

Final Report
625-0928

Mid-Term Evaluation
Integrated Pest Management Project
and
Final Evaluation
Regional Food Crop Protection Project
625-0928

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Agency for International Development
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SUMMARY OF FINDINGS

Background

In the early 1970's, world attention was quite suddenly brought to focus on severe and repeated drought conditions in a band of African countries adjoining the Sahara Desert,--the Sahelian Zone. Starvation situations became more serious and widespread with each succeeding year as "normal" rainfalls became less frequent. Relief food shipments provided only a temporary solution as meteorologist conditions continued to be inhospitable, year-after-year.

A Sahelian organization (CILSS) was formed to solicit and coordinate efforts to alleviate the rapidly developing crises. Many international and bilateral donors bent their efforts to rehabilitate agriculture in the Sahel zone and to ensure a more reliable supply of food for the inhabitants.

The U.S. Agency for International Development (AID), the United Nations Food & Agriculture Organization (FAO), and the CILSS participated in the formulation of a comprehensive program for Food Crop and Post-Harvest Protection. This program was divided into separate activities which could be implemented by individual donor organizations.

In anticipation of the broader program, AID launched a 10-year, three-phase Regional Food Crop Protection Project (RFPP) in 1975 to assist five Sahelian countries: Senegal, The Gambia, Mali, Mauritania and Cape Verde, and two neighboring countries: Cameroon and Guinea-Bissau, in establishing national crop protection services. The U.S. Department of Agriculture was designated to implement the RFPP which included the construction of facilities; establishment of field observation posts to monitor pest migrations; a considerable quantity of commodities include lab equipment and vehicles; and personnel training overseas, in third countries, and in-region for a large number of local agricultural specialists. The safe and minimal use of toxic chemical pesticides was emphasized in the training courses.

The CILSS-FAO-AID deliberations also produced the Integrated Pest Management Research Project (IPM) which sought to provide the Sahelian farmer through the RFPP with the best available methods for protecting his crops from insects, diseases, and competing weeds. Ideally, these would minimize the use of deleterious chemicals and would incorporate other non-chemical practices which would be effective in reducing crop losses to pests (crop rotation, planting dates, adequate cultivation, introduction of natural predators, etc.). With increasing attention being given in western countries to the harmful effects of toxic chemicals, it seemed proper to stem the uncontrolled use of these materials in the developing world.

In 1978, AID agreed to underwrite this project in a region consisting of eight countries: Niger, Upper Volta (now Burkina Faso), Mali, Mauritania, The Gambia, Cape Verde, Senegal and Chad. FAO agreed to provide the technical assistance and implement the project, while AID would provide financing for personnel, construction, training, and commodities. General guidance was to be given by a tripartite committee composed of representatives of CILSS, FAO and AID. The methodology developed in this regional research project was to be "fed" into the on-going RFCP which was developing institutions in its seven countries which would utilize the findings at the grass-roots level.

In theory, the marriage of the two projects would make maximum utilization of the investments in both projects and would accelerate the application of improved methodology in the region's food crop production areas. However, the designers of the two projects did not foresee a plethora of impediments which have beset both activities. These constraints have already been thoroughly documented and belabored in annual reports, evaluation reports, and cable traffic. In short, startup delays were experienced by both projects: (incompatibility of AID and FAO regulation, personnel recruitment difficulties); inter-country differences in stages of institution development; communications and transportation difficulties; indistinct lines of authority and responsibility; financing arrangements; and an overly-optimistic estimate of how soon the research component could produce useful results.

It suffices to indicate that the lack of any IPM "packages" stalled progress of the RFCP beyond its second stage and resulted in its termination in February 1985. The IPM has fallen more than two years behind schedule and the first phase is scheduled to terminate in September 1986.

Against this background, it behooves all of the participating agencies to capitalize upon the accomplishments which have been realized, to limit further ineffectual investments of time and resources, and to recognize lessons which can serve in the design and implementation of future projects under similar circumstances.

Regional Food Crops Protection Project

Conclusions

By the end-of-project on February 28, 1985, crop protection services have been strengthened, commodities have been procured, many people have been trained and have returned to work for crop protection services and most of the host country positions are covered in the national budget (except Cape Verde).

The obvious failure which led to an unanticipated negative effect is that the project relied on the IPM Project to research and develop technical packages in IPM methods that would then be extended by the crop protection services established and/or strengthened through RFCP I and II. To date, not one package has been developed by the IPM Project. It was unrealistic to expect that a system of research, data collection, analysis, and testing could be put in place and have sufficient experience and replications to develop such a package in the IPM Project in time for implementation by the RFCP II Project.

At present, pesticides are either given by donors or are sold at low prices, which enables the governments to provide them free of charge or at nominal rates to growers. Pesticides that have long term residual effect on the environment are being used in inappropriate amounts and sometimes at the wrong point on the pest life cycle when it has no effect, or affects the wrong insects.

Until the host countries recognize the problems, pass appropriate legislation, provide proper controls, reduce or eliminate the subsidies on pesticides (which distort the economic thresholds for utilization of IPM methods), and have extendable IPM packages available, USAID should not provide additional support to the crop protection services per se. Future AID assistance, on a bilateral basis, should be directed toward correcting these fundamental problems in each country.

However, the roles played by the RFCP in supporting the training activities of the Dakar Training Center staff, and the INSAH Communications Department merit continuation on a regional basis.

Lessons Learned

Analysis of the RFCP II Project has yielded some lessons learned for future AID efforts.

Some major findings are:

1. RFCP depended on another project (IPM) to produce the technology it needed to transfer but did not include its availability as an assumption in the project design logical framework.
2. The Logical Framework itself is poorly developed, does not stand alone, lacks quantifiable measures for output and purpose levels, and has no input level assumptions.

3. The evaluation plan did not include quantifiable targets. The project may have exceeded its training and infrastructure targets, but there is no means to verify this without evaluation indicators.
4. Inputs and outputs were to be developed annually through work plans and project agreement amendments. They were done piecemeal and not in relation to the project as a whole, nor in conjunction with the IPM project.
5. When it became apparent that IPM techniques were not forthcoming from the IPM project, the RFCP project attempted to include demonstrations, crop loss assessments and economic threshold analysis in its own portfolio without proper support to carry them out, or means to use results.
6. Due to subsidy by governments on pesticides, the incentive for the Crop Protection Service and the farmer to develop and use IPM non-chemical methods is minimized. This was not an assumption in the Logframe.
7. The training center was not given sufficient resources to become a regional training resource and staffing gaps seriously hampered it.
8. The recurrent cost question at the end of project was not sufficiently addressed. With the end of the project, there will be many well trained staff in place without the necessary resources and support to function at current levels.
9. The funds provided to INSAH were useful to a point but not sufficient to give INSAH the capability to analyze the results and disseminate them to the countries for research and extension purposes.
10. The project design did not accept the reality that pesticides would be initially emphasized, as in the U.S., and that as a result the project should work toward the use of selected pesticides, proper use and storage of pesticides and proper timing and application of pesticides.
11. The PASA arrangement led to unclear role definitions on the part of AID and USDA and problems in implementation and field responsibility.

Recommendations

1. End RFCP Project as planned February 28, 1985.
2. Those RFCP activities of the Dakar Training Center, needed to fulfill training requirements of IPM, should be absorbed by IPM, if possible.
3. INSAH activities supported by RFCP should be transferred to IPM and monitored by the IPM Liaison Officer in Mali. Continued AID financial support is recommended.
4. Field activities of RFCP be included in the portfolio of individual USAID Missions for continuance on a bilateral basis as missions determine feasible.
5. Pesticide use policies and subsidization policies should be examined in the context of each USAID Mission agricultural portfolio to identify leverage points for policy dialogue with the host governments.
6. Extension of crop protection methods in services other than the CPS should be identified and encouraged through existing and new agricultural and education projects funded by USAID.

Integrated Pest Management Project

Conclusions

Despite the magnitude and number of obstacles which have impeded the IPM Project, a necessary start has been made to focus national and regional attention of IPM as an approach which will become increasingly important to each country's long-term well-being. Government officials, researchers, and a few farmers have been made more aware of inherent dangers in the use of toxic chemicals; researchers have been networked, to a degree, in collaborative research; and donors have experienced the limitations of large-scale regional projects vis-a-vis more manageable bi-lateral single country activities. Equally important is the recognition that agricultural research is not a short-term proposition.

Many of the constraints observed by the evaluators, such as the shortage of trained manpower, weakness in local training institutions, and undeveloped extension services, have already been noted by some USAIDs and other donors and steps have already been taken to alleviate these limitations.

1. Entomology is strongly represented in both technical assistance and training in the IPM project. The need to increase the number of phytopathologists and weed scientists is present and will increase over time.
2. Except in isolated cases, collaboration with other regional programs in crop research (e.g., ICRISAT and SAFGRAD) as well as in-country programs is weak. This delays the application of results to farmers fields by reducing the potential pay-off of similar or collaboratively designed on-farm trials and research station work.
3. Technical expertise provided by FAO is not of uniform quality nor standard across the region. Where necessary, short-term technical expertise should be provided to country teams in specific areas such as crop loss assessment, and research design, and pilot on-the-farm trials.
4. Current pesticide policy must be modified to facilitate the implementation of effective IPM strategies.
5. Overall priority pests are relevant to the region, with the exception of bacterial disease of rice.
6. With the exception of Senegal, little or no crop loss assessment is being carried out in the region under IPM.
7. The AGRIMET component will complete a grasshopper prediction model by the end of project to use in forecasting outbreaks. The Rachava and downy mildew models will take longer.
8. The socio-economic component is insufficiently staffed and needs to draw on in-country expertise in these fields as well as short-term expertise to produce acceptable IPM packages. There are few design linkages existing to ensure integration of socio-economic aspects.
9. There will be little overlap of returned participants and FAO technical assistance before the end of the project. This limits the long-term benefits of counterpart on-the-job experience and collaborative research.
10. The inclusion of some cash crop-centered research would likely lead to more rapidly acceptable IPM application.

11. Based on performance of present IPM technical assistance, any future phases of IPM activity supported by AID should be awarded competitively.
12. Present project management is much improved after the recent restructuring.
13. IPM packages will not be ready by the end of project, but significant research capacity will have been developed.
14. The on-the-farm pilot program has made a start toward bringing research trials to the farmer's land but they should be simplified and refined for the 1985 and 1986 seasons.

Lessons Learned

1. The complex administrative and management structure initially established for the project was too cumbersome. Country-by-country projects would have been simpler to manage and could have better accommodated the diverse situation in each country. A regional "umbrella" can play an invaluable part in integration and coordination of research, and in information gathering, archiving, and dissemination.
2. The project's concept, which requires a sophisticated data collection and analysis system throughout the Sahel, has proved to be too ambitious for the time allotted. The ability to manage a complicated regional structure is weak in Sahel. An unrealistic time frame for development of IPM packages should not have been accepted.
3. The information necessary for crop loss assessments, and economic threshold analyses are far from adequate. Meaningful benchmarks will not be available within the planned life of the project.
4. The project paper was not clear about the reality of long-term basic research vs. short-term applied research. There should be a clearer understanding of the time-frame involved and the expectations for each.
5. The IPM Project suffered from the outset from the lack of understanding of (or commitment to) the roles and responsibilities of the USAIDs, host country institutions, regional institutions, technical

assistance contractor, and AID/W. The project was placed under a regional organization, CILSS, which, according to its executive secretary, should not have been involved in project implementation. Furthermore, adequate project management at both the country level and at the regional level became a serious constraint.

6. The capability of each country to establish and maintain a separate IPM structure, plus a system of observation posts, laboratories, field trials, specialists in bio-control, crop loss assessments, entomologists, phytopathologists, weed scientists, etc., should have been more accurately appraised before inception of the project.
7. The systems for carrying out the demonstration trials and Pilot Program are not sufficiently developed for large-scale implementation throughout the Sanel. The Pilot trials were added late in the project as a method to speed up the verification and acceptability of IPM techniques. Their impact and replicability will be very limited by the end of the project and follow-on extension involvement needs to be addressed.
8. Using a multilateral agency as a technical assistance contractor has created many problems of accountability, accessibility to financial records, placement of participants in non-U.S. universities, and lack of control over quality of advisors.
9. In the participant training element, the selection of candidates for entomology training was over-emphasized, at the expense of plant pathology and weed control. Other disciplines such as agricultural extension training, communications, sociology, and agricultural economics, were overlooked entirely. In many cases, the institutions selected for the training were not appropriate for IPM indoctrination.
10. Emphasis should have been placed initially on developing the capability within existing research staff and extension services, rather than on developing a separate structure.
11. The project should have done adaptive research on known IPM techniques before trying to develop new techniques. This should have included research on the proper use of pesticides along with non-chemical methods.

12. Having each project set up separate commercial bank accounts did not encourage institutional development by assisting the governments to set up better accounting systems.

Recommendations

1. The IPM Project should be extended to the end of March 1987. The present PACD of September 30, 1986 is too early to finish the research conducted on the 1986 cropping season and to analyze and documents the results. Many of the participants will not have completed their training by September 1986. Future AID support of IPM research should be handled on a bi-lateral, country-by-country basis, as determined by each USAID Mission and host government.
2. A number of participants from Mauritania and Niger who have been nominated for B.S. degree training but who have not yet left for overseas should not be processed under the present project. At best, they could not complete their training until 1989!
3. Some of the M.S. candidates who have yet commenced training and cannot complete it within a year should be suspended as well. If not, they will not return within the life of the present project.
4. If FAO does not place the remaining experts in country by the end of March 1985, these positions should not be filled.
5. Niger needs to replace with Nigerians the eight Peace Corps Volunteers who are acting as observers in the observation posts. AID and the Peace Corps will need to collaborate on this action.
6. The Government of Niger should replace the two Egyptians, who presently are acting as host country counterparts, with Nigerians during the next twelve months.
7. The weed scientists in the IPM technical assistance should provide regional as well as in-country assistance, supplemented by additional short-term expertise.
8. The project should accelerate the integration of IPM research with on-going in-country crop research. A farming systems approach should be emphasized.

9. On-farm trials should be expanded to give practical research results in each country. Short-term technical assistance should be provided for research design, agricultural economics, farming systems, and agronomy to facilitate a more applied approach.
10. The staff of the Dakar Training Center should be used to the extent possible for conducting train-the-trainer type short courses in each of the IPM countries. The assistance of a short-term consultant in Extension training could facilitate this activity. (Generated local currency may offer a source of financial assistance in some countries).
11. The INSAH Communications Department at Bamako has made a commendable start toward providing a technical communications network for agricultural research and extension in the Sahel countries. The financial support previously provided throughout the RFCP should be continued throughout the IPM Project, and augmented if possible.

Recommendations for Future AID Interventions

The observations of the evaluators, coupled with opinions expressed by the USAID Missions, overwhelmingly point to continued assistance in bi-lateral country programs. In this fashion, the capabilities and willingness of each country can be more carefully gauged.

Nonetheless, there are some regional functions which are still necessary and which should be addressed:

- a) Coordination and complementarity of research can be encouraged throughout frequent regional conferences such as the December 1984 conference in Niamey. Progress reports can also be shared on such occasions. AID financial support would undoubtedly promote greater participation in such conferences.
- b) A sincere impulse toward networking researchers in the region has been initiated by INSAH. The functions it is undertaking would be very costly for each country to perform individually. The continued and augmented financial support by AID could permit refinement and expansion of INSAH's periodic technical publications, digests of journal articles and other research reports, and translation of external research papers for distribution within the region.

- c) There are indications that much related agricultural research conducted over the past several decades rests in archives in France. A search of these annals might well avoid the time and cost of "rediscovering" these findings. INSAH could serve the entire region in this research and dissemination.
- d) No single project can foresee every technical need which may emerge in a project as large and important as IPM. A regional liaison person, specialized in pest management and attached to INSAH, could serve as a monitor to recommend and coordinate short-term specialists for individual country consultations or for regional seminars and short courses. Funding would be required for the long-term monitor, short-term consultants, and for conducting short courses and conferences. In view of the continuing USAID bilateral country activities, the regional liaison person should be sponsored by AID.

The evaluation team, therefore, recommends that design be commenced on a single new follow-on regional project to incorporate aspects of CILSS annexes A, B, G₁ and G₂. Essentially, this would be a low-investment "skein" to preserve the progress made to date and to insure the continuation of a network system in the future.

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ACRONYMS AND ABBREVIATIONS USED

- AGHYMET - Agro-Meteorological-Hydrology data collection and forecasting program in the Sahel
- Annex A - The section of the CILSS program dealing with the establishment and strengthening of national crop protection services
- Annex B - The section of the CILSS program dealing with integrated pest management research for basic food crops
- Annex G - The section of the CILSS program dealing with Extension and Training
- APHIS - The U.S. Department of Agriculture's Animal and Plant Health Inspection Service
-
- B.F. - Burkina Faso, formerly Upper Volta
- BHC - Benzene Hexachloride, and Insecticide
- B.S. - Bachelor of Science degree
-
- CAT - Center for Agricultural Training, an intermediate school
- CIDA - Canadian International Development Agency
- CILSS - International committee for addressing Sahel drought problems
- CNRA - National agronomic research center in Senegal
- COP - Country Operations Plan, a USAID document
- CPS - Crop Protection Service
-
- DTC - Dakar Training Center
- EDF - European Economic Community, or
- EEC - European Economic Community
- FAO - Food and Agriculture Organization of the United Nations
- FSN - Foreign service national (USAID employee)
-
- GERDAT - Research group for the development of tropical agriculture (French)
- GOBF - Government of Burkina Faso
- GOM - Government of Mali
- GOS - Government of Senegal
- GTZ - West German technical assistance program
-
- ICRISAT - International Center for Research in the Semi-Arid Tropics
- IER - Institute of Rural Economy, Mali
- IITA - International Institute of Agronomic Research
- INSAH - Institute of the Sahel
- I PM - Integrated Pest Management, as a Project, or as a system of pest control
- IRAT - French overseas agricultural research agency
- IRBET - Institute for research in tropical biology and ecology

- ISRA - Senegalese institute for agronomy research
- IVRAZ - Agricultural research station in Burkina Faso

- LOP - Life of project

- MIS - Management information system
- M.S. - Master of Science degree

- NPPS - National plant protection service

- OCLALAV - An organization concerned with the control of migratory
bird and insect pests
- OICD - The U.S. Department of Agriculture's Office of Inter-
national Cooperation and Development
- OICMA - African migratory locust organization (international)
- OPSR - Crop protection service in Mali
- ORD - Provincial rural development organisms in Burkina Faso

- PACD - Project assistance completion date
- PASA - Participating Agency Support Agreement
- PDO - Project Development Officer
- Ph.D. - Doctorate degree
- PIO - An AID document for executing services for technical
assistance, participant training, or community procurement
- PP - Project Paper
- PSC - Personal Services Contract (USAID document)

- REDSO - AID's Regional Economic Development Support Office in
Abidjan
- RFCP - Regional Food Crops Protection Project
- RIG - A rural development project in Mauritania, sponsored by
USAID
- RPM - Regional Project Manager

- SAFGRAD - Semi Arid Food Grain Research and Development, an AID
regional project

- SWA - Sahel and West Africa Office of AID

- T.A. - Technical assistance

- USAID - the AID Mission in an individual country
- ULV - Ultra low Volume (pesticide solution application)
- USDA - the U.S. Department of Agriculture

- WARDA - the West Africa Rice Development Agency
- WCA - West and Central Africa
- WMO - World Meteorological Association

Team Composition

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I. Introduction

A. Project Histories

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 10-year, three-phase Regional Food Crop Protection (RFCP) Project in 1975 assisting five Sahelian and two neighboring West African countries. This project served goals and objectives outlined by CILSS, and was part of Annex A of the CILSS Program. (See Annex B, History of the CILSS Plant Protection program)

CILSS-FAO-AID deliberations also produced the Integrated Pest Management research project aimed at providing the Sahelian farmer with the best available methods for crop protection through integrated pest control. AID authorized \$25.3 million in FY 1977 for the five-year, first phase of the IPM project (known as Annex B of the CILSS) in February, 1978. However, implementation was delayed for a variety of reasons.

By the third year of the project, all three parties, AID, CILSS, and FAO, had become concerned that IPM was seriously behind in implementation and achievement of its objectives, with the result that the RFCP project was not receiving IPM research results for extension to small farmers as planned.

As the result of an evaluation in 1981, the IPM project was re-designed and the new emphasis began implementation in 1982-83. Because of IPM's delays, the Regional Food Crop Protection project was not receiving tested IPM packages. As a consequence, that project focused on assisting governments to increase their use of chemical pest control means and on training agents in safety measures. Without IPM alternative technologies, RFCP could not move toward its ultimate objective of extending IPM concepts and methodologies to Sahelian small farmers. In addition, provision needed to be made to link IPM, RFCP, and other crop protection activities in the Sahel, in order to establish mutually agreed priorities and focus many diverse efforts on producing specific results of primary importance for the Sahel.

Specifically it was found in 1981 that:

The IPM Project's technical and developmental rationale(s) remained valid and even more urgent than when the project was designed; and

IPM's problems were primarily administrative, rather than technical, attributable mostly to errors in initial assumptions and design.

The Regional Food Crop Protection Project was originally conceived as a three-phase effort over ten years to help host country governments develop the institutional capacity to reduce crop losses. Phase I of what was originally known as the Sahel Food Crop Protection Project* was conceived as the result of a tour by the AID Administrator through the Sahel in late 1974, and had as its principal objectives the creation of national crop protection services in each of the participating countries. These new institutions were supported through the provision of technical advice, practical and academic training, and funding for physical plant and equipment.

At the same time that RFCP was being established, AID in collaboration with FAO and CILSS launched a major program of crop protection which culminated in April 1977 in the announcement by the CILSS Council of Ministers of a "Comprehensive Program for Crop and Post-harvest Protection". Using its newly formed RFCP as an implementing vehicle, AID was able immediately to fund the bulk of that portion of the Comprehensive program designated as "Annex A: The Strengthening of National Plant Protection services." Later in 1977, AID provided funds for another component of the comprehensive program, "Annex B: Research on and Development of Integrated Pest Management for basic Food Crops", which was charged with the responsibility for producing IPM technical packages suitable for extension to farmers.

Under RFCP Phase II, the stated project purpose was, "to encourage and facilitate the extension of IPM concepts and techniques to food crop farmers..." through a variety of measures aimed at augmenting and strengthening the national crop protection services. In addition, extension agents were to have been trained in IPM techniques at the regional training centers constructed under Phase I. Left unspecified, however, was the source of research-proven IPM techniques suitable for extension; and therefore it was inevitable that an evaluation of Phase II (commonly referred to as the 1981 Evaluation) would find later that no concrete steps had been taken to extend IPM to farmers.

* Beginning with Phase II in 1978, the word "Regional" was substituted for "Sahel" in the project title, such change reflecting the inclusion of Cameroun and Guinea-Bissau, both of which contain areas of arid subsistence agriculture, but nonetheless are not conventionally considered to be Sahelian countries. Cameroun has since withdrawn and Guinea-Bissau is funding crop protection activities bilaterally.

The effect of the 1981 Evaluation was to focus attention on the gap between stated intent and operational reality within RFCP Phase II. It also served to highlight a "phasing problem" that had emerged, due to implementation delays in research activities under Annex B. Recognition of this problem was given in the 1982 Project Paper Amendment (of RFCP Phase II) wherein a recommendation was made that limited research be carried out under RFCP Phase II (Extended), as a response to, "the urgent need to begin identifying ecologically safe, cost-effective alternative IPM methods." It is against this administrative and planning reality that the two projects which are the subjects of this evaluation must be judged.

B. Evaluation Methodology and Data Gathering

On October 19, 1984, the Evaluation Team was assembled in AID/Washington for its first briefing. Members of the team were selected by AID/W with the assistance of the Consortium for International Crop Protection. It was made up of:

Team Leader - Institutional analyst
Entomologist
Plant Pathologist
Weed Control Specialist
Plant Protection Specialist
Agricultural Extension Specialist
Agricultural Economist
Project Development Specialist

The team was given a 4-point charge:

1. Conduct a final evaluation of the Regional Food Crop Protection Project (RFCP);
2. Conduct an intermediate evaluation of the Integrated Pest Management Project, (IPM),
3. Explore options for incorporating crop protection concepts into bilateral or regional projects; and
4. Respond to RFCP audit report findings.

A time-frame of less than four weeks in the Sahel region including visits to five countries limited investigation time in each country. The team split up after its initial orientation in each country to cover specific responsibility areas, and preliminary arrangements by a USAID Liaison officer in each country facilitated optimal use of the team's allotted time.

In each of the African countries visited, all or part of the team was engaged in discussions with the USAID staff, the IPM Project staff, RFCP staff (Senegal, the Gambia, Mali), the leadership of the Ministry concerned with agricultural development, and the country's Crop Protection Service. Where applicable and possible, the national agricultural research centers and agricultural training institutions were also visited. Visits made to points outside of the capital cities or items of special significance are indicated in the team's itinerary below.

Oct. 19-20 Team convened in Washington.

Briefings by Africa and Science and Technology Bureaus and backstop officers of RFCP and IPM Projects.

Oct. 20-22 Paris

Two team members met with Club du Sahel officials

Team organization meetings

Oct. 23-26 Ouagadougou, Burkina Faso

In addition to the standard set of meetings described above, the team met with the Executive Secretary of CILSS, a CIDA representative, and a specialist with IRAT. Visits were also made to the Kamboinse Research Station and the University of Ouagadougou Farm at Gampela.

Oct. 26-Nov. 2 Depart for Bamako, Mali.

The first meeting with the IPM Regional Director and the FAO Senior Technical Advisor was held in Bamako. Since this city is headquarters for the Institut du Sahel, a meeting was arranged with INSAH's Director of Research and Deputy Director. Visits were made to two Observation Posts at some distance from Bamako, to the CAA Extension Training School at Katibougou, to the Bancoumana Base of the Operation Haute Vallee where some farmers were visited, to the Sotuba Research Station and to two farms in Kangola.

Nov. 2-6 Dakar, Senegal.

Because the time constraint did not permit the team to visit Mauritania and the Cape Verde Islands, project delegations from those two countries met with the team at Dakar. On a business trip from her Bamako Office, the head of INSAH's Department of Communications also gave up a weekend to confer with team members. Several members spent an afternoon at the RFCP Dakar Training Center a short distance from Dakar.

Nov. 6 Depart by road for Banjul, The Gambia.

Enroute, the researchers in the IPM/Senegal Project met the team at Kaolack to discuss their research program. This would be followed by a research station visit upon the team's return.

At Banjul, after the routine schedule was completed, visits were made to the Extension Aids Unit, the CPS Training Unit, and Agricultural research director.

Nov. 8 Depart by car for Sapu, the Gambia.

The Gambia Pilot Pre-Extension Trials were conducted in two villages in this area. A half-dozen farmers, (both participating and non-participating) submitted to discussions with team members about their impressions of the pilot trials at Mamu Fana.

Nov. 9 Depart by car for Kaolack, Senegal.

Enroute another Gambian village (Fulla Bantang) involved in the Pilot Trials was visited. Six farmers were interviewed. Other team members completed interviews with USAID/Banjul.

Nov. 10 Depart by car for Dakar, Senegal.

Enroute, the Senegal IPM research team was visited at the Niore Research Station. Following this, stops were made at an observation post, a field demonstration plot, and the Bambay Research Station. Part of the team met with CPS and USAID officials and RCEP project staff in Dakar. Meetings were held Sun. Nov. 11 with Senegal IPM director in Dakar.

Nov. 12 Depart by air for Niamey, Niger

In addition to the routine meetings, visits were made to the Polytechnic Institute at Kolo, the Agronomy School at the University of Niamey, and to staff members of related USAID projects: Niger Cereals Research and the Agricultural Production Support Project.

Nov. 16 Depart for Ouagadougou, B.F.

De-briefing report presented at the USAID/BF to representatives of RCEP (Senegal) and IPM (regional).

Final conference held with IPM Regional Director and the Senior FAO Technical Advisor.

- Nov. 19 Technical Specialists depart for Paris and home.
- Nov. 22 Team leader departs for Paris and home.
- Nov. 26 -Dec. 3 Washington, D.C. Preparation of draft final report.
- Dec. 4-14 Team leader and entomologist attend IPM Regional Conference in Niamey, Niger. Report finalized on team leader's return.

C. Report Organization

The report discusses both the RFCP and IPM projects in technical terms and analyzes project management and draws conclusions. It then turns to contextual considerations which influence project success: the institutional, economic and agricultural extension system frameworks within which crop protection and research operate taking into account regional characteristics of both projects before presenting the team's major recommendations. The report concludes with options for future USAID involvement in crop protection in the Sahel.

II. REGIONAL FOOD CROP PROTECTION

A. Background

The Regional Food Crop Protection Program identified as Annex A of the overall CILSS program was established in 1975 as a three-phase, 10-year effort to strengthen national crop protection capabilities and develop channels for extension of Integrated Pest Management (IPM) strategies to the small farmer.

Phase I of the project was primarily directed at institution-building through training, facility construction, and equipment procurement. Phase II continued this institution-building to provide for an infrastructure within country to enable IPM research results to reach the farmer. Also included in Phase I were research and demonstration efforts attuned to specific national needs which were generally not included in the more specific regional IPM effort but which could be of significant value in the overall regional effort in crop protection improvement.

The method used in judging how well RFCP performed in fulfilling its role of strengthening the crop protection capabilities of the RFCP regions is based on a comparison of the basic functions of a sound crop protection organization, fully implemented, with the present status of the various crop protection services within the Sahel. The evaluation, therefore, looked at both planned project results (See Project Log Frame) and a baseline of what an established crop protection service should be able to do.

B. Baseline Assessment of Crop Protection Services by Country

Basic functions considered in the evaluation are:

1. Adequacy of pest survey and detection capabilities, including early detection of newly introduced pests, pest spread from confined areas, and pest population surveys to define infestation limits and levels of infestation in order to provide an alert system to farmers on which action strategies can be soundly based.

2. Adequacy of plant quarantine regulations and enforcement capabilities to insure against the introduction (except through normal landbridge spread) of new pests, the artificial spread of pests from confined areas, the regulation of propagative plant material and other introductions in newly introduced research materials, and the pest free status of exports to other nations.

3. Adequacy of pesticide regulations and enforcement capabilities in the use, manufacture, formulation, distribution of pesticides, safety practices (both worker, consumer and environmental), pesticide container disposal and pesticide selection for most efficient use consistent with minimal environmental contamination.

4. Quality of crop protection assistance to farmers through the provision of technical advice and on-farm assistance; training of farmers in the techniques of application, safety and area-wide assistance, where individual farmer effort is insufficient and equating with the concepts of IPM.

5. Quality and quantity of developmental assistance through research and/or the adaptation to field use of research findings readily acceptable by the farmers.

6. Quality and quantity of training received and its relationship to the targetted activity it is meant to improve.

7. The capability of an extension organization to take new or modified techniques to the farmer level.

In this analysis all 7 functions are lumped under Crop Protection recognizing that, in most cases, responsibilities for particular functions do not necessarily lie solely with the national crop protection service but may be incorporated into the duties of other national or departmental governmental organizations which have responsibility for research and extension.

C. Analysis by Country Component

Mali

Base Line Zero - no measurable crop protection infrastructure existed prior to RFCP.

The CPS was established in 1974, consisting of 1 BS level entomologist and 4 laborers, to survey for crop pests. Also, in 1974 with funding provided by the European Economic Community (EDF), the Operation de Protection des Semences et Recoltes (OPSR) was established to manage and operate a pesticide formulation plant and provide technical advice to farmers in the use of pesticides. In 1975 the CPS was placed under OPSR, but now is a separate service with field operations in areas not serviced by OPSR. In those areas serviced by OPSR they are the extension arm of crop protection, but they also continues to maintain its original function of pesticide formulation and distribution to the farmer.

The CPS now consists of about 40 staff members. Organizationally, on paper, it has 9 field bases at varied locations throughout Mali, but in actuality only 3 exist. These three operational bases are located in Northern Mali adjacent to the Mauritania border which is principally a livestock production area and has low yield, field-grain subsistence-level farming.

Six bases were once operational but budget cuts and lack of donor support has reduced these to three. CPS personnel have received training in basic survey techniques principally through the Dakar Training Center and train-the-trainer techniques. Not so with OPSR who have received little or no training in the basic survey and detection techniques. The CPS field personnel observed were knowledgeable in the identification and biology of pests within their work area. As available, CPS provides survey assistance to other sectors of the nation upon request by OPSR, but fund limitations preclude all but cursory visits. CPS does conduct organized surveys on grasshoppers, locusts and migratory birds in cooperation with OCLALAV and CICMA, but no organized detection system exists.

Plant quarantine is practically nonexistent. Sporadic inspections of commercial air cargo apparently occur but CPS readily admits they have no control over passenger baggage. Reliance is placed on the Ivory Coast and Senegal for sea to air or rail agricultural imports and the phytosanitary certificate issued by the exporting nations. There are no post-entry quarantine facilities in country or screening facilities for introduced biological organisms prior to field release. The prevention of unwanted pest introductions is based entirely on good will of exporting nations and the scientific community.

No pesticide regulations per se exist, although CPS has some guidelines in the form of memos. These are incomplete, outdated and not enforced. CPS has apparently been divested from direct association with the pesticide formulation plant and now uses or recommends only USAID-approved pesticides. A pesticide residue laboratory has been established and is being equipped by CPS in Bamako (adjacent to the pesticide formulation plant.) It is directed by an MS-level chemist and is not yet operational nor have field sampling techniques been developed nor have sampling plans been provided to CPS or OPSR staff.

