

TRIPARTITE EVALUATION
OF
SAHEL REGIONAL IPM PROJECT (625-0928)
BY
GLISS - FAO - AID
MARCH 19 - APRIL 24, 1986

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CONCLUSIONS

The Integrated Pest Management Project, authorized in 1978 was plagued by too numerous management problems which impeded effective implementation until 1983. Since acceptance of the Amended Project Paper in 1983, its implementation has proceeded at an adequate pace albeit with certain constraints identified by the evaluation team.

It is important to be fully aware of the benefits derived both, nationally and regionally, which have been acquired in a short period of time. For example, national governments have been made aware of the potential benefits of IPM to their long term production planning goals; extension personnel and some farmers, through the Pilot Programs, have been shown the benefits of rather simple crop protection interventions; researchers have been networked regionally; research on crop loss assessment resulting from attack of Ragnuva on millet will probably soon result in a regional damage threshold for the pest; development of prediction models for Ragnuva and grasshoppers is nearing completion and only needs verification and fine tuning; bioclimatological data has been acquired and stored as a result of information supplied by the network of observation and surveillance posts across the region; and, most important, a cadre of young research talent has been or is being trained to continue research and development in crop protection. In addition, annual meetings of regional scientists provides a necessary line of communication.

When the project began, it was estimated that some ten researchers worked on crop protection problems in the Sahel. At this moment about 75 scientists collaborate in the IPM project. This clearly indicates its direct impact and catalyzing effect.

These are significant contributions which would not have been made if it were not for the support of the IPM Project.

Step by Step Comparison of Objectives and Achievements

Generally, in comparison to the situation before the project began, the objectives set for this phase of IPM efforts (See Introduction) have been achieved.

In spite of the delays in development of the infrastructure for research, the different components have received sufficient funds and materials and now are in a position to perform basic research in crop protection. At the end of the present project (or a little after), all eight countries except Niger, Chad, and Mauritania will be able to continue without the support of expatriate expertise in its present form. A considerable body of information has been collected on the subjects identified as requiring priority attention, the work done along the lines of thought of IPM. Basic studies on the most important pests have yielded methods to control these pests with little or no utilization of chemical pesticides. However, the effectiveness of these methods needs further testing.

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Pilot programs have been performed on millet in six countries, and this is an important step towards implementing IPM techniques at the Sahelian farmers' level. Future pilot programs deserve to be performed according to carefully designed planning, with help from socioeconomists. The pilot programs have influenced farmers and extension services for the better.

The different protocols used in the pilot programs are in fact preliminary sets of techniques that require further adaptation. It would be premature to hand them over to the Plant Protection Services for general dissemination.

A relatively large amount of work has been done on surveillance systems, which are functioning in all countries, with certain difficulties still to be solved in some. Based on this system, a warning system for pest outbreaks can be established, provided in-country communication between observation posts and headquarters is brought up to standard where it is insufficient or lacking. A forecasting system depends on the additional availability of models, the development of which has made good progress for two pests.

Extensive surveys have enabled identification of the main pest species, and crop losses by some species have been assessed. Moreover, the large body of data on pest incidence available could and should be scrutinized to try and assess preliminary economic thresholds.

Constraints

As in any successful research or institutional building project (IPM has both aspects) there are usually identifiable constraints which partially impede progress. The redesigned IPM project is no exception.

The team noted that entomology is strongly represented in most national components, both in training and in technical assistance. Weed problems and plant diseases are of equal importance if not more important in some instances than insect pests.

The policy of national governments and crop protection services to provide cheap or free pesticides will have a negative effect on farmer acceptance of IPM. These policies need to be examined carefully and redesigned with ILISS regional IPM staff involvement. Use of high-risk pesticides such as fieldrin should be halted.

In the pilot programs the national components should utilize the same experimental design whenever possible (number of villages, number of fields per village etc.). As a matter of fact there will be differences in the cultural measures depending upon the local situation. Proper performance of the pilot programs requires that each national component be supported by a national socioeconomist; in certain cases additional support from consultants could be useful.

Active collaboration with other regional crop research groups as well as other donor supported research at the national level is open to improvement. It was not clear how much within-project collaboration is ongoing in some of the components visited.

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In many cases, manpower now in training will not have the advantage of on the job training with a trained counterpart considering current PACO of March 1987.

The technical assistance provided by FAO varied in quantity and quality across the region. Short term assistance could have alleviated some of these difficulties.

The present project management is improved since restructuring in 1983 but still presents some difficulties in procurement etc.

Project management on a national level has also caused delays, and personal problems. This problem area as well as the one concerning external expertise could be substantially reduced in a bilateral funding model.

Close cooperation between IFM and other USAID funded projects should be established in order to obtain full benefits from these researches. The evaluation team felt that in general there was too little cooperation in place; it found that in at least one case cooperation had wilfully not been established (The Gambia).

