination and provision of technical assistance activities to the national services participating in the program."

By inserting the words "and regional" between "national" and "services" the proper roles for both units will be defined. The Regional Project Direction, as described above, will fulfill the CILSS role with respect to Annex B as set forth in Article 17 b.

B. U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
 FOOD CROP PROTECTION/INTEGRATED PEST MANAGEMENT
 ORGANIZATIONAL STRUCTURE



Note: Job descriptions and acronyms are attached.

PERFORMANCE RATINGS:

CPO and RTEO are rated by the senior officer responsible for agricultural programs in their respective missions and endorsed by the Regional FCP Project Manager.

The Regional IPM/FCP Officer forwards the reports to USDA-PASA office, including appropriate comments on each CPO/RTEO's effectiveness in fostering and expanding the employment of IPM methods and practices.

AID/W BACKSTOPPING:

AID/W Backstop Officers for the RFCP and IPM projects should co-chair an administrative and technical Project Support Committee, comprising representatives of AID's Office of Agriculture, USDA's Int'l Operations Div., APHIS, and appropriate members of the academic community to assure a continuity of guidance to the field project managers and provide timely responses to requests for assistance, whatever their nature.

Qualifications:

Ph.D. in entomology with training or experience in management of complex programs in foreign environments, preferably developing countries. French language ability, minimum S-3 R-3 level.

Duties:

Administrative and technical manager for AID-funded projects in Regional Food Crop Protection and Regional Integrated Pest Management Research. Principal AID representative in all matters dealing with the CILSS Program for Crop and Harvest Protection.

Supervises project managers of two above mentioned projects in delivery of AID policy and technical support to Sahelian regional and national agencies implementing programs in food crop protection and IPM research. Assures appropriate contacts with FAO and other donors active in the same sectors.

Assures coordination and reinforcement between the two projects toward their objectives of identification and adoption of tested pest control measures and consequent reduction of pesticide usage.

Serves as senior AID technical authority and advisor on IPM activities in West Africa. Visits AID Missions in the region, briefs senior Mission personnel and assures timely responses to requests of any nature.

REGIONAL IPM PROJECT MANAGERQualifications:

Ph.D.; entomology preferable, especially for IPM Manager. Otherwise should have specialized in other pest control disciplines, e.g., rodent control, plant pathology.

IPM specialist with proven experience in IPM development and execution in less developed countries or regions.

French language, S-3, R-3 level (current)

Duties:

Serves as the principal AID manager of resources allocated to the IPM project under the CILSS Program for Crop and Harvest Protection. Plans all AID support for the project as well as necessary documentation and administrative backstopping.

Represents AID in all deliberations with the CILSS Regional Project Manager and FAO Senior IPM Adviser. Meets periodically with these representatives for discussions of matters of common interest and exchanges of professional views. Joins the CILSS and FAO managers in the resolution of any problems of interpretation or understanding of current policy or procedures.

Prepares periodic reports on overall regional IPM activities for use by bilateral Mission personnel, RFCP CPQ, and IPM Liaison Officers in particular. Visits participating countries, reviews national project status and briefs bilateral Mission personnel on all matters of common interest. Receives any local requests for assistance and follows up to assure timely responses. In particular, visits FCP Training Centers to review progress in

Regional IPM Project Manager (Contd)

their use for IPM technician training and integration of IPM techniques into crop protection technician training.

Serves as the AID Liaison Officer to the Upper Volta national IPM program.

Provides orientation material on IPM to RFCP, CPO Liaison Officers in Cameroon and Guinea-Bissau for use as appropriate and receives/responds to request for information.

REGIONAL FCP PROJECT MANAGERQualifications:

Ph.D.; entomology preferable,

Otherwise should have specialized in other pest control disciplines, e.g., rodent control, plant pathology.

IPM specialist with proven experience in IPM development and execution in less developed countries or regions.

French language, S-3, R-3 level (current)

Duties:

Coordinates the activities of Country Project Officers (CPO-USDA PASA) assigned to five bilateral missions plus two Training Officers (RTO-USDA PASA, one each in Yaounde and Dakar). Assures proper allocation of funding and backstopping on all administrative matters, including procurement and training (U.S., third country and local).

Assures continuous technical backstopping through exchange of periodic reports among all bilateral projects.

Visits all participating countries on regularly scheduled basis to ensure uniformity of inputs and progress; briefs mission managers on regional status of the project; discusses problems and offers solutions or facilitates followup from outside resources.

Maintains continuous flow of current state-of-the-art literature on crop protection and integrated pest management to bilateral projects and processes individual requests for specific assistance, i.e., short-term consultants; special training or orientation; particular publications.

Regional FCP Project Manager (Contd)

Maintains contact directly (or through bilateral AID Missions as appropriate) with other donors providing assistance for crop protection services in Mali, Niger and Upper Volta.

The additional positions listed below are provided under a recruiting program as follows:

The Regional Food Crop Protection Project is supported technically through a Participating Agency Service Agreement (PASA) with the United States Department of Agriculture (USDA). This agreement designates the Animal and Plant Health Inspection Service (APHIS) as the manpower resource agency for Country Project Officers (CPOs) and Regional Training Officers (RTOs).

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

N.B.: The Phase III Design Team should review this PASA for its responsiveness to RFCP goals and objectives. Consideration should be given to possible inclusion of other USDA components to provide CPO with experience in economics, socio-economics, extension, plant pathology and pest control.

COUNTRY PROJECT OFFICERS (CPO)Qualifications:

M.S. degree preferably in entomology or plant pathology. Must have proven IPM training orientation and experience. Previous assignments in developing countries is desirable. Good health is essential to work under arduous travel and climatic conditions.