Nationwide, crop protection assistance (pest control) is confined to grasshopper control and other migratory insects such as army worms, and migratory birds. Technically, CPS seems fairly well equipped for this function. CPS no longer relies on the hard pesticides (BHC-Dieldrin etc.) for control operations and in 1984 pesticide usage against these pests was minimal. Within the field operational base units, activities are broader. Farmers

are provided a wide range of technical advice and demonstration (insects, plant diseases, weeds). CPS works closely with the farmers and advice appears to be readily accepted. Observations near the Mourdiah Base revealed clean cultivation with practically no Striga in bloom, minimal insect damage to basic crops (millet, sorghum, cowpeas) and practically no smut or mildew. Comparatively, in areas between Bamako and Mourdiah, outside the CPS base operational area, both millet and sorghum show a high degree of smut (up to 30% of heads) and numerous blooming Striga in most farm plots). This indicates that where personnel and resources are available, the Mali CPS can have a positive effect on crop production. CPS does sell seed treating chemicals to farmers in their work areas and charges for pesticide applications except for migratory pests.

OPSR continues to be basically a commercial pesticide operation, principally on cash crops such as cotton. Residual pesticides (Dieldrin for helicthos armigera, BHC and lindane) are widely marketed as well as a wide diversity of carbamate and phosphate insecticides. (See RFCP III pp annex I for regional pesticide use discussion). Applications for use by farmers include the adaptation of ULV application techniques to CPS control strategies and non-pesticide IPM techniques being applied within the CPS limited working area around field bases.

During the life of the project, RFCP support for the CPS has been minimal. Original plans called for CIDA to pick up Annex A in Mali. With the exception of some equipment purchase (UNIMOGs), this was not fulfilled. AID has provided training to four Malians from the CPS and short-term study tours in the U.S. and France. In addition, some equipment was purchased as were documents for a reference collection.

Senegal

Base Line Zero - no measurable crop protection infrastructure existed prior to RFCP.

The CPS was established in 1974 primarily to cooperate nationally with OCLALAV in the control of pest birds and desert locusts. Since the initiation of RFCP there has been a significant increase in staff. The permanent staff consists of 30 professionals and technicians. During the cropping season temporary assistance increases these numbers to about 60. On paper the CPS has 10 field bases but, in actuality, these do not yet exist. The functions of the CPS include general pest survey, control intervention through the use of chemical pesticides, crop protection extension to train farmers in pesticide handling and use, the field distribution of pesticides and the extension of IPM concepts. Without a field staff, the CPS must rely to a large extent on the extension service to fulfill their mission.

Organized surveys are confined to locusts and other grasshoppers and birds. There is no evidence of other organized surveys either by CPS or extension to monitor pest populations in the principal crops. Detection of new pest introductions must rely on farmer vigilance. Since farmers are ill-equipped for this function, new pest introductions are unlikely to be detected until widely spread and causing extensive damage. WARDA officials and Richard Toll have reported natural enemy destruction which has led to insect infestation increases which they attribute to indiscriminate pesticide use.

Plant quarantine is included as a function of the CPS but no structure exists to carry out this responsibility.

Pesticides - A law providing for the establishment of regulation pertaining to the importation, sale and use of pesticides was passed in February 1984. However, no evidence could be found that any regulations have ever been formulated. Safe handling of pesticides appears to be a myth as evidenced by the pesticide storage near the Dakar Training Center. Pesticides were stored in bags on the ground, drums and cans were leaking, open drums were in evidence, empty drums were scattered around outside the storage area and workers were not provided (or did not use) protective clothing or devices. There apparently has been some tightening on importation of highly toxic pesticides. According to Gambian officials the flow of highly toxic pesticides and long residual insecticides from Senegal to Gambia has appreciably diminished in recent months.

There is no residue analysis capability within country as far as could be determined. A proposal for residue analysis assistance has apparently been presented to the GTZ but not yet acted upon.

Most agricultural pesticides are purchased by the government in concentrate form, formulated in country to lower dosage levels and sold to the farmer through the extension service. The pesticides sold commercially by importers must be approved by the CPS. Generally, the CPS relies on the literature to make a determination on acceptability of a pesticide, and the CPS has at times required in-country experimentation by the manufacturer.

The CPS works principally on pest outbreaks but no evidence was available that guidelines, including economic thresholds, have been established as to what constitutes an outbreak. (See Section IV. B. Economic Considerations). Outbreak pests include but are not limited to grasshoppers, army worms, stalk borers in millet, aphids in peanuts, birds, etc. For its operations the CPS continues to rely largely on the long residual pesticides such as BHC, Aldrin and Dieldrin and highly toxic parathion for bird

control. OCLALAV, the West African organization with primary responsibility for desert locust and bird control, is practically defunct and will likely be ending in 1986, so its activities within Senegal have largely been taken over by the CPS. The RFCP has supported the food crop protection aspects of CPS. Without this support, it is questionable as to whether CPS could function as an organization at its present staffing level. Since CPS has no full-time, field-based personnel, it calls on the extension service to assist on pest outbreaks. Pest outbreak control is provided free to the farmers. Of the 10 field bases projected by CPS, four are in various stages of development. Funds have been allocated by the GOS for two additional bases.

Developmental assistance through crop protection is confined to adoption of ULV pesticide application techniques. No evidence was uncovered as to the CPS utilization of non-pesticide techniques. The RFCP program conducted initial testing of noseema on grasshoppers, but there has been no follow-up. Examination of Neem extracts for control of lepidopterous pests of grain crops and the use of the entomox virus on amsacta maloneyi were included in the projected work for RFCP during Phase II but these apparently were not pursued. Coordination between CPS and the National Research Unit is negligible.

In addition to long-term training provided for Senegal CPS under the project, the Dakar Training Center has provided regional and national training programs throughout RFCP II and is the main in-country training application resulting from Phase II.

This Center, which has been supported by the RFCP, has classroom, laboratory and dormitory facilities to accommodate 20 live-in students. It is located several kilometers from Dakar and has a staff of 4 instructors, including the Director. Its 1984 Annual Report lists a catalog of 36 courses, all dealing with aspects of crop protection and one-half of which are IPM related.

During the past year, 15 courses of about one-week each were conducted by the staff, and, in 2 others, the staff assisted the sponsoring external organizations. The DTC was in use almost half of the time. Twelve courses were for Senegalese programs while four had regional implications.

In addition to teaching, the DTC staff also attend training conferences in other countries and assist occasionally in field work on crop protection related activities in Senegal.

In years past, the DTC has spent a much greater proportion of its time on regional-type courses but, of late, requests from other countries diminished, partially because some of the

necessary training has been given, and partially because it has become expensive to pay air fare and per diem to Dakar for large numbers of people from other countries for one- or two-week courses.

It appears feasible for this resource from the RFCP to be considered for adoption by the IPM Project--utilizing the center and staff if advisable, or the staff alone to provide training in any of the IPM countries. At this juncture, the DTC should consider presenting a train-the-trainer approach on several extension-oriented topics, such as basic communications, extension methods, establishing pilot research demonstration plots, and other needs as determined by the participating countries. The purpose would be to present the needed subject material in a form which could be used by the trainees in passing on the training to others in their country. The DTC staff has had considerable valuable experience and appears to be versatile enough to provide training for CPS and extension services in conjunction with IPM trials and techniques. Additional short-term technical assistance in training methods and extension communication techniques could benefit future IPM and CPS use of trained personnel from the Center both nationally and regionally.

The Gambia

Base Line Low - A CPS organization existed prior to RFCP but was essentially inoperable.

At the time of initiation of RFCP, the CPS consisted of one entomologist and two or three pest control workers. The present headquarters staff includes an additional three graduates and two mid-level graduates in specialized crop protection trained under RFCP. The field force organized in 1976 consists of six teams with 10 to 12 persons per team. Team personnel are posted directly in the villages. Most have participated in a concentrated training program at Gambia College.

The Director of CPS is also the IPM Project Director so a close relationship between the two projects is possible.

Gambia has the best survey and detection system of all RFCP nations visited. All field personnel have received training in survey techniques. Personnel at one of the field bases observed had adequate knowledge of basic techniques and could identify the principal insect pests. A good reference collection has been established at Yundum. The national CPS headquarters personnel have received training in training-the-trainer techniques and regularly conduct training courses for the field staff.

Gambia has agriculture quarantine laws which require updating to be effective. Inspections are being carried out at the port of Banjul and at the airport. In May 1984, K. Mahler, consultant to RFCP, visited Gambia to review their quarantine program and make recommendations. Implementation of his recommendations by the CPS should appreciably strengthen the present system with minimal additional financial requirement.

A comprehensive well-designed pesticide law has been developed and passed by the Parliament. The CPS headquarters staff is attempting to reduce or eliminate the use of long residual and highly toxic phosphate pesticide by not approving their importation. These efforts are hampered, however, because of relatively large stocks of long residual pesticides still on hand that can only be disposed of through their use, and the continued smuggling of pesticides from Senegal despite new legislation in that country.

Although CPS field personnel have received formal instruction in pesticide safety and use, observations indicated that the practices have been largely ignored at the field level. In one CPS field office, an open Dieldrin can was observed. CPS officials explained that it was an empty can now used to store oil for vehicles, but the office reeked with the smell of Dieldrin. The pesticide storage warehouse was poorly ventilated. Some drums were leaking and dust from broken bags had merely been swept into a pile in a corner of the warehouse. These observations indicate the need for additional training and closer supervision.

Field operations of the CPS are still directed primarily at chemical pest control despite assertions by the Director that CPS is emphasizing the IPM concepts. During interviews with farmers we were told that their pest problems were in large part taken care of merely by calling CPS, who would then come out and spray their crop free of charge. The farmers obviously liked this arrangement. In addition to handling localized and individual farmer pest problems, both CPS and extension working together control outbreak pests such as grasshoppers, army worms, stalk borers, birds, etc. Some efforts have been made by the CPS through RFCP to initiate field testing of IPM techniques as directed in RFCP Phase II, Project Work Plan. This includes the release in March 1984 of parasites to control cassava mealy bug. There has been lack of follow-up to assure establishment. Village level farmer training was begun in 1981 and has continued until now. The results of this effort are just beginning to be realized. No concerted effort by CPS has yet been made to quantify results. However, headway has been made in providing information to the farmer. Much of the information in these training programs is directed towards the implementation of IPM

upon availability of IPM packages. The village-level farmer training program represents a favorable step, reversing the trend toward complete reliance on chemical pesticides. Adapted methods of ULV application techniques are also taught.

As for training, all Gambia Crop Protection personnel have received at least the basics in survey and control techniques and pesticide safety and use. However, continual followup through refresher courses is needed with particular emphasis on pesticide safety.

The village-level training program in Gambia is a large step in the process of assuring that IPM findings reach down to and are acceptable at the farmer level. Gambia comes closest of all the countries studied to having developed the capability to effectively extend IPM to the farmer. (See Extension Analysis)

Mauritania

The RFCP Program in Mauritania was terminated in 1983 because of changes in AID agricultural program policy.

Only very limited information was available on which to make a judgment on the strength of the CPS and its ability to carry IPM to the farmer level. CPS appears to be principally a pesticide applicator service to the farmers on a crisis basis. A radio network is used to supply outbreak information to field bases for intervention. The CPS is also involved to some extent in extension of crop protection in cooperation with the separate extension service. No evidence was presented to indicate that either CPS or the extension service, separately or jointly, are technically or physically prepared to extend IPM to the farmer level. It was noted however, that some effort is being made in plant quarantine. While passing through Nouakchott it was observed that inspectors came on board the aircraft to supervise the removal of garbage. However, the significance of this action could not be determined without knowledge of the method of disposal.

It appears evident from discussions with the IPM personnel and the crop protection service director that a fairly good communication and working relationship has been established between the CPS and IPM programs. The CPS Director is responsible for both programs.

Obviously, some progress has been made. However, Mauritania still lacks necessary pesticide use controls, even though pesticide use is limited. Adequate pest surveys are a necessary step for the proper functioning of IPM.

Cape Verde

No base line could be established -- however, based on RFCP program accomplishments, including GTZ assistance, and present capabilities, it is probable that the base line would have to be considered low.

This small group of islands was not visited by the team. Information was obtained through interviews with CPS and IPM Cape Verde officials in Dakar, RFCP reports and IPM administrative evaluation.

The CPS permanent staff consists of 6 professionals (BS or above) and 5 technicians. A close working relationship appears to have been established between the CPS and IPM.

The country has been divided into action bases (one or more islands constitute an action base). The number of operating action bases could not be determined. During the rainy season organized surveys are conducted, principally for grasshoppers in maize and stink bugs on beans. During the dry season, surveys are conducted on irrigated crop pests and fruit pests. Some work has been done to establish economic thresholds. The threshold level established for grasshoppers, for instance, is 80 hoppers (nymphs) per meter², which is a high value by most standards. Isolated from the natural spread of many major crop pests Cape Verde has been fortunate. To maintain that status, a good plant quarantine structure is essential. According to Francisco Delgado, CPS, plant quarantine is strongly emphasized. There is evidence, however, that additional plant quarantine training is required. This was to have been the major component of RFCP Phase III for Cape Verde.

Although (apparently) no comprehensive pesticide regulations have been established, there is evidence of fairly strict control of importation and use. All pesticides are imported through the government and can only be sold to the farmer by CPS and on approval of IPM personnel. When new products are introduced, the government subsidizes the cost to the farmer for three years. Beginning with the fourth year, the farmer pays full cost. The use of low toxicity short-lived pesticides and biologicals are being emphasized. The use of these materials necessitates correct timing of application. Additional training is needed at CPS and farmer level as there is evidence of control failures which discourage farmer use and can result in demand for return to the long residual pesticides.

CPS conducts control operations on what are considered to be outbreak pests, principally grasshoppers and fruit flies (*Dacus* sp.) and occasionally even thrips. CPS attempts to minimize the

use of chemical pesticides except on grasshoppers. The use of Bacillus Thuringiensis (BT) and the virus elkar are receiving emphasis currently for biological control.

Development applications of crop protection in Cape Verde include:

1. Introduction and release of two Opius sp. for control of fruit flies. (There has been no followup to confirm establishment.)
2. Use of biologicals as replacements for chemical pesticides.
3. Substitutions of malathion and the synthetic pyrethroids for the more toxic and longer residual pesticides formerly used.

Training of the CPS personnel has included short courses in basic survey techniques and pesticide safety, and long-term training overseas.

The CPS agrees with the philosophy of IPM but, without training in IPM techniques and usable packages, it has little incentive to implement IPM at the field level.

Niger

The Niger sector of Annex A is the responsibility of Canada (CIDA) and the Republic of Germany (GTZ) working jointly. The GTZ emphasizes aspects of plant protection such as special equipment, techniques of application, timing of pesticide applications and pesticide selection for attainment of efficiency in use and efficacy, while minimizing the hazards of environmental contamination. CIDA is associated with the training and extension aspects. The ultimate objectives of the CIDA-GTZ-Niger project and the USAID-supported RFCP are compatible but there are dissimilarities in the basic approach. The evaluation system used to measure progress in the USAID-supported action to strengthen National Crop Protection Services is therefore not a suitable method of assessment for the Niger sector. Only a narrative statement of achievement, problem areas, and proposed future effort has been applied. Technically, CIDA has concentrated on entomology and the GTZ on plant pathology in Niger.

The Canadian involvement in Niger began in 1972. This was principally a construction effort in support of strengthening the newly formed Crop Protection Service. This included offices, warehouses and 8 border posts. In 1974, the project was extended

to include technical personnel and material support to build the CPS infrastructure and provide two entomologists and a technician to INRAN. Phase III, begun in 1976, was principally a continuation of the phase II infrastructure-building.

A new project is now under design. The design is expected to be completed by the end of January 1985. The first phase will be of a 5-year duration. It is principally a training effort to reach the farmer level. Training will also be provided for agricultural aviation pilots and mechanics. An aircraft hanger will be constructed.

CIDA will be working in three areas:

- 1) Extension in CPS,
- 2) training for mechanics of vehicles and small engines: and
- 3) stock control and warehouse management.

CIDA's activities are confined to the six southern departments of Niger. They will have two representatives in the field, each with a CPS agent counterpart who will have responsibility for all CPS activities in three departments.

The GTZ program is a two-pronged effort with emphasis placed on phytopathology research. Like the CIDA effort, the GTZ program has an ultimate goal of CPS development to enable extension of IPM concepts to the farmer. The program acknowledges the trend toward continued growth in pesticide use and is focusing its efforts on proper pesticide use. Training is provided in the techniques of proper calibration of equipment, the use of the efficacious yet environmentally compatible pesticides for the target pest. The most suitable application techniques, safety of application, mechanical upkeep of equipment and pesticide formulation, are all included.

GTZ apparently is also addressing the fact that pesticides are here to stay but their usage must be controlled. Their basic approach thus appears to be to train the CPS extension workers and the farmers in the most effective and efficient use of pesticides and to minimize their hazards to humans and the environment. Although this is not an approach fully compatible with IPM which emphasizes non-chemical approaches, it may be realistic considering the dependency on pesticides that has developed in many Sahelian nations over the past several years.

The Niger CPS is primarily a service group. Rather than being divided along traditional organizational lines, i.e. survey, control, plant quarantine, etc, it is divided along disciplinary lines, i.e. entomology, plant pathology, weed science. There is a CPS field officer in each of the 9

departments. Plans are for these to be increased to three in each department. There is a separate aerial unit with two aircraft. Four of the headquarters staff have received training in Canada at the technician level.

There is no pesticide law in Niger. The FAO model has been recommended by the CPS for enactment. All pesticides used in the country are imported. Most are purchased by farmers through the CPS (probably 90%) although many of the pesticides used in Niger are donated. Some of the cooperatives, such as the rice cooperative, import pesticides directly. The CPS will apply pesticides to a farmer's field at no cost, but the CPS is supposed to respond only when the farmer is financially or otherwise incapable of protecting himself. The most widely used pesticide is BHC.

The GTZ project director identified the development of a severe problem of pesticide resistance in some of the major crops. The problem has become so extensive that he has asked for intervention by his government.

The field personnel of CPS have responsibility for control, training, provision of technical advice to the farmer, equipment maintenance and management of stocks. It is through the CPS agent in the field that CIDA apparently plans to extend GTZ and IPM findings to the farmer. There has apparently been some lack of communication between CIDA, GTZ and the Director of Crop Protection. To correct this, a schedule of monthly meetings has been established to review work plans and measure progress in their implementation.

A major problem area in extension to the farmer level identified by CIDA is the limited allocation of fuel to CPS and extension personnel. The CIDA project does not provide for fuel purchase as this is a host country responsibility.

Both CIDA and GTZ were highly complementary of Peace Corps assistance with the project and working relationships established with German volunteers.

Burkina Faso

The crop protection specialist joined the evaluation team after the brief field visits in Burkina Faso; therefore, the information on crop protection Annex A efforts was obtained by other team members and the comparison factors being used in the rest of the RFCP and Annex A analysis were not applied. Annex A activities in Burkina Faso are being funded by CIDA.

In December 1985, CIDA will come to the end of a Phase II, 5.7 million Canadian dollar investment in Annex A in Burkina Faso. Approximately 200 tons of pesticide per year are also being provided, mainly carbamate. The Canadian support pays for the functioning of the CPS in Burkina. They see horticultural crops as those which are most economical to treat, as well as seeds.

Currently, CIDA is considering a phase III investment of \$20 million Canadian over five years primarily for training programs, both in-service and long-term. The contacts with RFCP and IPM are through regional meetings and informally in-country. There is no phyto-sanitary legislation in Burkina Faso but CIDA is beginning a small collaborative project to develop it. Contact with RFCP/IPM-funded dissemination activities through INSAH is very limited.

General Observations

The Crop Protection Services in the countries evaluated do not have the capability to effectively extend IPM to the farmer. The combined use of CPS and the extension services will be required. Except for The Gambia, which may soon change, the CPS lack necessary field staff to carry out IPM extension. Project design seriously underestimated the numbers of agents or kind of institutional support which would be required to effectively extend IPM techniques. Current extension services will need training to perform these functions. (See Section IV.C., Institutional Analysis and Extension System Description)

The expanding use of pesticides and the often available pesticide application on request and at no cost to the farmer discourages the institution of the IPM concept. The farmers have become used to seeing the pest die. The IPM approach generally does not provide this dramatic action. Also, the farmer is unwilling to expend extra effort or financing to actions that do not always provide dramatic visual proof of effectiveness, especially when he can get pesticide applications free or at nominal cost. He is not interested in the long term implications of excessive pesticide use. He is worried only about having food for tomorrow or, at most, the next cropping season. Without drastic action to reverse the pesticide use trend, IPM is at a great disadvantage. (See Section IV.B., Economic Considerations)

The support by RFCP, particularly in Cape Verde, could result, at program phase out, in an inability of the nation to adequately support the institution established. USAIDs must then determine whether to continue to underwrite or lose their investment, particularly in the training field.

There needs to be follow-through on some of the actions taken under RFCP, particularly those in non-Sahel nations. A case in point is the release of parasites and predators of Cassava mealy bug and Green spider mites, the release of Opius-sp to control Dacus frontalis, fruit flies in Cape Verde, nosema trials against grasshoppers in Senegal, entomox virus on Amsacta maloneyi and neem extracts for leaf miners in vegetables and Lepidoptera on millet. All of these have potential value for incorporation into an IPM package. Initial studies have been undertaken but there has been little or no follow-up to assess results or potential value.

Pesticidal applications as a part of IPM, have received little or no attention. Yet, in most of the effective IPM programs, the use of pesticides is an integral part. Use of pesticides is well established in the Sahel and will continue. IPM should recognize this and determine the most efficient, environmentally compatible pesticide for use against a particular pest or pest complex in the principal Sahelian food crops. IPM packages when applicable should include the most efficient pesticide, its proper timing and method of application. The goal of the project is to increase food production through crop loss reduction. Pesticide use cannot be ignored in the search for methods to attain that goal. Annex A has done some work along this line particularly under CIDA and GTZ. Other institutes such as IITA and ICRISAT include pesticide use in their research package. Properly used, pesticides are but another tool in the basket of possible control techniques, a practice that the IPM project has tended to ignore.

RFCP can certainly not be blamed for all the faults of the joint projects. Some aspects of the RFCP have been accomplished (facility construction, equipping national CPS and training). In other aspects it has failed, but so has IPM. Much can still be salvaged however, and objectives accomplished, through IPM project redirection to take full advantage of the gains that have been made by both projects and the knowledge imparted from the mistakes of the past.

In summary, it can be said that:

1. In cases where CPS are staffed and working in confined areas (Mali, Gambia) improvement in crop protection from pests can be seen.
2. Subsidization of CPS by RFCP has led to serious recurrent cost issues which should be avoided in IPM as much as possible.

3. The DTC is a resource whose trainers could be used regionally in IPM for in-service extension training in IPM-related techniques and to train in-country personnel.
4. CPS alone cannot extend IPM broadly enough to deliver to the farmers and must rely on other extension services.
5. Most countries had little or no plant protection capability prior to RFCP and other donor Annex A funding.
6. Current pesticide policies in all countries, even those with legislation (Gambia and Senegal), will make economic support for crop protection and IPM adoption problematic.

D. INSAH

In addition to country components, RFCP II funded an information dissemination component Annex G, through the Institut du Sahel's Department of Communications, to produce a newsletter on crop protection, technical information bulletins and some radio programs. During 1984, funding for these activities was picked up by IPM to ensure continuity given the phase down of RFCP II activities.

Evaluation of outputs to date shows that under the leadership of a professional communicator, an assistant and several translators, secretaries, and mimeographers, some appreciable outputs are already in evidence:

"CILSS-P.V.-Info" - a bi-monthly newsletter, mimeographed, in English and French, reports on crop protection and IPM activities on a country-by-country basis. News contributions can be increased by the designation of a correspondent in each country. Present distribution is 500 copies per issue.

Radio programs are recorded on tape for those radio stations in each country who agree to use them. Topics concern seasonal agricultural practices, are prepared in at least two languages, and are accompanied by a typewritten script to facilitate translation into other local languages.

Recently begun was a digest of research papers produced in Sahelian countries or of particular interest to this region "Liaison Sahel". INSAH maintains a repository for these publications and can make copies available upon request. This publication will be produced bimonthly and distributed to all IPM research units, libraries, other agricultural research organisms in the region, and agricultural education institutes.

The INSAH Communications Department also reproduces and distributes in quantity its own publications on topics of general interest, as well as texts prepared by other activities in the IPM Project. Expansion in this direction is limited by the number of translators in the Department and the editorial assistance available. The Communications Department is physically located in the Training Section of INSAH. It is in the process of arranging for active correspondents in each of the IPM countries to serve as contacts and news sources.

The INSAH Communication Department has made a good start toward knitting together the many elements of IPM personnel. The publicity given to scientific publications by some researchers should inspire others to also publish. The CILSS-P.V.-INFO was seen in every country which the evaluators visited. The Communications Department, wedded to a regional training, planning and implementation service, holds promise of becoming a viable and permanent center for networking regional activities in the future.

Its current needs include the availability of a technical review committee from within the IPM research group to evaluate submissions to "PV-Info" and technical bulletins for scientific accuracy and usefulness. This assistance could be provided by the Malian IPM Country Task Force as all three members are scientists.

INSAH will need to make decisions with the IPM Regional Task Force and country components as to the target audiences and best selection methods for the technical bulletins. At present, little coordination exists with Annex A components in non-USAID funded countries (Burkina Faso and Niger) on technical bulletins. Distribution standards and target groups will need to be set so that regional distribution can best meet both research and extension needs in the future.

A strong argument can be found for continuing support to INSAH for Annex G, activities:

It has performed well with small amounts of funds to disseminate RFCP and IPM information.

As in-country research programs yield results, a regional gathering and distribution point can provide a "critical mass" of results (e.g. on a target crop) which can be disseminated to all member countries and encourage further work and individual exchange between researchers.

The INSAH emphasis on publication can provide incentives for earlier publication of results than might otherwise occur in only international research and agricultural journals.

INSAH can serve as a focal point beyond IPM project life to which Sahelian scientists can turn to document their results, store them for future use, and keep African control of the distribution of information necessary for effective crop protection practice and research.

E. Analysis of Project Design and Management

Each of the participating countries has a project agreement with the local USAID mission which outlines the specific inputs of both parties. It is the only document that mentions input and output figures. The Project Paper is very vague on the specifics of technical assistance person-years, specific commodities, construction, and training person-years. The logframe simply refers in the indicator column, to the project agreements and annual work plans to determine if goals, purpose, outputs and inputs are met.

The project provides a regional project manager (RPM) as the primary source of technical assistance through a PASA with USDA/OICD/APHIS. The PASA also provides short-term consultancies as required.

The participating missions were to have country project officers to work with the national plant protection service. These positions have not always been filled by qualified technical personnel. In fact, for long periods of time, the positions were vacant. When they were filled, it was often by a present or ex-Peace Corps Volunteer. The volunteers did a creditable job given their limited education and experience but often someone with more experience and education was required. The USAID gave the project minimum attention as it was a regional project managed from somewhere else. Generally, the missions assigned oversight responsibility for the project to an agricultural project manager who was already overworked with management of bilateral agricultural projects.

In addition to institutional development of the national plant protection services, a primary purpose was to extend integrated pest management methods developed under the Integrated Pest Management project (IPM). As the IPM project was delayed for several years and started after the RFCP project, it was a serious error in design to think that IPM techniques, which require years to develop, would be available in a timely manner for RFCP to extend.

Due to the lack of IPM methods, the CPS have turned to the only other method known, --use of pesticides. Although the RFCP project did provide training in pesticide use and did purchase protective equipment and clothing, the countries are still

overusing and misusing pesticides and are using some pesticides with a long residual effect on the environment.

As long as the participating countries continue to receive pesticides from donor nations at low cost and, in turn, provide pesticides free or at a subsidized rate to the farmers, and as long as IPM methods are not available, the farmers will continue to over-use pesticides (See Section IIB., above).

USAID has provided assistance to the CPS for over eight years. The infrastructure is in place and personnel trained. It is an appropriate time to end support to the CPS and place continued support in IPM to develop alternatives to use of pesticide as well as research into appropriate methods for application of pesticide when necessary.

Some activities of the RFCP project should be considered for continued funding under the IPM project as they directly relate to the goals of that project. These activities are:

1. Support for IPM-participating countries to utilize the Dakar Training Center (DTC) or for the staff to travel to third countries for training related to integrated pest management.
2. Publication of materials related to IPM through INSAH.
3. Sponsoring seminars and conferences on IPM which would involve all regional crop protection services and donors assisting them.
4. Short-term consultancies in crop loss assessment and economic threshold determination
5. Support for policy issues and policy formulation related to pesticide safety and subsidies both regionally and in national agricultural programs.

These activities would be managed at the country level by the IPM liaison officers and at the regional level by the staff of the institution involved, e.g. CILSS, INSAH or AGHRYMET.

Any remaining funds in RFCP should be shifted into the IPM project to support the above activities.

A procedural problem that was identified during the evaluation was that the funds expended in Mali for INSAH to carry out the documentation and information dissemination activity (Annex G) and for training and commodities for the Mali crop protection service were spent without a project agreement either

with the government of Mali, INSAH or CILSS. They were authorized by PIO T's, P's, and C's.

A management problem identified in Senegal is that the IPM liaison officer is also the project assistant for RFCP. Although competent in general management and logistics, he is not qualified technically to carry on after the regional project manager, provided by USDA, departs at the end of February. Consideration should be given to replacing the IPM liaison position in that country unless the mission is prepared to provide appropriate technical backup.

The RFCP II project is implemented through a Participating Agency Services Agreement (PASA) with the U.S. Department of Agriculture. The units involved are the Office of International Cooperation and Development (OICD) and the Animal Plant Health and Inspection Service (APHIS).

The project is managed by the USDA regional project manager (RPM) assigned to Dakar, Senegal. The USAID mission in Senegal has a PSC administrative assistant to assist the RPM in supporting activities in Senegal and Cape Verde. The Gambia has a PSC employee who monitors RFCP II activities as well as IPM.

Project agreements have been signed with Senegal, the Gambia and Cape Verde for the projects. The funds allocated to Mali have been obligated incorrectly by PIO/T's to support some training and commodities for the Mali crop protection service and the information and dissemination activities of INSAH through the Annex G program. The Mali mission provides management support and monitoring to RFCP II through a foreign service national (FSN) project manager.

The primary backstop for this project in AID/W is provided by a direct-hire project officer in AFR/PD/SWAP. The project committee consists of the members of the Integrated Pest Management Task Force.

F. Conclusions - RFCP

By the end-of-project on February 28, 1985, crop protection services have been strengthened, commodities have been procured, many people have been trained and have returned to work for the crop protection services, and most of the host country positions are covered in the national budget (except Cape Verde).

The obvious failure which has led to an unanticipated negative effect is that the project relied on the IPM project to

research and develop technical packages in IPM methods that would then be extended by the crop protection services established and/or strengthened through RFCP I and II. To date, not one package has been developed by the IPM project. It was unrealistic to expect that a system of research, data collection, analysis and testing could be put in place and have sufficient experience and replications to develop such a package in the IPM project in time for implementation by the RFCP II project.

At present, pesticides are either given by donors or sold at low prices which enables the governments to provide them free of charge or at nominal rates to growers. Pesticides that have long-term residual effects on the environment are being used in inappropriate amounts and sometimes at the wrong point in the pest life cycle when it has no effect, or affects the wrong insects.

Until the host countries recognize the problems, pass appropriate legislation, provide proper controls, reduce or eliminate the subsidies on pesticides (which distort the economic thresholds for utilization of IPM methods), and have extendable IPM technical packages available, AID should not provide additional support to the crop protection services per se. Future AID assistance, on a bilateral basis, should be directed toward correcting these fundamental problems in each country.

However, the roles played by the RFCP in supporting the training activities of the Dakar Training Center staff, and the INSAH Communications Department merit continuation on a regional basis.

G. Lessons Learned

Analysis of the RFCP II project has yielded some lessons learned for future AID efforts.

Some major findings are:

1. RFCP depended on another project (IPM) to produce the technology it needed to transfer but did not include its availability as an assumption in the project design logical framework.
2. The Logical Framework itself is poorly developed, does not stand alone, lacks quantifiable measures for output and purpose levels and has no input level assumptions.
3. The evaluation plan did not include quantifiable targets. The project may have exceeded its training and infrastructure targets, but there is no means to verify this without evaluation indicators.
4. Inputs and outputs were to be developed annually through work plans and project agreement amendments. They were done piecemeal and not in relation to the project as a whole nor in conjunction with the IPM project.

5. When it became apparent that IPM techniques were not forthcoming from the IPM, project the RFCP project attempted to include demonstrations, crop loss assessments and economic threshold analysis without proper support to carry it out or means to use results.
6. Due to subsidy by governments on pesticides the incentive for the Crop Protection Service and the farmer to develop and use IPM non-chemical methods is eliminated. This was not an assumption in the Logframe.
7. The training center was not given sufficient resources to become a regional training center and staffing gaps seriously hampered it.
8. The recurrent cost question at the end of project was not sufficiently addressed. When the project ends there will be many well trained staff in place without the means to function at current levels.
9. The funds provided to INSAH was useful to a point but not sufficient to give INSAH the capability to analyze the results and disseminate them to the countries for extension to the farmer.
10. The project did not accept the reality that pesticides would be initially emphasized, as in the U.S., and that as a result it should work toward use of low residual pesticides, proper use and storage of pesticides and proper timing and application of pesticides.
11. The PASA arrangement led to unclear role definitions on the part of AID and USDA and problems in implementation and field responsibility.

H. Recommendations

1. End the RFCP project as planned February 28, 1985.
2. Those RFCP activities at the Dakar Training Center needed to fulfill training requirements of IPM should be absorbed by IPM, if possible.
3. INSAH activities supported by RFCP should be transferred to IPM and be monitored by the IPM Liaison Officer in Mali. Continued AID financial support is recommended.
4. Field activities of RFCP be included in portfolio of individual USAID missions for continuance on a bilateral basis as missions determine feasible.
5. Pesticide use policies and subsidization policies should be examined in the context of each USAID mission agricultural portfolio to identify leverage points for policy dialogue with the host governments.
6. Extension of crop protection methods in services other than the CPS should be identified and encouraged through existing and new agricultural and education projects funded by USAID.

I. Response to Audit Report Findings

In the course of evaluating the IPM and RFCP projects, the team gathered information to respond to the findings of the RIG/Dakar report on the RFCP project issued August 20, 1984. While the review of both projects in the current evaluation concurs with the audit findings on the lack of technical packages to apply to farmers' fields, it is not certain that the lack of packages means that no significant institution - building is going on in both research and training which can lead to contributions to crop loss reduction in the future and to decreased pesticide use.