General Conclusion

In conclusion, the IPM efforts in the Sahel fully deserve to be continued. A second program, however, should be designed as the minimum necessary to consolidate and further develop present achievements and expand cautiously in problem areas uncovered as yet, rather than have the grandeur of the present projects. In particular, it should include research on pests of stored products and on grasshoppers.

RECOMMENDATIONS

The evaluation team, based on their review of the Regional IPM Project as well as each of its national components, concluded that the present national and regional efforts are effective and necessary; we therefore recommend continuation of the effort in a follow-on project Phase II IPM program. It is strongly recommended that a follow-on project be developed without further delay to avoid, if possible, any disruptive funding gap between the present program and the beginning of the next.

In addition the team specifically recommends the following:

- National components should be funded in a bilateral mode, thus providing each with initiative and greater responsibility for the conduct of the work;

- Maintenance of the regional coordinating unit to support the national components and to initiate new important regional tasks, utilizing a high quality staff to develop:

- a basis for a common policy and necessary legislation in plant protection e.g., pesticide regulation legislation, plant quarantine services;
- an IPM strategy for the region;
- a functional regional research network;
- a system of consultancies for replacement of expatriate experts.

In addition, the regional coordinating unit should continue its important tasks for which the unit is already responsible such as coordinating the publication of scientific and technical papers, coordination of participation in international congresses, as well as organizing workshops, seminars, etc. It is also recommended that coordination of the bioclimatology program be incorporated as an additional new task.

- Reinforcement of the national crop protection services to disseminate IPM research results in a manner consistent with the regional IPM strategy and which will integrate IPM into the crop protection services and thereby effectively reduce the dependence on pesticides.

- Provision of increased practical IPM contributions to the farmers through training of middle-level cadres at Sansalan training centers with practical courses, workshops, seminars, etc. to provide a functional group of trained field agents to assure integration of IPM strategy into crop protection and extension services.

- Provision of advanced training, outside of the Sahel, in IPM basic disciplines (Entomology, plant pathology, weed science), if a need is identified, to qualified BS or MS level candidates to enlarge the research capabilities at the national level. In order to perform its future tasks in research and development of IPM, the Sahelian research capacity now in place needs every staff member returning from training abroad. It is most important that these returning trainees be guaranteed a research position in each of the national IPM Programs.

- That there be added, where appropriate in national programs, the necessary trained persons to assure that each primary discipline of IPM be represented. This is particularly true in the case of weed scientists who are lacking in many national components.

- Provision of a national socioeconomist (MS) for each national component. This is necessary to conduct appropriate on farm trials with farmer participation as well as demonstration of IPM tactics. The socioeconomist should play a role in design, implementation, and analysis of such projects. It is anticipated that this individual would have the benefit of a short term consultant with whom to plan, with the technical crop protection staff, research and development at the onfarm level. Where needs are determined, a BS level economist or sociologist should receive appropriate training for the MS degree in socioeconomics.

- Continuation of efforts to develop prediction models which will be a useful tool for early prediction of outbreaks as well as damage estimates due to key pests. The utilization of data already acquired by the bioclimatological component should be subjected to critical analysis and evaluation to achieve the best use of the data for prediction purposes.

- A radio communications network for support of the surveillance cadre at each observation post, because of need for transmitting information concerning local pest population data which can be utilized nationally and regionally for early warning of potential pest outbreaks. Such information generated within country and within the region can be a valuable asset in predicting and combating major outbreaks of pests.

- The follow-on project should be designed as the minimum necessary to consolidate present achievements and it should expand into new areas such as grasshopper and stored products pests control. Expansion of research should be limited and only entered into with caution to best utilize information already obtained on key pests.

It is not recommended to embark on detailed, profound studies of crop loss assessment across the region. Simple preliminary treatment thresholds are adequate and practical at this stage of development.

Concerning the completion of the present project, the evaluation team recommends the following:

- measures should be taken to allow the staff in training abroad to finish their studies as planned;

- since national project management is one of the weaker parts of the total effort, the team recommends that a scientific project management course be organized for relevant staff. This should be done regionally, in the form of a consultancy.

- since the IPM Project in the Sahel is much less well-known by the international scientific community than it deserves, the team recommends that a well-balanced synthesis of the total effort be published.

In this respect, the following could be considered:

- a special symposium towards the end of the project, or
- a session of an international congress on plant protection devoted to the project.