Duties:

Current job descriptions should be amended to include the following:

Serve as designated liaison officers to national IPM components. Meet regularly with national IPM directors and FAO advisors, discuss matters of common interest and report accordingly to the Regional IPM Project Manager. (In Mali and Niger, the Mission's Senior Agriculture Officer will perform this function; monitoring in Upper Volta is the responsibility of the Regional IPM Manager.) CPO in Cameroon and Guinea-Bissau will follow any IPM developments in those respective countries, accept any requests for solutions to specific problems (and pass them to the Regional Manager) and generally encourage the introduction of new or continuation of existing IPM practices.

REGIONAL TRAINING AND EXTENSION OFFICERS (RTEO)Duties:

Advise Directors of Regional Training Centers (one in Yaounde; one in Dakar) under the technical guidance of the Regional FCP Project Manager. Encourage and influence Center Directors toward incorporation of regional classes into Center schedules.

Enlist participation of U.S. and third country specialists for special short courses on topics of current crop production and protection interest. Seek special resources for courses in Portuguese and French.

Establish working relations with the CILSS-FAO Regional Training Advisor on the IPM Project and incorporate IPM topics into curriculum for crop protection technicians. Encourage the offering of IPM courses for national IPM technicians. Employ this contact as permanent channel of communication to the Sahel Institute for coordination of activities under CILSS Programs Annexes G1 (Documentation) and G2 (Training).

Brief bilateral AID Mission Directors on training opportunities at Training Centers for Sahelian (plus Cameroon and Guinea Bissau) nationals working as AID counterparts in other agricultural and rural development projects. Where and as feasible, encourage Center Directors to allocate Center facilities for short-term orientation of U.S. Project Managers in Agriculture and Rural Development on IPM methods and practices; use such opportunities to encourage integration of IPM concepts into other project activities, as appropriate.

VIII. OVERALL MANAGEMENT AND TECHNICAL RECOMMENDATIONS**A. General Management:**

- 1) AID authorize a Regional Integrated Pest Management/Food Crop Protection Office located at USAID/Ouagadougou with a high-level staff of three;
- 2) CILSS and AID vest responsibility for technical direction IPM Project implementation in FAO (RFCT moves from Dakar);
- 3) FAO accepts technical direction, financial management and procurement responsibility for IPM Project;
- 4) CILSS transfers Regional IPM Project Direction Office from Bamako to Ouagadougou. Executive Secretary should have authority to appoint Regional Project Director (CILSS);
- 5) Regional IPM Project Director (CILSS) serves as ex officio member CILSS Coordinating Committee for Crop Protection;
- 6) CILSS-FAO-AID designate Technical/Administrative Advisory Committee to implement Evaluation Team recommendations and to conduct annual evaluations starting June, 1982;
- 7) CILSS-FAO-AID designate Regional Management Committee to resolve differences concerning policy directives or procedures;
- 8) Management analyst review and recommend changes in Management Protocol (Protocole de Gestion) and relationships shown therein.

B. Technical Recommendations - Food Crop Protection
Project (Annex A)

- 1) Project should be redesigned to emphasize Integrated Pest Management;
- 2) Design team should include Sahelian representation, experienced IPM specialists, an agronomist, a project design and management specialist;
- 3) Project designed according to a Logical Framework including overall objectives of increased use of IPM and de-emphasized use of chemicals;
- 4) Project designed to include demonstrations on fields of small farmers;
- 5) Training courses should also be developed for Certified Plant Protection Managers for the Yaoundé Center under FAO-OAU auspices;
- 6) Publications should include manuals on pests, surveillance guidelines, manuals de-emphasizing pesticides, fact sheets and pamphlets on IPM, limitations of pesticides and alternatives;
- 7) Project should have Regional Training and Extension Officers at Dakar and Yaoundé;
- 8) Arrangements should be made to recruit short-term consultants in socio-economics and special topics;
- 9) Team should critically examine usefulness of academic training in U.S.;
- 10) Yaoundé and Dakar training Centers should be upgraded and should cooperate more closely with other agencies engaged in training;

- 11) FAO Training Officer of CILSS IPM Project should relate closely to Training and Extension Officers of RFCP Project;
- 12) Surveillance and Crop Loss Assessment activity of RFCP and IPM Projects should be carried out collaboratively;
- 13) Development of extension delivery systems for IPM techniques should be given highest priority;
- 14) Research should be concentrated on applied research on farmers' fields. RFCP and IPM research should be coordinated through work groups;
- 15) Strict guidelines should be developed for the use of pesticides;
- 16) Other donors should develop policies for pesticide use and management to alleviate environmental hazards;
- 17) CILSS should employ one person full-time to assure collaboration between national and international organizations involved in food crop protection in the Sahel and surrounding areas (possibly place responsibility in the Regional Management Unit).

G. Technical Recommendations - Integrated Pest
Management Project

- 1) FAO socio-economist's position should be filled in regional project staff;
- 2) Outstanding young researchers should be recruited by FAO through relaxation of language and experience requirements;
- 3) Farming systems agronomists should be recruited;
- 4) FAO should consider recruitment of an additional crop.

loss assessment expert;

- 5) All research counterparts should be full-time researchers of Sahelian nationality;
- 6) CILSS, FAO and AID should arrange for adequate counterpart training funds for regional project staff and researchers;
- 7) National governments should place future plant protection graduates in IPM research programs for half of their internship;
- 8) Director of Training, Sahel Institute, should chair a newly created CILSS Crop Protection Training Working Group;
- 9) FAO IPM Training/Liaison Officer should develop teaching packages;
- 10) Experiments should be carried out on farmers fields with proper attention paid to intercropping systems;
- 11) Counterpart researchers should work with non-chemical IPM methods;
- 12) AID should support the WARDA project in rice IPM;
- 13) Project personnel should assist with future pesticide residue monitoring activities;
- 14) The IPM function of observation posts should be defined and adhered to;
- 15) IPM and RFCP project staffs should cooperate on extension activities;
- 16) IPM Project national Coordinating Committees and project seminars should ensure liaison between/national agricultural IPM research and the and crop protection services;

17) Annex G-1 should be funded through contributions to a single fund by all Crop Protection Program donors, including USAID;

18) The following Working Groups should be formed from both RFCP and IPM project staff. They should meet regularly, coordinate activities, publish manuals and other material.