Alternative technologies alone are insufficient to augment crop production without policy support, institutional capability and significant economic incentives. Success for crop protection improvement is linked to its applicability in agricultural research and its relevance to existing and improved farming practices. Crop protection services alone are insufficient to extend IPM. They are an important source of pesticide safety training and information and need to be directly involved in economic threshold research to promote more judicious use of pesticides and avoid their use in situations where there will be no benefit to farmers. The value of IPM is in an integrated farming systems approach to crop loss assessment and crop protection improvement.

The technical analysis of the RFCP program included in the Audit Report is considered accurate. Exception is taken to the auditors conclusion (p. 13) that the organization of the NPPS (National Plant Protection Services) in the participating countries has basically been accomplished. The training included in the project work plans has largely been accomplished and the quality of training, particularly that provided at U.S. universities and the Dakar Training Center (DTC) has been good as far as can be determined subjectively. The DTC training has addressed some aspects of IPM and the various components of a strong plant protection service including survey and detection, plant quarantine, control, pesticide safety and use. Some additional, more specific training is required in plant quarantine, particularly in those nations with active plant quarantine activities in progress. Training has been concentrated on the Crop Protection Service using, to a large extent, the train-the-trainer concept. However, since much of the effort to impart IPM concepts to the farmer level must come through the various extension services rather than CPS, the extension services must be more actively brought into the Crop Protection Training effort. This then needs to be carried to the farmer level in a form similar to the village level training program in Gambia. A similar approach is being implemented by

Canada (CIDA) for Niger. The assumption that CPS alone is responsible for IPM extension as implied in the audit report has not been supported by the evaluation findings. All extension services need to be involved in research, field trials and extension of IPM and other crop protection methods.

Due to the acute shortage of qualified personnel in the Sahel nations, returning university graduates are placed in positions in the Crop Protection Service that require managerial and supervisory knowledge as well as technical knowledge. Most have not been trained in these additional skills. This was acknowledged in the proposed Phase III RFCP and needs followup if crop protection is to be effective.

Many of the basics in the infrastructure of the Crop Protection Services are missing. The CPS organizations have generally developed in a vertical mode with pest control by pesticides their only or their principal function. A strong CPS tends to grow in a horizontal mode with equal emphasis on survey and detection, plant quarantine, control (chemical, biological, cultural, and their combinations).

Within the phase II portion of the project, RFCP was to conduct certain tests to support the IPM effort on a national or localized problem basis. Unfortunately, the RFCP staff were ill prepared technically to conduct these tests which were more of an applied research nature than demonstration. Test designs were faulty except where outside consultants were brought in to assist, and personnel shortages prevented adequate followup.

Although it has failed to meet its Phase II Logframe goal of reducing food crop annual losses in an amount equal to or greater in value than its annual project costs*, it is doubtful that extending the project life on a regional basis would prove to be of value. IPM still has a long way to go before sufficient research results are available on which to develop a package for presentation to accomplished by IPM researchers working through a redirected project based on a farming systems approach. Continued institution building to develop crop protection service infrastructure in a horizontal mode can best be accomplished on a bilateral basis. Continued training needs can partially be handled on a regional, but principally bilateral, basis. The DTC can easily handle the local needs of Senegal on a bilateral basis. Training needs common throughout the region, i.e., plant quarantine training, could be supported regionally on an as needed basis with payment made by individual projects to assist in underwriting of the DTC cost of operations.

* Subjective estimate based on observations and production data, since no reliable crop loss assessment is yet available from IPM.

The RFCP design was faulty in that it was based on compatibility and comparable progress with IPM. It failed to take into account the often long-term needs of research in order to produce transferrable results. It also failed to provide for quantifiable results. This can partially be attributed to the lack of crop loss assessment data anticipated from IPM. However, even in its training effort this important aspect has failed to be taken into account. The numbers trained reflect the logframe goals but how well the persons trained utilized their training has not been targeted.

The spiral of pesticide use practices in the Sahel with little or no concern for human and environmental values must be broken if IPM is ever to become a reality. Pest control with chemicals is dramatic. The effects of cultural and biological controls, varietal resistance, etc. is much less evident. Thus, full commitment on the part of the host governments as well as donor nations is essential for the implementation of IPM. This commitment is not very evident at this time.

The support by RFCP in some nations could result at program phase out in an inability of the nation to adequately support the institution established through USAID support.

The project has shown significant improvement during the last year of operation. The training provided is beginning to pay off in terms of quality and quantity of output by CPS, an increased awareness of potential pesticide problems and a need to reverse the present trend. A young enthusiastic core group of professionals now exists in most of the countries surveyed. This plus the greatly improved management in the project from the U.S. side has maximized future benefits as new, more imaginative thinking begins to shape the CPS organizational structure.

In responding specifically to audit recommendations, the evaluation team has prepared the following responses:

Recommendation No. 1:

"Bureau for Africa, SWA in the evaluation of RFCP and IPM projects, determine how AID can deal with the following constraints to IPM development:

- participating countries' and farmers' favorable attitudes toward and dependency upon pesticides, and
- participating countries' pesticide subsidization policies"

As discussed in detail in Section IIb. above, pesticide use in-country and by farmers has been evaluated to determine its

likely impact on IPM and crop protection in general. The economic analysis in section IV.B addressed the economic and policy implications of current pesticide use in the Sahel. As might be expected, the evaluation found the pesticide policy issue to be one of a few key determining factors which influence crop protection efforts in the region.

Recommendation No. 2:

"Bureau for Africa, SWA evaluate the technical assistance needs of each participating country in the RFCP project in developing their (a) training programs and training curriculums, (b) crop protection extension programs, (c) follow-up systems on training and extension, (d) management systems and procedures, and (e) technical capabilities such as crop loss assessments, economic threshold analyses, pest surveys and demonstration programs."

The topics identified above were examined in both the RFCP and IPM evaluation in this report and the findings should answer most of the concerns. A detailed analysis of training programs and curriculum was not possible within the scope of the double evaluation and with the mix of expertise and assignments on the eight person team.

Recommendation No. 3:

"Bureau for Africa, SWA evaluate the need to (a) fill the vacant regional training officer and country project officer positions, and (b) develop procedures to fill vacant positions in a timely manner."

As the evaluation has found that the present PACD of February 28, 1985 should be maintained, the issue of unfilled project positions becomes moot.

Recommendation No. 4:

"USAID/Senegal (a) develop a system so that management information flows between the RFCP regional office, country project officers, NPPS', and USAID; (b) specify the items that should be reported on in the management information system; and (c) establish measurable goals and periodic benchmarks against which management can assess project progress."

The evaluation concurs with USAID/Senegal's preference to handle this themselves. However, for reasons stated in the response to Recommendation No. 3, the issue is no longer pertinent. It should be noted that it is unlikely that an MIS alone could solve the serious design problems under which RFCP

was forced to operate. The issue of roles and responsibilities within project management which were only resolved in the last year of project operation greatly affected project performance during LOP and it is doubtful that an MIS alone could solve these. An MIS is a tool, not a solution to administrative problem areas.

RFCP
625-0928
Evaluation Log Frame

Purpose	Measures	Assumptions
<p>1. To encourage and facilitate the extension of IPM concepts and techniques to food crop farmers by:</p>	<p>New IPM techniques have not been developed nor have traditional methods been adequately tested for adaptation in each country.</p>	<p>That personnel will be assigned to NPP services, and available for academic and practical training. That extension, agriculture service, farm unit and other personnel will be available for training, sufficient in numbers and adequate in qualification</p>
<p>a) Strengthening the organization, training and equipping of the National Plant Protection Service in each of the participating countries.</p>	<p>None of the extension services were determined by the evaluation team to be adequately prepared for extension of IPM techniques if they were available.</p>	<p>That personnel receiving training will be available to conduct method demonstration exercises and outreach activities to farmers.</p>
<p>b) Developing and strengthening a system for extension to farmers of IPM concepts and techniques using train-and demonstration.</p>	<p>None of the extension services were determined by the evaluation team to be adequately prepared for extension of IPM techniques if they were available.</p>	<p>That farmers accept suggested protection measures.</p>
<p>c) Utilization of national agric. extension cadre and agric. training facilities as elements in the above system including training of those cadres in IPM concepts and techniques and incorporating such training in institutional curriculums.</p>	<p>None of the extension services were determined by the evaluation team to be adequately prepared for extension of IPM techniques if they were available.</p>	<p>That conditions in subsistence farming areas are sufficiently stable or permit unrestricted extension activities.</p>
<p>2. To strengthen the capacity of the NPP services to anticipate pest infestations, re-surgences, and other pests crisis through surveillance and applied technology capability.</p>	<p>A pest surveillance system has been partially put in place in the participating countries. Through the IPM project 3 observation posts have been built in Mauritania and 11 in Mali. 5 will be built in the Gambia and 4 in Senegal.</p>	

RFCP (625-0928)
 Evaluation Log Frame
 (continued)

Purpose	Assumptions	
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.	The crop protection services were primarily geared to intervening against pests by use of pesticides and not IPM techniques.	
<u>Outputs</u>	<u>Long-Term</u>	
1. Improved structure and admin. capacity: A well organized and staffed NPP service is functioning in each participating country.	<u>Training completed or which will be completed by PACB:</u> 78.5 person years 20.0 participants	That project inputs are appropriate and sufficient to achieve desired outputs.
2. Improved Technical Expertise The NPP service has received training in 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.	<u>Short-Term</u> 8.9 person years 161.0 participants <u>Training provided by the Dakar Training Center:</u> 5.25 person years 772 participants	That project inputs are timed according to priority needs and delivered or planned.
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.	<u>Other Outputs</u>	No mention was made of the assumption that IPM techniques would be made available in a timely manner by the IPM project for extension by the crop protection services.
	5 publications 12 fact sheets on pests 1 calendar	

RFCP (625-0928)
Evaluation Log Frame
(continued)

Purpose	Assumptions
Subsistence and other food crop farmers have been given demonstration and training in IPM concepts and techniques.	
4. National plant protection service ways and means to measure changed practices and physical results.	
<u>Inputs</u>	
Budget breakdown Technical assistance: commodities: construction: training:	No assumptions were included regarding the inputs:

III. INTEGRATED PEST MANAGEMENT

A. Background

The Integrated Pest Management project (IPM) was authorized in 1978 to:

- o help establish and strengthen Sahelian institutional capacity to carry out IPM research;
- o produce research on high priority pests in a form suitable for extension to small food producers in Sahelian countries.

The project supports long-term technical assistance in each participating country (Senegal, Mauritania, Cape Verde, The Gambia, Mali, Burkina Faso, Niger and, more recently, Chad); a regional project directorate located at the CILSS in Ouagadougou; long and short-term training for Sahelian researchers; construction and commodity procurement needed to build national IPM research infrastructure; and expenses associated with regional seminars, technical working groups and research publications. In the last year, IPM has supported Annex G at the Institut du Sahel (INSAH) formerly funded under RFCP.

Since its authorization, IPM has experienced a range of implementation delays beginning with a start-up delay as AID negotiated operational issues with FAO, the technical implementing agent, and CILSS, the executing agency. Once implementation began, an evaluation in 1981-82 drew attention to serious management and administrative problems which necessitated a re-design and PP amendment. These were completed in 1983.

It is important to note that while authorization was in 1978, technical assistance for the most part was not in place until early 1983 and operational problems persisted through mid-1983. The evaluation team therefore took note of these delay problems and focused its technical assessments from the points at which actual assistance and training began. As in the RFCP analysis, the focus of this mid-term evaluation is on what kind of research and utilization programs are in place, how they might compare to what a good IPM program should be doing, whether regional and national needs are being met by the program and the likelihood of both results and sustained capability. The IPM entomologist, phytopathologist, weed scientist and extension specialist focused a large part of the field data gathering and analysis on determining the state of IPM in each country and in the region as a whole. Contextual considerations discussed in Section IV deal with economic, institutional and extension system analysis which help situate IPM performance and strategy within the policy and operational environments in which the project must function.

The project (Phase I) is planned to end in September 1986 with an extension of PACD for training of long term participants planned until September 1987.

B. Technical Analyses by Country and for the Region

The technical analysis of IPM carried out by the IPM specialist, entomologist, phytopathologist, and weed scientist, with assistance from the extension specialist, examined the IPM components in Burkina Faso, Mali, Senegal, The Gambia and Niger. Information on Cape Verde and Mauritania was obtained from project representatives who travelled to Dakar to meet the team. Information on Chad was obtained from a Chadian representative at the IPM Conference in Niamey. Key factors examined by the team included quality of research topics and methodology, assessment of support infrastructure in place, appropriateness of training and persons trained, and likelihood of technical packages being produced which can be used by farmers at the end of the project in 1986.

The discussion is presented by country and some regional characteristics are described in conclusion.

Burkina-Faso

Based on 1983 research report, technical research in entomology followed the program of research as outlined in the report of the work groups on the priority pests outlined in the PP amendment. Raghuva albipunctella on millet and Contarinia Sorghicola as a pest of sorghum were studied using the standardized regional methodologies. The studies were conducted in different ecological zones to make comparisons in regions with differing rainfall. Objectives of the research were to better understand the population dynamics of the pests as well as beneficial species and to estimate crop losses attributable to the two pest species. Sampling methodologies for sorghum midge (c. sorghicola) are being investigated as a part of the program.

Research is conducted at Kamboinse Agriculture Research Station and at Farakoba and Saria Stations. Entomologists for the latter two stations are in training.

The FAO entomologist conducting research at the Kamboinse Station is working on basic biology of sorghum midge in relation to population dynamics as well as sampling methodologies. In addition, she is working on beneficial species as they relate to biological control.

Planned research in 1984-85 will include aphids as pests of sorghum and an associated program conducted by IRAT on the

rice-midge. Some work on virus transmission problems was conducted with the plant pathologist before that person left the station. Little or no collaboration is going on with the entomologist working for ICRISAT nor with the SAFGRAD program. There is no significant crop loss assessment nor on-farm trials program and the program could benefit from short-term technical assistance. The national counterpart is in training at this time.

The observation post observed was operational and gathering data. Research stations are constructed or under construction as originally planned. Library facilities are inadequate for Kamboinse IPM station. The FAO technician is attempting to develop a working entomological reference collection. Laboratories are adequate for work underway.

The IRAT phytopathologist at Farakoba identified rice varieties resistant to pyriculariosis and has started work on the epidemiology of the disease. A survey was made of sorghum and millet diseases. Leakspots and covered smut were the most important diseases on sorghum, and anthracnose was severe in a few locations. In millet, mildew and smut were the major diseases. The FAO virologist made a good survey of virus diseases and found maize streak to be a serious threat to maize production. Viruses in cowpeas may cause 45% loss in infected plants but it is not known how prevalent these virus problems are in sorghum, millet, groundnuts. Studies on millet mildew and sorghum smuts were not completed, but the planned work on rice diseases was very well done. It appears that three of the four priority disease problems, pyriculariosis in rice, smut in sorghum and mildew in millet, are major problems in this country. The fourth, bacterial blight of rice, has not developed to any great extent and has been largely ignored.

One person is now in France working toward a Master of Science degree and will return in 1987. Another phytopathologist is needed to be trained to the doctoral level.

The laboratory at Kamboinse needs to be equipped for plant disease research.

The FAO virologist left in Sept. 1984 and there is no FAO phytopathologist at present. An advisor is needed especially for sorghum and millet diseases.

It will be many years before a self-sustaining IPM research capacity and a CPS to support it will be developed. There has been no progress on crop loss assessment. The research on pyriculariosis on rice should provide information to advise farmers on which varieties to plant and when to spray to minimize losses. Work is needed on sorghum and millet diseases.

Assuming the GOBF will continue to support the programs, the return of trainees should increase capabilities to sustain efforts, if adequate TA is available. Library reference materials are needed as well.

Not enough science, other than stereotype biological studies fashioned on European methods, is being undertaken. Scientists are not doing field work and FAO TA does not appear to be doing significant IPM field research in phytopathology. Trained nationals should be encouraged to take to the field. Project directors should request more technical assistance. It appears that no packaged IPM strategies will be forthcoming within the next 2 years for plant diseases.

Weed research is based at Kamboinse Agriculture Research Station. O. Ouedraogo is the IPM Weed Scientist but other weed research is linked to ICRISAT and SAFGRAD programs. Observations are carried out at one site in each of the current 11 ORDs.

A Striga survey was carried out according to the CILSS/IPM survey protocol in 1983 and 1984. The results indicate that S. hermonthica occurs in all 11 ORDs as a parasite of cereals, with up to 100% infestation of sorghum and millet plants. S. gesneriodes was noted from three ORDs as a parasite of cereals but this is erroneous: this species parasitizes cowpea and some other plants, but not sorghum or millet. There are considerable variations in Striga density but the overall survey indicates that this weed is a priority pest in Burkina Faso and confirms the need for research to control it.

The regionally co-ordinated trials to evaluate three Striga-resistant varieties released by ICRISAT was commenced by IPM staff in 1984 following the agreed protocol. In addition to IPM activities, ICRISAT and SAFGRAD have selection and breeding programs for producing Striga-resistant varieties of millet, sorghum and cowpea.

ICRISAT has made some progress in producing Striga-resistant red sorghums but more work is needed to find good white varieties which are generally more acceptable to consumers. SAFGRAD is making some progress in identifying cowpea varieties resistant to Striga.

No further assistance is required in the Sahel region on the preliminary identification of weed resistant varieties but there is a global need to assist breeders by identifying the mechanisms of resistance. Evaluation of resistant-cultivars in field trials would benefit from more intensive research relevant to the various covering systems and agronomic practices in the Sahel.

Packages of Striga-resistant varieties are being produced by ICRISAT for the IPM program and for pre-extension trials being carried out by SAFGRAD. A general weed survey was done in 1983 but it was done in 1984 using the CILSS/IPM protocol. No results are available but it should be a useful guide to the importance of weeds in the country. No work was identified as being done by the IPM team in crop loss assessment but an ICRISAT trial revealed that sorghum grain yields were reduced by 14% where the Striga density was 0.74 plants/m² (densities of 0.1 to 33.4 plants/m² were found in the IPM survey of Burkina Faso). This single trial quantifies the possible crop loss due to Striga but it is common knowledge that 100% crop loss is possible in severely infested areas.

ICRISAT has conducted agronomic management trials on controlling Striga using, for example, varieties, spacing, fertilizers, herbicides, ethylene, etc. Some of the results, especially with fertilizer, are very encouraging but the program needs a high level agronomic input, preferably from a Striga expert, to continue. This is unlikely to be provided by ICRISAT so it should be provided by another organization.

The most serious and alarming omission is the total lack of research on weeds other than Striga. Advice should be obtained from one of the regional FAO weed experts or from another consultant on the most appropriate program for the country.

Weed science is poorly covered in the course provided at the Faculty of Agriculture, University of Ouagadougou. This could be supplemented by introducing guest seminars by visiting weed scientists through short-term consultancies. One local weed scientist commenced a three-year degree course in weed science at Nancy, France. He will return in 1986 and he should be able to form the nucleus of weed research, advice and training in the country. A qualified weed scientist should be able to fit into the existing agricultural research structure. At present, there are no weed laboratories but one is planned at Saria Agriculture Research Station.

ICRISAT has a small herbarium at Kamboise but the best source of advice on identification is at IRBET (Institut de Recherches en Biologie et Ecologie Tropicale) which has a plant collection from Burkina Faso. IRBET herbarium has a limited number of reference books and floras and therefore needs more literature to improve its plant identification service.

There is no technical assistance to the IPM Project for weed control in Burkina Faso apart from collaboration provided by ICRISAT and SAFGRAD staff. An FAO Striga expert, Mr. C. Parker, visited Kamboinse in October 1984 to report on his recent 3-week visit to Mali and to hold a seminar with the staff. His report contains proposals which are relevant to the future of Striga research in the region.

The absence of technical assistance in weed control is seriously reducing the capability of Burkina Faso to overcome or alleviate one of its most important causes of crop loss. It is hoped that the two regional IPM/FAO weed scientists based elsewhere will carry out research and produce recommendations which are relevant to the country. The potential for weed research is good, especially when support and co-operation is obtained from ICRISAT and SAFGRAD.

Mali

Based on a visit to the Sotuba Research Station, observations of the program conducted with CPS-Mali (Sorghum) and similar programs run out of Sotuba on millet in the Haute Vallee, it appeared that the Mali component of the regional IPM project in entomology was involved with studies at this laboratory and the field level. In addition, the researchers at Sotuba are engaged in basic biology studies involving the priority pests as delineated in the project paper amendment.

The population dynamics of blister beetles are under study in the laboratory as well as at field trials. Conversation with farmers indicate that blister beetle is a serious problem. Annual reports of project(s) will support the observation. In addition, studies are being conducted on a truly regional pest (Pomomena).

Research on resistant varieties and Raghuva have been suspended because this species is not yet considered a serious pest. Farmer interviews indicated a variety of problems but blister beetle was commonly mentioned as a pest species and therefore warrants additional research. Contarinia is not recognized by farmers interviewed as a problem but has been judged, based on limited research, as a serious pest.

With exception of limited field studies, which were not well designed on farmers fields, the research orientation is directed toward basic biological investigations.

Research conducted by Sotuba Station is under direction of Y.O. Doumbia (entomologist), National Director, with M.S. Bonzi (entomologist) as FAO counterpart.

The FAO/IPM entomologist seemed to be well trained but may have limited experience in experimental design. His counterpart, the National Director, appears to have the required training and experience.

CPS has demonstrations on plots of sorghum in the Haute Vallee which are the same as farmer trials conducted by IPM on millet. Also, IPM monitors the CPS sorghum demonstrations as they do the millet plots. Both are involved with data acquisition at observation posts.

Team field observations indicated that on millet, stem borers are apparently a problem according to farmers interviewed. Striga was also a major problem.

There is a lack of cooperation with CPS in conducting more on farm trials, assuming cultural interventions can be put into place. Crop loss studies are not a major thrust of the present program and collaboration with other in-country research programs is weak.

The Malian's have or will have trained the number of participants proposed in the PP. The research base of personnel is well established and assistants are available. Short-term technical assistance is needed in planning and design. Observation posts are staffed and acquiring data. There are reference collections at Sotuba and at the one observation post visited (Haute Vallee).

Assuming GOM continues support, the cadre of trained personnel should be able to maintain a program of research, albeit with outside technical assistance on special topics. The extension linkage is present, but can be improved.

The prevalent use of pesticide in some areas could mitigate the application or acceptance of IPM research.

In examining phytopathology in Mali, it was found that several fungicides were used as seed treatments for the control of sorghum smuts, but the low level of infection in the untreated controls did not allow a good evaluation of the effectiveness of the treatments. It was estimated that at 1983 prices the cost of Thioral for treating sorghum seed to plant one hectare would be equivalent to 0.5 to 0.7 kilo of sorghum, and for Granox would be 1.3 to 1.9 kilos of sorghum. Seed treatment of millet seed with a systemic fungicide (metalaxyl) reduced the incidence of mildew, but disease incidence was too low to give significant yield

increases. Millet varieties were evaluated for resistance to mildew and smut. Sorghum varieties were evaluated for resistance to smut. Artificial inoculation to increase incidence of smut in variety tests was not very successful. Maize streak, a virus disease, poses a real threat to maize production in Mali. The main disease problems on groundnut, are leafspots, rust, and seedling diseases. Rice varieties were evaluated for resistance to pyriculariosis. In Mali, three of the four priority diseases are of primary importance. The fourth, bacterial blight, has not caused much damage so far. In addition to the above, the 1982 plans included a study of the biology of millet mildew but this was not accomplished.

Two phytopathologists are in training, one at Texas A&M to return in 1986 and one in France (Montpellier) to return in 1985.

When the two phytopathologists return, this will give Mali the best contingent of phytopathologists of any of the countries visited. The laboratory at Sotuba is essentially completed. Madame Ba Diallo (the regional project director) will return to research in phytopathology in the future and the IRAT phytopathologist at Sotuba has many years of experience in the country. The FAO phytopathologist has been in Mali for only 1 year but had several years of experience working with diseases of sorghum and millet in Northern Nigeria. Personnel in phytopathology would therefore be adequate for IPM research, but it will probably be many years before they would have adequate financial support from the national government to sustain the necessary research. Presently, no crop loss assessment is being carried out.

Weed research is based at the Sotuba Research Station of the Ministry of Agriculture and was carried out in 1983 by Mr. B. Dembele and Mr. A. Korate and in 1984 by Mr. Konate.

A Striga survey was carried out in 1983 and 1984 at four observation posts: Sotuba, Kita, Samanko and Savre, using the CILSS/IPM protocol. Three are based within the 120-150 day growing season zone and one in the 90-120 day zone. As in Burkina Faso, *S. Gesnerioides* was erroneously recorded as a parasite of millet and sorghum in 1983. The highest averaged density of *S. Hermonthica* was 54.44 plants/m² on millet at Samarko.

Multi-variety sorghum trials were carried out in 1983 to evaluate Striga-resistance. One variety, N13, appeared to be tolerated. In 1984, the regionally co-ordinated variety evaluation was carried out at three locations. Live methods of controlling Striga on millet were tested in 1983 but no successes were obtained and there were no treatment differences. A survey

of traditional methods of Striga controls - a survey of farmers' methods - was conducted and some of these methods are being incorporated into the research program.

A weed survey using the CILSS/IPM protocol was initiated in 1983 and continued in 1984. At present, it covers only a small area of the country as not all observation posts are operational. The observers send pressed specimens of the ten most important weeds to Sotuba for identification. Mr. Abdoulaye Sow, Botanist in the Section de Recherches for les Cultures Vivrieres et Oleagineuses (SRCVO) assists the weed scientists with weed identification on an informal basis. Trials in rice, groundnut and millet were carried out to evaluate herbicides as part of the country program.

Crop loss assessment trials have been carried out to assess crop losses in millet due to 'shibra' millet, a problem weed in parts of Mali. However, the trial methodology and analysis of results leave something to be desired and the results cannot be taken too literally. Crop loss trials have been implemented at three sites in 1984 to assess losses due to Striga. It is planned to continue these trials in 1985. An estimated 80% of the weed scientist's time is spent on the IPM designated program.

ICRISAT has evaluated finger millet (Eleusine corocana) in Mali and noted its tolerance of S. Hermonthica. This may be an alternative cereal to use in infested areas. However, some caution is needed because strains of Striga do exist which parasitize this crop in Uganda.

No technical packages have been developed for the IPM weed program but the identification of resistant cereal varieties in other countries through the regional program may well lead to the production of varieties for release to farmers. Work with fertilizers may also lead to a recommendation in the near future.

Training in crop protection is given as part of the course given by the Centres d'Apprentissage Agricoles (CAA). Five hours tuition in weed control is given in the second year of the course.

Mr. Boureman Dembele began training in weed science at Montpellier in 1983 and will return to Mali in 1987. Mr. M.M. Diawara is scheduled to take a Masters degree from 1985 to 1987 in the USA.

A weed laboratory exists at Sotuba but it has not yet been furnished. Advice is to be provided by the FAO weed scientist based in Niger. When completed, the facilities for the weed scientists will be good. No problems were foreseen in the integration of weed scientists into the research structure.

The Institut d'Economie Rurale (IER) in Bamako has a good library which includes 30 publications on weeds, mostly in French. These include standard text books but no weed journals. There is no national herbarium but Mr. A. Sow maintains a plant collection at the SRCVO which is at the disposal of the weed scientists.

There is no FAO technical assistance working on weed control in Mali though some expertise is present in the ICRISAT project in the form of Dr. Shetty. An FAO Striga expert, Mr. C. Parker, visited Mali for three weeks in October 1984 to carry out a survey of Striga and advise on its control. Mr. Parker was accompanied on this visit by the FAO weed specialist from Niger, Mr. D. Laycock, but the FAO weed specialist from The Gambia, Mr. A. Carson, was unable to join them.

Mali is partially competent in the weed science component of IPM through the activities of Mr. Konate. However, full competency in this area is not likely until overseas trainees return in 1987.

Mali would make a good base for a research project on Striga (Burkina Faso is also a possibility). This is because of laboratory facilities at Sotuba and easy access to large, moderately homogeneous, infestations of Striga. There is a desperate need for a good research base to extend to research plots and farmers' fields the concepts which have been developed or theorized in laboratories. Breeding, biological control and agronomic and chemical solutions for the control of Striga need thorough investigation. Mali should also address its other weed problems. Expert advice on the problems and priorities should be sought, perhaps from one of the regional FAO weed experts in the Gambia or Niger, or from other short-term assistance.

There is a favorable attitude towards weed research in Mali. The present weed scientist has limited technical proficiency because he lacks the training but the future of weed research in the country should be good after two weed scientists return from training in 1987. The IPM Project, by providing a laboratory and training, has made a valuable contribution to weed science in Mali.

Senegal

IPM Laboratories are located at Nioro du Rip and Djibelor and have been equipped since 1982. The lab at Nioro du Rip is adequate for the project but has shortcomings pointed out below. The staff of researchers at Nioro in entomology appeared to be jointly working on a solution to the Raghuva problem including a most active program on crop loss assessment. The latter program

is the only significant approach to crop losses in the IPM project regionally. On-farm trials are established and followed up with data analysis at Nioro.

Reasonable programs of research involve studies of biological control agents indigenous to Senegal. The information will be used in an attempt to augment natural biological control and also establish what parasites or predators are indigenous, prior to considering liberation of exotic species. This is a logical approach. Biological studies are aimed at understanding the biology of the principal pests, particularly Raghuva in the agro-ecosystem. This invokes bioclimatological studies as relating to the dynamics of Raghuva populations. The program at this station was the most impressive reviewed to date and showed some imagination on the part of the FAO advisors as well as the Senegalese nationals. It is the only biological control component in IPM regionally.

There did not appear to be much collaboration with other programs within Senegal and this is alluded to in documentation supplied the review team. Varieties supplied by ICRISAT are tested by Senegal component.

An entomologist and weed scientist are starting long term training in January 1985.

There is a need for additional trained personnel in entomology, plant pathology and weed science. Two of these positions will eventually be filled by personnel to enter long term training.

The location of the FAO technical expert at Bambey was not made clear and appears justified. He should be required to move to the Nioro station to work with the rest of the research team. The level of his expertise in entomology as well as relevant experience was not established to the evaluation team's satisfaction. The Senegalese working in IPM at Nioro seemed to be well trained and very enthusiastic about their work.

The lack of housing on station for the staff seriously handicaps the operation of programs and costs the project excessively for transport. This should change when housing is available and all staff should then be required to move to the station.

The laboratory facilities seemed adequate for the program of work. However, the growth chamber, if actually needed, cannot function where it is located even if it is properly installed. The growth chamber should be located outside of the building, under cover, so that heat generated can be dissipated. The autoclave is not being properly used.

Some screen houses are in disrepair and others are improperly designed for sorghum or millet-research as they are not high enough for plant growth.

When the remaining participants return, a complement of scientific personnel will be in place which should be able to carry out the work plans, provided short-term technical backstopping is made available. This may require 3 or more years.

Research work done by the IPM rice pathologist seems to be excellent. He has identified rice varieties resistant to pyriculariosis for the different types of rice culture and has conducted a number of experiments to estimate yield losses from the disease. In one experiment, the susceptible variety (IR9819) under natural infection had 100% neck rot and yielded nothing whereas the resistant variety (IR144) had only 15% neck rot and yielded 2005 kg/ha. A number of experiments were conducted to study the interactions of nitrogen fertilization, disease development, and yield to determine the optimum level of nitrogen fertilization. The IRAT phytopathologist at Bambey works only on head molds on sorghum. There appears to be no research on other diseases of sorghum or millet or on diseases of other crops. The 1983-86 plans call for studies on biology, crop losses, and varietal resistance in millet mildew and damage thresholds in millet smut, but this work has apparently not been started yet.

One phytopathologist was trained to the B.S. level by RFCP and works with CPS. There are none in training by IPM. At least one phytopathologist should be trained for Senegal, at the M.S. level.

There is no FAO phytopathologist and help is needed to work on sorghum and millet diseases. Short-term assistance could assist in this area for time remaining in the project.

There is good progress in estimating losses to pyriculariosis in rice, but no progress in sorghum and millet to date. IPM research in rice pathology is adequate now but would need financial support in the future. Little progress is being made in diseases of other crops.

The Senegal weed component of IPM is conducting very little regional research. The Sine-Saloum area of Senegal where IPM labs are located is not a convenient location for trials on Striga because of its patchy distribution, though locally serious infestations occur. Hence there has been no Striga survey or evaluation of sorghum varieties resistant to this parasite. There was no evidence that a weed survey had been undertaken.

A research program on weeds in rice is outlined in the operational plan for 1983-1986 but there is no indication as to how this work can be done. The research is to include Cyperus spp., Oryza longistaminata and bio-ecological studies. Weed research has been carried out as part of a crop loss assessment program under RFCP in Senegal. At the CNRA, Bambe, research on weeds has been conducted over a long period and receives partial support from IPM funds through ISRA. Ms. Fontanel is the current weed scientist who is working on the ecology of weed communities, herbicide evaluation and cultural weed control as part of a farming systems program. The team includes two agro-economists, one zoologist, one agronomist, one hydro-pedologist, a mechanic and a weed scientist and they are concentrating on one or two rural communities. Fontanel has collected 125 species of weeds, the most important being Digitaria, Dactyloctenium, Brachiasia, Hibiscus and Commelina. Herbicides tried in millet include propazine in combination with other triazines, applied with a CDA sprayer. After slight chlorosis, the millet recovered. Yields from the trial were very low due to the drought and there appears to be no economic potential for using herbicides in this crop.

A weed specialist working for British Aid, Mr. E. L. Davies, has carried out a survey of weeds in the Senegal River Valley, published his work and returned to the UK. A WARDA weed scientist is believed to be working at Richard Toll Research Station at present.

No technical packages have been produced for weed control but the CNRA team may be in a position to produce recommendations at some time in the future.