ACRONYMS AND ABBREVIATIONS

ACDI	Agence Canadienne de Developpement International (CIDA)
ADO	Agricultural Development Officer
AGRHYMET	Agro Meteorological Hydrology Data Collection, Storage and Forecasting Program for the Sahel Region, Niamey, Niger
ANNEX A	Regional Food Crop Protection Project
ANNEX B	The Section of the CILSS Program which deals with Integrated Pest Management for Basic Food Crops
ANNEX G	G1. Cellule d'Information Regionale pour la Protection de Cultures et des Recoltes G2. Formation et Vulgarisation
ASECNA	Association de la Securite de la Navigation Aerienne
BS	Bachelor of Science Degree
CFPV	Centre Sahelien de Formation en Protection de Vegetaux
CIBC	Commonwealth Institute for Biological Control
CIDA	Canadian International Development Agency
CILSS	Comite Permanent Inter-Etats de Lutte contre la Secheresse dans le Saneil
CIDT	Compagnie Malienne des Textiles
CNRA	Centre National de Recherches Agronomiques
CNRADA	Centre National de Recherche Agronomique et de Developpement Agricole, Mauritania

ACRONYMS AND ABBREVIATIONS (Continued)

CONA/CILSS	Correspondent National-CILSS
CPS	Crop Protection Service
ENFVA	Ecole Nationale de Formation et, de Vulgarisation Agricole
FAO	Food and Agriculture Organization, United Nations
GERDAT	Groupement d'Etudes et de Recherche pour le Developement de l'Agriculture Tropicale (FRENCH)
GTZ	West German Technical Assistance Program
IBRAZ	Institut Burkinabe de Recherche Agronomique et Zootechnique
ICRISAT	International Center for Research in the Semi-Arid Tropics
IER	Institut de l'Economie Rurale, Mali
IITA	International Institute of Tropical Agriculture
INIA	Institut Nacional de Investigacion Agraria, Cap Verde
INRAN	Institut de Recherches Agronomiques du Niger
INSAH	Institut du Sahel
IPM	Integrated Pest Management <u>as</u> a Project or <u>as</u> a Pest Management system
IPR	Institut Polytechnique Rural
IRAT	Institut de Recherches Agronomiques Tropicales (FRENCH)
ISRA	Institut Senegalais des Recherches Agronomiques

ACRONYMS AND ABBREVIATIONS (Continued)

LOP	Life of Project
M.S.	Master of Science Degree (or Msc.)
NPPS	National Plant Protection Service
OCLALAV	Organization Commune de Lutte Antiacridienne et Antiaviaire
OIGMA	Organization Internationale contre le Criquet Migrateur Africain
OMM	Organization Meteorologique Mondiale (WMO)
OPSR	Operation Protection des Semences et Recoltes, Mali
ORD	Organization de Developpement Rural, Burkina Faso
PACD	Project Assistance Completion Date (AID)
PH. D.	Doctorate
PLI	Project Lutte Integree
PNUD	Programme des Nations Unies pour le Developpement (UNDP)
PP	Project Paper (AID)
PRPR	Project Regional de Protection des Recoltes
PV	Projection des Vegetaux (Crop Protection)
REDSO	Regional Economic Development Support Office, Abidjan, (AID)
RFCP	Regional Food Crop Protection Project (PRPR)

ACRONYMS AND ABBREVIATIONS (Continued)

SAFGRAD Semi-Arid Food Grain Research and Development (AID)

SRCVO Section de Recherche sur les Culture Vivrieres et Oleagineuses

SVP Service pour la Protection des vegetaux

TA Technical Assistance

UNDP United Nations Development Program (PNUD)

USAID AID - United States Agency for International Development
(Mission or AID/ W (AID/Washington))

WHO World Meteorological Organization (CMM)

TEAM MEMBERS OF THE EVALUATION MISSION

J.D. Paschke, Team Leader/Entomologist, Consultant for USAID, Washington; P. Gruys, Integrated Pest Management Specialist, Consultant for FAO, Rome; B. Sidibe, Entomologist, Consultant for CILSS' Ouagadougou.

The team wishes to express its appreciation to all of those persons who so graciously assisted with the organization and data gathering for the Mission, in particular Mme Ba Diallo, CILSS-IPM Project Directrice; Dr. Gaston Pierrard, FAO Principal Technical Advisor, and Mr. Boundi, Administrative Officer, IPM-CILSS.

We especially wish to express our thanks to the Ministers of Agriculture or Rural Development and their staff, and to each of the Country Component directors, scientists, FAO representatives, technical experts, and assistants for their assistance in providing information and documentation for conducting the evaluation and also for their very able logistic support as well as their hospitality. We finally wish to thank the translators and secretaries for a lot of work done in little time.

In addition, we wish to thank the USAID Missions for their assistance in the conduct of this evaluation.

I. INTRODUCTION

A. Project History

The IPM project was authorized in 1978 with the long term objective "to increase food crop production in the Sahel by reduction of crop losses due to insects, plant diseases and weeds".