Crop Loss/Surveillance/Forecasting/Environment

Biological Control

Modification of Cropping Techniques

Integrated Pest Management Systems

Evaluation and Extension

19) Working Groups should procure advice from outside experts;

20) CILSS should sponsor an annual regional plant protection research conference, directed particularly at the West African region;

21) The CILSS Plant Protection Program should employ an international liaison officer;

D. Financial Management Recommendations

1) AID should take action to extend IPM Project until June, 1985 and a revised life of project budget should be jointly prepared by AID, FAO, CILSS;

2) Life of project budget should become basic project management tool for both financial and administrative planning;

3) USAID Project Officer, CILSS financial manager, CILSS Project Director and senior FAO advisor should meet immediately to finalize IPM 1982 budget;

- 4) Overall budget should be broken down and each national component advised of their 1982 budget;
- 5) Budgeting and financial management should be a responsibility of the Project Director's office and necessary personnel resources made available.

E. Financial Administration and Accounting
Recommendations

- 1) Accounting systems should include an encumbrance journal;
- 2) Period for financial reporting and accounting should be the calendar quarter;
- 3) Fifteen days before the end of the quarter requests for advance fund replenishments should be received, they should be processed immediately and new advances received by first day of quarter;
- 4) National and sub-regional components should employ full time administrative/accounting officers;
- 5) Internal audits should be conducted by Project Directorate at least annually;
- 6) Project account should be for entire project. Maintenance of component financial records should be CILSS responsibility;
- 7) Close working relationship should be established between CILSS financial officer, FAO financial advisor and USAID controller.

F. Construction Recommendations

- 1) IPM Project construction budget and supporting program should be formally approved;

- 2) USAID engineers at local level should be assigned responsibility for execution of construction program at local level;
- 3) AID should recognize simple nature and low cost of construction required and seek to simplify its monitoring requirements;
- 4) Possibility of using Fixed Amount Reimbursement (FAR) method of paying for construction should be examined especially for simple observation posts;
- 5) Cost reduction through design simplification and use of local materials should be studied in each case;
- 6) The Project Directorate should play more active role in supervision of construction and purchase of commodities to reduce costs on unnecessary expenditures.

G. Procurement Recommendations

- 1) Procurement plans, specifying what is procured when, by whom, by what methods, should be drawn up for each category of material and equipment: vehicles, laboratory equipment, equipment for field and offices;
- 2) Procurement Plan should be prepared jointly by CILSS Project Director's office, USAID and FAO;
- 3) Waivers should be sought for motor vehicles in a timely manner and after objective survey of dealers, other users and facts of maintenance, repair and fuel use records.

H. Travel Recommendations

- 1) National, CILSS and FAO travel regulations, especially as regards per diem should be examined for fairness and adequacy;
- 2) Travel regulations should be very flexible as regards acceptable modes of travel in remote areas.

I. Recommendations on Project Delay

- 1) CILSS-FAO-AID should consciously adopt parallel action style of management so that other actions continue when one action hits an obstacle;
- 2) Some form of PERT, Critical Path or Critical Event programming device should be considered. This should be done in preparation of June, 1982 crop campaign.

APPENDIX I
REFERENCE GUIDELINES FOR IPM DEVELOPMENT AND EXECUTION

Because development of a specific integrated pest management program depends on many variables, the kinds of pests involved, resources to be protected, economic values, and availability of personnel, it is difficult to establish absolute guidelines. But the following guidelines generally apply in developing IPM programs, regardless of the kinds of crops and pest categories involved :

- (1) Crop loss assessment and analysis of the "pest" status of each of the reputedly injurious organisms

A given crop field may be infested with dozens of potentially harmful species at any one time. For each situation, however, there are rarely more than a few pest species in sufficient density to cause significant damage. These often recur at regular (and often fairly predictable) intervals.

Pests that generally recur regularly and cause economic losses if not controlled are the focal point for integrated pest management programs; they are known as "key" pests.

The key pests contrast to "occasional" or "secondary" pests which attain injurious levels only irregularly when conditions of the natural environment (e.g., optimal weather or low incidence of natural biological control) are particularly favorable for their increase.

Another category of pests, "potential" pests, includes potentially harmful species that reside at sub-economic levels unless aggravated by human manipulations of the cropping system (e.g., introduction of a new crop variety or use of an insecticide that disrupts biological control) which favor their increase.

A final category of pests, "migratory" pests, is exemplified by migratory species (e.g., migratory armyworms or locusts) that do not reside in a given area but occasionally enter it, sometimes causing severe damage.

When developing an integrated pest management strategy, it is particularly important that actions taken to manage the focal pests, the key pests, do not aggravate the potential pests. The improper use of insecticides directed at key insect pests frequently has resulted in the outbreak of potential pest species. The total fauna of key and potential insect pests in a given crop may be likened to an iceberg in a body of water. The real pests (the key pests), those which usually lack effective natural enemies, are readily recognized above the surface; the potential pests, which may represent 80-90 percent of all the pest species present, are not readily recognized and will remain innocuous if their natural enemies are not destroyed.

A ship navigator views the visible portion of an iceberg as a danger signal to a potentially more serious problem and, therefore, approaches it cautiously. The IPM specialist similarly should approach the management of the key pests cautiously in order to avoid the creation of potentially more serious problems.

The population level that determines whether a reputedly harmful species has attained "real" pest status is the "economic threshold". The economic threshold is defined as the density of a pest population below which the cost of applying control measures exceeds the losses caused by the pest. Establishment for economic thresholds for each of the real pests is requisite to any IPM program .