Weed science is included in the course at Dakar Training Center. Mr. D. Ba began a three year training course at Nancy, France in 1984. One weed scientist not funded by IPM is receiving graduate training in Belgium and he will return to Bambe in 1985.

The Dakar Training Center has a good library of weed books, but no journals specific to weeds, funded from the RFCP Project. CNRA is also reported to have a library which includes weed literature but it was not seen. There is a weed herbarium at CNRA Bambe but the reference collection for the flora of West Africa is based at IFAN. An herbarium of weeds of rice was prepared for Richard Toll research station in 1980-82 but this was not visited.

Present pesticide policy in the country (free applications of insecticides to farmers) is counterproductive to IPM. The CNRA approach is towards the use of herbicides for weed control though the economics of this for cereal crops, except rice perhaps, is questionable in small-scale agriculture.

The Gambia

Main research station is at Sapu with project headquartered at Yundum. Major research effort in entomology on millet centers on stem borers, Acigona and Raghuva. Sorghum midge Contarinia is a problem, and ICRISAT varieties are more susceptible to disease, therefore not useful. Grasshoppers, stink bugs and chilo are a problem in rice. The blister beetle complex is considered a serious problem by those researchers and farmers interviewed. Research is being conducted on the priority pests and with exception of the pilot studies deal with basic biological studies. Work has centered on geographical distribution, systemics, biology and biological control, the latter tactic against Contarinia. Crop loss assessment is not being undertaken.

Two participants are in the US being trained (BS) for plant pathology and entomology. One recently returned (U. Fla.) earned a degree in nematology but is working 50% of his time directing field trials of CPS and sometimes as an entomologist.

The program is understaffed as the weed scientist (FAO) only recently arrived and there is no FAO pathologist, although one is badly needed. The current FAO advisor doubles in entomology and pathology and probably has problems doing both.

Yundum is adequate for the work which is ongoing. The Sapu laboratories which are proposed will provide needed space for research and housing for researcher. Yundum had built and is adding to a significant reference collection of insects and millipedes. Rearing facilities for insects at Yundum are not adequate, however.

The National IPM director also serves as CPS director making linkages more likely. Cooperation with CPS personnel in the field appears to work but the team did note some problems at Jenof between CPS and IPM personnel, i.e., a lack of communication and collaboration.

When participants return, the Gambia should be able to sustain IPM research; however, experienced technical assistance will be needed in some areas.

No phytopathologist was found in the Gambia. The FAO expert in entomology indicated that he had had course work in phytopathology. The 1984 work plans call for a study of the geographical distribution and importance of mildew and smuts in millet and cooperative trials (with Senegal) on resistance of rice to pyriculariosis, but no evidence was found that this work was done.

One phytopathologist is in training. Another one is needed at M.S. level to sustain an IPM capability in phytopathology. A laboratory for plant disease research is needed.

Weed research is based at the Crop Protection Service, Yundum but will eventually be transferred to Sapu Agricultural Research Station when the housing for the FAO weed expert, Dr. A. Carson, becomes available in 1985. Dr. Carson's counterpart, Mr. Kunuo, is already living in Sapu.

Mr. Carson modified the CILSS/IPM protocol to make the striga survey more effective; 4 quadrants of 25m² each were placed in areas of the field which were representative of the whole population. The Striga was counted, uprooted and fresh weights were taken. The 1984 survey covered five cereal fields, selected at random, in each of 150 villages. The survey was done only in pure cropped cereals. The work will not be repeated in 1985 except for selected benchmark sites.

In crop resistance in the standard test with three ICRISAT varieties and one local variety of sorghum was laid out in the field according to the regional protocol. Unfortunately, the weed scientist was not present at the beginning of the season and only one of the sites selected was infested with Striga. The results were not seen but apparently one variety of sorghum, a red cultivar, is resistant to Striga.

For the weed survey the regional survey protocol has been followed with the IPM trials resulting from six observation posts around the country which are linked to the CPS team bases. Weeds have been collected and returned to Dr. Carson for identification. This partly duplicates a survey carried out in 1979-80.

The survey of crop production practices has been designed with particular reference to weed control but it includes brief sections on insects and diseases. The objectives of the survey are to assess all practices associated with weed management in order to identify practical and appropriate methods of weed control for small scale farmers. The survey includes fertilizer use, seasonal labor demand, timeliness of weeding, and methods of cultivation. It is hoped that 50 households or farm-families in each division of the country will be interviewed during November-December, 1984. This appears to be an excellent method for identifying information which will help the future weed research program in the Gambia.

In the area of crop loss assessment, the weed scientist arrived too late in the growing season to commence trials on upland crops but he initiated trials in swamp and irrigated

rice. The trials are carried out on five farms using a system where four quadrants of 9m² are placed in the farmer's fields and weeded in the 'ideal' way. Fields will then be compared with those obtained by the farmer. The IPM observers are organizing the trials in three areas of the country.

An outline of the 1985 research program was examined and it includes the following trials for Striga control: land management; intercropping; fertilizer placement; herbicide application with pistol-grip sprayer; 2, 4-D granules. The ICRISAT coordinated evaluation of Striga resistance in sorghum will be continued. Crop loss trials will be carried out in millet, maize and possibly other crops.

Approximately 80% of the weed scientist's time is spent on the IPM Project. There is no other weed research program in the Gambia. It is expected that a technical package can be developed from the weed research programme and the crop production practices survey by 1986.

There is no provision for weed training abroad for a Gambian. This is a serious omission, especially as the Gambia has had a good weed research program in the past and will have no local expertise to take over from the FAO weed expert in 1986.

The coordination between CPS and the Ministry of Agriculture's research and extension units could be improved to promote efficient use of crop protection scientists attached to the CPS. However, support for the weed expert is very good at present and is allowing a productive program of surveys and research to proceed smoothly.

CPS Yundum has good crop protection information and it is well protected in metal and glass cabinets. There are sufficient weed books to assist an instructor in the in-course training but more books are needed and have been ordered. A good weed collection is present at CPS Yundum and a duplicate collection has been given to Sapu Research Station. RFCP was to have provided herbarium cabinets in 1980 but these have not been received. Priority should be given to obtaining these items if a valuable resource is not to be wasted.

The FAO weed expert, Dr. Alex Carson, is based at the CPS Yundum. He did not take up his appointment until September 1984 but he has already established a good research program and carried out weed and Striga surveys. He enjoys a good rapport with the Director of the CPS and his colleagues and shows every sign of making a valuable contribution to the IPM program and weed science in The Gambia. Links between CPS and the extension service are evident in the implementation of the Pilot Programme.

The IPM concept will be hard to promote when CPS provides free pesticides (but not herbicides) to farmers. A weed science input will not be possible if a Gambian is not sent for overseas training. Overall the weed research component is strong and should yield usable results for the Gambia.

Niger

Research is conducted at Maradi, Agadez, Kolo, Dosso, and Zinder. IPM researchers are located at the INRAN facilities in Maradi (Tarna station). In 1983, research was conducted on the priority pest Raghuva with some work done in Kolo on contarinia as a pest of sorghum. The latter program involved resistant varieties supplied by ICRISAT. This research dealt with population dynamics of the midge also.

Research on Raghuva dealt with damage and crop loss assessment, seasonal cycles, distribution, resistant varieties, and biological control agents. Another Raghuva program dealt with pseudo-resistance (tolerance) of varieties of millet supplied by ICRISAT. This study was conducted in three locations and took into account plant pathology. Sampling was based on the number of mines per head.

Crop loss studies were conducted in 1983 and 1984. No report for 1984 was available. The 1983 work was conducted on traditional and new varieties on farmers' fields, treated and untreated plots, and replicated for each. Data were collected on head (epis) mines classified in three classes of head length, short, central, and long. Damage to heads was further classified according to severity. There were apparently no gram loss estimates for the classes. Data were analyzed and differences shown. These studies are not comparable to those conducted in Senegal. Other work centered on national pests of cowpea and groundnuts.

The investigator working as one of two in the region on a major crop loss assessment project should have had closer collaboration with the Senegal IPM project.

There is some collaboration work with ICRISAT and there should be more not only with ICRISAT but Niger Cereals Project, and farming systems programs.

None of the nationals have been trained as outlined in the project design. There is a major block in training and this should be corrected by pressure from USAID if possible.

Observation posts are staffed by Peace Corps rather than Nigeriens. The level of training needed for the posts does not require college graduates and extension agents could be posted there.

All technical assistance is in place since the arrival of the weed specialist. There is now a vacancy for the crop loss specialist.

Without training additional personnel it is unlikely that Niger can develop a long term capability in IPM research.

It does not appear that the project research has been very productive, --one report was substantive, others below average in quality. The lack of host country trainees is a very serious problem and should be overcome if research capability is to be put in place.

In the plant pathology area, fourteen varieties of millet were tested for resistance to smut by natural infection and by artificial inoculation. Varietal means varied from 15.4% to 47% smutted grains but the differences were not statistically significant. Tests to determine varietal resistance to mildew in millet and seed treatment tests for mildew control failed because of insufficient disease development. On cowpeas, virus diseases, bacterial blight and Macrophomina seem to be important. The 1983-86 plans call for loss estimates for millet mildew, sorghum smuts, and cowpea diseases; a study of specificity of some pathogens, and research on cultural methods of control. Apparently these have not started yet.

According to the GTZ phytopathologist, there are important disease problems on the irrigated crops. Pyricularia is rather light on rice but bacterial blight and rice yellow mottle virus are important. Tobacco leaf curl virus and wilts (Fusarium and Vesiticillium) are important in tomatoes. Maize streak poses a threat to the production of this crop.

One phytopathologist recently left for an advanced degree in France under other donor programs and another is due to leave soon. These positions should contribute to the overall crop protection capacity for Niger although not directly participating in IPM.

Weed research is based at the INRAN Station at TARNA, Maradi, where the FAO weed expert, Mr. D. Laycock, is working.

The CILSS/IPM striga survey was carried out in 1983 but the INRAN Plant Pathologist, Hama Hassane, who was supervising the survey, said that it was done poorly through lack of adequate training of the observers. The survey was repeated in 1984 with some apparent improvement. The FAO weed expert has had little opportunity to travel but he has made observations on the distribution of Striga in the Magaria-Zinder Region. The presence of Smicronyx, a potential biocontrol agent for Striga, has been recorded.

Resistance to Striga in varieties of millet and sorghum has been studied in Niger since 1979. Some of the work has been done in co-operation with ICRISAT in a single location trial, except for 1984 when two sites were used. Promising resistance has been found in two local varieties of cowpea. For some reason, yields were not taken but Laycock was able to assess the stand and vigor of cowpeas in the trial at Tarna.

A weed survey has been done but no results were observed. The observers do not send specimens for identification. They are expected to do this themselves by conversing with farmers and by consulting a list of vernacular names of weeds. This is a very suspect method and of doubtful reliability. No crop loss assessment work on weeds has been done.

The job description for the FAO weed specialist calls for him to research agronomic approaches to weed control and does not mention Striga. Nigerian researchers indicated, however, that they expect him to spend 90% of his time on Striga. A comprehensive work plan with both dry and cropping season research objectives has been drawn up and should prove useful with appropriate government and project support.

No technical weed packages have been developed yet. The ICRISAT research program includes research on topics related to weed control, including: tillage, soil stabilization, crop losses and Striga-resistant varieties.

Mr. I.D. Assoumane commenced training in weed science in Nancy, France in 1984 and will return in 1987. This training is being funded by other projects.

The infrastructure for allowing the IPM research to go ahead seems to be in place but it is hampered by personnel and administrative problems which must be resolved so that research can proceed. The team was told that observation posts are to be used purely for pest surveys and not for research or demonstration trials.

There is a library at Maradi but it lacks a lot of useful weed books and journals. It is apparently quite normal for journals, e.g., Tropical Pest Management, FAO Plant Protection Bulletin, to arrive at the research station but they are retained by individuals and not made available to the staff. A small herbarium exists at Maradi and assistance with plant identification is being given by a pasture agronomist based at Maradi. FAO, Rome is being very supportive by providing abstracts and other information on Striga, weeds of the Sahel and semi-arid zones, and weeds of cowpea, sorghum, millet. The FAO weed expert took the initiative in requesting information. There is no greenhouse at Maradi but a quarantine, tropical greenhouse is planned and funds are being sought.

The FAO weed specialist arrived in August 1984 because FAO had considerable difficulty in recruiting someone with adequate experience. He has considerable experience in tropical weed control in Kenya, Ghana and S.E. Asia but cannot speak French and needs language training.

If the current administrative and personnel problems are not resolved it is unlikely that the weed expert will accomplish more than a fraction of his proposed research program next year. Overall IPM capacity development is hampered by the lack of trainees to replace outside technical assistance. Only with greater cooperation between counterparts and outside experts can useful results be obtained. It will take at least five more years to develop a practical IPM capacity in-country under present conditions.

Mauritania

Laboratories are located at Kankossa, Nouakchott (50% complete), and Kaedi (under construction). There are 12 observation posts of which three are completed with four under construction. Dr. N.B. Magema is the principal FAO expert (entomologist) and has been on board since 1981. Dr. Magema provided a report covering the period from 1981-1983 and which presents information concerning the biology--ecology, geographical and seasonal distribution of sorghum, millet, rice and cowpeas. Groundnuts are considered from the standpoint of an inventory of insect pests. With the exception of groundnuts, the report provides an indication of the most serious insect pests and also relates the pest to plant phenology. Not much work is being conducted on weeds or diseases. A plant pathologist and another entomologist have been recruited. Counterparts are in place.

Dr. Magema is probably one of the best FAO experts encountered. The information provided is well done and appears to be complete for the insects and it will provide a good basis for development work. They are working on priority pests Raghuva and Contarinia.

No crop loss assessment work has been done and there is a lack of information on weeds or diseases. Participants in plant pathology (2), entomology (2) and weed science (1) are proposed for training but had not left in December 1984, making their completion by PACD unlikely. The administrative analysis provided by the regional project management reports infrastructure is partially built.

Lack of technical assistance has probably hindered the project particularly in the area of weed science and pathology.

Based on administrative analysis there appears to be a direct linkage between CPS and IPM as the same person serves as National Director of IPM and also as crop protection Director for Mauritania.

Mauritania has a good start in entomology but still needs short-term technical assistance to help in design, based on reports seen. Dr. Magema has done well with what he has had to work with. If GIRM will support staff and technicians and a plant pathologist and weed-specialist can be recruited there will be a nucleus to do reasonable IPM work.

There is now a good entomological basis for initiating on-farm trials to determine crop losses in Mauritania. More short and long-term technical assistance is needed to build IPM capacity, but a good start has been made.

Meetings with the FAO entomology expert and Chief IPM officer and with the Chief of the Plant Protection Service from Mauritania indicated that no research work is being done at present in phytopathology in that country. Previous surveys had indicated that the principal disease problems were smuts and leafspots on sorghum, smut and very little mildew on millet, and seedling diseases and leafspots on cowpeas.

There are two phytopathologists at the B.S. level and one bacterio-virologist in training. One phytopathologist was trained at the B.S. level in crop protection. One phytopathologist needs to be trained to the Master's level. When these trainees return they should take care of the needs of the country in plant pathology.

There appears to be no weed research program in Mauritania. The principal weeds are stated to be Striga in sorghum and millet and Oryza srp., Cyperus srp. and Sphenoclea in rice.

In 1984, the Project requested that FAO provide a weed consultant to conduct an economic analysis of the important weeds of rice in Mauritania. The consultant had not arrived by November 1984, thereby losing a season's work. Dr. Magema would like the consultancy to take place in 1985, the best time being from mid-July to mid-November.

WARDA (ADRAO) would be the logical organization to assist Mauritania with a weed consultant. (They have someone based at Richard Toll in Senegal). Unfortunately, Mauritania receives little help from WARDA because it is not contributing funds.

One weed specialist (I. Kane) is scheduled to go to the US for training in 1985. It is recommended that he be sent to Oregon State University, a highly respected center for international weed science.

The weed problems in the country need to be appraised and advice obtained from a qualified rice agronomist/weed expert on adaptive research packages to be tested in Mauritania.

Little has happened in weed science though serious problems undoubtedly exist. Advice on weed control in rice is a priority area for a consultancy. The training of a Mauritanian weed scientist in the US has been delayed but should be undertaken as soon as possible.

Although observations on Mauritania are second hand, the team assessed the IPM program there as promising provided participants are trained soon and additional TA is provided in a timely matter from FAO.

Cape Verde

Research effort in Cape Verde Islands stresses IPM-biological control strategy, which is logical in an insular situation. The chance for success is higher in such environments than in the continental programs. Maria Luisa Lobo Lima impressed the team as a highly qualified biologist in discussion. Further, on the basis of one publication (the only published journal article given to the team during evaluation) and a technical paper jointly authored with Antonius van Harten, GTZ, it appears that she and her FAO counterpart can come up with some truly integrated pest management strategies. It was apparent to the team, based on interviews, that their research relies on a pesticide intervention only in worst case scenarios (grasshoppers). The regional aspect of the research is due to assignment as part of the Sahel and the crops emphasized in the project are not those considered in the Sahel as a whole.

There is no one in long-term training from Cape Verde. According to the administrative evaluation report, laboratory space, guest houses, staff houses, etc. are under construction or completed except for two technician houses.

The FAO technical expert was sent home and his replacement seems unnecessary under the present program. The Cape Verdians indicated that they could manage without this assistance. Since Cape Verde does not have an extension service, the outreach potential for IPM is limited except for bio-control. Cape Verde should not be included in the CILSS-JPM program because of different crop and pest problems. IPM-Biological control has an excellent chance for successful control of a number of pest problems. Work should be continued under some bilateral funding mode.

According to the Chief IPM officer and Chief of CPS of Cape Verde, there is no phytopathologist in that country. Plant

diseases are thought to be minor problems. No one is being trained in phytopathology. A survey of plant diseases in Cape Verde should be made by an FAO short-term expert to determine future needs.

In Cape Verde, Striga is not a problem and other weeds are not being surveyed. A comment was made that weeds are not a problem in Cape Verde. This is taken to mean that farmers can cope satisfactorily with weeds. The possibility that time spent weeding could be better spent on other activities, eg. growing a larger area of crops, was not pursued in the discussion.

Chad

Although the Chad component of IPM is just beginning, the team obtained information from the Chadian Crop Protection Service during the Niamey IPM Seminar. The new program focuses on millet as part of the pilot program expansion and has these principal objectives: inventory of millet and sorghum pests; literature survey of all other research on pests of these crops by ICRISAT and other research organizations; an inventory of natural enemies; definition of economic thresholds and intervention recommendations; research on local resistant varieties for specific enemies.

A technical expert is being provided and a participant is being sent for long-term training.

Regional Component

The evaluation team recommends that a regional function be continued which will enhance the country components. The role recommended for the regional component could consist of the following elements:

1. Act as a centrally coordinated network for research activities in IPM techniques to insure that research activities are known by all CILSS countries, to minimize duplication where it is not important and maximize it where replication is necessary.
2. Supervise the work of the socio-economist, bio-climatologist and the crop loss assessment experts whose functions relate to all the countries.

3. Insure that methods for carrying out demonstration and pilot activities are uniform.
4. Continue development and refinement of the standardized forms for observation posts.
5. Publication and dissemination of articles, reports, research, case studies etc. amongst the CILSS countries as well as outside the region.
6. Make appropriate links to other agencies carrying out research in pest management or agricultural practices related to pest management, e.g. ICRISAT, IITA, SAFGRAD, GERDAT, etc.
7. Provide training opportunities locally, in third countries or in the U.S.
8. Bring in short-term consultants to support the regional effort.
9. Coordinate and assist in having regional seminar and workshops related to IPM and to work with CILSS and host countries to develop position papers, analysis, suggested legislation, etc. on pesticide safety and subsidization.

The above activities could be carried out by a separate regional project and implemented through project agreements with the appropriate Sahelian institution e.g., CILSS, INSAH or AGHKYMET.

C. Gambia Pilot Program

The Design

The Pilot Programme idea was introduced into the IPM project in March, 1984 at the Bamako meeting of the Project Working Groups in a presentation by George Allen, IPM Coordinator at FAO. The purpose of the Programme as outlined by Dr. Allen was to move IPM research closer to the farm level by testing a complete package of accepted practices for millet production, incorporating various direct pest control practices as well as indirect measures felt to provide improved pest protection.

A Pilot Programme design meeting was then convened in Gambia in May, 1984. After some initial discussions among the consultants, meetings were held at the village level. Farmers in three villages were given an opportunity to express their opinions on their most urgent needs in food crop production and to provide information on traditional pest control practices. Their responses served as the basis for the specific interventions intended to be part of the test (or demonstration) package. Essentially, the package agreed to by the design consultants involved a composite of practices presently used by millet farmers in the villages, spiced with the addition of a few new ideas (on fertilizer application, herbicide use, etc.).

Five farmers were to be selected as pilot farmers in each of three villages; each farmer was to make available one plot of millet land for the test/demonstration and an equivalent-size plot for a "traditional practices" control. The plots were either one-half or one hectare each. The pilot farmer was to perform most of the operations in the test/demonstration plot under the direction of the IPM Pilot Programme staff (with additional assistance hired by the Programme as necessary), and all of the operations on the control plot. The Pilot Programme activities in each village were managed full-time by a resident technician employed by the Crop Protection Service. The technician specifically intervened where and when "Pilot" practices were introduced. Up to 12 new interventions were planned for the test/demonstration plots, an array of changes which challenged the ability of farmers to comprehend and accept.

Several natural and administrative phenomena intervened in the course of the Pilot Programme to reduce the number of interventions actually implemented. Unusually early rains induced the farmers to sow their seeds earlier than planned, that is, before the arrival of the FAO Pilot Programme expert and before the seeds could be treated as specified in the test/demonstration design. Many of the anticipated insect pests failed to arrive in their usual numbers. A planned trial with a chemical herbicide was ruled out when the herbicide did not arrive from the manufacturer in time. As a result the number of Pilot interventions was narrowed down to: 1) earlier and cleaner

weeding than "traditionally" done; 2) use of adequate amounts of fertilizer; and 3) applying the urea fertilizer as a side band rather than broadcast over the entire surface of the plot as is normally done in the Gambia. In addition, spraying services for insect pest control were provided at specified threshold levels and there was constant monitoring of pest incidence by the trained technician in the village.

It was assumed that this Pilot Programme in Gambia would provide guidelines for similar Pilot Programme efforts slated to be launched in Senegal, Mali, Niger, and Chad in 1985.

Observations

Two of the Pilot villages were visited during this evaluation after the harvest had been completed. Although the formal written analysis of results was not available at the time of the visit, the Pilot farmers interviewed indicated satisfaction with the test/demonstration and the results achieved. Of the 12 participating and non-participating farmers interviewed, all but one seemed to have noticed the differences between the test plot and the control plot. Most agreed that the additional work or cost involved would be more than offset by the increased yield (although no farmer gave comparative output results in quantitative terms). Almost all attributed the greater part of the yield effect to heavier fertilizer applications on the test/demonstration plots. (Indeed, some interviewees' responses indicated that the distinction between quantity and method of fertilizer application was definitely not very clear.) Reasons given for lower applications on the control plots seemed to deal with the lack of supplies at the local cooperatives and lack of cash or credit to purchase what was available. (In these villages, credit for fertilizer is tied to groundnut sales and supplies of SSP are stocked in preference to complex fertilizer and urea.) The earlier and extra weeding would mean additional labor inputs; most farmers agreed that this might be possible but indicated that they would give priority to their cash crop, groundnuts. (Millet in these villages is produced largely for subsistence purposes.)

In these interviews with farmers and with Pilot Programme staff, the evaluation team made a special effort to assess whether the Gambia Pilot Programme experience indicates that more Pilot Programme efforts along similar lines are:

1. Likely to be useful to IPM researchers (in terms of generating new research insight);
2. Likely to effectively bridge the gap between individual research findings and integrated application at the farm level; and

3. whether the returns to such a test/demonstration program were commensurate with the costs.

In general, as a proving ground for IPM research interventions at the village level, the Gambia Pilot Programme has been only marginally worthwhile.

First, as luck would have it, the treatment threshold for armyworm was misjudged and two fields were destroyed, reducing the sample size to 13 more-or-less paired plots. Incidence of other pests for which chemical treatments had been recommended was low in all fields, however, so no comparisons between "treated" test/demonstration fields and "untreated" controls will be possible. (Indeed, it is not clear whether no treatment of the controls was envisioned. Gambian farmers all expect free Crop Protection Services spraying services when they report outbreaks of insects and would no doubt have exerted pressure for equal treatment of test/demonstration and control fields.) All farmers except two were already engaged in regular rotation between groundnuts and millet; striga incidence was, therefore, low and the clean weeding of the demonstration fields may well have had no effect on yields. This finding will, however, have to be further examined by the Pilot Programme analysts when all the yield and input data are brought together.

Second, many of the recommended Pilot interventions (that is, use of fertilizer in substantial quantities, thinning, and timely tillage) were already well-known to most of the Pilot farmers, many of whom had participated in other tests/demonstrations of other crops in other years. While the rationale of encouraging good stand establishment and thus increasing the plants' resistance to pest is an IPM-type intervention, it is not clear that this rationale was explained to or understood by the farmers. The connection which was apparently made was a more conventional fertilizer-incremental yield relationship.

As a demonstration of several practices to increase millet yields, the Pilot Programme was a success. But as a demonstration of an innovative approach to crop protection (through integrated pest management interventions), the Pilot Programme has to be given a score near zero.

In fact, two of the innovative interventions were not implemented (the seed treatment and herbicide). The application of fertilizer in a band rather than by broadcasting was innovative, but lack of controls on quantities applied may make the analysis an impossible one to complete with any degree of statistical satisfaction. The Pilot Programme has certainly raised the awareness of farmers to pest incidence and has possibly raised the awareness of a small group of farmers of a trend away from chemical pesticides.

As an effort to involve farmers in the process of translating research findings into an applicable, integrated package of practices, it was successful. The consultative process was well done. The follow-up and management by project technicians appeared to be good -- and was appreciated by farmers. It should be noted that this was accomplished at a very high cost (possibly as much as \$10,000 per participating farmer) as a result of the small number of farmers who were involved in the activity.

On the basis of these observations, the evaluation team considered the lessons for future Pilot efforts which may be derived from the Gambia experience in 1984. Three points need to be taken into account before further Pilot Programme efforts are undertaken:

1. The objectives of the Pilot Programme require further clarification.
2. The distinction between the on-farm trials which are supposed to be conducted near observation posts and the Pilot Programme must be more carefully drawn or the two should be completely integrated.
3. Modification of research trials including cost-effectiveness.

1. Clarification of Objectives

If the purpose of the Programme was research, then additional statistical considerations should have been incorporated into the research design and management. Sample sizes could have been greater in number (smaller plots and more farmers per village, for example); field plot sizes could have been more carefully measured; the desired treatment/control effects could have been laid out in more detail.

If the purpose of the Programme was extension of almost-certainly-useful packages, then the extension service should have been more intimately involved in the research design and implementation.

If the purpose of the Programme was both research and extension, then the elements which were experimental (such as band application of fertilizer and herbicide application) should have been more carefully controlled and those elements which were assumed to be more broadly extendable (application of fertilizer on a foddercrop) should have been subjected to an economic or a farming systems analysis.

2. The Distinction between On-Farm Trials and the Pilot Programme

Assuming that the principal purpose of the Pilot Programme is research-oriented, then the distinction between the on-farm trials and the Pilot Programme deserves additional attention. On first inspection, it would seem that they were intended to be somewhat different approaches to applied research. But on second glance, the distinction is not at all evident.

Thus, it was the team's observation that clearing up some of the semantic confusion surrounding on-farm trials could be a useful first step toward addressing the distinction. Part of the confusion involves inexact translations between French and English, but there is also some confusion in English terminology alone. Further, it is our view that better distinction of four different types of on-farm trials would help IPM researchers to clarify the objectives they intend to achieve. This would then be a first step toward the improvement of the design and implementation of the trials themselves.

The following distinctions seem useful:

a. Research field trial:

A purely research trial conducted on farm land, away from the research station, completely under the design control and management of the research staff. Often research field trials involve large plantings. There is no restriction on the number of variables.

b. On-farm trial, research-managed:

A trial involving testing certain experimental (unproven) research techniques or materials on farmers' land, with the farmer providing most or all of the labor inputs as well. Researcher-managed on-farm trials are, however, always under the direction of the research staff. Each trial may include several test elements.

c. On-farm trial, farmer-managed:

A trial involving testing of promising new techniques or materials on farmers' land, with the farmers themselves managing all operations as well as providing some or all of the inputs. Such farmer-managed trials are often conducted on a small test plot, adjacent to a traditionally-managed planting of the same crop. The new techniques or materials introduced for the experiment are usually limited to one or two.

d. Farm demonstration:

Demonstrations involve new techniques and/or materials which have been sufficiently tested to be recommended by the research and extension services. Only one or two new techniques or materials are introduced either as a method demonstration or as a result demonstration, or both. Demonstration plots are normally supervised by an extension agent and may employ either farmers' donated or hired labor. Result demonstrations are ideally sited very near to a traditional planting of the same crop to facilitate comparison. While farmers can be involved in selecting, planning, and implementing the demonstration, they are principally involved in the evaluation of the results.

The semantic waters are muddied when the English translation of the French term "prevulgarisation" is introduced. Pre-extension trials appears to include all four types of trials specified above. Seen by some researchers as the last stage of research testing before release to extension services, pre-extension activities have also been noted by others to include demonstration activities.

Neither the national on-farm trials reports nor the Pilot Programme documents are written up in such a way that the specific type of on-farm trial conducted can be identified. But lumping them all together as "pre-extension activities" runs the risk of confusing objectives, increasing costs of information generation needlessly, and not achieving desired results.

It is the view of the team that on-farm trials can play a vital role in accomplishing the IPM research objectives and be an effective bridging mechanism between research and extension activities. But is a special Pilot Programme effort needed to supplement a "normal" program of on-farm trials? The observations made in Mali and Senegal of on-farm trials results and the Gambia Pilot Programme results indicate that a special Programme is probably not necessary. Instead, project efforts should be devoted in targeted Pilot Programme countries for 1985 to increasing the utilization of on-farm trials as research tools and to improving their technical and cost-effectiveness.

It is recommended, in lieu of a special activity presently identified as "Pilot On-Farm Programmes", that the Regional IPM office consider a modification of its on-farm research trials to meet the objectives of both of these activities. These actions would be required:

1. In a zone which would otherwise be designated for an on-farm research trial, substitute 3 to 5 small-size plots to be operated with randomly selected local farmers willing to cooperate;
2. Involve the Extension Service and local farmers in planning the research to be conducted;
3. Limit the number of practice "changes" to not more than two on any pair of plots (trial vs. control);
4. Provide supervision and observation at the site whenever operations are conducted on either plot;
5. Involve Extension and the farmers in evaluation at significant points during the season and at harvest.
6. Solicit farmer suggestions for modifications in the trials for the subsequent season.
7. Maintain accurate and sufficient readings to serve the research objectives.

In addition, these trials should be multidisciplinary involving entomology, plant pathology, weed science, extension agricultural economics, and agronomy. In this way, a farming systems approach within a scientifically designed study can yield results more useful for farmers. With clarification of objectives and careful design to ensure replicability, a program of on-farm trials can be adapted to meet both country and regional IPM research objectives as it moves research closer to application.

D. IPM Agro-Meteorological Component

AGHRYMET (agrometeorological/hydrology program) is an institution chartered by CILSS in 1975. The purpose and program of AGHRYMET was developed by WMO/UNDP and CILSS in a program document entitled "Programme for the strengthening of the agrometeorology and hydrological services in the Sudan-Sahelian zone".

The program goal is to enable Sahelian farmers, herders and national planners to make short and long-term decisions in their agricultural and livestock production planning and operations, based on more timely complete and accurate weather and climatic data, and/or better knowledge of cyclical events and their impact on water, soils, vegetation and crops. The purpose of AGHRYMET is to develop a regional system which will produce this data and information and make it available to farmers, herders, planners and other users.

The goal of this multi-donor project was to be met in three phases. The project is now in Phase II which will complete the establishment of a regional data collection, storage and analysis center in Niamey, Niger and the strengthening of the national data collection system in the eight Sahelian countries by 1987.

The IPM project through FAO has placed an agro-meteorologist (Mr. M. Bernardi) at AGHRYMET in Niamey. The agrometeorological component of IPM focuses on the collection and analysis of regional IPM data, generation of pest maps, and development and testing of three forecasting models for pest outbreaks for grasshopper, Raghuva and downy-mildew. These goals were to be accomplished by September 30, 1986.

In discussions with Mr. M. Bernardi and Mr. Gaston Pierrard, it became obvious that, for this component to function properly, improvements would have to be made in the computer capacity of AGHRYMET, and in the communication system between the field posts and national centers and then to Niamey and back to the national centers for further dissemination.

The reliance upon the ASECNA (Agency for the Safety of Air Traffic in Africa) communication system is a disadvantage if speed of transmission for short-term pest outbreak forecasting is required. The ASECNA system (controlled by the World Meteorological Association) only transmits meteorological data and only when their own priority data has been sent will they transmit the IPM meteorological data.

The IPM agro-meteorological component requires data on crop, weather and pest conditions in order to develop pest outbreak forecasting models.

The AGHRYMET data collection system has 95 observation centers throughout the Sahel, the IPM project is establishing 58 observation posts. Some of the IPM posts are located near AGHRYMET stations but many are not which required the purchase of similar equipment. This is an example of where better planning and coordination would have resulted in more efficiency of operation and less cost.

According to Gaston Pierrard, the FAO principal technical expert, it is possible to have a forecasting model tested for grasshopper outbreaks by the end of project but not likely for Raghuva and downy mildew.

A report prepared in May 1984 for FAO by Heaters, Jones and Mishie of the University of Florida - Gainesville made several recommendations regarding the data collection and storage system. These recommendations were accepted and an increase in funds was made by the IPM project for the agrometeorological component.

The preliminary work of Mr. Bernardi was presented at the IPM Seminar in December 1984 and underlined the need for the IPM researchers to provide quantitative crop loss assessment indicators to complement the work being done at AGRHYMET. The need for baseline crop production statistics from each country to complete water need projections was also mentioned. AGRHYMET and IPM together are needed to correlate the water needs of crops with their estimated losses due to pests.