Since its initial authorization the project has experienced a wide range of implementation problems. In 1981 CILSS-FAO-AID authorized a major independent evaluation of the project and subsequent high-level tripartite discussions (CILSS-FAO-AID) resulted in an AID redesign team (composed of CILSS-FAO-AID representation) who drafted a Project Paper Amendment in February 1983. The PP amendment was subsequently approved by CILSS-FAO-AID in July 1983.

The PP amendment states the following objectives (abstracted for brevity) for the Phase I - IPM Project:

1. "Establish a research capability in the Sahel for the study of the biology and ecology of the major pests, including natural mortality factors which affect them"..... "Integrated pest control techniques will be developed"..... "These techniques suitable for differing national, ecological, and other conditions will represent the most effective and appropriate controls"....

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2. "Establish a network of experimentation/demonstration areas in each of the Sahelian countries to study and demonstrate integrated pest management systems, obtain farmer input to the research and assist in the introduction of IPM"....
3. "Provide IPM research results in packages"....
4. "Develop.... and initiate in each of the countries.... a surveillance and forecasting system providing current information on the occurrence of major pests"
5. "Organize in each country the capability to evaluate the relative economic importance of these pests through crop loss assessment experiments, and to determine the economic damage thresholds for each species....".

The project has supported long-term technical assistance in each of eight participating countries (Burkina Faso, Cape Verde, Chad (most recently), The Gambia, Mali, Mauritania, Niger and Senegal) with a Regional Directorate located in Ouagadougou with CIIRSS as the lead institution, technically supported by FAO.

Long and short term training for Sahelian researchers, construction and commodity procurement to build national infrastructures as well as expenses associated with regional seminars, technical working groups and research publications have been supported by the project. In addition, INSAH, Annex 31, formerly supported under the Regional Food Crop Protection Project (RFCP), has been supported under the IPM Project since the RFCP terminated in 1985.

In early fiscal 1984 USAID/W requested a Mid-term Evaluation of the IPM Project. The results of that evaluation and subsequent report have not been published by USAID/W. The recommendations resulting from the 1984 evaluation are to be found in Annex A.

Subsequently it was agreed at the tripartite consultative committee meeting in Rome in September 1985 that a tripartite evaluation of the IPM Project would be carried out during the course of 1986. In a cablegram AMEMBASSY ROME 19584 (Annex B) the terms of reference for the tripartite evaluation were presented as developed by Mr. Rene Blouard, FAO/AGO in collaboration with staff of the Plant Protection Division and Mr. Abdul Bitar, FAO/DD. AID/Burkina reiterated concurrence with suggested evaluation (Annex 3) in February 1986. AID/W agreed to provide consultant to represent USAID on tripartite evaluation team (Annex 3). The composition of the team members was mutually agreed upon by CILSS-FAO-USAID.

Because of insufficient liaison between CILSS, FAO, AID/Rome with AID/W the team was not fully assembled until reaching Praia, Cape Verde March 19, 1986. Two of the team, Dr. B. Sidibe (CILSS) and Dr. P. Gruys (FAO), had arrived earlier, Dr. Gruys having been briefed by FAO Rome March 13-14 enroute Praia.

B. Evaluation Methods

The Team (Dr. J.D. Paschke, Team Leader (AID), Dr. B. Sidibe, CILSS, and Dr. P. Gruys, FAO) met with the CILSS IPM Directrice, Mme Ba Diallo, Mr. Gaston Pierrard, FAO principal Expert, Mr. David M. Songer, AID/IPM, Ouagadougou, Mr. Boundi, Administrative Officer IPM/CILSS and Dr. G. Schulten, FAO-Rome, March 19, 1986 to discuss the terms of reference (Annex C) as revised by CILSS with concurrence by AID Ouagadougou and FAO.

The charge to the mission was "to examine the efficiency and the conformity of the Projects realizations in relation to the objectives as redefined" in the Project Paper Amendment.

A time frame of approximately four weeks was allocated to evaluate the project in seven of eight Sahelian countries; the Chad component was to be interviewed in N'kar because of restrictions concerning entry to the country.

The team discussed the project with appropriate AID/CILSS/FAO constituents in each country as well as the appropriate Ministry officials in each. A brief itinerary of the mission is presented in Appendix: D.

C. Organization of Report

The report discusses the project in technical terms by country, touches on project management, and analyses the future of the project in regional terms, and administrative considerations which influence project success. The conclusions and recommendations are given in the beginning of the report.

II. EVALUATION AND MISSION ANALYSIS OF THE PROJECT

A. Background

The technical evaluation of the IPM project was conducted in each country visited through lengthy discussion with personnel and their administrative directors in each of the respective components. In addition the FAO technical experts were in the group discussions. Key factors which were examined by the team were those identified in the terms of reference. In each country the team was provided reports on scientific accomplishments and usually had the opportunity to inspect laboratory facilities. Response by the host component and FAO personnel to specific technical questions was excellent. The technical evaluation is provided below.