- (2) Establishment of IPM research capability and devising study of traditional systems and crop protection : schemes for lowering equilibrium positions of key pests

A key pest varies in severity from year to year, but its average density usually exceeds the economic threshold. This characteristic abundance is known as the pest's "equilibrium position".

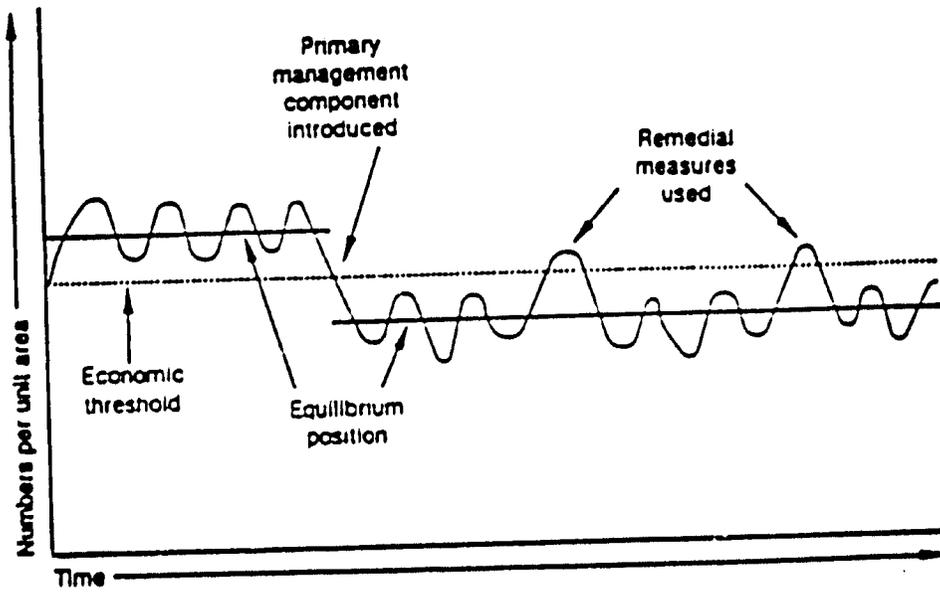
Integrated pest management efforts strive to manipulate the environment in order to reduce the key pest's equilibrium position permanently to a level lower than the economic threshold, as illustrated in Figure 1. This reduction may be accomplished using three primary management components singly or in combination :

- Deliberate introduction and establishment of natural enemies (parasites, predators, or pest diseases) in areas where they did not previously occur.

- Utilization of pest-resistant varieties of crop plants which cause a reduction in the pest's equilibrium position or which simply tolerate the pest at equilibrium position, and

- Modification of the pest environment in such a way as to increase the effectiveness of the pest's biological control agents, to destroy its breeding, feeding, or shelter habitat, or otherwise to render it harmless. Examples include many well known agronomic practices such as crop rotation, destruction of crop harvest residues, and soil tillage.

Figure 1
Lowering the Equilibrium Position
of a Pest



Pest management practices can also raise the equilibrium position of a pest. For example, repeated applications of insecticides may destroy natural enemies, thus creating a higher equilibrium position than when an insect pest was regulated by its enemies. A basic feature of IPM programs is to devise ways to lower the equilibrium positions of major pests while avoiding practices that create environments favorable to pests of secondary importance.

(3) Surveillance methodology and decision making about pesticide use

Utilization of the best combination of natural enemies, resistant varieties, and environmental modification may eliminate the need for further action against many key pests except under unusual circumstances. Nearly permanent control of key insect and disease pests of some agricultural crops, for example, has been achieved by integrating such cultural practices as plowing and timing of irrigation with pest-resistant crop varieties and conservation of natural enemy populations.

For the occasion when the key pests have flared up or the secondary pests are out of control, remedial measures must be taken (see Figure 1) ; pesticides may be the only recourse. In integrated pest management programs, selection of the pesticide, dosage, and treatment time are carefully coordinated to avoid ecological disruptions and other problems associated with the improper use of pesticides. Economic thresholds serve to identify when and where the remedial measures are truly justified.

Monitoring and surveillance are essential to integrated pest management. Pest populations are dynamic, sometimes more than doubling in a few days or decreasing at a comparable rate.

Because weather, crop growth, natural enemies, and other factors that affect population growth and decline are also changing constantly, pest populations and the parts of the environment influencing their abundance must be inspected frequently in order to determine when to apply or relax various control measures. Only through monitoring and surveys can the real need for control be known and the natural controls maximized.

How monitoring and surveillance are conducted depends upon the type of pests involved, environmental conditions, and economic resources. Light traps and traps baited with natural or synthetic lures have been used to monitor a wide variety of insects. Some soil-borne fungal and bacterial pathogens and nematodes are detected by soil sampling techniques. Other monitoring procedures involve even less sophisticated procedures and very little expense. Scouting the crop fields and recording information on pest abundance and pest damage to the plants are the most commonly used procedures.

(4) Extension to farmers (demonstration study areas),
training Programs, and coordinative mechanisms.

The ultimate test of integrated pest management is whether or not the farmers use it. New IPM technology offers no real utility to any one unless it is adopted successfully by the farmers. Therefore, crop protection specialists must develop educational materials and guidelines for IPM implementation which can be understood and utilized by farmers with no great difficulties.

Many of the farmers in west Africa are illiterate or barely literate. The requirements of these persons differ substantially from requirements of the literate farmers.

Integrated pest management schemes, closely synchronized and integrated into optimal crop production systems that are essential for long-term profitable farming, will necessitate good communication and cooperation among all the persons involved in the crop production systems. It is especially important to develop feed-back mechanisms from the farmers and extension workers in the field to the research workers as to properly guide the evolution of IPM programs.

Training for persons at all levels -- extension workers at the farm village level, research technicians, scientific experts, supervisory staff, crop protection officials, and the farmers themselves -- is essential to the development and implementation of integrated pest management. It is essential that the crop protection officials understand the principles of IPM and that expertise in its application is developed appropriate to the level of their activities. To get integrated pest management established on the farms, field workers must explain and demonstrate the advantages of the approach. In turn, they must have the support and understanding of their senior officers. To enable continuing improvement and development of specialist services, particularly identification of pests and natural enemy species, additional training is required for the research participants.