It was the estimation of the evaluation team that forecasting for grasshoppers and Raghuva would be of definite value to Sahelian farmers, but that downy mildew was more problematic as interventions are limited for this disease and its crop loss potential for the region is smaller.

E. Socio-Economic Component

The team economist and institutional analyst discussed the regional socio-economic component with the FAO socio-economist stationed in Burkina Faso and with other IPM personnel.

The socio-economic component is aimed at determining parameters which influence dissemination of innovation: social structure and relations; the dynamic nature of the social environment; traditional farm practice systems for production; traditional plant protection systems.

Along with an agricultural economist from the Mixed Farming Project in the Gambia, the socio-economist was asked to participate in the Gambia Pilot Programme. The emphasis in this participation seemed, to be "curative" rather than preventative as the socio-economist was called in once the program was under way. As noted elsewhere in this report, economic aspects have not been adequately addressed to date in the IPM project. There is a strong awareness by most IPM personnel that this assistance is needed.

A single regional socio-economist is insufficient to meet the needs of all the countries in this area. The position needs to be supplemented by short-term assistance in experimental design, farming systems research, and agricultural economics on a regular basis. In addition, each country needs to have both a sociologist and agricultural economist, preferably nationals or other Sahelians from institutions or universities in-country, available for the pre-cropping season experimental planning and for the post-season analysis of results at a minimum. These country socio-economic teams are vital to future IPM application. It should be noted that there is a difference between sociology and economics as disciplines and that social scientists may have training and experience in one or the other, but rarely both.

F. Analysis of Project Management

Administration

Under the decentralized system of project management put in place since the August 1983 amendment, the IPM project is managed in the following manner:

Each participating country has an IPM liaison officer position. At the present time there is a liaison officer in Senegal, The Gambia, Mali, Niger and Burkina Faso. No one has been hired in Cape Verde, Mauritania and Chad.

The project agreement is between CILSS and A.I.D. The technical assistance contract is between CILSS and FAO. Under the decentralized mechanisms each USAID mission is given an allotment of funds for each fiscal year based upon the budgets predetermined in the August 1983 Project Paper Amendment. The budget is reviewed by the tripartite consultative committee which meets in Ouagadougou and consists of representatives from USAID/Ouagadougou, FAO and CILSS. Once the budgets are determined, AID/Washington allots the funds to the missions. The missions in turn give authorization to USAID/Ouagadougou to sign an amendment to the Project Agreement to add the incremental funds.

The missions then receive an amendment to their country operation plan (COP) which is signed by CILSS, the host country and the USAID mission.

The above procedure was used as a result of the decentralized plan established in August of 1983 to develop the initial COP with each country for the period of 1984 to September 30, 1986 which is the end of project.

In some instances, this cumbersome process caused delays of six months or more before the COP was signed by all parties. This caused a break in funding which, in the case of Senegal, caused the FAO advisors to pay, out of their own pockets, thousands of dollars to keep the project going. If this had not been done, an entire crop season's research would have been lost.

The record keeping for project funds was transferred from Ouagadougou to the missions as of March 31, 1984.

The funds disbursed to the local units of the project in each country are placed in a commercial bank account and given as advances with the succeeding disbursement dependent on reconciliation of the previous advance and the bank account statements.

The only location where there appeared to be a problem in control of the local account was with the regional management

unit account of CILSS in Ouagadougou. USAID/Ouagadougou had the advisor from the regional financial management project review the records of this account in October 1984. The USAID should be asked to advise AID/W of its final determination regarding this account. As of September 30, 1983 as a result of the decentralization of the project, no additional funds are to be given to this account by the IPM project. The reconciliation is due for the funds remaining in the account as of that date.

The decentralized system is more effective than the previous management system; therefore, for the remaining life of project, it is not recommended to change it. However, for any continuation of IPM or a similarly named project beyond 1986, it is recommended that any regional component of the project to be carried out by a regional institution such as CILSS, INSAH or AGHRYMET be arranged by a separate project agreement with the particular institution involved.

For the remaining life of project, it is recommended that management of IPM/Mauritania be transferred from Ouagadougou to Noakchott. The mission should have an IPM liaison officer to assist in project management. The funds should be allotted to the Mauritania mission for FY 85 and 86 and a country operating plan developed and signed between the mission and host government.

Technical Assistance

The technical assistance is provided by FAO through an agreement with CILSS. They are, however, considered as an equal partner in a tripartite committee. They are not viewed as a contractor carrying out an A.I.D. project.

As FAO is a multi-lateral organization with over one hundred member nations, they would not accept the status of a contractor carrying out a project of one of its member nations. Also as a U.N. organization, USAID cannot audit the FAO accounts related to the project. A.I.D. can, however, request financial reports.

Because of the nature and status of FAO, there are some disadvantages to their providing technical assistance. Some of these are: 1) In two instances reports were requested by the evaluation team and they were told that the reports were confidential; 2) When a team member suggested that FAO provide French language training to an FAO advisor (paid for by AID), he was informed that FAO rules would not allow the expenditure of sufficient funds for language training, 3) FAO procedures require that the technical reports at the national level be forwarded to Ouagadougou and to Rome for review and comment without technical discussion and review between the country task force members (USAID, host country and FAO).

In addition to the above, another problem that surfaced regarding the decentralized structure is that, at the national level, unless all three members of the country task force are mature, qualified professionals, the system breaks down. This was seen in Senegal and Niger. In both instances part of the problem is with the FAO principal experts.

In the Niger case, the problem was exacerbated because FAO insisted on placing an expert there who historically has had serious problems with the key Nigerien research director with whom he would work. The problem was known by FAO, yet they insisted. The FAO person has since left the country at the request of the Niger government. FAO is now considering placing the same expert in Chad to start their new program there. This should be reviewed very carefully by the mission in Chad.

Another problem that was found during the evaluation is that the placement of host country participants for university training by FAO is evenly divided between U.S. and French universities. There are two problems with this: 1) no waiver was given for participants to go to a European university; and 2) there are differences in approach to research between the U.S. and the French universities. The technicians on the evaluation team believe that the French system over-emphasizes pure basic research and not enough hands-on applied research. As a result, participants return to the host country with conflicting approaches to research. It is the judgement of the evaluation team that the hands-on applied research approach is the most appropriate for this project and should be its focus.

This same issue surfaced with the FAO experts who were assigned in that some of them do not believe in getting their hands dirty and remain aloof from the daily demonstration and research trials.

The advantages, mentioned to us for using an organization such as FAO are: 1) broader pool of experts to draw from, 2) better language capability and 3) quick response for placement.

The above advantages are not a predominant capability of FAO. It is the evaluation team's opinion that qualified people with language skills can be identified by a private firm or university in the U.S. In addition, if there were a discernible edge by FAO in the above areas, it would not offset the disadvantages mentioned earlier.

It is the team's recommendation that, for any future phase of this project or any similar separate project, the technical assistance be sought on a competitive basis from U.S. private firms or universities.

Financial Management

For some reason, now unknown, the IPM and the RFCP projects were given the same project number, 625-0928. As a result, it is difficult to separate the expenditures that apply to each project as well as the actual amount authorized. In the process of reviewing the project documentation, an error or omission of \$2.3 million was found. There is further confusion due to funds authorized from a review of the records shows that the IPM project total is \$26,533,000 and the total for RFCP II is \$8,271,300.

The IPM project, until the amendment to the Project Paper in 1983, had a central management of financial matters through the USAID Controller in Ouagadougou. By March 31, 1984, the mission in Ouagadougou ceased to be the accounting station for the components.

The budgets totals for each country and the regional component were established through the Project Agreement with CILSS and then the specific budgets were established in the country operating plans (COP).

The following shows the amount obligated to date by component:

* Burkina Faso	\$ 19,455,916
Gambia	849,000
Cape Verde	873,000
Niger	1,048,000
Mali	1,033,000
Senegal	958,000
	<u>\$ 24,216,916</u>

* This total reflects amounts obligated for all components up to March 30, 1984 and from that date the total includes the Regional, Burkina Faso and Mauritania components.

The amount remaining unobligated from the LOP total of \$26,533,000 is \$2,316,084 which is less than the amount to be obligated for the remaining LOP. A request has been sent to all the missions asking them to do a complete budget analysis and a determination of the additional amounts required to carry out their program through the PACD September 30, 1986.

Each mission controller monitors the bank account established by the host government for the IPM project and requires a reconciliation of each account before authorizing reimbursement or an advance. Replenishments are now taking place routinely and in a timely manner.

No controller nor host country official commented negatively about the system now in place.

The USAID Controller in Mali commented that the budget breakdown is not adequate and that it should be by specific line item rather than broad category such as construction, technical assistance, operating costs, commodities, etc. A review, however, of the budget for the other missions shows that they are all broken down into specific line items. The Controller in Mali should request that the USAID and host country managers develop a more detailed budget.

One aspect of the financial management system that in the long run is counterproductive to institutional development is the requirement that for each IPM country component a separate bank account be established. Once the project is over, the bank account will be closed and no development of a new accounting system or strengthening of an old system will be left behind in the responsible ministry.

The process for developing the budgets in the country operating plans was cumbersome and caused delays resulting in funds being disbursed too late. The first example of this was in Senegal where the FAO advisers had to pay out of their pockets several thousand dollars to keep their research efforts going in order not to lose the research of an entire crop season.

The process involved allowances sent by AID/W to each mission which in turn had to authorize USAID/Ouagadougou to sign the project agreement with CILSS on their behalf. Then the COP was drafted in Ouagadougou, sent to each mission, usually changed and returned before it was ready for final signature by the four parties, e.g., CILSS, FAO, USAID and the host country.

It is recommended that in any follow-on project this procedure not be used and that each country component should have a project agreement between the host country and the USAID. The

regional component in Ouagadougou should also have its own project agreement. Any required relationship between the Regional and country components should be arranged through letters of understanding.

G. Conclusions (IPM)

Despite the magnitude and number of obstacles which have impeded the IPM Project, a necessary start has been made to focus national and regional attention on IPM as an approach which will become increasingly important to each country's long-term well-being. Government officials, researchers, and a few farmers have been made more aware of inherent dangers in the use of toxic chemicals; researchers have been networked, to a degree, in collaborative research; and donors have experienced the limitations of large-scale regional projects vis-a-vis more manageable bi-lateral single country activities. Equally important is the recognition that agricultural research is not a short-term proposition.

Many of the constraints observed by the evaluators, such as the shortage of trained manpower, weakness in local training institutions, and undeveloped extension services, have already been noted by some USAIDs and other donors and steps have already been taken to alleviate these limitations.

1. Entomology is strongly represented in both technical assistance and training in the IPM project. The need to increase the number of phytopathologists and weed scientists is present and will increase over time.
2. Except in isolated cases, collaboration with other regional programs in crop research (e.g. ICRISAT and SAFGRAD) as well as in-country programs is weak. This delays the application of results to farmers fields by reducing the potential pay-off of similar or collaboratively designed on-farm trials and research station work.
3. Technical expertise provided by FAO is not of uniform quality nor standard across the region. Where necessary, short-term technical expertise should be provided to country teams in specific areas such as crop loss assessment, research design and pilot on-the-farm trials.
4. Current pesticide policy must be modified to facilitate implementation of effective IPM strategies.
5. Overall priority pests are relevant to the region, with the exception of bacterial disease of rice.

6. With the exception of Senegal, little or no crop loss assessment is being carried out in the region under IPM.
7. The AGHRYMET component will complete a grasshopper prediction model by the end of project to use in forecasting outbreaks. The Raghuva and downy mildew models will take longer.
8. The socio-economic component is insufficiently staffed and needs to draw on in-country expertise in these fields as well as short-term expertise to produce acceptable IPM packages. There are few design linkages existing to ensure integration of socio-economic aspects.
9. There will be little overlap of returned participants and FAO technical assistance before the end of the project. This limits the long-term benefits of counterpart on-the-job experience and collaborative research.
10. The inclusion to some cash crop-centered research would likely lead to more readily acceptable IPM applications.
11. Based on performance of present IPM technical assistance, any future phases of IPM activity supported by AID should be awarded competitively.
12. Present project management is much improved after the recent re-structuring.
13. IPM packages will not be ready by end of project, but significant research capacity will have been developed.
14. The on-the farm pilot program has made a start toward bringing research trials to the farmers' lands but it should be re-examined and restructured before being replicated.

H. Lessons Learned

1. The complex administrative and management structure initially established for the project was too cumbersome. Country-by-country projects would have been simpler to manage and could have better accommodated the diverse situations in each country. A regional "umbrella" can play an invaluable part in integration and coordination of research, and in information gathering, archiving, and dissemination.

2. The project's concept, which requires a sophisticated data collection and analysis system throughout the Sahel, has proved to be too ambitious for the time allotted. The ability to manage a complicated regional structure is weak in the Sahel. An unrealistic time frame for development of IPM packages should not have been accepted.
3. The information necessary for crop loss assessments, and economic threshold analyses are far from adequate. Meaningful benchmarks will not be available within the planned life of the project.
4. The project paper was not clear about the reality of long-term basic research vs. short-term applied research. There should be a clearer understanding of the time-frame involved and expectations for each.
5. The IPM Project suffered from the outset from the lack of understanding of (or commitment to) the roles and responsibilities of the USAIDs, host country institutions, regional institutions, technical assistance contractor and AID/W. The project was placed under a regional organization, CILSS, which, according to its Executive Secretary, should not have been involved in project implementation. Furthermore, adequate project management at both the country level and at the regional level became a serious constraint.
6. The capability of each country to establish and maintain a separate IPM structure, plus a system of observation posts, laboratories, field trials, specialists in bio-control, crop loss assessment, entomologists, phyto-pathologists, weed scientists etc. should have been more accurately appraised before the inception of the project.
7. The systems for carrying out the demonstration trials and the Pilot Programme are not sufficiently developed for large-scale implementation throughout the Sahel. The Pilot trials were added late in the project as a method to speed up the verification and acceptability of IPM techniques. Their impact and replicability will be very limited by the end of the project and follow-on extension involvement needs to be addressed.
8. Using a multilateral agency as a technical assistance contractor has created many problems of accountability, accessibility to financial records, placement of participants in non-U.S. universities, and lack of control over quality of advisors.

9. In the participant training element, the selection of candidates for entomology training was over-emphasized, at the expense of plant pathology and weed control. Other disciplines such as agricultural extension training, communications, sociology, and agricultural economics, were overlooked entirely. In many cases, the institutions selected for the training were not appropriate for IPM indoctrination.
10. Emphasis should have been placed initially on developing the capability within existing research staff and extension services, rather than on developing a separate structure.
11. The project should have done adaptive research on known IPM techniques before trying to develop new techniques. This should have included research on proper use of pesticides along with non-chemical methods.
12. Having each project set up separate commercial bank accounts did not encourage institutional development by assisting the governments to set up better accounting systems.

I. Recommendations

1. The team recommends that the IPM project should be extended to the end of March 1987. The present PACD of September 30, 1986 is too early to finish the research conducted on the 1986 cropping season and to analyze and document the results. Many of the participants will not have completed their training by September 1986. Future AID support of IPM research should be handled on a bi-lateral, country-by-country basis, as determined by each USAID Mission and host government.
2. A number of participants from Mauritania and Niger who are nominated for B.S. degree training but who have not yet left for overseas should not be processed under the present project. At best, they would not complete training until 1989 or later if extensive English training is required.
3. Some of the M.S. candidates who have not yet commenced training and cannot complete it within a year should be suspended as well. If not, they will not return within the life of the present project.
4. If FAO does not place the remaining experts in country by the end of March 1985, those positions should not be filled.
5. Niger needs to replace with Nigeriens the eight Peace Corps Volunteers who are acting as observers in the observation posts. AID and the Peace Corps will need to collaborate on this action.

6. The Government of Niger should replace the two Egyptians, who presently are acting as host country counterparts, with Nigeriens during the next twelve months.
7. The weed scientists in the IPM technical assistance should provide regional as well as in-country assistance supplemented by additional short-term expertise.
8. The project should accelerate the integration of IPM research with on-going in-country crop research. A farming systems approach should be emphasized.
9. On-farm trials should be expanded to give practical research results in each country. Short-term technical assistance should be provided for research design, agricultural economics, farming systems, and agronomy to facilitate a more applied approach.
10. The staff of the Dakar Training Center should be used to the extent possible for conducting train-the-trainer type short courses in each of the IPM countries. The assistance of a short-term consultant in extension training could facilitate this activity. (Generated local currency may offer a source of financial assistance in some countries).
11. The INSAH Communications Department at Bamako has made a commendable start toward providing a technical communications network for agricultural research and extension in the Sahel countries. The financial support previously provided throughout the RFCP should be continued throughout the IPM Project, if possible.

IPM

625-0928

Evaluation Logframe

Purpose			Assumptions																		
<p>1. To establish a functioning coordinated integrated pest management and research program Sahel wide through which economically/ environmentally sound pest control methods appropriate for small farmer use will be developed for dissemination and extension.</p>	<p>System is still being put in place.</p>	<p>1. Host country project infrastructure, FAO staff, and counterparts in place by 30 Sept. 1983.</p>																			
<p>2. To produce tested research packages on selected key pests for extension through CILSS Annex A and other channels.</p>	<p>Trained cadre in place and prepared to carry out IPM.</p>	<p>Plan</p>	<p>2. Restructured project management will facilitate implementation. The decentralized system is working better than the previous system but more needs to be done to make it work effectively.</p>																		
	<table border="0"> <tr> <td>Phytopathologists</td> <td>13</td> <td>0</td> </tr> <tr> <td>Entomologists</td> <td>9</td> <td>0</td> </tr> <tr> <td>Weed Scientists</td> <td>6</td> <td>0</td> </tr> <tr> <td>Virologists/ Bacteriologists</td> <td>2</td> <td>0</td> </tr> <tr> <td>Crop Protection Specialists</td> <td>2</td> <td>0</td> </tr> <tr> <td>Observers</td> <td>110</td> <td>0</td> </tr> </table>	Phytopathologists	13	0	Entomologists	9	0	Weed Scientists	6	0	Virologists/ Bacteriologists	2	0	Crop Protection Specialists	2	0	Observers	110	0	<p>Act.</p>	
Phytopathologists	13	0																			
Entomologists	9	0																			
Weed Scientists	6	0																			
Virologists/ Bacteriologists	2	0																			
Crop Protection Specialists	2	0																			
Observers	110	0																			
	<p>Technical packages tested or model developed. No Likelihood of packages or models ready for field testing by Sept. 30, 1986. The only possibility is the three forecasting models for rhaguva, grasshopper, and downy mildew from the agro-meteorologist.</p>		<p>3. CILSS, FAO and AP develop cooperative working relationships.</p>																		
	<p>Possibly a crop loss assessment methodology by the crop loss assessment expert.</p>		<p>At the regional level it is working. Problems remain at the National level in several countries.</p>																		
			<p>4. No catastrophes or natural event prevents completion of research within prescribed schedule.</p>																		
			<p>The continuing drought has been a factor in carrying out demonstration trials.</p>																		

IPM

625-0928

Evaluation Logframe

Outputs		Assumptions			
	<u>Construction</u>	<u>Pln.</u>	<u>Compl.</u>		
1. Research facilities constructed/equipped; demonstration areas developed and in use.	Laboratories	14	6	1. Majority of construction approved and underway by Sept. 1983	
	Office	1	1		
	Insectaries/ screenhouses	7	0		
	Greenhouses	8	0	There is still a lot of construction that remains to be done.	
	Water Tower	1	1		
	Observation Posts	55	22		
	Generator House	4	1		
2. Observation network constructed/staffed; demonstration areas developed and in use.	<u>Training</u>			2. Majority of Commodity procurement finished or ready by Sept. 1983	
		<u>Pln.</u>	<u>Long Term Comp.</u>		<u>In-Proc</u>
	Entomologists	13	0		7
	Plant Pathologists	9	0		7
	Weed Scientists	6	0		4
	Bacteriologist/ Virologist	2	0		1
	IPM Specialists	2	0		1
	Socio-Economist				1
		<u>Short Term</u>			
	3. Sahelian Cadre Trained	Observers	110		
		<u>Inputs</u>	<u>Target</u>		<u>Actual</u>
1. Construction	\$			1. AID funds available and provided on timely basis.	
2. Commodity	\$				

Evaluation Logframe

Outputs	Assumptions
3. Technical/assistance/FAO \$	<p>Generally this was true. In some countries there was a delay in transferring funds from regional control in Ouagadougou to USAID missions. In one case a delay of six months caused problems.</p>
4. Training \$	<p>2. Restructured project management will facilitate implementation.</p> <p>At the decentralized level poor relationships between the host country and FAO in some countries has caused problems in implementation.</p> <p>3. FAO recruits experts rapidly.</p> <p>Some experts are still not recruited.</p> <p>4. CILSS/FAO/AID produce necessary plans/documentation on schedule.</p> <p>The problem mentioned in #2 above was in part caused by the delays in developing and approving the country operations plan.</p>

IV. CONTEXTUAL CONSIDERATIONS FOR BOTH PROJECTS

A. Institutional Aspects

In examining the institutional dimensions of the support for crop protection services and the role for IPM research in the region, it becomes evident that a substantial amount of variation in key institutionalization indicators occurs across the countries studied. The evaluation focused on aspects for long-term institutional capability such as government policy toward crop protection and IPM research, structural and organizational opportunities and constraints which affect linkages and the use of research results and regional dissemination and networking capacity.

The five countries visited by the team are included in the analysis as well as some partial observations on Cape Verde and Mauritania based on document review and limited interviews with CPS and IPM personnel from those countries.

Burkina Faso

Governmental policy toward agriculture in Burkina Faso is currently being reviewed and agricultural service delivery is being re-organized to 30 regional centers from the 13 former ORD (Organisme de Developpement Rural) organizations. The country is re-examining its pesticide regulation and subsidy policies in light of an agricultural policy aimed at increasing rural production through price incentives. The role of crop protection within the agricultural sector is being evaluated. Since there is no uniform extension system currently in place, individual IPM research efforts must look for local (near the research station) opportunities to link with agricultural extension activities. The unstructured system may in fact allow researchers easier access to farmers and extension workers to conduct initial trials. The constraints will come in the next step when experimentation yields transferable results and IPM research must be available on a country-wide basis.

The government is in favor of crop loss assessments for specific major food crops and considers pest damage the second most important factor in constraints to food production after lack of rainfall. The government (Ministry of Agriculture) also favors multidisciplinary research and supports the IPM regional approach which allows a nationally determined research focus along with regional priority pest research. Regional meetings to share results and solve problems are seen as positive aspects of the IPM project.

The researchers in Burkina are attached to IFRAZ (affiliated with IRAT) and therefore work for the Ministry of Enseignement Superieur et Recherches Scientifiques. Crop protection works for the Ministry of Agriculture and Livestock. There is a national body called the Commission de Protection des Vegetaux which meets annually to coordinate research activities. The dual ministry structure can lead to problems for utilization of results. The Minister of Agriculture in Burkina is the former head of crop protection and an entomologist by training and is therefore disposed to using IPM results in the agricultural sector.

The key determinant seems to be how heavily the CPS has learned to rely on chemical intervention either due to national policy or heavy donor support. In Burkina, the Canadians have supported Annex A and provided 200 tons a year of approved pesticides. The Crop Protection Service is heavily supported by CIDA and would be in danger of not continuing operations without Canadian support. The Annex A support has focused on training in safe pesticide use. IPM research dissemination would be partially dependent on the re-training of crop protection agents in new methods.

Overall, since Burkina Faso has not heavily used or subsidized pesticides and is not interested in expanding pesticide use, the possibilities for institutional support are not negative. A key factor to monitor will be the agricultural extension system and how it incorporates both crop protection intervention and the use of any IPM results.

Mali

In Mali, the research and crop protection services are in the same Ministry-Agriculture, but in different offices (directions). The CPS relies on the Direction Generale de l'Agriculture and the IPM research is under the auspices of the Institut d'Economie Rural (IER). The government considers pest problems of particular importance. During the last growing season, grain losses due to birds were substantial and whole villages are moving because of the problem. The government would like to see research targetted in rural areas and tied to varietal research. The government would also like to increase the number of researchers involved in IPM and is currently paying Malian IPM researchers' salaries. The main research coordinating mechanism is a technical committee for each food crop which meets annually.

Contrasted against seemingly positive government policy on the use of IPM research is the actual state of the crop protection service. Mali has had only limited support under Annex A, four scholarships from RFCP II and some equipment from

the Canadians. They are lacking in funding support from their government because their operations have been subsidized by a pesticide formulation plant up to now. Private sector users will pay for pesticide directly and apply it themselves, leaving the crop protection service with no way to get funds to subsidize farmer spraying. In addition, OCLALAV is withdrawing from Mali in 1986 and the state will have to assume the cost of bird control. Donors are and will be reluctant to fund a build-up of the Mali CPS at this juncture because of the pesticide linkage. Mali, therefore, is likely to have a weak CPS infrastructure for some time to come. The main avenue for diffusion of IPM in Mali will have to be the extension services of the "operations" (regionally organized crop production schemes). Any tie-in with CPS is likely to be minimal. A close look by the government at existing infrastructure and its ability to meet pest infestation problems should go along with the encouragement of IPM research. Ties with extension services will be even more important in Mali than in other countries because of the condition of the CPS. Rather than make an investment in it, it would be wiser to leverage for better pesticide regulation with the Ministry of Agriculture and identify alternative technology delivery systems through the operations.

Mali's primary interest in a regional IPM approach is to predict pest outbreaks and develop an early warning system. This hope seems unlikely in the near future for regional activities.

Senegal

With a plethora of ministries and institutions, Senegal has more infrastructure and more trained personnel than its Sahelian neighbors, but also more coordination problems. The Crop Protection Service is under the Ministry of Agriculture and the IPM project under ISRA (Institut Senegalais de Recherches Agronomiques) of the Ministry des Recherches Scientifiques et Techniques) (MERST). Although again a national research coordinating committee exists, it is composed of too few members to ensure a useful dialogue on the direction and use of IPM in crop protection. Senegal also has problems related to research coordination of IPM, AGRHYMET and CPS observation posts. Unless an organization in-country takes the lead to coordinate data gathering, Senegalese IPM post findings may only be of use regionally and not to Senegal.

The outreach dimension of on-farm IPM use is also constrained by the multiplicity of extension organizations with overlapping responsibilities (Ministries versus Societes de developpement). Current COS agricultural policy reform could lead to a restructuring of these systems making research - farm linkages more likely, but little action has been taken to date. The

government identifies crop protection among its top priorities but a heavy pesticide use policy, despite the appearance recently of regulation legislation, makes the utilization of IPM results by crop protection agents unlikely. It will take monumental efforts by the GOS and research organizations to form the linkages necessary in the existing structures to implement a research results use network on a national level. Most immediate pay-off will probably be in areas where researchers work directly with farmers and IPM practices are adopted by demonstration. The organizations controlling the extension agents being trained at the Dakar Training Center will probably not coordinate sufficiently to diffuse results in the field. There has been cross-over training between the RFCP and IPM projects with persons training under Annex A currently receiving further training under Annex B in research.

The government places particular importance on seed grain protection and post-harvest loss problems since these have a direct effect on groundnut production. Current government policy subsidizes pesticide use to encourage farmers to treat crops. Research is partially seen by top agricultural decision-makers as a means to test pesticide efficacy and not to seek its alternatives.

In all, several agricultural and research officials suggested that national and regional (sub-national) coordination mechanisms need to be created to permit utilisation of IPM research results. The difficulty of such a coordination task in the multi-institutional Senegalese environment is not to be underestimated.

The Gambia

Institutionally, the Gambia is restructuring the agricultural service delivery system to eliminate duplicative extension activities at the farm level. The Crop Protection Service is directly involved in this re-organization and will probably emerge as one of five functional areas within the extension service which will provide technical backstopping and training to the new multi-purpose extension agent assigned at the village level. In order to fulfill this collapsing of services, CPS will have to reduce its number of field agents. The fate of those being trained in IPM research is uncertain and care should be taken that they have a place in any agricultural research program being planned. The issue of which part of the ministry the subject matter specialist in pest control will work for is unresolved and bears watching. A joint research extension appointment is not practical if the specialist is not tied concretely to agricultural service delivery systems. The current

USAID planned Agricultural Research and Diversification project provides a means of monitoring larger structural changes in the agricultural sector in the Gambia with repercussions for IPM and crop protection.

In the Gambia, crop protection issues are being treated separately from crop production research, and this could lead to utilization problems. Unfortunately, the Pilot Programme in 1984 did not take advantage of opportunities to link with other agricultural research efforts in the test areas. Current research emphasis nationally is on varietal improvement for resistant food crops. A national Agricultural Research Advisory Board includes research and extension, but no other departments. The opportunity to meet with other directors of research in the Sahel through CILSS is seen as a positive aspect of regional involvement and the Gambia is anxious to share crop specific IPM results with other countries. The regional data gathering system being put in place is likely to have too long a lead time to help with outbreak problems in the Gambia and so they would like to have their own system to process information. This issue should be of importance to other countries as well to ensure adequate data treatment capability in-country to mirror information going out and being compared regionally at AGRHYMET.

The Gambia has passed pesticide legislation making it one of two countries (with Senegal) to have done so. As noted earlier, pesticide use problems persist even with concerted safety efforts and farmers are attuned in many areas to seeing chemical intervention work. A potential source of increasing pesticide abuse will be the expansion of commercial cotton farming by French investment in the eastern part of the country. Other countries in the region have cited this crop as the one which causes the most pesticide control problems. There is national concern as well over lack of quarantine capability and a highly permeable border with Senegal.

While the IPM project appears to be well-integrated structurally in the Gambia, upcoming changes in the extension system bear watching to make certain that structural roadblocks to IPM result utilization are not created.

Niger

Lack of trained personnel in Niger has led to some serious impediments to institutionalization. No host country counterparts are working as IPM researchers although other Nigerien scientists are involved in crop protection related research outside the project. No Nigerien participants have left for long-term training. A large number of IPM observation posts are staffed by U.S. Peace Corps Volunteers. All these facts add

up to a diminished opportunity to build and continue a human resource base post-project. Current research focus in Niger is mainly on food crops with a heavy emphasis on resistant variety development. Since the government has difficulty financing agricultural inputs, there is an interest in developing non-chemical crop protection techniques; however, the availability of large amounts of free pesticide (notably from the Japanese) mitigate against applying traditional and IPM techniques of crop protection. The crop protection service is part of the Ministry of Rural Development while the IPM research program is run out of INRAN (Institut National de Recherches Agronomiques Nigerien). There is a general lack of researchers in Niger though the government would like to have more people trained. This problem is unlikely to be remedied soon due to a very lengthy and cumbersome process of participant selection. Some donors such as Canada have been forced to cancel scholarships in crop protection (36 person-years) because of lack of candidates.

The need to staff observation posts with Nigerien agricultural agents has been recognized but no action has been taken to date. Peace Corps should be encouraged to reduce their volunteer staffing quickly to allow for greater Nigerien participation.

On the positive side, Niger has a more realistic recurrent cost policy and deliberately reduces training programs when it knows it cannot put the newly trained government employees on its payroll. This approach, while not conducive to meeting immediate donor project objectives, nevertheless can lead to a more realistic build-up of sustainable institutions in the long-term.

There is no pesticide regulation legislation in Niger and GTZ is sponsoring government work in this area under Annex A which should be noted and encouraged by all the donors. The government will need to be nudged toward a policy which can allow IPM results to be tried without competing with pesticide.

The IPM component at AGRHYMET is focusing on predicting raghuva, mildew, and grasshoppers but will only have one model to use by late 1986 (grasshoppers). A region-wide initiative between member states will have to begin perhaps in conjunction with quarantine protocols and pesticide legislation to bring about an outbreak-prediction capability tied to using eventual AGRHYMET results.

Cape Verde

Although the team did not visit Cape Verde, discussions with IPM and CPS personnel from there permit certain distinctions to

be made about the institutional setting. One ministry is responsible for both crop protection and IPM work. This can be positive if the proper linkages to field work are made. The extension system in Cape Verde is weak and its ability to disseminate results is very limited. There is a lack of persons available to be trained in IPM and scholarships are not needed. A coordination committee chaired by Agriculture looks at crop protection issues and has expanded the scope of research work to include irrigated agriculture also. Cape Verdian experts estimate that at least 10 years of work will be needed to reach an extendable technical package. Biocontrol measures and a strong quarantine system offer the most likelihood of assisting Cape Verde to meet its crop protection needs. Regional applications of results will be limited by agro-climatology and crop differences.

Mauritania

Mauritania data were collected from visiting experts. The IPM program is part of the crop protection service and works closely with it. A radio system set up for the CPS can also be used to transmit IPM observation post data. There is interest in re-defining phyto-sanitary law but no pesticide legislation exists. The returns for pesticide investment to the Mauritanian farmers in dryland agriculture are considered so small that the GIRM pays for application.

Participation in a regional project was judged beneficial by the Mauritanians because of access to information dissemination on activities in other countries.

Summary

The institutional context of IPM and crop protection in each country should be monitored closely from now until end of project for key indicators such as structural changes which promote or inhibit research coordination; national policies toward pesticide control and subsidy; changes in the agricultural extension system effecting possible use of IPM; and placement of returning participants. Despite some solid technical beginnings in a few countries, IPM and the crop protection services will have difficulty utilizing research results at farm level under current institutional realities. The problem of late returning (1986 or 87) participants further handicaps the IPM project as a "critical mass" of experts will not be in place at projects end.

Recommendations for Future AID Interventions

The observations of the evaluators, coupled with opinions expressed by the USAID Missions, overwhelmingly point to continued assistance in bi-lateral country programs. In this fashion, the capabilities and willingness of each country can be carefully gauged.