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B. Technical Analysis by Country

I. Burkina Faso

Sources of Information

The evaluation team obtained information on the IPM Project in Burkina Faso in the following meetings and visits:

- With the Director of the Plant Protection Service and of the National IPM Project, Mr. Salifou Traore, and FAO principal expert, Mr. B. Simaga, on April 7, 1986.
- With the national component, on April 7, 1986: Mr. S. Traore (National Director IPM Project, Mr. B. Simaga (FAO principal expert), Ms. L. Gomez (FAO expert), Mr. D.C. Thiampoinya, Mr. Y. Sere, Mr. O. Dakou, Mr. A. Campalegre, Mr. F.T. Nikiema, Mr. O. Ouedraogo and Mr. S. Sangare (national researchers).
- Audience of the Minister of Agriculture, Mr. Seydou Traore, in the presence of the Director of Agriculture Mr. G. Djinko, the Secretary General of the Ministry of Agriculture, Mr. J.M. Kambire, and the National Director of the IPM Project, Mr. Salifou Traore, on April 3, 1986.

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- Visit of the Kamboinse IPM Laboratory at the ICRISAT and IITA-SAGRAD research complex, on April 8, 1986.
- With the USAID representative, Mr. R. Bloom, Mr. B. Simaga and Mr. F.T. Nikiema on April 8, 1986.
- With the FAO deputy representative, Mr. Z. Rissa, Mr. B. Simaga and Mr. F.T. Nikiema on April 8, 1986.

Historical

The present principal FAO expert started as such in 1983, after having worked in 1981-1983 as expert in surveillance and experimentation. The expert in entomology started in 1981. An associated expert in virology worked on the project for 2 years. One expert post (phytopathology) has not been fulfilled, however. As far as national scientists are concerned, three entomologists, one phytopathologist, a weed scientist and an agronometeorologist now cooperate in the project.

Buildings, Equipment

Two laboratories have been constructed and one (with greenhouse and insectary) is being built. Simple office and laboratory facilities have been or are being constructed at nine observation posts. There are 11

observation posts; two use existing facilities. All laboratory and agrometeorological equipment (for five posts) is in place.

The entomological laboratory at Kamboinse which the evaluation team visited was spacy, well designed and had the basic equipment for entomological work.

Training

Burkina Faso has taken full advantage of the five grants for academic training of staff. Three staff prepare for MSc degrees in the USA (2 entomology, 1 IPM) and two prepare doctorates in France (1 plant pathology and 1 weed science). They are expected to return in 1986 - 1987.

Another five young national researchers are being trained on the job by the FAO experts and experienced national scientist.

Twelve technicians have been or are being trained for 2 years at regional schools, and 13 lower staff have had a short training within the project. These people receive a refresher course each year in the off season.

IPM RESULTS

Situation of the Studies

In phytopathology, research centered around:

- the evaluation of losses
- studies on the physiological races of Pyricularia oryzae races
- varietal resistance
- methods of non genetic control.

The results obtained after three years have contributed to furthering knowledge on diseases: their distribution and the crop losses they cause in farmer's fields and in different places. These results also enabled the development of a methodology for testing the varietal resistance of rice to P. oryzae, and to determine the distribution of the physiological races of P. oryzae.

Thus, the data on varietal resistance and distribution of physiological races enable the choice of varieties to be introduced in a certain area and in certain cropping systems. As regards maize, varieties resistant to streak have been found; proposals to the extension will be made as to their testing in farmers fields. The sowing date and additional irrigation each plays a major role in the development of rice pyriculariosis.

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In entomology, research was mainly on Raghuva albipanctella, Cicaculina sp (streak vector), Contrarinia sorghicola, and Orseolia oryzivora. This work provided better knowledge of the distribution and the population dynamics of the Raghuva, and to detect two local varieties that are resistant to this pest. On maize, nine species of cicadellids including two species of cicadulina were identified. As regards cecidomyids of sorghum (C. sorghicola) an estimate of crop losses was made during the 1985 campaign in experimental fields on an ICRISAT variety; these losses represent 10 to 33% of potential yield. Methods for sampling and crop loss assessment were developed. Similar studies were carried out on rice cecidomyids; moreover, the development of parasitization was followed: the rate of natural parasitism due to P. latycaster hiplosiae and Tetraneura pachydiplosiae could be some 70%. Insecticide treatments based on carbofuran are effective and could make for gains of 1 to 2 t/ha.

The different results obtained on rice shall be the object of a pilot project in an irrigated area, aiming at the development of a surveillance system enabling the reduction of insecticide applications.

In weed science, studies confirmed the resistance of the Pramida (ICSV 1002 IV) sorghum variety and of other varieties derived from it through hybridization.