Coordination and cooperation among personnel of research, educational, and operational agencies are critical to the success of integrated pest management. Without effective mechanisms for coordination, unnecessary duplication of effort may result, and the research, educational, and operational activities may lack the coherence essential for developing and implementing a cohesive IPM strategy.

A P P E N D I X II

FINANCIAL TABLES

The following tables were prepared on the basis of financial reports and estimates received from FAO and CILLS/UGR supplemented by cost estimates prepared by the evaluation team engineer. Certain assumptions are reflected in the estimates.

The costs for personnel, travel, operations, construction, equipment and vehicles are based on the original program design. Price inflation has been taken into account for equipment, construction and vehicles. Future further price inflation, estimated at 10 percent per annum, has been applied in estimating operating costs for the years 1982, 1983, 1984 and the first half of 1985. However, no additional program costs are included. There are no estimates included for additional costs for added personnel, increased training, salary supplements not previously approved, changes in travel allowance policy, etc... Such cost estimates have not been included for three reasons: they represent policy decisions that have not been made and may not be made; they represent project redesign elements whose costs cannot be estimated until project redesign is completed; they probably represent relatively minor changes in total project cost when compared to cost escalations resulting from inflation, the passage of time and the stretch-out of the project overtime. Most such costs, if they do occur, can probably be met by budget shifts within the larger order-of-magnitude budget estimates contained in the tables.

The arrangement of the budget does include one programmatic recommendation. The regional management of the project is shown as a single budget component. The costs include the equipment and operating costs for both the existing Regional Management Unit (Ouagadougou) and Office of the Director (Bamako). Both local operating costs and costs for planned FAO advisors are included. The basic assumption is that implementation of an improved management system, as recommended by the team, will result in neither important increased costs nor important savings at the management level since personnel to carry out managerial and management support tasks will be little changed.

All major procurement and construction costs have been shown as planned expenditures in calendar year 1982. This was done partly for convenience. In the absence of a detailed procurement plan, and at the present stage of construction planning, allocation of costs over 1981 and 1982, if any major costs occur in the last half of 1981, is impossible. Assigning the costs to 1982, however, does include an implicit managerial recommendation. Procurement of major items and construction of essential facilities must not be permitted to slip beyond the end of 1982.

While Table I presents the detailed information that shows what costs will be incurred when, and what kinds of costs they will be, it is Table II that highlights the major financial decisions which project management, AID/W backstoppers and support agencies must make now and which they might wish to defer.

From Table II we can see that anticipated expenditures by the end of 1981 are expected to total just over \$3.5 million. An additional \$11 plus million will be needed to carry the project through 1982. Amendment six to the Project Agreement brought the total obligation of funds to \$9.9 million of which \$6 million is obligated for FAO costs, \$2.9 million for local operating costs and \$1.0 million unallocated or earmarked for procurement now in process. The funds allocated for FAO costs should be sufficient through 1982. Funds for construction, procurement and local operating costs are not sufficient. To carry the project through the year AID should be prepared, after review of financial and implementation status, to obligate another \$5 million of FY 1982 funds sometime in the second quarter of that fiscal year. A decision as to FY 1982 or even early 1983.

Table II makes clear that any decision to increase life of project funding at this time would be quite premature. Within the original project cost estimate of \$25,280,000 are sufficient funds to carry out the project until about June 1984, or nine months into FY 1984. Certainly, substantial funds from that fiscal year will probably have to be allocated early in FY 1984. However, any decision to increase life-of-project funding should be deferred for at least two years to permit observation, and further evaluation of project implementation.

Table I - Financial Status and Projections - Integrated Pest Management - \$US

	Estimated Local Costs to Dec. 31, 81	July December 1981	Calendar Year 1982	Calendar Year 1983	Calendar Year 1984	January June 1985	Use Trends	Component Total
REGIONAL FAO								
Local Costs-Operations	485 553	100 240	519 715	571 650	655 410	292 200	\$ 945 000	
Materials - Equipment	89 220		203 757	420 270	476 640	440 210	\$ 1 170 240	
TOTALS	574 773	100 240	723 472	991 920	1 132 050	732 410		2 115 240
SUB-REGIONAL FAO								
Local Costs-Operations			330 030	330 130	305 300	304 917	\$ 795 000	
Materials - Equipment			215 714	204 047	210 642	220 000	\$ 650 400	
TOTALS			545 744	534 177	515 942	524 917	1 445 400	1 445 400
CAPE-VERDE - UNFAO								
Local Costs - Operations	16 100		51 300	20 020	20 200	20 200	\$ 60 000	
Materials - Equipment		20 000	25 000	20 040	21 045	20 200	\$ 56 285	
Construction			130 000				\$ 130 000	
TOTALS	16 100	20 000	206 300	40 060	41 245	40 400	246 285	246 285
CHAD - UNFAO								
Local Costs-Operations			274 015	320 270	300 020	260 457	\$ 750 400	
Materials-Equipment			210 000	220 000	200 000	200 000	\$ 630 000	
Construction			100 000	200 000	200 000	200 000	\$ 600 000	
TOTALS			584 015	740 270	700 020	660 457	1 980 400	1 980 400
GHANA - UNFAO								
Local Costs - Operations	42 000	17 100	110 030	124 000	107 000	82 000	\$ 310 000	
Materials-Equipment			52 000	60 000	25 000	12 000	\$ 149 000	
Construction			100 000				\$ 100 000	
TOTALS	42 000	17 100	262 030	184 000	132 000	94 000	559 000	559 000
MALI - UNFAO								
Local Costs-Operations	117 330	20 004	410 450	320 200	300 240	200 000	\$ 830 000	
Materials - Equipment			170 070	204 200	214 200	204 000	\$ 596 600	
Construction			500 270				\$ 500 270	
TOTALS	117 330	20 004	1 080 790	524 400	514 440	404 000	1 926 870	1 926 870
MAURITANIA - UNFAO								
Local Costs-Operations	20 000	26 000	120 000	100 000	120 000	50 000	\$ 316 000	
Materials - Equipment			90 245	104 200	110 040	100 000	\$ 308 485	
Construction			170 000				\$ 170 000	
TOTALS	20 000	26 000	380 245	204 200	230 040	150 000	694 485	694 485
NIGER - UNFAO								
Local Costs-Operations	220 000	100 200	420 000	340 200	320 200	200 200	\$ 980 000	
Materials-Equipment			150 000	200 000	210 000	100 000	\$ 560 000	
Construction			210 000				\$ 210 000	
TOTALS	220 000	100 200	780 000	540 200	530 200	300 200	1 750 000	1 750 000
SENEGAL - UNFAO								
Local Costs-Operations	200 000	100 200	350 000	300 200	250 200	200 200	\$ 800 000	
Materials-Equipment			200 000	200 000	200 000	200 000	\$ 600 000	
Construction			200 000				\$ 200 000	
TOTALS	200 000	100 200	750 000	500 200	450 200	400 200	1 400 000	1 400 000
UPPER VOLTA - UNFAO								
Local Costs-Operations	210 000	110 000	310 000	250 000	200 000	150 000	\$ 710 000	
Materials-Equipment			100 000	100 000	100 000	100 000	\$ 300 000	
Construction			100 000				\$ 100 000	
TOTALS	210 000	110 000	510 000	350 000	300 000	250 000	1 110 000	1 110 000
FAO Committed Costs 1980 - 1981 - to June 30, 1981 Including Commitments								\$ 951 240
TOTAL PROJECT COST								\$ 7,600,000