Nonetheless, there are some regional functions which are still necessary and which should be addressed:

- a) Coordination and complementarity of research can be encouraged throughout frequent regional conferences such as the December 1984 conference in Niamey. Progress reports can also be shared on such occasions. AID financial support would undoubtedly promote greater participation in such conferences.
- b) A sincere impulse toward networking researchers in the region has been initiated by INSAH. The functions it is undertaking would be very costly for each country to perform individually. The continued and augmented financial support by AID could permit refinement and expansion of INSAH's periodic technical publications, digests of journal articles and other research reports, and translation of external research papers for distribution within the region.
- c) There are indications that much related agricultural research conducted over the past several decades rests in archives in France. A search of these annals might well avoid the time and cost of "rediscovering" these findings. INSAH could serve the entire region in this search and dissemination.
- d) No single project can foresee every technical need which may emerge in a project as large and important as IPM. A regional liaison person, specialized in pest management and attached to INSAH, could serve as a monitor to recommend and coordinate short-term specialists for individual country consultations or for regional seminars and short courses. Funding would be required for the long-term monitor, short-term consultants, and for conducting short courses and conferences. The talent and experience of the Dakar Training Center could undoubtedly be utilized in carrying train-the-trainer type of courses to each country. In view of the continuing USAID bilateral country

activities, the regional liaison person should be sponsored by AID.

Recommendation:

The evaluation team, therefore, recommends that design be commenced on a single new follow-on regional project to incorporate aspects of CILSS annexes A, B, G1 and G2. Essentially, this would be a low-investment "skein" to preserve the progress made to date and to insure the continuation of a network system in the future.

B. Summary of Findings on Economic Aspects

1. On Crop Loss Assessment Efforts

- Such work is at a very rudimentary stage in both the IPM and RFCP projects. There has been some progress, however, in developing appropriate methods for yield loss assessments on early millet.

- The ongoing search for improved methods should be continued, but the perspective of the crop loss analysis should be considerably enlarged. Losses other than those due to direct feeding insects and of crops other than millet should be considered. Methods more geared to economic analysis of crop losses should be used. Techniques which permit examination of interaction between insect, disease, and weed attack and other variables should be developed.

- All on-farm trials should be routinely subjected to a crop loss assessment procedure.

- Thought should be given to how the crop loss assessment effort can be regionalized in 1985 and 1986.

2. On Economic Thresholds

- The calculation and application of economic thresholds for pest management interventions on specific crops in even "typical" farming situations has not been accomplished in either the IPM or RFCP projects to date.

- While the establishment of economic thresholds for interventions on various pests remains a desirable objective, present giveaway policies with regard to pesticides are establishing a precedent for crop protection services which may make later implementation of an economic threshold concept by the services difficult for farmers to accept.

- Attention should, therefore, be directed toward:

. introducing the concept even with tentative thresholds into the crop protection services;

. introducing user's fees for chemical sprays wherever possible as fast as possible; and

. sketching out, on the basis of present knowledge, a program for estimating with more precision what economic thresholds for important insects, diseases, and weeds are likely to be. Even though tentative, these thresholds would

serve to direct research efforts where the thresholds are relatively wide and to further sensitization of crop protection services and other agricultural decision-makers on the costs of possible interventions and the benefits which could be realized with their application.

This tentative threshold establishment would involve:

- . compilation of representative crop budgets for farmers in specified agroecological zones;
- . definition of possible IPM crop protection interventions;
- . sensitivity or risk analysis to determine plausible thresholds.

3. On the Comparative Costs and Benefits of Potential IPM Interventions

- As there has been no attention devoted to the economics of interventions being developed and tested, either in on-station or on-farm trials, it is difficult to improve upon the cost-benefit analysis in the KFCP III project paper.

- The basis for quantification of costs and benefits must, however, be improved in the remaining years of the IPM project. Three steps are suggested:

- . modifying the selection procedures for farmer-participants in on-farm trials to get a wider range of farmers;

- . pulling together existing farm budget information and estimated crop loss data (already discussed above) to determine costs of and returns to potential interventions; and

- . targeting research efforts and recommending new initiatives on the basis of these analyses.

4. On the Pilot Program Activity in The Gambia

- The Pilot Program Activity was evaluated as a special activity to see whether:

- . such an activity is likely to be useful to researchers elsewhere (particularly those countries slated for similar activity in 1985 and 1986);

. a pilot effort is likely to effectively bridge the gap between individual research findings and an integrated application of pest management techniques at the farm level; and

. the returns are likely to be commensurate with the costs (as the Gambia effort ran over \$10,000 per participating farmer).

- The utility of the Pilot Programme to IPM researchers in Gambia is judged to be practically nil. Pest incidence was low; few interventions were planned to test any approaches to pest management which were significantly different from farmers' present (or extension-service recommended) practices; and small sizes and limited data collection efforts weakened the predictive power of the activity.

- The Pilot Programme approach was also felt to be unlikely to provide an effective bridge to extension. In the Gambia experience, crop protection service agents duplicated extension tasks even when there were extension agents in the villages. Even though the results in yield terms were positive, it is unclear whether the participating farmers adequately understood the reasons for the differences and whether they would be willing to follow the "IPM package" on their farms without the project inputs.

- While complete cost data on the Gambia Pilot are not available, it would appear that, overall, the costs were excessively high for the amount of information and experience gained. Even discounting the salary for the expatriate Pilot Programme manager, the cost of inputs and field supervision must have run about \$3500 per field.

- in summary, it is suggested that consideration be given to strengthening the on-farm trials programs already ongoing in most IPM research programs rather than to undertaking new, separately-managed Pilot Programmes. In addition, it is recommended, on the basis of the Gambia experience that:

. objectives of on-farm activity require clarification;

. distinctions between different possible types of village-level activity should be carefully made; and

. every effort should be made to increase the cost-effectiveness of on-farm trials conducted with IPM project funds.

5. On the Capability of Sahelian Governments to Sustain the Present Level of Effort without External Support

- If the focus of IPM remains on foodcrops, there will be no possibility for governments to capture the benefits of research directly and to earmark part of these benefits to support ongoing research.

- Governments in the Sahel do appear to allocate a fairly high priority to pest control, however, and may, therefore, be willing to provide public budgetary support to sustain the research effort. IPM research units will have to compete with other research efforts and perhaps with what are perceived to be effective crop protection service activities (e.g., chemical spraying).

- Charging users for public crop protection services may be suggested as one way governments could generate resources to sustain the research effort.

- Governments also will have to be alert for ways to increase the cost-effectiveness of the research effort and reduce recurrent costs. Thanks to the training efforts of the IPM project, most countries will at least have minimal capacity to staff units with national professionals, but efforts will have to be made to use this specialized research talent in a most efficient way.

- On-farm trials, for example, should only be done in collaboration with farming systems research teams or other research teams (soil fertility, commodity development, etc.) so as to minimize the amount of time IPM scientists have to spend on general field administration. Varietal trials should only be done in collaboration with breeders and agronomists in commodity improvement programs so as to minimize IPM scientists' effort on the agronomy of growing the crop to be analyzed for pest resistance.

- The possibility of developing a collaborative research program involving other countries in the region should not be overlooked as a way to reduce costs. The evolution in the IPM project to date has been toward national emphasis on all priority pests; a more regional approach could be based on national specialization in one or more pests -- with all countries sharing the results. Senegal, for example, could continue to take the lead in investigations leading to biological control of raghuva, while Niger, for example, could specialize in varietal development (given access to the ICRISAT regional millet breeding facility) or in agrometeorological modelling (given access to AGRHYMET facilities) for this pest.

. In addition, a more concentrated focus on improving the efficacy of farmers' traditional methods of control might be suggested as a cost-saving research strategy.

6. On the Potential for the IPM and RFCP Projects to Generate a Stream of Benefits

- There are few data in hand to permit confident assessment of the magnitude of the benefits likely to be realized. On the basis of people met and the kinds of work being done to develop the knowledge base upon which future IPM interventions will be funded, however, there are indications that such benefits will be realized if research efforts are sustained.

- For example, Raghava has now been documented in both Senegal and Niger as causing major yield losses in a major foodcrop. Since it does not occur in such levels outside of the Sahel, it is essential that research on this insect be done in the region. Basic understanding of the biology and ecology of this pest, some knowledge of its natural enemies, and a preliminary understanding of the relationship between bioclimatological factors associated with millet production promise more research gains in the future.

- There is still some distance to go in accomplishing the research and training tasks needed before IPM interventions can be broadly extended to farmers.

C. Extension and Training Description

Burkina Faso

The delivery of extension services is decentralized to the various regional development projects in the country (ORDs) where both planning and implementation are realized. The evaluators did not visit any of the ORDs but received reports of considerable variation in the activities and effectiveness of extension and the organisms. At the Ministry level, limited coordination and support of the ORD programs is undertaken, in the form of national publicity, production of radio programs on general topics for the farm audience, in-house communications and assistance in planning training programs.

Ministry of Agriculture officials recognize a need to unify the extension staff throughout the country and improve the effectiveness of communicating with farm families. To this end, several extension approaches will be studied in order to select the best organization for the country. They are aware that this will be time-consuming but feel no immediate pressure because new extendable technology is not yet available. In the meantime, the Ministry hopes to upgrade its field staff to be better trained for on-the-farm extension work.

Under the IPM, 5 participants are being trained:

2 at Univ. of Idaho for M.A. degree in Entomology to be completed in 1987;

1 at University of Rennes for Ph.D in Plant Pathology, by 1987;

1 at Univ. of Nancy for Ph.D in Weed Control to be completed in 1986; and

1 at University of Idaho for M.A. degree in Integrated Pest Management to be completed in 1987.

Academic training for future agricultural workers is conducted at two national institutions, both of which have been supported by the USAID Agricultural Human Resources Project.

The Centre de l'Apprentissage Agricole at Maturkou trains Techniciens Agricoles (TA) and Techniciens Supérieurs (TS). About 60 TAs are graduated per year after 3 years of training; the turnout of TSs is 40 per year after an additional year of training. Both courses involve considerable field practice for the students. At least 8 years of schooling are required for admission to the CAA and most of the graduates find positions in government agricultural work. With the recent demands on the government's finances, it is unlikely that there will be any increase in enrollment in the near future.

Personnel for higher level positions are trained at the Institute Supérieure Polytechnique at the University of Ouagadougou. A 3-year course leads to a "License" in agriculture while an additional 2 years provide the title of Ingénieur Agronome. Its output of 25-30 graduates per year includes livestock and forestry specialists. The final year for both levels requires 1 year of farm experience at the College farm at Gampella. This includes an individual research project in the student's area of specialization.

Faculty of the ISP is invited to the national agricultural research conference. Extension specialists also participate actively in this conference.

Mali

Mali participates in both the RFCP and the IPM Projects. Technical assistance in crop protection by the Canadian Government during the first years of the RFCP resulted in the limiting of A.I.D. support to training and the provision of commodities. With the termination of CIDA assistance, A.I.D. has been approached to play a more active role in the development of the Millan Crop Protection Service.

Upper level extension workers are reported to exist in adequate numbers but the Malian Government has in recent years emphasized improvement in quality and quantity of field staff. The majority are assigned to various projects (Operations) in the country with minimal liaison with the central Ministries and with research institutions. An extension agent typically works with 3 to 5 villages in his "Operation" and works hand with an on-site member of the Crop Protection Service. Coordination at the local level is reported to be harmonious. Quality of the monitors and specialists in extension has improved of late, but there is no formal liaison between extension and research. There are some research field trials being conducted on farmer fields and these are arranged through the Crop Protection Field Trials Officer. The CPS may undertake field trials on its own and passes the results back to research. ICRISAT and SAFGRAD findings were reported as having been subjected to such trials by the CPS.

The overseas training component of U.S. assistance under the RFCP consists of:

1 participant at Oklahoma State U. leading to M.S. degree in Entomology, completed in 1982.

2 participants at Texas Tech leading to M.S. degree in Entomology, completed in 1983

Under the IPM Project, six nationals will have been trained overseas:

2 in Paris in Entomology to the Ph.D. level (1986)

1 in Montpellier in Weed Control to the Ph.D. level (1987)

1 at Mississippi State in Bactero-Virology to Ph.D. (1986)

1 at Texas A&M in Plant Pathology to Master level (1986)

1 at Montpellier in Plant Pathology in Master level (1985)

Academic agricultural training is actively supported through a contract with the Southeastern Consortium for International Development (SECID) providing 5 Ag Educ. Specialists. The Centre d'Apprentissage Agricole (CAA) offers two years of agricultural education courses leading to the title of "moniteur". A third year at a Centre de specialisation includes field practise and advances the graduate to the specialist grade. About 170 moniteurs matriculate each and, until recently, all have been absorbed by the civil service. Restrictions recently imposed by the IMF may limit future assignments to the government.

Senegal

Although agricultural extension is a function of the Ministry of Agriculture in Dakar, its personnel are dispersed among several societies de developpement throughout the country. Activities of the agents are determined at each operation, as opposed to nationally directed programs. In general, the extension field staff works closely with the Crop Protection Service in each region. During the dry season, the Dakar Training Center is used to provide in-service training for the Senegalese field workers, as well as for some farmers.

U.S. training has provided 3 B.S. degrees, and a 4th should be completed in 1985, all under the RFCP (3 Entomology, 1 Plant Pathology). Under the IPM, one participant is training in entomology in the U.S., and another in weed control in France. Degree level training is not available in-country. The Agricultural School at Bambey provides training equivalent to one-year beyond secondary, while much of the preparation for farm level extension field staff is accomplished at the D.T.C.

The dispersion of extension services among many agencies, and discussions of possible reorganization or cutbacks have not helped to integrate services to farmers. Indeed, the CPS may be obliged to absorb more extension agents if reorganization takes place. In any case, some standardization of training in extension for most agents seems to be needed, and the Dakar Training Center is helping in a small way to meet this need. This has been a reasonable evolution of the DTC as its role in regional projects has diminished.

The DTC produces some instructional aids and hand-out materials for use in the training it provides at the Center or outside. It has reasonable training facilities and teaching aids, and has dormitory facilities for 20 persons. The versatile staff of 4 is occasionally supplemented by specialists to handle a fairly wide range of subjects.

The Gambia

Agricultural Extension and Agricultural Research in the Gambia are directly under the Director of Agriculture, which greatly facilitates linkage at the national level, but the Crop Protection Service has been separated from the Department. An agricultural research advisory board was formed to integrate research efforts in the country but its meetings are irregularly convened.

After Gambia's independence, all extension activity was under the jurisdiction of the Department of Agriculture but as donor

activities undertook individual development projects, much of the Extension staff was siphoned into the separate projects with no formal links to the national office. A USAID Agricultural Research and Diversification Project seeks to upgrade the existing Extension staff and the host government is very much aware of the need to unify and further train extension staff. The Department of Agriculture feels that it has a sufficient number of field agents, with an average of 5 villages served by each agent. The attitude of farmers is favorable toward improved practices. The IPM "pre-extension" pilot trials have attracted much attention and all farmers interviewed in two villages favor expansion of this method of exposing them to potential improvements. Extension field staff serve as farmer contacts as well as monitors for possible pest infestations.

Two participants were trained in the U.S. under IPM but, unfortunately, one died away after his return. Six more Gambians are programmed for U.S. training under the RFCP and four others to train in Nigeria. Many staff members have received short-term in-service training in other West African countries and the U.S.

Supporting services to field staff are provided by the Extension Aids Unit which produces brochures, an Extension Workers' Handbook, and SENELAA, a periodic house organ. The Unit also produces a weekly radio program in two or three languages for farmers, conducts radio listening sessions at village level, and operates three mobile audio-visual vans in rural areas. The Unit has a well-equipped audio-visual production facility.

Niger

Research and Extension are under separate directorates within the Ministry of Rural Development in Niger. Lower and intermediate level training is handled under the same ministry, while degree level training is the responsibility of the Ecole Supérieur d'Agronomie of the University of Niamey. A national coordinating committee has been established to guide all agricultural research and field programs in the country.

Extension programs are determined at the national level and submitted to each of seven "departements" in the country for implementation. The training and direction of the field staff is admittedly weak, and the Ministry is taking positive steps to improve their effectiveness and to promote better contacts with the farm population. USAID directly supports two projects which are intended to accelerate the process - the Niamey Department Development Project and the Agricultural Production Support Project; Other donors are also actively involved. Farmers are being directly trained at annual live-in training centers, while new field staff members receive two or three years of formal

training at the Polytechnic Institute for Rural Development at Kolo. Currently, emphasis is placed on increasing the amount of practical field work being provided for the enrollees and the curricula are undergoing gradual revision to better train the future field staff for working at the farmer level.

Many opportunities exist for long-term overseas training but difficulty has been experienced in obtaining appropriate candidates. Under the IPM Project, for example, of the seven training grants planned only two persons are about to be selected as of November 1984. Both are destined for studies in France (plant pathology and weed control). The paucity of qualified and available staff will persist for several years. This is recognized by the host government and many donors and long-range corrective measures are being taken.

Mauritania

The evaluation team did not visit Mauritania but had an opportunity in Dakar to discuss project activities underway with the Director of PV and the FAO advisor. Such extension activities as exist are considered weak and are splintered among several "perimeter" schemes. A USAID Project in integrated rural development (DRIG) was to promote research trials on the farmers' land but was halted prematurely.

At the entry level into the Extension Service, candidates must have completed the lower school and are then trained for a complete cropping season working in IPM activities. Enrollment ranges between 10 and 20 per year and successful completion earns the title of "conducteur". Additional training for the "encadreur" level and the higher rank of "Technicien Supérieur" are provided at the Agricultural School at Kaedi. Current enrollment is approximately 50 students, and this is the highest level of agricultural training being provided in Mauritania.

Overseas training under IPM has sent 2 participants to Morocco, and 3 to the U.S. Another 15 staff members have attended diverse short courses. The emphasis from 1985 onward will be on additional short course training.

Mauritania feels pressed to accelerate the extension of improved practices to the farmers, but also recognizes the need to strengthen the Extension Service. An Extension Specialist has been attached to the Project to assist in additional training, and the national Extension staff will be brought in to the research field trials to accelerate the transfer of technology. Farmers express interest in improving their practices, but will probably accept changes only in "small bites". To satisfy the felt needs of the farmers, the Mauritania IPM staff would like to

involve the Extension staff and the farmers at an earlier juncture in the research field trials. This would assure direct linkage among Research, Extension and Farmers.

Cape Verde

The evaluation team did not visit the island nation of Cape Verde but did have a discussion with the Chief of Plant Protection, and the Director of the Food Crop Production Department. With headquarters at Santiago, the field services are extended through a representative on each of the other 8 inhabited islands. Under the RFCP, two participants were trained for two years in the U.S. and two additional people spent 7 months with the APHIS organization in the U.S. Some scholarships have been made available by other donors. All participant training under the IPM Project will be short-term.

The CPS provides some extension service to the farm families, and other projects (GTZ, USAID Watershed Protection) are involved in Extension. The Ministry of Rural Development has plans to place all Extension Services under the CPS.

The unique island situation is a mixed blessing. Communications and transport problems must always be a consideration. At the same time, the isolation impedes the spread of plant pests. The government emphasizes plant quarantine measures to this end. The Project representatives were of the opinion that integrated pest management is indeed important for Cape Verde, but the considerable differences in crop production and pests minimize the benefits it can expect from a regional project for the Sahel region.

General Observations on Extension

In a brief overview of the extension needs and the resources available, one generalization can be made; that is, the need exists to upgrade the quality of existing extension field staff. Unquestionably, some countries need more field workers to maintain contact with the farmers, but budget restrictions may not permit. Other countries may have a sufficient number but the services rendered are not meeting the needs of the farm families. In some instances, the existing staff is deployed to projects which are concerned with site-specific developmental activities.

The training which has been provided to farmer-level workers ranges from a single year of on-the-job training to at least 3 years of academic studies which includes one year of practical farming experience. Very little attention has been given to the basic philosophy of agriculture extension or to the sociological aspects of dealing with rural families in West Africa. Fortunately, this has been recognized by some upper level agricultural officials, -- and by some donor agencies who have already undertaken projects to improve the training of the future field workers in some countries.

Another recourse, which seems to have been neglected, is to provide annual in-service training for the present field staff to enable them to better satisfy their job requirements. Topics which were not provided in their formal training can be presented in one or two-week sessions during the non-cropping seasons, such training will undoubtedly be more meaningful as a result of their field experience to date. Two or three experienced trainers, using train-the-trainer techniques, can provide the necessary groundwork in two or three presentations in each country to enable a local cadre to continue the training function on its own.

Annual in-service training can also bring the participants up-to-date on technical subjects and program planning.

The assignment of an Extension Training Specialist to the IPM Project and the utilization of the Dakar Training Center staff could provide the essential take-off point for regular in-service training in each of the participating countries.

General Observations on Participant Training

Table 2 lists the overseas training provided by the RFCP. All but 2 of the 24 participants were sent to U.S. institutions and 5 have not yet returned from their studies.

Evaluators felt that the training under RFCP was quite well planned as to numbers but would have suggested more attention to Plant Pathology and additional training of some B.S. candidates to the M.S. level. This would have qualified them to conduct research projects.

IPM plans call for 35 participants. As of November 1984, 18 have commenced training of whom 8 are in the U.S., 8 in France, and 2 in Morocco (See Table 1). The team notes that no trainees have yet completed their training, and only 2 will have returned by September 1986, the scheduled end of the project. Another 17 participants have not commenced training.

Specific recommendations for the training component are:

Gambia - needs a weed specialist at the B.S. level.

Burkina Faso - an additional plant pathologist to M.S. level.

Mauritania - Bacterio/virologist training should instead be plant pathology. Master's level training should be the target for the Mauritians.

Senegal - The remaining plant pathology trainee should work toward a masters degree.

Niger - Switch ento/taxonomy training to general entomology to masters degree.

Regional - Provide participant training in agricultural extension to the master level.

Niger is experiencing difficulty in identifying qualified people for training and has not yet sent its first candidate.

The team felt that future IPM participant training should be provided to a greater degree in American or Canadian universities which are more oriented to the IPM approach, and offer more practical field experience than is usually provided under the French system.

Table 1

IPM/RFCP TRAINING-PROJECT GCP/RAF/128/CLS

Name	Country		Field of Study	University/ Location	Degree	Dates		Position Intended Upon Comp
	of origin	of study				start	concl.	
A. Ouedraogo	B. Faso	U.S.A	Entomology	U. of Idaho, Moscow 1/	M.Sc.	26.6.84	25.3.87	Entomologist
A. Combari	B. Faso	France	Weed Control	ENSAIA, Nancy	Doctorat de 3e cycle	5.10.83	4.10.86	Weed Control Officer
A. Zampalegre	B. Faso	U.S.A	Entomology	U. of Idaho, Moscow 1/	M.Sc.	24.7.84	23.4.87	Entomologist
D. Pare	B. Faso	France	Plant Path.	ENSA, Rennes	Doctorat de 3e cycle	5.10.84	4.10.87	Plant Path.
D. Traore	B. Faso	U.S.A	Integrated pest Mgmt.	U. of Idaho, Moscow 1/	M.Sc.	1.7.84	30.4.87	Specialist of IPM
M.E. Njine	Gambia	U.S.A	Entomology	Oklahoma St. U., Stillwater 2/	B.Sc. + M.Sc.3/	5.8.83	4.5.87 4/	Entomologist
M.B.S. Canteh	Gambia	U.S.A.	Plant Path.	N. Carolina St. U., Raleigh	B.Sc.	29.12.83	28.9.87	Plant Path.
K. Toure	Mali	France	Entomology/ Taxonomy	Universite de Paris-Sud, Orsay	Doctorat de 3e cycle	1.11.83	31.10.86	Entomologist
A. Hamadou	Mali	France	Entomology	Universite Pierre et Marie Curie, Paris	Doctorat de 3e cycle	4.11.83	3.11.86	Entomologist
E. Dembele	Mali	France	Weed Control	ENSAM, Montpellier	Doctorat de 3e cycle	1.11.83	31.10.86	Weed Scientist
Y.B. Kouyate	Mali	U.S.A.	Bacterio-Viro- logy	Mississippi St. Univ., Mississippi 5/	Ph.D.	19.4.84	18.12.86	Bactrio-Viro
F. Sacko	Mali	France	Plant Path.	CEAT, Montpellier	Diplome Ing. Agron.	16.9.83	15.9.85	Plant Path.
M. Diourte	Mali	U.S.A.	Plant Path.	Texas A&M U. College Station	M.Sc.	12.5.84	11.9.86	Plant Path.

M.A. Cheikna	Mauritania	Morocco	Phytopathology	Institut Agron. B.Sc. et Veterinaire Hassan II, Agadir		24.11.83	23.7.87	Phytopath.
A.Y. Kidi	Mauritania	U.S.A.	Entomology	U. of Idaho, Moscow, 1/	B.Sc.	19.8.84	31.12.88	Entomologist
B. Bourema	Niger	France	Phytopathology	ENSA Rennes	Docteur- Ingen.	12.84	31.12.87	Plant Path.
I.D. Assoumane	Niger	France	Weed Control	ENSAIA Nancy	Doctorat 3e Cycle	12.84	31.12.87	Weed Scientist

N.B. 5 fellows from Niger and 5 from Mauritania request a 5 years training (Jan 85 - Jan 90 ???)

<u>Name</u>	<u>Country of origin</u>	<u>Country of study</u>	<u>Field of Study</u>	<u>University/ Location</u>	<u>Degree</u>	<u>Dates start</u>	<u>concl.</u>	<u>Position Intended Upon Comp</u>
REGIONAL DIRECTORATE								
P.G.A. Kafando	B. Faso	France	Socio-economy	U.E.R. des Sciences Econom. Montpellier	Doctorat de 3e cycle	30.10.83	29.10.86	Socio- Economist
B. Traore	Mali	France	Bio-climatology	Universite de Paris-Sud, Orsay	Doctorat de 3e cycle	23.9.83	22.9.86	Bio- Climatologist
D. Ba	Senegal	France	Weed Control	ENSAIA Nancy	Doctorat de 3e cycle	12.84	31.12.84	Weed Scientist
A. Niassy	Senegal	U.S.A.	Entomology	Univ. of Oklahoma	M.Sc.	01.85	31.12.84	Entomologist

1/ up to 31.12.84 at I.E.I. Lewis-Clark State College, Lewiston, Idaho for English training.

2/ transfer to Kansas State Univ. early 1986 if M.Sc.

3/ B.Sc. + M.Sc. in time allotted for B.Sc.

4/ Fall 1987 if M.Sc.

5/ might be transferred to Univ. of California, Davies

2.11.84

REGIONAL FOOD CROP PROTECTION

Table 2

Project No. 625-0928
ACADEMIC LONG TERM PARTICIPANTS
NOVEMBER 1, 1984

	DEGREE	SCHOOL	DEPARTURE	COMPLETION DATE	PRESENT POSITION
<u>CAMEROON</u>					
MOISE MEDJO NYEMBE	M.S. PLANT PATH.	OKL. STATE U.	MAY 79	MAY 82	CHIEF DIAGNOSTIC LAB (CPS) DIRECTOR CREFFHY ASSISTANT DIRECTOR CPS
E. SADDACK NDOMOU	M.S. IPM	UNIV. GEORGIA	JANUARY 80	JUNE 84*	
STEVEN NYINAM	M.S. ENTOMOLOGY	OKL. STATE UNIV.	JANUARY 79	JUNE 81	
<u>SENEGAL</u>					
MAHGOR DINGE	B.S. PLANT PATH.	OKL. STATE UNIV.	DECEMBER 79	DECEMBER 83	CHIEF PATHOLOGY DEPT/ NEMATODE PROJECT TO BE DETERMINED BIOCONTROL, IPM TECHNICIAN TO BE DETERMINED CREFFHY DIRECTOR
DOUDOU FAYE	B.S. ENTOMOLOGY	TEXAS TECH.	MAY 80	JUNE 29, 1984	
ABDOULAYE NIASSY	B.S. ENTOMOLOGY	OKL. STATE U.	AUGUST 79	DECEMBER 82	
LAMINE BA SEYNI DIER	B.S. ENTOMOLOGY M.S. ENTOMOLOGY	OHIO STATE U. OKL. STATE U.	JUNE 82 JAN 78	JUN 85** MAY 81*	
<u>THE GAMBIA</u>					
SANKING SAGNIA	B.S. ENTOMOLOGY	OKL. STATE U.	DECEMBER 79	MAY 81	CHIEF OF CPS FIELD OP. CHIEF OF CPS RESEARCH CHIEF OF BASE CHIEF OF BASE CHIEF OF FIELD OPERATIONS DECEASED
SANKING SAGNIA	M.S. IPM	UNIV. CALIFORNIA	DECEMBER 82	JANUARY 85**	
IBRAHIMA FANJO	HIGHER CERTIFICATE	AMADOU BELLO	MAY 80	JUNE 82	
AMADOU GANTER	CROP PROTECTION	AMADOU BELLO	MAY 80	JUNE 82	
SAMUEL BRANT-OLIVER	B.S. ENTOMOLOGY	U. FLORIDA	JANUARY 79	DECEMBER 82***	
BOUBACAR OUM	B.S. PLANT PATH.	U. FLORIDA	JANUARY 77	DECEMBER 81	
<u>GUINEA-BISSAU</u>					
JOSÉ F. DE SAUSSES	B.S. PLANT PATH.	OKL. STATE	AUGUST 79	DECEMBER 83	CHIEF OF PLANT. PATH. DEPT. CHIEF OF ENTOMOLOGY DEPT.
LORENÇO DE ABREU	B.S. ENTOMOLOGY	OKL. STATE	JANUARY 79	DECEMBER 83	
<u>CAPE VERDE</u>					
MARIA AZEVEDO	B.S. ENTOMOLOGY (BIO-CONTROL)	UNIV. OF FLORIDA	SEPTEMBER 79	DECEMBER 82	BIOLOGICAL CONTROL RESEARCH TECHNICIAN
<u>MAURITANIA</u>					
HAMATH NEAIDE	B.S. PLANT PATH.	UNIV. MISSOURI	JANUARY 79	DECEMBER 83	IPM PLANT PATH. FAILED TO GRADUATE AND RETURNED JUNE 84.
<u>SIDI OULD ISMAIL</u>					
SIDI DIARRA	B.S. ENTOMOLOGY	OKL. STATE U.	JUNE 82	JUNE 85	
	B.S. PLANT PATH.	OKL. STATE	JUNE 82	JUNE 85	
<u>MALI</u>					
MATHIA KAMISSOFO	M.S. ENTOMOLOGY	TEXAS TECH.	AUGUST 80	SEPTEMBER 83	CHIEF OF TRAINING SECTION CHIEF OF ENTOMOLOGY DEPT. TO BE DETERMINED CHIEF OF TECHNICAL LAB.
MOUSSA SISSOFO	M.S. ENTOMOLOGY	TEXAS TECH.	AUGUST 80	SEPTEMBER 83	
SIDI SISSOFO	B.S. ENTOMOLOGY	TEXAS TECH.	AUGUST 80	DECEMBER 85**	
L.S. DIARRA	M.S. ENTOMOLOGY	OKL. STATE	JUNE 79	JULY 82	

* interrupted program

*** due to error USAID/Banjul funding source was African Manpower

** estimated

? proposed position

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V. Discussion of IPM/RFCP Options for the Future

At each mission as part of the discussion with the Mission Director or AID representative, six options for the future of the two projects were presented. They ranged from closing both projects within 90 days (Option I) to follow-ons as regional projects.

The missions in general tended toward Option II but also agreed that Option III would be acceptable provided that a case could be made for a regional role separate from the country components.

Option II

A. Close out RFCP II as a separate, regional project in February 28, 1985 except for a few participants who will finish in June and December of 1985.

B. Incorporate those elements of RFCP II which are considered important to the success of the IPM project into the IPM project. This would include information dissemination and publications through INSA, other publications related to IPM methods, regional training activities, and seminars or workshops such as the one scheduled in April on pesticide legislation.

C. Modify IPM as recommended in the evaluation to maximize the results to be expected by the end of project in 1986.

D. Close out the regional project in 1986 except for participant training which will continue into 1987.

E. Missions and host countries to determine whether IPM/RFCP activities are to be incorporated into their existing bilateral portfolio.

All the missions visited stated that although they would not consider separate bilateral projects in IPM or RFCP they would consider amending existing projects to pick up certain elements of both projects. Generally, there was an existing or planned project in farming systems research or agricultural diversification and research that could absorb some of the approaches or methods of both the IPM and RFCP projects.

The Africa Bureau would have to decide whether the funding to add these elements would come from the OYB as presently projected or whether additional funds would be allotted to the missions.

Option III

A. Close out RFCP II as a separate, regional project in February 28, 1985 except for a few participants who will finish in June and December of 1985.

B. Incorporate those elements of RFCP II which are considered important to the success of the IPM project into the IPM project. This would include information dissemination and publications through INSAH, other publications related to IPM methods, regional training activities, and seminars or workshops such as the one scheduled in April on pesticide legislation.

C. Modify IPM as recommended in the evaluation to maximize the results to be expected by the end of project in 1986.

D. Design a separate regional component with project agreements separate from those of the national components with the appropriate regional institution, e.g. INSAH, CILSS, AGHRYMET, etc. This component would carry out the following roles:

1. Act as a centrally coordinated network for research activities in IPM techniques to insure that research activities are known by all CILSS countries, to minimize duplication where it is not important and maximize it where replication is necessary.
2. Supervise the work of the socio-economist, bio-climatologist and the crop loss assessment experts whose functions relate to all the countries.
3. Insure that methods for carrying out demonstration and pilot activities are uniform.
4. Continue development and refinement of the standardized forms for observation posts.
5. Publication and dissemination of articles, reports, research, case studies, etc. amongst the CILSS countries as well as outside the region.
6. Make appropriate links to other agencies carrying out research in pest management or agricultural practices related to pest management, e.g. ICRISAT, IITA, SAFGRAD, GERDAT, etc.
7. Provide training opportunities locally, in third countries or in the U.S.

8. Bring in short-term consultants to support the regional effort.

9. Coordinate and assist in having regional seminars and workshops related to IPM and to work with CILSS and host countries to develop position papers, analysis, suggested legislation, etc. on pesticide safety and subsidization.

E. Expand the RFOCP components that are incorporated into IPM to include Mali and a strengthened liaison role between the USAID-financed project and those of the Canadians, Germans and Dutch related to Annex A and G₂ activities.