Capability for IPM Research

Although the number of national IPM researchers is not very high at present, a good capability for IPM research and development will be in place when the academic trainees have returned.

The IPM project in Burkina Faso is embedded in the CPS, and cooperation of IPM researchers with other research groups is good. IBRAZ (Institut Burkinabe de Recherches Agronomiques et Zootechniques) researchers take part in the IPM Project, and cooperation exists with ICRISAT and SAFGRAD.

Future external technical support can be supplied in the form of (repeated) short-term consultancies.

Constraints

Burkina has had similar problems as other countries with vehicles, fuel, slow and incomplete delivery of equipment and complications of financial administration that delayed purchase of materials.

Personnel, scientific as well as technical, has been short throughout the project. FAO could not fulfill the expert post in phytopathology budgeted, and the government did not replace staff sent in training.

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Conclusion, Recommendations

The basic structure for IPM is well in place in Burkina, in terms of buildings, equipment, personnel, experience and basic research data. Further funding is necessary to maintain and develop this structure, and to realize full development and implementation of IPM. Future developments can be performed basically by the national staff, supported by regional coordination and (repeated) short-term consultancies.

The following specific recommendations are made:

Facilities at observation posts that are not yet in place should be constructed before the project's end;

- A solution should be found by the Regional Direction, USAID and the national component to enable the staff in training abroad to finish their studies as planned;

- A list of incomplete laboratory equipment should be made by the national component and measures taken in cooperation with USAID to assure completion of this equipment as soon as possible;

- Future research support by way of consultancies will be necessary;

- Funding of day to day costs will be necessary after March 1987.

2. CAPE VERDE

Sources of Information

The evaluation team obtained information on the project in Cape Verde in two meetings, both on March 21, 1986 :

- with the USAID representative, Mr. J. Hartmann, ADO
- with the president of the Institute Nacional de Investigaco Agraria (INIA), Mr. Horacio Soares; Mrs. Paula Monteiro (Division of Plant Protection, Ministry of Rural Development); Mr. A. Neves and Mrs. Maria H. Andrade CONACILSS and Mr. P. Katsoyannos (FAO principal expert).

The National Director of the IFM Project, Mrs. J. Lobo Lima, was absent on a consultancy.

Moreover, during a visit of the San Jorge Research Station on March 21, the evaluation team talked to Mr. A. Viereck, in charge of GTZ - funded IFM Project in Cape Verde. Additional information was obtained from reports listed in the Annex G.

Historical, General Agricultural Scene

The agroecological situation in Cape Verde is unique in the region and differs in several respects from the other Sahelian countries.

First, the present potential for agricultural production is very limited. Some 90% of the food requirements of the population have to be imported.

Second, the crop spectrum is different. Maize, cowpea, pigeon pea, and other species of beans are important dry land crops (40 000 ha), and manioc, fruits and vegetables, including potatoes, are important where irrigation is possible (2 000 ha).

Third, a GTZ-funded project has supported national development in plant protection and IPM since 1977. Hence, the activities and achievements of CILSS/USAID/FAO must be considered in connection with those of the GTZ-funded project.

IPM research in the framework of CILSS/USAID/FAO started in the fall of 1983, with the arrival of an FAO expert in IPM. The present expert, Mr. P. Katsoyannos, took over in January 1985. He, the national entomologists and the two GTZ researchers work closely together.

No work on diseases and weeds was planned and has been done in the framework of the IPM Project.

Research on IPM is well integrated into research on sociological and ecological conditions, rural development including management of water resources, and agronomic techniques. Mr. Soares explained that his Institute aims at the optimal utilization of the hydrological and rainfall conditions by devising systems of soil treatment, crop varieties, and IPM methods adapted to local variations of these conditions.

Assessments by hydrology experts suggest that wise management of local precipitation and condensation (from fog, in the mountains), and of underground supplies of water, would allow considerable expansion of irrigated cropping and greater self-sufficiency in food.

Buildings, Equipment

Facilities at the San Jorge Research Station for housing of researchers on short term missions and for housing of research staff are being finished. The evaluation team visited the Station and found it very well equipped in terms of laboratory facilities and fields for experiments. The Station has a school for vocational agricultural training, at present attended by 64 pupils divided over two levels of training, one basic (18 months of theory and 6 months practice) and the other specialized (15 months of theory and 7 months of practical experience). The latter level trains "ingénieurs de travaux".

Office, laboratory and insectary facilities at Fogo and Santo Antão Islands have been finished as planned.

On S. Antao, a quarantine unit for introductions of entomophagous insects is developed. One vehicle has been obtained for each of the two islands.

The facilities at Fogo are not yet in use because the national technician responsible for the project's activities on this island has not yet arrived.

Training

Within the framework of the CILSS/USAID/FAO Project, no academic staff has been trained abroad.