PROJECT BUDGET SUMMARY - IPM

TABLE II

COMPONENT	1982	1983	1984	JAN-JUNE 1985	COMPONENT COST	PROJECT COST
REGIONAL	1 037 706	1 106 789	1 144 343	756 220	4 043 058	
Sub- Regional	1 175 874	1 236 165	1 280 042	454 517	4 146 598	
CAPE-VERDE	642 782	61 872	45 293	29 140	779 077	
CHAD	724 695	1 309 575	967 675	460 467	3 463 452	
GAMBIA	705 451	173 043	232 476	124 898	1 255 868	
MALI	1 324 900	733 100	813 902	473 332	3 345 234	
MAURITANIA	787 556	253 332	292 190	162 536	1 495 614	
NIGER	1 079 367	647 867	745 453	608 549	2 881 236	
SENEGAL	1 992 924	994 056	1 097 179	670 518	4 754 677	
UPPER-VOLTA	1 746 789	788 256	886 869	526 910	3 948 824	
TOTALS	11 218 044	7 323 077	7 507 742	4 065 098		32,113 954
ADD 1980-1981 expenditures						3,924 473
TOTAL PROJECT COST						36,038,427

- IPM -

Table 3

. Regional Food Crop Protection Project
Available Financial Resources: June 1981-June 1982

Inasmuch as a careful design of Phase III will take several months, the evaluation team financial advisor was asked to review briefly availability of funds and indicate whether they were or would be sufficient to run through June 1982.

The following table summarizes the information obtained:

<u>Country Component</u>	<u>June 1981 Pipeline</u>	<u>Estimated expected costs</u>	<u>Funds available 1982</u>
Senegal	1,556,571	500,000	1,056,571
Cape Verde	426,185	150,000	276,185
The Gambia	584,192	300,000	284,192
Guinea-Bissau	753,027	550,000	203,027
	<u>3,319,975</u>	<u>1,500,000</u>	<u>1,819,975</u>

Expenditures for the Mauritania component are expected to run between \$315,000 and \$360,000 over the next year. With a pipeline balance of about \$500,000 reported as of June 30, 1981, an estimated \$150,000 could be considered as added to funds available to the project as of June, 1982.

Expenditures in Mali over the 1981-1982 period are expected to just about equal allotments made. The balance as of June, 1982 is expected to be negligible.

Conclusions:

Funds are clearly sufficient to carry the project through the Phase III design period. As the two projects are considered, Phase III and extended IPM, a very careful financial review should be made of all financial projections, particularly with a view to cost savings in 1982, the critical high expenditure year. Cost savings on IPM combined with careful budgeting of the substantial balance indicated above might well make FY 1982 and early FY 1983 financial planning a great deal easier.

E - FAO Expert
 C - Counterpart
 E - Planned
 (E) - In Place

APPENDIX III: STATUS OF IMPLEMENTATION OF NATIONAL PROGRAMS OF THE CILSS

IPM PROJECT

	SENEGAL	MAURITANIA	THE GAMBIA	CAPE VERDE	MALI	NIGER	UPPER VOLTA
I P M	(E) (C)	(E) (C)	E (C)	E (GTZ) (C)	(E) (C)	E (C)	(E) (C)
ENTOMOLOGY	(E) E (C) C						(E) E (C) C
SURVEILLANCE/ EXPERIMENTATION					E C	(E) C	(E) C
CROP LOSS ASSESSMENT	E C					E C	
BIOLOGICAL CONTROL	(E) C			(E) (GTZ) C			
PLANT PATHOLOGY	E (C)				E C	E C	E (C)
WEED SCIENCE					E C		E C
OBSERVERS TRAINED	15	6	-	-	10	6	-
OBSERVATION POSTS ESTABLISHED	4	6	-	-	-	7	-

- X 1 1 7 -

A P P E N D I X IV

THE ISSUE OF INDEMNITIES OR PREMIUM PAY FOR ASSUMPTION OF ADDITIONAL RESPONSIBILITIES

The Team mentions this issue because it was raised repeatedly through the course of the evaluation. USAID Ouagadougou undertook on September 10, 1981 to poll all RFCP and IPM project countries for current data on the subject, i.e., host country policy; AID Mission policy; evidence of bonuses being paid and for what. The USAID IPM Project Manager has found that "research bonuses" were included in the original IPM Country Operating Plans, which received region-wide AID approval. These bonuses were to "encourage/stimulate/reward agricultural researchers" work with FAO experts/technicians. Later proposals for "management bonuses" or "position bonuses" were rejected by USAID Upper Volta and the Regional Economic Development Support Office/West Africa (These bonuses were intended for IPM country directors and accountants).