F. Begin design of a single new follow on project to incorporate annexes A, B, G₁ and G₂ activities. This would be based upon a decentralized model with each host country component having a project agreement between the USAID and the host country. The regional component would have its own project agreements and would basically provide a service to the national components as described in D above.

G. This option could be funded entirely by regional funds or split between regional and bilateral funds similar to the model established by the OMVS research project.

No one felt that it would be prudent nor the best use of our investment to date to close both projects within 90 days. The IPM project has just recently been decentralized, nineteen FAO experts are in place, the IPM liaison officers have been hired, the national counterparts are available, construction of laboratories and 55 field observation posts is ongoing and 18 participants are in university training.

By the end of the project, the infrastructure will be in place, participants will be returning, two more crop seasons' research results will be available, and the results of further development of crop loss assessment and economic threshold analysis methods and pest outbreak forecasting models will be available.

Although a long time in coming, a system of observation, tabulation and analysis, research and demonstration trials will be in place by the end of the project in 1986.

An analysis, as part of a redesign effort should be made in 1985 regarding the returns to be expected from the system once in place and a determination made about continued USAID support to integrated pest management research and to the crop protection service or extension service. The evaluation team recommends that follow-on bilateral support be encouraged in order for the Sahelian countries to gain further experience in research and

demonstration trials related to crop loss by pests in order to effectively combat pests in an environmentally safe way and thereby increase food availability by 20-30%. Summary of mission preferences for future project options:

Burkina Faso

IPM - Sees the need for a regional role in coordination, sharing of research results, training, standardization of forms for observation, central storage and analysis of data on a country and Sanel-wide basis, publications, etc. The country components could be linked into the existing bilateral portfolio or other projects related to IPM goals e.g. ICRISAT, SAEGRAD, etc. Either funded bilaterally and incorporated as above or kept as a distinct activity managed by the mission but funded regionally.

RECP - Handled by Canadians.

Mali

IPM - Tended to prefer the option of letting the project finish in 1986 and then picking up some of the activities through the existing bilateral portfolio. Did not see much value in the regional role.

RECP - AID only provided training and commodities. Would agree to this activity ending in February.

Senegal

IPM - Tend to want the project end in 1986 with possibility of picking up elements through a related bilateral project. Did not see much value in the regional role, but would consider such a role if a valid case can be made.

RECP - Would agree to ending it in February with some activities taken over by IPM. After end of IPM, may continue some support for the crop protection service through an existing bilateral project.

The Gambia

IPM - value in a regional role provided it was clearly defined and structured as a separate project with a project agreement for the regional activity only. The country components would be handled by Project agreement between mission and GOTG.

RFCP - Would end RFCP in February but include action elements into IPM project.

Niger

IPM - Mission would tend toward ending the project in 1986 with possibility of incorporating elements of the project into existing bilateral projects. Would consider the notion of a regional role provided it was a separate Project agreement from the host country component.

RFCP - carried out by the Germans and Canadians. Annex G-2, carried out by the Netherlands at Kolo.

In general, the missions tended toward the option of ending the regional project in 1986 and incorporating elements of the project into existing agricultural research projects. The mission staffs, however, did concede that if a strong case could be made for a regional role that they would consider continuation of a regional project combining IPM and RFCP. The condition was that it would have to be done on a highly decentralized model with project agreements between the USAIDs and the respective host country institutions for the national components and a separate, well-defined project agreement for the regional role. This separate agreement or agreements could be with CILSS, INSAH and/or AGRHYMET to carry out the role of coordinating regional technical seminars training, technical assistance dissemination of research results, publications, development of standardized forms for data collection, and standardized methods for demonstration trials, sampling techniques, crop loss assessment, economic threshold analysis, centralized data analysis and storage for use by countries and the region, pest forecasting models, developing issues and policies around pesticides safety and subsidies etc.

Whether the decentralized components of the project are funded bilaterally or regionally would be up to the mission.

ANNEX A
LOGICAL FRAMEWORKS

ANNEX A
PROJECT LOGICAL FRAMEWORK

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

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

IMPORTANT ASSUMPTIONS

MEANS OF VERIFICATION

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.
- 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.

* 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.

PURPOSE

- That personnel will be assigned to NPP services, and available for academia and practical training.
 - That extension, agriculture service, farm unit, and other personnel (male & female) will be available for training, sufficient in numbers & 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 FRAMERWORK

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

NARRATIVE	OBJECTIVELY VERIFIABLE INDICATORS
<p>Outputs:</p> <p>1. Improved structure and admin. capacity: A well-organized and staffed NPP service is functioning in each participating country.</p>	<p>Magnitude of Outputs. NPP service is developed in accordance with plans as specified in 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 and 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 curriculum.</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 services 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>
<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 CLASS program will have some implication for inputs and outputs needed in RFCP for individual countries.</p>	

IMPORTANT ASSUMPTIONS

MEANS OF VERIFICATION

OUTPUTS

-That project inputs are appropriate and sufficient to achieve desired outputs.

Project Agreements

RFCP project evaluations

-That project inputs are timed according to priority needs, and delivered as planned.

Project reports

INPUTS

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

<u>Narrative Summary</u>	<u>Objectively Verifiable Indicators</u>	<u>Means of Verification</u>	<u>Important Assumptions</u>
<p>Outputs:</p> <ul style="list-style-type: none"> - Research facilities constructed/equipped; demonstration areas developed and in use - Observation network constructed/staffed; demonstration areas developed and in use - Sahelian cadre trained 	<p>Magnitude of Outputs:</p> <ul style="list-style-type: none"> - 14 laboratories - 7 insectaries/screenhouses - 8 greenhouses - 55 observation posts - 110 observers - 11 entomologists - 9 plant pathologists - 6 weed scientists - 2 bacteriologists/virologists - 2 IPM specialists 	<ul style="list-style-type: none"> - Project reports, site visits - Evaluation of workplans, results, annual regional work group meetings; site visits - Approved training plans and reports on participant progress/employment 	<p>Assumptions for achieving outputs:</p> <ul style="list-style-type: none"> - Majority of construction approved or underway by Sept. 1983. - Majority of commodity procurement finished or ready to begin by Sept. 1983.
<p>Inputs:</p> <ul style="list-style-type: none"> - Construction of laboratories and observation posts - Commodities (lab and observation post equipment, vehicles) - Technical assistance - Training 	<p>Implementation Target: Refer to financial plan, Annex C</p>	<p>AID/FAO/CILSS Annual budgets, reports; evaluations</p>	<p>Assumptions for providing inputs:</p> <ul style="list-style-type: none"> - AID funds available and provided on timely basis. - Restructured project management will facilitate implementation. - FAO recruits experts rapidly. - CILSS/FAO/AID produce necessary plans/documentation on schedule.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>Outputs:</p> <ul style="list-style-type: none"> - Research facilities constructed/equipped; demonstration areas developed and in use - Observation network constructed/staffed; demonstration areas developed and in use - Sahelian cadre trained 	<p>Magnitude of Outputs:</p> <ul style="list-style-type: none"> - 14 laboratories - 7 insectaries/screenhouses - 8 greenhouses - 55 observation posts - 110 observers - 13 entomologists - 9 plant pathologists - 6 weed scientists - 2 bacteriologists/virologists - 2 IPM specialists 	<ul style="list-style-type: none"> - Project reports, site visits - Evaluation of workplans, results, annual regional work group meetings; site visits - Approved training plans and reports on participant progress/employment 	<p>Assumptions for achieving outputs:</p> <ul style="list-style-type: none"> - Majority of construction approved or underway by Sept. 1983. - Majority of commodity procurement finished or ready to begin by Sept. 1983.
<p>Inputs:</p> <ul style="list-style-type: none"> - Construction of laboratories and observation posts - Commodities (lab and observation post equipment, vehicles) - Technical assistance - Training 	<p>Implementation Target: Refer to financial plan, Annex C</p>	<p>AID/FAO/CILSS Annual budgets, reports; evaluations</p>	<p>Assumptions for providing inputs:</p> <ul style="list-style-type: none"> - AID funds available and provided on timely basis. - Restructured project management will facilitate implementation. - FAO recruits experts rapidly. - CILSS/FAO/AID produce necessary plans/documentation on schedule.

Annex B

History of the CILSS Plant Protection Program

The economies of the Sahelian states are primarily agriculturally based with some 85 percent of their population of approximately 26 million engaged in agriculture. This 85 percent consists mainly of small, subsistence farmers producing sorghum and millet. Historically, little attention has been paid by governmental authorities to production and protection of domestic food crops. Agricultural development efforts have tended to concentrate on production of export crops, notably peanuts and cotton. As a consequence, in the face of rising populations, the Sahel has become chronically dependent on imported food to meet the requirements of its urban populations while its rural populations have become increasingly vulnerable to climatic vagaries or other natural afflictions in their struggle for survival.

In the 1960s, a number of regional and international organizations addressed the problem of increased food production. This research has primarily concentrated on maize, sorghum, and millet and involved research and limited field trials to determine local adaptability to existing varieties and to develop new varieties and agronomic practices to best utilize the genetic capabilities of the new varieties. The extension link between this research and the farmer, however, requires further attention before research results find their way into agricultural production practices.

Comparable progress was not achieved in the area of plant protection. Two regional organizations, OCLALAV (Joint Organization of Locust and Bird Pest Control) and OICM (Inter-State Organization for the African Migratory Locust), established in the 1960s, succeeded in controlling locust outbreaks and ongoing research efforts enabled them to greatly increase the effectiveness of aerial and group spraying. The Center for Overseas Pest Research (COPR), sponsored by the British Overseas Development Ministry, and the French-sponsored Groupement d'Etudes et de Recherches pour le Developpement de l'Agriculture Tropicale (GERDAT) have done valuable research on grasshoppers. Beyond this progress, limited entomological and plant pathological research was undertaken at the various research stations in the Sahel. No comprehensive and reliable information is available on the character and extent of crop losses caused by pest damage, with informed estimates ranging from 25 percent to 40 percent of potential production.

In the agriculturally advanced countries during these years, awareness grew that heavy reliance on chemical pest controls carried serious environmental, ecological, and economic

consequences. In response, the FAO/UNEP mounted in 1974 a Cooperative Global Program for the Development and Application of Integrated Pest Control in Agriculture advocating a careful choice of control measures. This approach avoids any problems normally encountered in wide-scale pesticide applications: development of pest strains resistant to pesticides, decimation of natural enemies leading to the appearance of new and often more dangerous pests, escalating treatment costs, environmental contamination and public health problems, and disturbance of ecological balances.

A U.S.-funded multidisciplinary study conducted in 1972 suggested a long-range goal of practical programs of total pest management integrated completely with improved production systems.

The human suffering and deprivation of the protected drought of 1968-1973 in the Sahel brought into sharp focus, both in the countries directly concerned and in the world donor community, the fragility of the ecosystem of the area, its basic and unresolved development problems and its total inability, in the face of such situations, to deal with the food needs of its populations. In order to better cope with these problems, Chad, Mali, Mauritania, Niger, Senegal, and Upper Volta joined in March 1973 to form the Permanent Interstate Committee for Drought Control in the Sahel (CILSS, Comite Permanent Inter-etats de Lutte contre la Secheresse dans le Sahel). Cape Verde became a member following its 1975 independence and The Gambia also joined. The CILSS has fixed as its objectives to:

- o Reduce the consequences of emergency situations in the future
- o Insure self-sufficiency in staple foods
- o Accelerate economic and social development, particularly in the least developed countries of the region

The CILSS attempted from the beginning to present needs of the member states for donor financing of specific project proposals and, with the international donor community, to search out additional ways to bring about a basic transformation of the region. These efforts to secure donor support led to the creation by donors of the Club du Sahel, which held its inaugural meeting in March 1976 at Dakar. The Club provides a forum for the CILSS members and interested donor and funding organizations to discuss the goals of Sahelian development and the strategy for achieving them.

The easing of the drought in 1974 brought with it massive outbreaks of pests which highlighted both the inadequacy of the existing capability to deal with pest problems and the magnitude

of the threat which pest attacks posed to food production and availability. There was realization also that planned agricultural development efforts (e.g., expansion of acreage under irrigation, expansion of recession agriculture, reduction of mixed or intercropping) would favor the growth of pest population and greatly increase the risk of crop losses.

Recognizing that the benefits of investment in agricultural production schemes could be largely negated without a parallel development of plant and crop protection capabilities, the CILSS, at its meeting in Banjul, The Gambia, in December 1974 adopted a resolution which recommended the reinforcement of national plant protection services and regional plant protection organizations, as well as related research and training. Following this meeting, subsequent meetings, both regional and international, were held to examine Sahelian plant protection problems in depth.

Subsequently, the FAO convened in Rome from December 13 to 17, 1976, a Government Consultation on Crop and Post-Harvest Protection Needs in the Sahel. The consultation, in addition to reviewing the status of needs and existing, planned and proposed assistance, devised a common strategy outline for strengthening plant protection in the region. This strategy reflected recognition of the need to:

- o Strengthen national plant protection services
- o Strengthen regional coordination of research, surveillance, training, and information within the framework of CILSS.
- o Maintain the capability of regional migratory pest control organizations to respond to outbreaks of locusts and grain-eating birds.
- o Coordinate planning and implementation on both a national and regional basis

Also in December 1976, at the N'Djamena meeting of the CILSS Council of Ministers, the Sahel Institute was formally established and specifically charged with coordination of CILSS member state activities in the field of plant and crop protection. For a variety of reasons, among them lack of financing, the Institute has not fulfilled this mandate.

Pursuant to a proposal made at the Rome Consultations, a design team was assembled in Dakar in February-March 1977 to complete the formulation of a comprehensive program embodying the strategy decisions reached in Rome. Under the leadership of the FAO and with the active participation of AID, this team developed a series of action proposals for plant protection in CILSS member

countries. This program was adopted by the CILSS at its meeting in May 1977 and forwarded to the Club du Sahel for consideration by the donor community.

The document, entitled "Plant Protection in the CILSS Member Countries," described a program planned over a 15-year phase. In accordance with the goal of the CILSS to insure self-sufficiency of the Sahelian countries in staple foods, and recognizing that crop protection should be considered as a vital element in agricultural production equal in importance to plant improvement and soil fertilization, this medium and long-term program has the following objectives:

- o To establish in the countries concerned a national capability to develop and implement effective pest management programs for the protection of food crops in field and storage
- o To promote the expansion of extension activities at the required scale for effective pest control at the small farmer level
- o To promote regional collaboration in plant protection, particularly through research, information exchange, and contacts, and support effective regional organization.

The comprehensive program, costed at approximately \$70 million for its first 5-year phase, is composed of seven annexes:

- A Strengthening of National Plant Protection Services
- B Research on and Development of Integrated Pest Management for Basic Food Crops in the Sahel
- C Regional Locust Control
- D Grain-Eating Bird Control
- E Improved Post-harvest Crop Protection
- F Improved Rodent Control
- G Plant Protection Information/Documentation (G1), and Training (G2)

The program addresses what continues to be seen as the major constraints to crop production in the Sahel, through the regional and national institutional structures responsible for crop protection efforts. Each of the components is somewhat distinctive in character, calling for its own approach to the problems under consideration. However, to the extent applicable,

the principles of integrated pest management are embodied in each. The major emphasis centered on the Integrated Pest Management project for which AID provided first phase financing as proposed in the original project paper approved in 1977. The knowledge and technology developed within the IPM Project will benefit work under the other annexes; for example, it is planned under one of the three phases of the IPM Project to develop an effective pest surveillance and forecasting system for the whole of the Sahelian zone.

The overall CILSS program was to be operational at three levels: national, sub-regional, and regional. The establishment of plant protection policies, programs, and priorities in each country was the responsibility of the national authorities. The implementation of these policies and programs are also primarily a national responsibility. Strong national plant protection services were considered to be the fundamental basis of any sustained progress in the reduction of crop losses from predators and disease. At the same time, it was recognized that pests and diseases are not respectors of national boundaries, that many aspects of research can best be dealt with at broader ecological levels, and that the most economic use of scarce manpower and financial resources requires the avoidance of duplicative national efforts. These considerations dictate a subregional or regional approach to many of the problems of crop protection. This does not suggest, however, that functions be tightly compartmentalized within these levels, thus some functions can find appropriate expression at all levels.

Annex A--Strengthening of National Plant Protection Services concerns primarily the national level. This annex has been funded in Upper Volta by CIDA (Canadian International Development Agency), in Niger by CIDA and GTZ (West German Technical Assistance Agency), and in the rest of the Sahel (except Mali) by USAID, which funds companion projects in Guinea-Bissau and Cameroon. Infrastructure development, training, and pesticide management support have been given to the national services and limited applied pest control research has been conducted, while awaiting IPM research results. These programs are to undertake extension and training activities meant to bring IPM annex research results into use by farmers and crop protection agents. Under the third and final phase (of the U.S.-funded portion) to be designed and approved in 1983.

Annex B--Integrated Pest Management Research The research activities are to be implemented through national institutions in the CILSS member countries, each of which will undertake certain elements of the regional research program (activity in Chad was initiated, but has been suspended because of adverse internal conditions). Although this research will be conducted at the national level, it will address the problems in the context of

the Sahelian ecological zone. Similarly, a concentrated approach on pest surveillance and forecasting and the development of crop loss profiles are to be undertaken through the national services in the CILSS member countries. Assistance in development of a base for the introduction of integrated pest management into country programs will also be provided to national services in all the Sahelian countries. This approach is consistent with the overall program aim of strengthening national services, but it is expected that the research results and outreach activities will have sub-regional and regional applicability. CILSS will facilitate regional coordination with technical assistance from FAO. This coordination will serve to assure that work at the national level is efficient and applied as widely as possible.

Annexes C and D--Migratory Pest Control. Pests such as locusts and birds range over wide areas within the Sahel region and even beyond. Moreover, the breeding areas where controls can be most effectively applied are not necessarily coincident with the areas (or states) which are potentially subject to attack. A regional approach to research, surveillance, forecasting, and control of these pests is, therefore, necessary. The program envisages that these activities will be continued within the structure of the existing regional organizations, OCLALAV and OICMA, both of which include member states outside of the geographic confines of the Sahel, and/or such other arrangements as the participating groups of states may agree upon. Parts of this undertaking will involve research at the sub-regional or ecological zone level. In accordance with established practice, national services will be involved in activities within their countries. Current finding for OICMA and OCLALAV, however, falls far short of that needed to conduct effective programs.

Annex E--Post-Harvest Crop Protection. This is an inter-country project involving the establishment of an adequate infrastructure for effective control operations and the development of a forecasting system through bio-ecological research, as well as applied research to adapt known technology to the conditions of the countries concerned. Specific elements of the study and survey program will be conducted in each of the participating countries with the information gathered in each country providing a basis for improvements in grain storage in all. At this writing, Annex E is unfunded.

Annex F--Rodent Control. This project is foreseen for implementation through the national crop protection services in Senegal and Niger where rodent problems have been most serious and where there is immediate interest on the part of the governments. The studies and research will have regional implications, however, and should lead to better techniques for evaluating the real extent of rodent damage in other countries and provide a sound research base for control programs which could

be replicated elsewhere as required. Annex F is likewise unfunded.

Annex G--Plant Protection Information

Documentation/Training. This annex will function at the regional level in close cooperation with the Sahel Institute, which will ultimately subsume its functions. G1, Regional Information Unit for Crop and Post-Harvest Protection (Cellule d'Information Regionale pour la Protection des Cultures et des Recoltes) may be partially funded by USAID at the Communications Department of the Sahel Institute. It will serve as a data collection center, a documentation center, a coordinating unit to facilitate a continual flow of knowledge and technology into outreach programs, and an evaluation mechanism to assess the effectiveness of training or information and communication techniques at the farmer level. Among its activities will be a monthly newsletter for researchers and crop protection personnel and the production of audiovisual aids--radio and slide programs, handout sheets, flipcharts--for use in Sahelian crop protection extension programs. G2, Training, is being funded in part by the Institut Universitaire de Technologie (IUT), Dakar, and field technicians at Ahmadu Bello University, Nigeria (anglophones) and the Institut Polytechnique de Developpement Rurale, ((IIPDR) Kolo, Niger (francophones). Higher level (researcher) training under the Annex is unfunded at this writing, but is in part incorporated into the redesign of Annex B activities.

The CILSS considers the Crop and Post-Harvest Protection Program to represent a cohesive whole, all elements of which should proceed within a compatible time frame. If the program has been presented as a series of discrete components, this is more to accommodate expressions of donor interest than to emphasize the distinction between the activities to be carried out. The CILSS is actively seeking donors for the unfunded parts of the plant protection program. All the Annexes should be operational in order to secure full potential benefits. For example, success under AID-financed Annexes A, B, and G1 should reduce field losses to insect, disease, and weed pests, but the yield gains will be partly erased if birds, rodents, and post-harvest pests continue to consume large proportions of the harvest.

Two CILSS organs monitor and coordinate the overall plant protection program. The Regional Management Unit in Ouagadougou assists in arranging the execution of the various annexes in conformity with CILSS policy, following and reporting on their progress, arranging for donor funding, and serving as liaison between the CILSS Program and other regional and international crop protection and IPM programs. The Regional IPM Directorate, also in Ouagadougou, supervises regional, subregional, and national programs within the scope of the AID-funded project under Annex B.

ANNEX C
CABLE DESCRIBING JPM SEMINAR
IN NIAMEY
DECEMBER 1984

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Department of State

INCOMING
TELEGRAM

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AMEMBASSY BANJUL
AMEMBASSY DAKAR
AMEMBASSY NOJAMENA
AMEMBASSY NIAMEY
AMEMBASSY NOUAKHOUT
AMEMBASSY PRAIA
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AMEMBASSY MONROVIA
AMEMBASSY PARIS
AMEMBASSY ROME

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ACTION ADDRESSEES FOR IPM LIAISON OFFICERS,
SECSTATE FOR AFR/SVA-PROCCPIS, AFR/TR-MARTIN AND
IPM TASK FORCE, AFR/PO/SWAP-SIMMONS, S&T/AGR
COLLIER AND KISS; ABIDJAN FOR REDSO/WCA-PDO;
BISSAU FOR CASTLETON; DELHI PASS TO ICRISAT;
LAGOS PASS TO IITA-LIPPOLD; MONROVIA FOR RUGH
PASS TO WARD/AD/VERI; PARIS FOR CECO/CLUB DU
SAHEL-CLOUM; ROME FOR FODAG/AIDATT-FURMAN

E. O. 12355: N/A

SUBJECT: IPM (625-0928) SEMINAR IN NIAMEY

1. THE FIRST CILSS INTERNATIONAL SEMINAR ON STRATEGIES
FOR INTEGRATED PEST MANAGEMENT (IPM) FOR SAHEL FOOD
CROP PESTS TOOK PLACE IN NIAMEY, DEC 6-13, 1984 UNDER
THE SPONSORSHIP OF THE NIGER MINISTRY OF RURAL
DEVELOPMENT. RESEARCHERS AND EXTENSION SPECIALISTS
FROM ALL SAHELIAN COUNTRIES AND CILSS SECRETARIAT AND
RELATED CILSS AGENCIES (INSAH, AGRHYMET) PARTICIPATED
ALONG WITH REPRESENTATIVES FROM INTERNATIONAL
ORGANIZATIONS INCLUDING WARD, ICRISAT, SAFGRAD-IITA,
GERDAT, FAO/ROME AND USAID. IN ADDITION, DELEGATES
FROM RESEARCH ORGANIZATIONS IN THE USA, GREAT BRITAIN,
WEST GERMANY, FRANCE, CANADA AND HOLLAND PARTICIPATED.
THE SEMINAR ADDRESSED IPM STRATEGIES FOR PESTS OF THE
FIVE PRINCIPAL FOOD CROPS (I.E., MILLET, SORGHUM, RICE,
COWPEA, AND MAIZE) IN TERMS OF THE THREE MAJOR DISCIPLINES
(ENTO, PHYTO-PATH, WEEDS).

2. THE MINISTER OF RURAL DEVELOPMENT SET THE TONE OF
THE SEMINAR BY EMPHASIZING THAT CROP PROTECTION WAS THE
MOST IMPORTANT, AFTER RAINFALL, LIMITING FACTOR FOR
FOOD SELF-SUFFICIENCY IN THE SAHEL.

3. THE SEMINAR ARRIVED AT VARIOUS CONCLUSIONS AND
RECOMMENDATIONS:

(A) THE IDENTIFICATION, ON THE ONE HAND, OF PHYTOSANITARY
PROBLEMS ON WHICH RESEARCH SHOULD BE CONCENTRATED AND,

ON THE OTHER HAND, SUBJECTS WHICH REQUIRE COMPLEMENTARY
INFORMATION TO PERMIT A BETTER DEFINITION OF STRATEGIES
OF CONTROL;

(B) THE NEED FOR CONTINUING REINFORCEMENT OF A CROP LOSS
ASSESSMENT PROGRAM FOR ALL THE NATIONAL COMPONENTS OF THE
IPM PROJECT TO ESTABLISH THE ECONOMIC IMPORTANCE OF THE
PESTS;

(C) RECOMMENDATION THAT ALL CONTROL METHODS TAKE INTO
ACCOUNT THE PROTECTION OF NATURAL ENEMIES OF PESTS ON
FOOD CROPS;

(D) STATED INTEREST IN THE PURSUIT OF WORK IN THE CONTEXT
OF THE OBSERVATION POST NETWORK AND THEIR ROLE IN THE
MONITORING OF POTENTIAL PESTS;

(E) THE NEED FOR A REGIONAL ANALYSIS OF PEST BEHAVIOR
ON FOOD CROP IN ORDER TO OBTAIN USABLE INFORMATION MORE
RAPIDLY FOR NATIONAL COMPONENTS;

(F) IMPROVEMENTS OF THE MILLET PILOT PROGRAM AT THE FARM
LEVEL WERE SUGGESTED; RECOGNITION WAS GIVEN TO THE NEED
TO INVOLVE THE FARMER EARLY IN PEST MANAGEMENT STRATEGY
DEVELOPMENT TO ENSURE APPROPRIATENESS OF INTERVENTIONS
AND THEIR ACCEPTANCE. THIS IMPLIES EARLY INVOLVEMENT
OF RELEVANT HOST GOVERNMENT AGENCIES TO PLAN AND
IMPLEMENT PROGRAMS;

(G) THE IDEA THAT CERTAIN SIMPLE THEMES COULD BE
RECOMMENDED FOR APPLICATION IN EXTENSION WAS PROMULGATED;

(H) RECOMMENDATION THAT ALL OF THE PLANNED TRAINING BE
COMPLETED AND THAT THE PARTICIPANTS RETURN FOR ANNUAL
SHORT TERM ASSIGNMENTS IN THEIR RESPECTIVE COUNTRIES

WHILE IN TRYINGONING, IT WAS ALSO RECOMMENDED THAT ADDITIONAL
SUPPORT (FINANCIAL) BE SOUGHT FOR THE CILSS CROP
PROTECTION TRAINING PROGRAMS.

THE SEMINAR CONCLUDED THAT, GIVEN THE COMPLEXITY OF
PROBLEMS TO BE RESOLVED, IT IS IMPERATIVE THAT RESEARCH
EFFORTS BE CONDUCTED IN A MULTI-DISCIPLINARY AND
BALANCED APPROACH.

THE SEMINAR RECOMMENDED THE NEED FOR CONTINUED
STRENGTHENING OF COLLABORATION BETWEEN NATIONAL
SUBREGIONAL, REGIONAL AND INTERNATIONAL INSTITUTIONS
WORKING ON FOOD CROPS IN THE SAHEL.

4. SEVERAL IMPORTANT THEMES WERE REPEATED THROUGHOUT
THE SEMINAR WHICH REINFORCED THE NEED TO BROADEN
RESEARCH INTO A FARMING SYSTEMS RESEARCH (FSR) APPROACH.
(FYI THE FSR APPROACH WAS STRONGLY SUPPORTED BY RECENT
IPM/RFCP EVALUATION. END FYI). THESE THEMES INCLUDED:

- CROP RESIDUE PRACTICES
- VARIETAL RESISTANCE
- SEED TREATMENT
- INTERCROPPING AND DENSITY
- CARRY-OVER OF PESTS ON ALTERNATE HOSTS DURING NON-
--CROPPING SEASON
- FERTILIZER USE INCREASING WEED AND INSECT PROBLEMS
- CROP ROTATION
- ON FARM CROP LOSS ASSESSMENT
- ECONOMIC ASPECTS OF ALTERNATIVE STRATEGIES
- NEED FOR INCREASED ATTENTION TO VIROLOGY PROBLEMS
-- (DESIRABLY OF ESTABLISHING REGIONAL RESEARCH FACILITY)
- POTENTIAL PEST PROBLEMS OF IRRIGATED AGRICULTURE

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5. THE CILSS IFR REGIONAL DIRECTION WAS COMPLEMENTED ON THE SEMINAR ORGANIZATION AND THE INTERACTIONS WHICH DEVELOPED BETWEEN RESEARCHERS, EXPERTS/INTELLECTS, AND PLANNERS. ONE FINAL RECOMMENDATION WAS TO STRENGTHEN THE SOCIO-ECONOMIC ASPECTS OF THE PROJECT.

6. REQUEST COUNTRY TASK FORCES MEET AND DISCUSS RECOMMENDATIONS/CONCLUSIONS IN ORDER TO DEFINE WORK PLANS FOR 1985 AND 1986 FOR DISCUSSION AT ANNUAL WORKING GROUP MEETING IN MARCH, 1985 IN OUAGADOUGOU, NIGER.

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ANNEX D
PERSONS CONTACTED

BURKINA FASO

Mr. Edouard G. Bonkougou, Director of IRBET, Ougadougou
Mr. Idrissa Dicko, Lecturer, University of Ougadougou
Robert G. Hellyer, IPM Project Manager, USAID/Ougadougou
Mr. Jean Marie Ouadba, Research Assistant, IRBET
Dr. K.V. Ramaiah, Plant Breeder, ICRISAT, Kamboinse
Agriculture Research Station
M. Brah Mahamene, Dep. Director of CILSS
Gilbert Benharrosh, CIDA Crop Protection Project
M. Darrendell, Director of IVRAZ Ag Research Station at Farakoba
Mr. Bundi, Admin Officer, IPM/CILSS
Paul Sciaronne, Club du Sahel (Paris)
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Igor Nesechek, Controller, USAID
Emerson Melaven, Director, USAID
John Becker, Ag Development Officer, USAID
Blaise Ouedraogo, Director, CILSS/IPM/Burkina Faso
Bakary Simaga, FAO/IPM/B.F. advisor
Helen Gunther, USAID, Human Resources Project Officer
Moussa Senou, Director, Plant Protection, Min. of Agriculture
Abdoul Zorome, Project Assistant
Francois Nikema, Agricultural virologist
Lillian Gomez, FAO entomologist
Mario Rodriguez, IITA/SAFGRAD plant scientist
Joseph Suh, IITA/SAFGRAD agriculturist

MALI

Flazan Berthe, CPS Base Chief, Mourdiah
M.S. Bonzi, FAO Expert, Entomology
Kindia Moriba Camara, OHV, Cooperating Farmer
Nanamory Camara, OHV, Cooperating Farmer, Bancoumoma Village
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Aliou Coulibaly, OHV, Base Sector
Abdoul Diallo, USAID Liaison Officer w/RFCP/MALI
Mme. Ba Diallo, Director of IPM
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Lassana Sylvestre Diarra, CPS Extension Agent (returned U.S.
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Yacouba Ousmane Doumbia, Director Nationale, IPM
John Gruwell, USAID/Mali IPM Project Liaison Officer
James Jackson, Asst. ADO, USAID/Mali
Martha Kamissako, CPS Extension Agent (returned U.S. participant)

134

Bubakar Kante, Operation Haute Valle, Asst. Director and Head of Production
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Dramane Keita, OHV, Sector Chief
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Shaloum Sacko, CPS Head of Training
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Dr. Shetty, Agronomist, ICRISAT, Sotuba Research Station
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Mr. Abdoulaye Sow, Botanist SRCVO
M. Suntra, Chief of Training, CPS
H.V. Vuong, Phytopathologist, IRAT, Bamako
Ibrahim Wangara, OHV, Agronome. Formateur
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Staff of CAA

CPS Personnel

Director General of Agriculture, Mali

Group Discussion w/20 local farmers held at Mourdiah

Unidentified Farmer, CAA Staff

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Mr. Fontanel, Weed Scientist, CNRA, Bambey
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Fallon Mfoche Gueye, Secretary General MRO
Diop Mamadou Hamath, Dakar Training Center
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Matt Horween, Asst. Controller
James Ito, Controller
Khoi Le, Agronomist, Dakar Irrigation Project, USAID
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Mr. Mbaye Ndoye, Director of Senegal IPM
Abdulaye Niassey, Bio-control Specialist, RFCD
John Peterson, USAID/Senegal, IPM/RFCP Liaison
Dogo Seck, IPM Senegal, stored products
H. Senko, ISRA
Moctar Toure, Director of Research Agricultural Production/MERST
Mme. Rokia Ba Toure, Head of Communications Dept., INSAH/Bamako

GAMBIA

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Jatta Ceesay, Non-cooperating Farmer near Pilot Demonstration,
1st village
Sampo Ceesay, Asst. Director, Agricultural Research
Haji Ausman Gissay, Cooperating Farmer at Pilot Demonstration,
1st village
Ralph Conley, ADB
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Jalamang Drannen, Cooperating Farmer, Pilot Demonstration, Fulla
Bantang
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Sanko Jammeh, Direct of Agriculture
Ibrahim Kunjo, Chief of Base, CPS
Alida Lawrence, FAO Expert, Ag Info, CPS
R. Lock, Ag. Machinery Spec. U.K.
Tom Mahoney, Program Officer
Peter Manser, FAO, Pilot Trials Officer
Bara Mballow, non-participating farmer, Fulla Bantang

Lanin McBandeh, Head of Crop Protection Service, Jenoi
Seedy F.D. Njie, CPS, Supt. in Charge of Training
Joe Oliver, CPS
Samuel Oliver, Chief of Field Operations, CPS
Dr. Neal Patrick, Agricultural Economist, MF Project
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Momodou L. Touray, IPM Observer, Jenoi
Adrian Young, ADO Marketing and Processing Adv., Sapu
M. Zeiss, USAID/IPM
O. Zethner, FAO IPM Expert

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Dr. N.B. Magema, Principal Expert, FAO
Mr. Galedon Tahara, Director IPM and Director, Crop Protection
Service

CAPE VERDE

Francisco Delgado, Chief of Plant Protection Section of Crop
Protection Service
Maria Luisa Lobo Lima, IPM Director

NIGER

Ali Akilou, Acting Director Agriculture (normally Director of
Extension)
Dr. Bakker, Phytopathologist, IPDR
Sahadou Bacua, Director, Institute Polytechnic de Developpement
Rural at Kolo
Michel Bernardi, FAO Bio-climatologist
Dr. Roy Bronson, Chief of Party, Purdue Contract for Niger
Cereals Research Project
Mr. Dedecker, FAO Expert at IPDR
Amadou Diop, IPM Director
Ing. F.B. Dirise, Phytopathologist, IPDR
Lynn Graybeal, USAID IPM Project Officer
Mr. Graf, Head, GTZ/RECP Project
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Mr. Imana Hassane, Head of Plant Protection, Maradi
Lance Jepson, USAID ADO
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Mr. D. Laycock, FAO Weed Expert, Maradi
Jim Lowenthal, USAID Ag. Officer
Mr. Maga, Dept. of Agricultural Research, INRAN
H. Maiga, Entomologist, Service Protection, Chef de sous-section
Moukalla Maquinjo, Chief of Biological Control Laboratory,
INRAN, Agadez

Stanley Mitchell, Controller
Ismael Mouddour, Chief of Crop Protection Service
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John Mullenax, Advisor to USAID Agricultural Production Support
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Ibrahim Oumarou, Director of Agriculture
Peter Reckhaus, Phytopathologist, GTZ Crop Protection Team
Moussa Saley, Director General, INRA
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Jesse Snyder, USAID Acting Director
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Karl Van Elsen, FAO Entomologist
Alhassan Yanikoi, Boyen, Ecole Supérieur d'Agronomie, University
of Niamey
Ousmane Yonli, FAO, Principal Expert (Entomologist)

Regional

M. Michard, Socioeconomist, FAO Consultant
Mme. Lalla Sanou, Socio-economist, IPM/CILSS, Ouagadougou

ANNEX E

Documents Consulted

Burkina Faso

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Hama Hassane.