According to information obtained from Mr. Soares, apart from the National Director of IPM, Mrs. S. Lobo Lima, there are two academically trained staff (BSc and MSc level) in plant protection at present ; another two (MSc) are being trained abroad. Under the USAID financed Food Crops Research Project, eight academic staff are trained, one of the eight in plant protection (nematology).

Eight laboratory assistants have been trained on the job and are now in place in Santiago (5) and S. Antao (3). Another six laboratory assistants are in training in Santiago (4) and in S. Antao (2).

Capability for IPM Research

National scientific staff for IPM seems to be limited to an agronomist and two entomologists, one of whom is the National Director of the IPM Project. Since she is also Director of Research of INIA, the time she has available for entomological work in a strict sense must be limited.

The evaluation team feels that the number of trained scientific staff is a weak point in Cape Verde.

On the other hand, Cape Verde has a strong point in the concentration of agricultural research in one Institute, in which IPM is well integrated. Moreover, as Mr. Soares explained, coordination of the Institute's research programme with the needs of the various Directorates of the Ministry of Rural Development (including the Plant Protection Service and Agricultural Extension), and with activities within other ministries and services, is well organized.

IPM in Cape Verde is also in a favorable position because the Ministry of Rural Development has the system for a tight grip on pesticide use. Legally, the use of pesticides is subject to permission issued only in case of need. The number of pesticides allowed is limited and several of them are biological (85%) (e.g. Thuricide, Elcar). This will certainly favor the effectiveness of entomophagous insects in IPM systems.

Hence, if national scientific staff could be strengthened, the Cape Verdian capacity for research and development of IPM would be very favorable.

IPM Research

According to rough estimates, 30-40% or more of agricultural production is lost to pests, mainly insects.

Studies on pest incidence on cowpea have been shown that aphids, grasshoppers, leaf miners (Acrocercops caerulea) and defoliating caterpillars (Acherontia atropos, Heliothis armigera) are the most important pests, causing some 20-60% crop loss.

Pests on other species of beans, including pigeon pea, have also been studied. Lamprodes boeticus was the most important defoliating caterpillar. Losses of pigeonpea seeds to insects ranged from 60 to 70%. Grasshoppers and the defoliating caterpillars, Sesamia nonagrioides and Heliothis armigera are important pests on maize.

In cassava, several species of coccids are important pests and a number of entomophagous insects, particularly coccinellids, have been introduced. Attack by local parasites has also been studied. In potatoes on San Antao, the myriapod Spinotarsus caboverdus causes severe losses, up to 94% in one case; this has made farmers stop growing potatoes. Baits poisoned with propoxur are tested as a control agent.

Activities of the GTZ-funded IPM Project concentrate mainly on irrigated crops. The most important pests and their damage are ascertained, economic thresholds assessed, and control methods developed. Emphasis is on biological control by entomophagous insects and microbial pesticides. This project also contributes to extension, by issuing printed material and by training.

Summing up, it can be said that the total of IPM research in Cape Verde is well under way and of good quality. The emphasis on biological control is sensible in view of the ecological and socioeconomic situation. The attempts in this field are promising.

The observation posts now in place in Santiago (10) and Santo Antao (3) can be developed into a surveillance network to assist in directing pest control actions.

However, the work on all aspects that are now under study will have to be continued for several years, if a more or less complete system of IPM is to be developed for the main crops. Moreover, activities at Fogo will have to be started, and pilot projects on important crops such as beans and maize conducted.

Although insects are the main pests, some attention should also be given to diseases and weeds.

An extension service, which is in the process of being developed, will enable new information to be passed on IPM on to farmers.

Constraints

The main constraints are in the number of personnel. In the short term (within the present project), this applies to the lack of the technician at Fogo to take charge of IPM activities on this island. Also, efforts should be made to have sufficient technical staff available to continue observations on the numbers of important pests over the dry period, in order to have a link between observations in two consecutive growing seasons.

More importantly, in the long term, the shortage of trained scientific personnel is a major constraint to the future development of IPM.

Conclusion, Recommendations

Research and development on IPM in Cape Verde has made considerable achievement, is beginning to have an impact on plant protection practices, and must be continued to attain its full potential.

- After 1987, further funding of expatriate experts will be needed until sufficient national staff have been trained to take over. This has to be considered in relation to possible continuation of GTZ funding.

- Attention should be paid to identifying possible needs in expertise and training in the disease and weed aspects of IPM.

- Funding of day to day costs will be necessary after March 1987.

3 CHAD

Sources of information

Since it was not possible to visit Chad, the evaluation team obtained information on the achievements of the IPM Project in Chad in a discussion with Mr. M'Balmsra, National Director of the IPM Project, and Mr. Diamba Bedingam, Chief the Crop Protection Service, in Dakar on March 23, 1986. The principal (and only) FAO expert in Chad, Mr. H. Khoury, was unable to attend for health reasons.