N.B.: The Team has recommended full-time, adequately paid accountants for national components, therefore, any such bonus question moot.

The Evaluation Team endorses the current efforts by the USAIDs to reach an equitable solution to this problem based on current law and practice. One thoughtful Sahelian formulated

his thoughts for the Team as follows: "As concerns the IPM project which has the peculiarity of straining at the researcher's initiative and imagination in very special fashion, bonuses well-conceived for actions really concluded are the key and the certain guarantee of project success." In societies short of trained manpower, where the competition among assistance-funded development projects focuses in many instances on the incumbents of key management positions, a project bonus may be the "key to success". If so and if bonuses are paid, no individual should be extravagantly rewarded nor should more than one donor support a single individual's management talents.

In those cases where an "incentive pay" or a "command responsibility" bonus is built into a host country's personnel compensation system, included in its budget system, paid, as appropriate to personnel not funded with external assistance, payment of such costs should be easily justified as a project cost and covered as part of the assistance being financed. We recommend that this subject be taken out of the realm of guesswork, myth and philosophy and an experienced, Francophone personnel administrator be called in to study the problem and make an agency policy recommendation.

APPENDIX V
ACRONYMS AND ABBREVIATIONS

ACPO	: Accelerated Crop Production Officer
ADRAO	: Association pour le Développement de la Riziculture en Afrique de l'Ouest
AGR	: Agriculture
AGRHYMET	: Centre pour l'Agriculture, l'Hydrologie et la Meteorologie (Niamey)
AID	: Agency for International Development
AID/ST/AGR	: Aid Office for Science, Technology and Agriculture
AID/W	: Agency for International Development/Washington
AMC	: American Motors Corporation
APHIS	: Animal Plant Health Organization Service
A.R.	: Agricultural Research
ARTO	: Assistant Regional Training Officer
ATA	: Assistant Technique Agricole
BADEA	: Banque Africaine pour le Developpement Economique de l'Afrique
B.S.	: Bachelor of Science
B.I.V.	: Banque Internationale Voltaïque
CEAO	: Communauté Economique de l'Afrique de l'Ouest
CIBC	: Commonwealth Institute of Biological Control
CICP	: Consortium for International Crop Protection
CIDA	: Canadian International Development Agency
CILSS	: Comité Permanent Inter-états de Lutte contre la Sécheresse dans le Sahel
CIAMYT	: Centro Internacional para Mejoramiento de Maiz y Trigo

OGIAR	: Consultative Group on International Agricultural Research
CLD	: Centre Local de Développement
OOP	: Country Operating Plan
OOPR	: Center for Overseas Pest Research
CER	: Centre d'Expansion Rural
CFA Franc	: Franc de La Communauté Financière Africaine
CNRA	: Centre National de Recherche Agronomique
CP	: Conditions Precedent
CPO	: Country Project Officer
CREPPHYD	: Centre Regional de Formation Phytosanitaire de Dakar
CREPPHY	: Centre Regional de Formation Phytosanitaire de Yaoundé
E	: Extension
EEC	: European Economic Community
e.g.	: Example
ESCS	: Economics, Statistics Cooperatives & Services
FAC	: Fonds d'Aide et de Coopération
FAO	: Food and Agriculture Organization
FCP	: Food Crop Protection
FED	: Fonds Européen de Développement
FY	: Fiscal Year
GERDAT	: Groupement d'Etudes et de Recherches pour le Développement de l'Agriculture Tropicale
GMC	: General Motors Corporation
GTZ	: Gesellschaft für Technische Zusammenarbeit
G 1	: Annex G 1
G 2	: Annex G 2

ICIPE	:	International Centre for Insect Physiology and Ecology
ICRISAT	:	International Crops Research Institute for Semi-Arid Tropics
i.e.	:	That is
IITA	:	International Institute for Tropical Agriculture (Ibadan, Nigeria)
ILO	:	International Labor Organization
IDRC	:	International Development Research Center (Canada)
IPM	:	Integrated Pest Management
IPM/FCP	:	Integrated Pest Management / Food Crop Protection
INSAH	:	Institut du Sahel
INRAN	:	Institut National de Recherche Agronomique du Niger
IRAT	:	Institut de Recherche d'Agronomie Tropicale
ISRA	:	Institut Sénégalais de Recherche Agronomique
ITA	:	Ingénieur des Travaux Agricoles
IVRAZ	:	Institut Voltaïque de Recherche Agronomique et Zootechnique
M.S.	:	Master of Science
N.A.	:	Non Applicable
N.B.	:	Nota Bene
NPP	:	National Plant Protection
OAU	:	Organization for African Unity
OCDE	:	Organisation de Coopération et de Développement Economique
OCLALAV	:	Organisation Commune de Lutte Anti-acridienne et de Lutte Anti-Aviaire
OECD	:	Organization for Economic Cooperation and Development
OICMA	:	Organisation International pour le Criquet Migrateur Africain