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ANNEX F
TEAM SCOPE OF WORK CABLE

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OUTGOING
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DRAFTED BY: AFR/PD/SWAP: KEITH ESIMMONS
APPROVED BY: AFR/PD: NCOHEN
AFR/PD/SWAP: S. SHAH

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INFO AMEMBASSY PARIS

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AIDAC, ROME FODAC/FURMAN PARIS OECD/SLOCUM

FOLLOWING STATE 253104 DTD 25 AUG SENT ACTION OUAGADOUGOU
DAKAR BAKAHO ABIDJAN BANJUL NIAMEY NOUAKCHOTT NIJAMENA
PRAIA, BEING REPEATED FOR YOUR ACTION/INFO:
QUOTE:

UNCLAS STATE 253104

AIDAC, ABIDJAN FOR REDSO/WCA, DAKAR FOR RIG/A

E.O. 12356: N/A

TAGS:

SUBJECT: EVALUATION OF RFCP II AND IPM PROJECT 625-0928

J. FRANKLIN RFCP, BAKAHO FOR SDPT

REF: OUAGADOUGOU 4240

1. THE FOLLOWING IS THE PROPOSED DOW FOR SUBJECT
PROJECTS. PLEASE REVIEW AND SEND COMMENTS.

2. BACKGROUND

THE EVALUATION WILL ADDRESS THE REGIONAL FOOD CROP
PROTECTION (RFCP) PROJECT PHASE II WHICH WAS INITIATED
IN 1979 AS A FOLLOW ON TO PHASE I WHICH WAS AUTHORIZED
IN 1975 AND THE INTEGRATED PEST MANAGEMENT (IPM) PROJECT
INITIATED IN 1978 AND AS AMENDED IN 1983. THE IPM
PROJECT IS ACTIVE IN THE EIGHT SAHELIAN COUNTRIES, CHAD,
NIGER, MALI, UPPER VOLTA, MAURITANIA, SENEGAL, THE
GAMBIA AND CAPE VERDE, AND RFCP II IS PRESENTLY ACTIVE
IN CAPE VERDE, SENEGAL, THE GAMBIA AND MALI.

THE RFCP PROJECT WAS IN RESPONSE TO THE CILSS

COMPREHENSIVE PROGRAM FOR CROP AND POST-HARVEST
PROTECTION ANNEX A AND THE IPM WAS TO ASSIST IN CARRYING
OUT ANNEX B AND C. OTHER DONORS ARE INVOLVED IN
CARRYING OUT ASPECTS OF ALL THE ANNEXES.

3. DISCUSSION

THE EVALUATION SCOPE OF WORK WILL INCLUDE ELEMENTS TO BE
APPRAISED FROM THE RFCP II AND IPM PROJECT PAPERS AS
WELL AS RECOMMENDATIONS 1 THROUGH 3 OF THE DRAFT AUDIT
REPORT OF THE RFCP II PROJECT. THIS IS A FINAL
EVALUATION FOR RFCP II AND MID-TERM EVALUATION FOR IPM.

THE EVALUATION SHOULD NOT MERELY COMPARE THE ACTUAL

OUTCOME WITH THAT PLANNED FOR IN THE LOGICAL FRAMEWORK
OF THE TWO PROJECTS. THE EVALUATION, IN ADDITION,
SHOULD QUESTION THE RELEVANCE OF THE PROJECTS; THE
PERTINENCE OF THE SEVEN CROP PESTS INCLUDED IN THE
RESEARCH PROGRAM AND SUGGESTIONS FOR ADDITIONS OR
DELETIONS OF PESTS FROM THE PRIORITY LIST; CHALLENGE THE
PROJECT DESIGN; REVIEW THE ADMINISTRATIVE AND MANAGEMENT
STRUCTURE. THE GOAL OF THIS ASSESSMENT IS TO REVIEW THE
ACTIVITIES AND RESULTS OF BOTH PROJECTS WITH THE PURPOSE
OF RECOMMENDING THE BEST APPROACH TO STRENGTHENING THE
CAPABILITY OF HOST COUNTRY INSTITUTIONS IN THE EIGHT
SAHELIAN COUNTRIES TO CARRY OUT PEST RESEARCH, DEVELOP
APPROPRIATE FEASIBLE TECHNICAL PACKAGES, CARRY OUT CROP
PROTECTION SERVICES AND THE EXTENSION OF RECOMMENDED
PRACTICES AND TECHNICAL PACKAGES TO THE FARM IN A
LOW-COST MANNER FOR THE FARMER AND A MINIMAL RECURRENT
COST MANNER FOR THE HOST COUNTRY. THIS EVALUATION
SHOULD LOOK AT THE VARIOUS APPROACHES/CONCEPTS FOR CROP
PROTECTION AND DETERMINE WHETHER THE INTEGRATED PEST
MANAGEMENT APPROACH IS, IN FACT, THE MOST APPROPRIATE
AND COST EFFECTIVE TO IMPLEMENT IN THE SAHEL.

THE EVALUATION SHOULD PRESENT OPTIONS FOR THE FUTURE
REDESIGN OF THE RFCP AND IPM PROJECTS OR FOR
INCORPORATING THE CROP PROTECTION/IPM CONCEPTS INTO
OTHER BILATERAL OR REGIONAL PROJECTS. THESE SHOULD
INCLUDE ADMINISTRATIVE, MANAGERIAL, CONTRACTUAL,
TECHNICAL, PRIORITY PESTS TO BE CONSIDERED IN A RESEARCH
PROGRAM, AND REGIONAL VS. BILATERAL OPTIONS. THE TEAM
IN DETERMINING RECOMMENDATIONS FOR THE FUTURE SHOULD
KEEP IN MIND THAT WEST GERMANY AND CANADA ARE CARRYING
OUT THE ANNEX A (RFCP) COMPONENTS IN UPPER VOLTA, NIGER
AND MALI, THEREFORE, A COORDINATION ELEMENT IN RELATION
TO IPM PROJECT OBJECTIVES WILL HAVE TO BE MADE. ALSO,
WHAT IS THE SCOPE FOR WIDER DONOR COORDINATION IN THE

FUTURE FOR COUNTRY AND REGIONAL EFFORTS?

THE EVALUATION TEAM IN REVIEWING THE HOST COUNTRY
INSTITUTIONAL CAPABILITY OF THE RESEARCH, CROP
PROTECTION AND EXTENSION INSTITUTIONS SHOULD ASSESS
INTER-
ORGANIZATIONAL ARRANGEMENTS AND ADEQUACY OF PHYSICAL,
MONETARY AND HUMAN RESOURCES TO PERFORM THEIR RESPECTIVE
TASKS IN A COORDINATED, EFFECTIVE MANNER.

4. INTEGRATED PEST MANAGEMENT PROJECT (IPM)

THE FOLLOWING IS PRIMARILY THE SCOPE OF WORK AS STATED
IN THE PROJECT PAPER EVALUATION PLAN, FOR THE
ADMINISTRATIVE REVIEW AND THE INTERMEDIATE RESEARCH
EVALUATION:

-- A. ADMINISTRATIVE REVIEWS

THE EVALUATION WILL EXAMINE THE FOLLOWING ORGANIZATION
AND MANAGEMENT CHANGES MADE BY THE PROJECT REDESIGN
AFTER THE 1981 EVALUATION AND THE PROBLEMS THEY WERE
INTENDED TO REDRESS:

(1) THE EFFECT OF DECENTRALIZATION (REGIONAL
TO BILATERAL) ON EXPEDITIOUS IMPLEMENTATION OF
PROCUREMENT AND CONSTRUCTION PLANS; AND
EFFICIENT BUDGETING FOR FINANCIAL MANAGEMENT,
PROGRAM PLANNING AND COMMUNICATION.

(2) EFFECTIVENESS OF MERGED ADMINISTRATIVE/
TECHNICAL FUNCTIONS IN THE REGIONAL PROJECT
DIRECTORATE (OUAGADOUGOU); AND ABILITY TO
ABILITY TO IDENTIFY/RESOLVE OPERATING PROBLEMS

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(3) EFFECTIVENESS OF DISSEMINATING RESEARCH (IPM) RECOMMENDATIONS TO INCAH (BAMARU) AND TO THE EXTENSION AND CROP PROTECTION SERVICES AND FARMERS IN THE PARTICIPATING COUNTRIES.

(4) EXPEDITIOUS RECRUITMENT OF QUALIFIED FAO ADVISORS AND NATIONAL COUNTERPARTS, AND OTHER COOPERATING COUNTRY AND REGIONAL OFFICIALS AND TRAINEES.

(5) PROBLEMS, IF ANY, ENCOUNTERED IN ORGANIZING THE WORK OF THE TECHNICAL WORKING GROUPS; EFFECTIVENESS OF COORDINATION WITH ANNEX A

(REGIONAL FOOD CROP PROTECTION) AND WHAT THEY ACCOMPLISHED SO FAR.

(6) EFFECTIVENESS OF THE TRIPARTITE CONSULTATIVE COMMITTEE MECHANISM FOR SETTING PROJECT POLICY AND MONITORING PROGRESS.

(7) ROLE OF USAIDS IN IMPLEMENTATION OF PROJECT; COULD FAO ASSUME THIS ROLE IN ALL COUNTRIES, AS IT HAS DONE IN MAURITANIA?

B. INTERMEDIATE RESEARCH EVALUATION

RESEARCH EFFORTS WILL BE EVALUATED AGAINST THE FOLLOWING BENCHMARKS TO BE INCORPORATED INTO THE ANNUAL COUNTRY WORKPLANS:

(1) PEST MANAGEMENT METHODS

(A) REGIONALLY COORDINATED RESEARCH UNDERWAY IN THE CROP SEASON PRECEDING THE EVALUATION AND FOR THE CONTROL OF THE PRIORITY PESTS (TWO INSECTS, FOUR PLANT DISEASES, AND ONE WEED) SPECIFIED IN THE TECHNICAL SECTION OF THE IPM PROJECT PAPER.

(B) ASSESSMENT OF EACH NATIONAL CONTINGENT AS TO TIME SPENT ON ONE OR MORE OF THE SEVEN REGIONAL RESEARCH PRIORITY TOPICS AGREED UPON AND THE REMAINDER OF THEIR TIME ON OTHER IPM RESEARCH. PP STATES AT LEAST HALF TIME EACH TO BE SPENT ON IPM RESEARCH TOPICS.

(C) ASSESSMENT OF AVENUES USED TO RESEARCH THE MANAGEMENT OF THE SEVEN SELECTED PESTS AND RESEARCH BEGUN ON THE MOST PROMISING AVENUES. (BY "AVENUE OF RESEARCH" IS MEANT AN APPROACH TO CONTROLLING THE PARTICULAR PEST, E. G., USE OF NATURAL BIOLOGICAL CONTROL ENEMIES, RESISTANT VARIETIES, OR CULTIVATION PRACTICES, ETC.)

(D) ASSESSMENT AND IDENTIFICATION OF RESEARCH ON PESTICIDES LIMITED TO ENHANCING SPECIFICITY OF USES, I. E., IMPROVING THE

TIMING AND MINIMIZING AMOUNTS APPLIED AND USE OF BIOLOGICAL INSECTICIDES AND NOT INCLUDING TRADITIONAL RESEARCH ON COMPARATIVE EFFECTIVENESS OF VARIOUS

PESTICIDES OR ON CALENDAR APPLICATION, APPLICATIONS ON PARTICULAR DATES, OR AT A PARTICULAR STAGE OF THE CROP, REGARDLESS OF THE PEST SITUATION IN THE FIELD).

(E) NUMBER AND USE MADE OF EXPERIMENT PLANNING FORMS DESCRIBING EXPERIMENTS AND OBJECTIVES, INCLUDING PLAN FOR ANALYSIS OF SOCIO-ECONOMIC AND ENVIRONMENTAL IMPLICATIONS OF EACH CROP PROTECTION METHOD TESTED AT THE FARM LEVEL.

(F) ASSESSMENT OF WHETHER DATA COLLECTED ON EVERY EXPERIMENT AVAILABLE ON STANDARD REGIONAL DATA FORM (FICHE).

(G) ASSESSMENT OF INITIAL OUTREACH AND CONSTRAINTS ENCOUNTERED (IN THE FORM OF DEMONSTRATION /STUDY AREAS ATTACHED TO LABORATORIES AND OBSERVATION POSTS) BEGUN. REGULAR SOLICITATION OF FARMER REACTIONS/OPINIONS PRACTICED.

(2) CROP LOSS ASSESSMENT, ECONOMIC THRESHOLD EXPERIMENTS, SURVEILLANCE AND FORECASTING

(A) ASSESS ITERATIVE CROP ASSESSMENT AND ECONOMIC THRESHOLD EXPERIMENTS UNDERWAY FOR EACH OF THE SEVEN PESTS IDENTIFIED AS REGIONAL RESEARCH PRIORITIES AND RECOMMEND NEW INITIATIVES, IF APPROPRIATE.

(B) FOR PRIORITY PESTS, SAMPLING METHODS FOR SURVEILLANCE AND FORECASTING, USABLE BY CROP PROTECTION TECHNICIANS AND FARMERS, BEING DEVELOPED. (WILL INCLUDE NUMBER AND LOCATION OF SAMPLES TO BE TAKEN, METHODS FOR RECOGNIZING THE CRITICAL STAGES FOR SAMPLING, AND METHODS OF DETERMINING INFESTATION LEVELS.) REVIEW PUBLICATIONS AND COMMENT ON CURRENT UTILIZATION OF MATERIALS.

(C) WHAT NATIONAL INSTITUTIONS ARE INVOLVED IN COLLECTING AND DISSEMINATING INFORMATION

AND ARE ADEQUATE RESOURCES AVAILABLE? REGIONALLY STANDARDIZED OBSERVATION POST DATA SHEETS AND REVIEW AND COMMENT ON THE NEED AND USE OF THESE DATA SHEETS.

(D) EVERY OBSERVER ENTERING COMPLETE HYDROLOGICAL, METEOROLOGICAL, CROP PHENOLOGICAL, PEST INCIDENCE AND CROP LOSS DATA ON STANDARD DATA FORMS (FICHES). REVIEW AND COMMENT ON THE NEED AND USE OF THESE DATA SHEETS. IS TRAINING ADEQUATE ON HOW TO FILL OUT AND UTILIZE THE DATA SHEETS?

(3) INSTITUTIONAL INFRASTRUCTURE

(A) COMPLETENESS OF STAFFING IN ACCORDANCE WITH TABLE 11-1 (PAGE 11-28 OF IPM PP AMENDMENT AUGUST, 1983), ASSIGNMENT AND RECRUITMENT OF FAO EXPERTS.

(B) AT LEAST ONE QUALIFIED NATIONAL COUNTERPART IN PLACE FOR EVERY FAO ADVISOR.

GUIDANCE OF FAO ADVISORS AND REGIONAL

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PLANT PROTECTION SERVICE

PROJECT TRAINING BEING EFFECTIVELY
UTILIZED BY LOCAL AGRICULTURAL PERSONNEL.

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(D) ALL THE NATIONAL CEREAL OBSERVATION
POSTS IN PLACE AND EACH STAFFED BY TWO TRAINED
OBSERVERS.

(E) LABORATORIES BUILT, EQUIPPED AND
ADEQUATELY STAFFED WITH TRAINED
TECHNICIANS. IS THERE AN ADEQUATE
MAINTENANCE AND REPAIR PROGRAM IN PLACE
FOR BUILDINGS AND EQUIPMENT?

(F) LONG-TERM MASTERS DEGREE LEVEL TRAINING
BEGUN FOR COUNTERPART RESEARCHERS IN THE
NUMBERS AGREED TO IN EACH COUNTRY
OPERATIONAL PLAN. REVIEW THE INSTITU-
TIONAL STRUCTURE AND ASSESS CURRENT
STAFFING COMPETENCY AND PROVIDE RECOM-
MENDATIONS FOR FUTURE INSTITUTIONAL
NEEDS, I.E., MORE STAFF, LESS STAFF
AND TRAINING NEEDS.

(4) MISCELLANEOUS

(A) ARE THE WORKING GROUPS MEETING AND
BRINGING TOGETHER PRINCIPAL FAD AND
NATIONAL PROJECT TECHNICIANS, ALONG
WITH OUTSIDE RESEARCHERS IN SUBJECTS OF
MUTUAL INTEREST, SUCH AS PROGRAM
PLANNING, TRAINING, RESEARCH
RECOMMENDATIONS. IS TECHNICAL MANUAL
PREPARATION UNDERWAY?

(B) ASSESS THE ADMINISTRATIVE AND
SCIENTIFIC COLLABORATION EFFECTS OF THE
IPM PROJECT IN REGARD TO ANNUAL PLANNING,
PROGRAM PLANS AND IMPLEMENTATION WITH OTHER
DONORS AND AID MISSION ACTIVITIES AND
MEMBER STATES EFFORTS TO PLAN FOR AND
FUND ON-GOING RESEARCH WORK. ALSO, MAKE
RECOMMENDATIONS TO IMPROVE ADMINISTRATIVE
AND COLLABORATION MECHANISMS, IF APPROPRI-
ATE. ASSESS THE COLLABORATION WITH OTHER
REGIONAL ORGANIZATIONS INVOLVED WITH
OTHER PESTS, SUCH AS OCEANIC LOCUST AND
BIRDS, DICHA (MIGRATORY LOCUSTS), COPR
(CENTER FOR OVERSEAS RESEARCH), ETC.

(C) ASSESS THE CAPABILITY OF THE SAHEL
INSTITUTE (INSRI) TO CARRY OUT THE ROLE OF
"PLANT PROTECTION INFORMATION DOCUMENTATION"
AS DETAILED IN ANNEX G OF THE CILSS PROGRAM.

4. REGIONAL FOOD CROP PROTECTION (RFPP) PROJECT

THE EVALUATION PLAN FOR THE RFPP PROJECT DOES NOT
ESTABLISH SPECIFIC BENCHMARKS FOR EVALUATION. HOWEVER,
FROM THE LOGICAL FRAMEWORK AND THE NARRATIVE OF THE
EVALUATION PLAN, THE FOLLOWING CAN BE ESTABLISHED:

A. ASSESS THE LEVEL OF DEVELOPMENT BY THIS PROJECT
OF THE NATIONAL PLANT PROTECTION SERVICES IN THE
PARTICIPATING COUNTRIES AS TO:

(1) ARE THEY FULLY STAFFED, EQUIPPED, OPERA-
TIONAL AND HAVE LOGISTICAL SUPPORT IN
EACH COUNTRY.

(2) TRAINING FACILITIES IN PLACE WITH MOST

(COUNTRY TRAINING AND STAFF ASSIGNED AND
PROGRAMS CONTINUOUSLY SCHEDULED)

(3) INSTITUTIONALIZATION OF DEMONSTRATIONS
ON FARMERS' FIELDS BY HOST COUNTRY
INSTITUTIONS (IDENTIFY).

(4) HOST COUNTRY STAFF ABILITY TO GATHER AND
ANALYZE DATA ON CROP LOSS, PRODUCTION, ETC.

(5) ASSESS FUNCTIONING MECHANISMS ESTABLISHED
WITH RESEARCH INSTITUTIONS AND EXTENSION
SERVICES.

(6) IDENTIFY AND ASSESS STAFF CAPABILITIES AT
THE PROVINCIAL AND NATIONAL LEVELS TO
COMBAT AND CONTROL PEST INFESTATIONS OF
MAJOR THREAT TO FOOD CROPS WHICH ARE
BEYOND CONTROL OF THE FARMER.

(7) HOW IS CROP PROTECTION STAFF COORDINATED
WITH EXTENSION STAFF AT FARMER AND AT
NATIONAL LEVEL?

B. ASSESS THE REGIONAL ORGANIZATIONAL CAPABILITY
(BAMAKO AND GUAGADOUCOU) FOR MEASUREMENT,
ANALYSIS, ADJUSTMENT AND DISSEMINATION OF
FINDINGS AND RECOMMENDATIONS TO THE SAHELIAN
COUNTRIES.

C. IDENTIFY AND ASSESS THE RELEVANT TECHNICAL
PACKAGES OF IPM CONCEPTS AND TECHNIQUES
AVAILABLE FOR EXTENSION TO THE FARMERS.

ASSESS THE ANNUAL WORK PLANS DEVELOPED FOR EACH
PARTICIPATING COUNTRY AS TO PRACTICALITY AND
EFFECTIVENESS IN MEETING TARGETS OF THE PROJECT.

D. ASSESS THE CURRICULUM OF THE REGIONAL TRAINING
CENTER IN SENEGAL AS TO APPROPRIATENESS FOR THE
RPPS EXTENSION AND OTHER GOVERNMENTAL AGENCIES
FROM EACH PARTICIPATING COUNTRY AND THE ADEQUACY
OF THE INSTRUCTIONAL STAFF. MAKE ANY RECOMMEN-
DATIONS FOR IMPROVING THE TRAINING PROGRAM, IF
-- APPROPRIATE.

F. MAKE ANY RECOMMENDATIONS FOR IMPROVING THE
ADMINISTRATIVE/MANAGEMENT AND CONTRACTURAL
ARRANGEMENTS FOR THE PROJECT.

G. IN DISCUSSING THE FUTURE MANAGEMENT OF A
FOLLOW-ON PROJECT, ASSESS WHERE THE PROJECT
MANAGEMENT RESPONSIBILITY SHOULD BE, E.G.,
AID/W, MISSIONS OR REDSO/WCA.

H. IN CARRYING OUT THE ABOVE, THE EVALUATION TEAM
SHOULD RESPOND TO THE FOLLOWING THREE RECOMMEN-
DATIONS OF THE RECENT DRAFT AUDIT REPORT OF THE
RFPP PROJECT.

(1) "RECOMMENDATION NO. 1" - DETERMINE HOW AID
CAN DEAL WITH THE FOLLOWING CONSTRAINTS TO
INTEGRATED PEST MANAGEMENT DEVELOPMENT:

---PARTICIPATING COUNTRIES AND FARMERS
FAVORABLE ATTITUDES TOWARD AND
DEPENDENCY ON PESTICIDES AND

---PARTICIPATING COUNTRIES' PESTICIDE

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RECOMMEND ROBERT WESSELMANN THROUGH CICP

(2) "RECOMMENDATION NO. 2 - USAID/SENEGAL'S REGIONAL FOOD CROP PROTECTION OFFICE PROVIDE TECHNICAL ASSISTANCE TAILORED TO EACH PARTICIPATING COUNTRIES NEEDS IN DEVELOPMENT: (A) TRAINING PROGRAMS AND TRAINING CURRICULUMS, (B) CROP PROTECTION EXTENSION PROGRAMS, (C) FOLLOW-UP SYSTEMS ON TRAINING AND EXTENSION, (D) MANAGEMENT SYSTEMS AND PROCEDURES AND (E) TECHNICAL CAPABILITIES SUCH AS CROP LOSS ASSESSMENTS, ECONOMIC THRESHOLD ANALYSES, PEST SURVEYS, AND DEMONSTRATION PROGRAMS."

(3) "RECOMMENDATION NO. 3 - USAID/SENEGAL'S REGIONAL FOOD CROP PROTECTION OFFICE DEVELOPS (A) PLANS TO FILL THE VACANT REGIONAL TRAINING OFFICER AND COUNTRY PROJECT OFFICER POSITIONS AND (B) PROCEDURES TO FILL VACANT POSITIONS IN A TIMELY MANNER".

THE RECOMMENDATIONS ABOVE RELATED TO THE FUNCTION OF THE REGIONAL FOOD CROP PROTECTION OFFICE MAY BE MOOT IF THE USDA SUPPORT TO THE RFCP PROJECT ENDS IN JUNE OF 1985. HOWEVER, OPTIONS SHOULD BE PRESENTED FOR UTILIZATION OF

THE REGIONAL FACILITY IF THE PROJECT DOES END.

5. COMPOSITION OF EVALUATION TEAM

PROJECT DESIGN OFFICER - TEAM LEADER, PACKAGER, EDITOR WILL BE RESPONSIBLE FOR FINAL PREPARATION OF THE EVALUATION. RECOMMEND EITHER JOHN CLOUTIER OR OTHER PDO FROM REDD/WCA OR A PDO THROUGH AN IOC.

AG ECONOMIST - THIS INDIVIDUAL WILL BE SOMEONE WHO IS BASED IN THE SAHEL AND HAS FIRST-HAND INFORMATION WITH THE AGRICULTURAL/CROP PROTECTION SYSTEM IN EACH COUNTRY. THIS PERSON WILL WORK CLOSELY WITH THE TEAM LEADER TO PROVIDE A GENERAL, BROAD AGRICULTURAL PERSPECTIVE TO THE EVALUATION. THE SPECIFIC TASK WILL BE TO (1) LOOK AT THE APPROPRIATENESS OF THE IPM METHOD FOR THE SAHEL AND (2) PROVIDE RECOMMENDATIONS ON THE FUTURE ROLE OF FAO, OTHER DONORS AND REGIONAL VS. BILATERAL ISSUES RELATED TO THE FUTURE PROJECT. RECOMMEND E. SIMMONS OF USAID/BAMAKO.

ADMINISTRATIVE/INSTITUTIONAL DEVELOPMENT SPECIALIST - REVIEW DEVELOPMENT OF PEST RESEARCH INSTITUTION IN EACH COUNTRY, NATIONAL PLANT PROTECTION SERVICE IN EACH COUNTRY, PROJECT MANAGEMENT, LINK BETWEEN RESEARCH AND EXTENSION. LINK TO REGIONAL AND INTERNATIONAL RESEARCH CENTERS. REVIEW THE SAHEL INSTITUTE (INSAH) AND ASSESS ITS CAPABILITY TO CARRY OUT THE RESPONSIBILITY FOR PLANT PROTECTION INFORMATION DOCUMENTATION AS STATED IN ANNEX G OF CILSS PROGRAM. RECOMMEND JAN TUTHILL THROUGH AN IOC.

AG RESEARCH/EXTENSION SPECIALIST - REVIEW NATIONAL RESEARCH CENTERS, DETERMINE INSTITUTIONAL AND STAFF CAPABILITIES TO CARRY OUT RESEARCH, LEVEL OF RESULTS, E.G., TECHNICAL PACKAGES SUITABLE AND ECONOMICALLY FEASIBLE FOR THE FARMER AND EXTENSION SYSTEM CAPABILITY OF THE NATIONAL PLANT PROTECTION SERVICES OR OTHER HOST COUNTRY INSTITUTIONS. REVIEW TRAINING CENTER STAFF NEEDS AND TRAINING PROGRAMS TO DETERMINE HOW EFFECTIVELY IT IS TRAINING PARTICIPANTS FROM EACH COUNTRY.

ENTOMOLOGIST - REVIEW TECHNICAL QUALITY OF RESEARCH AT NATIONAL RESEARCH CENTERS AND QUALITY OF TECHNICAL PACKAGES DEVELOPED AND OFFERED TO FARMERS. REVIEW USE OF IPM METHODS AND INSECTICIDES. CICP HAS IDENTIFIED TWO CANDIDATES TO SHARE THIS RESPONSIBILITY: PERRY ADKINSON AND RAY FRISBIE OF TEXAS A AND M.

PHYTO-PATHOLOGIST - REVIEW TECHNICAL QUALITY OF RESEARCH AT NATIONAL RESEARCH CENTERS AND QUALITY OF TECHNICAL PACKAGES DEVELOPED AND OFFERED TO FARMERS. REVIEW USE OF IPM METHODS. RECOMMEND TED HERBERT THROUGH CICP.

WEED SCIENTIST - REVIEW TECHNICAL QUALITY OF RESEARCH AT NATIONAL CENTER AND QUALITY OF TECHNICAL PACKAGES DEVELOPED AND OFFERED TO FARMERS. REVIEW USE OF IPM METHODS AND USE OF HERBICIDES, ETC. CICP IS SEARCHING FOR A CANDIDATE.

FAO OBSERVER

6. LANGUAGE REQUIREMENTS
FSI 3/3 FOR TEAM MEMBERS IS REQUIRED; FOR THE ENTOMOLOGIST, PHYTO-PATHOLOGIST AND WEED SCIENTIST TWO OF THE THREE SHOULD HAVE FRENCH AT THE REQUIRED LEVEL.

7. BACKGROUND MATERIALS

PROJECT PAPER RFCP II
PROJECT PAPER IPM
JOINT EVALUATION REPORT 1981
ANNUAL WORK PLANS
ANNEXS A, B AND G OF CILSS PROGRAM
PROJECT GRANT AGREEMENT AID/CILSS
CILSS/FAO AGREEMENT
USDA PROGRAM REPORTS
DRAFT AUDIT REPORT RFCP PROJECT

8. THE SCHEDULE FOR THE TEAM IS SET FOR APPROXIMATELY OCTOBER 15TH TO NOVEMBER 30TH. THE FOUR PERSONS CONTRACTED THROUGH CICP WILL BE AVAILABLE FOR FOUR WEEKS, AND THE TWO THROUGH AN IOC (ONE POSSIBLY FROM REDSO) SHOULD BE AVAILABLE SIX WEEKS; THE AG. ECONOMIST FROM BAMAKO SHOULD BE AVAILABLE FOR THREE TO FOUR WEEKS INCLUDING ABOUT ONE WEEK IN MALI.

9. CICP WILL PICK UP THE COST OF SALARIES FOR THEIR FOUR TEAM MEMBERS. THEY REQUEST THAT EITHER THE IPM - PROJECT OR PM AND R FUNDS BE USED TO COVER THE COST OF TRAVEL AND PER DIEM. THE TOTAL ESTIMATED COST OF THE EVALUATION IS DOLS 100,000 IN ADDITION TO THOSE COSTS COVERED BY CICP. IT IS RECOMMENDED THAT DOL\$57,600 BE COVERED BY PM AND R AND UP TO DOLS 50,000 FROM THE IPM PROJECT. PLEASE ADVISE ASAP IF USAID OUGAGADOUGOU CAN OBLIGATE DOLS 57,600 OF PM AND R FUNDS THROUGH A LIMITED

SCOPE GRANT AGREEMENT IN THE NEXT TWO WEEKS.

10. FOR HELLYER AND FRANKLIN: PLEASE SUBMIT RECOMMENDATIONS FOR THE MOST APPROPRIATE SCHEDULE FOR THE TEAM MEMBERS. TASK FORCE PROPOSES THAT TECHNICAL IPM TEAM MEMBERS FOCUS ON 3-4 COUNTRIES WHERE THERE IS ADEQUATE RESEARCH BEING CARRIED OUT. OTHER TEAM MEMBERS COULD FOCUS ON INSTITUTIONAL AND OTHER ISSUES WHERE IPM AND RFCP ARE BOTH OPERATIVE. THE GAMBIA SHOULD RECEIVE SPECIAL ATTENTION BECAUSE OF PILOT ACTIVITY. SHOULD CHAD AND CAPE VERDE RECEIVE ANY OR LIMITED ATTENTION? PLEASE ADVISE.

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FROM: DE WASH STATE DIVISION

TO: OS/NSA/OT/STATE/AT

11. REGARDING PARTICIPATION BY EVALUATION TEAM MEMBERS
AT THE DECEMBER 15th MEETING IN ARLING, VA. WE REQUEST
BY WFOFM THAT ONE OR TWO MEMBERS, PREFERABLY AFD
EMPLOYEES, ATTEND THE SESSION. THIS INPUT WOULD BE
INCORPORATED INTO THE FINAL EVALUATION REPORT AS
APPROPRIATE.

12. FOR DAMROD, PLEASE CONFIRM AVAILABILITY OF E
SIMMONS FOR AL ECONOMIST POSITION.

13. FOR REDSOX/DA, PLEASE CONFIRM AVAILABILITY OF JOHN
CLOUTIER FOR DESIGN OFFICER TEAM LEADER. OAM UNQUOTE
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