OMT	: Organisation Mondiale du Travail
OMVS	: Organisation de Mise en Valeur du Fleuve Sénégal
ORD	: Organisation Régionale de Développement
ORSTOM	: Office de Recherche Scientifique et Technique d'Outre-Mer
OSRO	: Office for Special Relief Operations
PAPEM	: Point d'Appui et d'Expérimentation Multi-local
PASA	: Participating Agency Service Agreement
PCV	: Peace Corps Volunteers
PES	: Project Evaluation Summary
PERT	: Program Evaluation Review Technique
PhD	: Doctor of Philosophy
PID	: Project Identification Document
PIL	: Project Implementation Letter
PID/C	: Project Implementation Order/Commodities
PNOD	: Programme des Nations Unies pour le Développement
PP	: Project Paper
Pro Ag	: Project Agreement
PV	: Protection des Végétaux
REDSO	: Regional Economic Development Services Organization
RFCP	: Regional Food Crop Protection
RMU	: Regional Management Unit
RM	: Regional Management
RPM	: Regional Project Manager

RTCU : Regional Training Center Unit
 RTDO : Regional Training Extension Officer
 RTO : Regional Training Officer
 SAED : Societe d'Aménagement des Eaux du Delta
 SAFGRAD : Semi Arid Food Grain Research and Development
 S-3 R-3 : Speaking-3, Reading 3
 SFCP : Sahel Food Crop Protection
 SODEVA : Societe de Developpement et de Valorisation Agricole
 STRC : Scientific and Technical Research Commission
 UN : United Nations
 UNDP : United Nations Development Program
 UN/FAO : United Nations/Food and Agriculture Organization
 UGR : Unite de Gestion Regionale
 U.S. : United States
 USAID : United States Agency for International Development
 USDA : United States Department of Agriculture
 USEPA : United States Environmental Development Agency
 viz : Namely
 WARDA : West Africa Rice Development Agency

APPENDIX VI

LIST OF PERSONS CONTACTED DURING THE COURSE OF THE EVALUATION

CAPE VERDE

BEDOLFE, Herbert	Watershed Management Adviser, USAID, Praia
BYRNE, Patrick F.	Agricultural Officer, USAID, Praia
DUARTE, Andre	FAO Advisor to Ministry of Rural Development, Praia
LOBO-LIMA, Maria Luisa	Acting Director of Crop Production and Protection and Director, IPM Research, Ministry of Rural Development, Praia
PEREIRA SILVA, Joao	CILSS Minister Coordinator of Cape Verde; Minister of Rural Development Ministry of Rural Development, Praia
PINA, Alexander	Head of Division of International Cooperation of Ministry of Rural Development, Praia - Ambassador to FAO, Rome
PIRES, Antonio	GIZ Entomologist, Sao Jorge Program Officer, USAID, Praia
SHEIBELREITER, George	Director General of Center of Agrarian Studies, Sao Jorge
SMITH, Hugh	U.S. Chargé d'Affaires, Praia
SOARES, Horacio	
TORRE, Edward	

CAMEROON

BADLEY, Leslie	Personnel Services Contractor, Instructor at CREFFHY, Yaounde
BURGESS, Ans R.	Project Manager for Regional Food Crop Protection Project, USAID, Yaounde
DIAMBONG, Jean	Plant Protection Service, Yaounde
KAMENI, F. Norbert	Instructor, CREFFHY, Yaounde
LEVIN, Ronald D.	Director, USAID, Praia

MILLER, Herbert
MOUSTAFA, Abdel
NJIMYAM, Stevan
NUMGNE, Seraphin
RIFENBURG, Raymond F.
SCHAEFER, Curt
WILDER, Bernard

Program Officer,
USAID, Yaounde
USAID National Cereals Project,
Project Manager, Yaounde
Director, CREFFHY,
Yaounde
Instructor, CREFFHY,
Yaounde
Project Design and Evaluation
Officer, USAID, Yaounde
Desk Officer for Cameroon,
USAID, Washington, D.C.
Deputy Director,
USAID, Yaounde ...

THE GAMBIA

BALDEH, Jai
Mr. BANDEH

BULLI, Saidiba
DARBO, M.L.
DIBLOA, Dembo
FUNICELLO, Tony

GEBIEN, Donna

JAGNE, Alieu

MADLAND, Marc

M'BOOB, Suleiman

MOSER, Thomas

MIDGE, Alan

PIPER, Lawrence

SIMMONS, Keith

TOURAY, M. L.

WELTY, Celeste

Farmer, Sinchu Gunde
Team leader, Crop Protection
Service, Yundum
Agricultural Assistant, Sapu
Pest Control Assistant, Yundum
Agricultural Assistant, Sapu
Program Officer, USAID,
Banjul
Plant Pathologist,
Sapu
Permanent Secretary, Ministry
of Agriculture
Range Management Officer,
USAID
Director of Crop Protection
and IPM Research, CILSS Coordinator
USAID Representative,
Banjul
Peace Corps Volunteer Entomologist
Sapu
U.S. Ambassador,
Banjul
Economist, USAID
Banjul
Assistant Team Leader,
Yundum
RFCP Country Project Officer,
USAID, Banjul

GUINEA BISSAU

CASSAMA, Mustafá	Director, Plant Protection Service, Bissau
FOWLER, Jerry L.	RFCP Country Project Officer, USAID, Bissau
GOUGNOUR, Richard	Accountant, USAID, Bissau
LOPES RIBEIRO, Luis Candido	Director General of Agriculture, Bissau
MACARY, Lou	Program Officer, USAID, Bissau
MAHER, James O'D.	Director, USAID, Guinea Bissau and Cape Verde; located in Bissau
MAXEY, Mike	Personnel Services Contractor, Seed Technology Project, USAID, Bissau
SARIOT MENCUT, Geraldo	Supervisor, Plant Protection Service, Bissau
DA SILVA, Avito José	Minister of Agriculture, Bissau
SLOTTEN, Wayne	Agricultural Officer, USAID, Bissau
DeVOOS, Peter	U.S. Ambassador, Bissau

LIBERIA

AKINSOLA, F.A.	Senior Entomologist, WARDA, Monrovia
AWODERA, Victor	Senior Plant Pathologist, WARDA, Monrovia
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