Further information was obtained from reports (see Annex G).

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Historical

The IPM program in Chad started in late 1984 - early 1985, when the necessary administrative arrangements were made.

Mr. Khoury started in December 1984. Mr. M'Saihasra was appointed National Director of the IPM program in February 1985. Funding arrived in April 1985.

Buildings and Equipment; Personnel

A building (at N'Djamena) with a small laboratory was made available by the Ministry of Agriculture and spruced up by IPM personnel. Two vehicles arrived in June and July 1985, and mopeds in May 1985.

Four observers started their work on July 27, 1985. Four observation posts were established, each of them with basic office facilities.

The research team consists of two national scientists, including the national director, and one FAO expert.

Training

Two national staff (V. N'Domian and M. Bamtoboin) have been planned to receive MSc training abroad. One of them will prepare a MSc in Canada (Laval) and will leave September 1986. After March 1987, USAID/N'Djamena will continue to finance their training so that they can finish as planned, on condition that the second trainee, a technical assistant, prepares a BSc at an African university.

Capability for IPM Research

The IPM project in Chad is embedded in the Crop Protection Service. Cooperation within the IPM Project, and relations between this project and other Chadian institutions, seems to be good.

The Crop Protection Service assisted the IPM researchers with manpower and advice, if needed and when possible. Cooperation also exists with several Departments of the Ministry of Agriculture, viz. The Direction of Water Resources and Meteorology, the National Office of Rural Development, Experiment Farms of the Division of Agricultural Research, and with the local extension personnel of the National Office for Rural Development.

IPM Results

Although the basic arrangements were rather late, the programme staff laudably managed to collect a more or less complete set of data on the 1985 campaign.

The work concentrated on off-season sorghum and on millet, and emphasis was on:

- inventory of pests,
- pilot programs, designed on the basis of the results of other countries, and
- training of observers.

Guidelines for the work were adapted from the results of other national components. Pests are similar to those in other Sahelian countries.

In 1985, no chemicals were used in the pilot experiments. Smuts caused severe losses in millet and sorghum, and chemical seed treatment is planned for 1986.

An inventory of traditional control methods of meiods and other insects has been made. One of these methods, hand picking, has been practiced in the pilot program.

In 1986, the pilot program will be repeated with adaptations based on the results of 1985. Another four observers will be trained.

During the campaign of 1985, one of the entomologists and the phytopathologist visited each of the observation posts once every 10 days.

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Constraints

Funds seem to become available slowly. The project could start in time thanks to advances by the French "Fonds d'Aide et de Coopération". Funding is for three month periods, and arrives usually too late. This seems to be caused by poor communications and the fact that the project is administered financially by USAID/Ouagadougou.

Lack of personnel is limiting the activities to off-season sorghum and millet in the Sahelian zone. No work can be done on cowpea, nor in the Sudanian zone where millet is very important. The only phytopathologist on the project also takes care of weed problems.

Conclusions and Recommendations

Clearly to date there is only the beginnings of capabilities for IPM in Chad. However, the researchers that the evaluation team met made a good impression and this group deserves confidence and support.

Because the local scene has not been visited, the evaluation team can only make general recommendations.

- The two scientists designated for training should start this training as soon as possible and a workable solution with USAID should be found to let them finish under the present project.

- IPM efforts should be continued after the present project ends in 1987.

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- Training of more academic staff is necessary and should be given high priority in the next IPM program.
- Further adaptation to the needs of research of the project's central building, and acquisition of equipment if not envisaged or practicable under the present project, should be funded in the next program.
- External expertise in IPM will be necessary in the next program. Assistance in phytopathology and weed science, of a nature adapted to the situation, is also needed.
- The present constraints in the financial administration of the present project should be removed.
- Funding for day to day costs of research will be necessary after March 1987.

4. THE GAMBIA

Sources of Information

The first meeting was with Mr. Dodou C.A. Jagne, National Director of the Crop Protection Services Department (CPS) of the Ministry of Agriculture and National Resources, and Director of the National IPM Project. Mr. S.B. Sagnia, a Gambian IPM researcher, was present to give

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translating services. In this meeting, project management was discussed.

The second meeting, on research, was with Mr. D.C.A. Jagne, Mr. S.B. Sagnia, Mr. S. Bruce Oliver, Mr. B.B. Trawally, Mr. E.M. Kunjo (National IPM researchers); Mr. O. Zethner, Mrs. A. Laurence, Mr. A.G. Carson and Mr. J.R. Hansen (FAO experts).

Historical

The IPM Project in The Gambia has had a relatively late start. The Principal FAO expert began work in the summer of 1983, and the weed expert started in September 1984. Associate experts started in 1984 (entomology) and 1985 (weeds), 1985 (phytopathology), respectively. One national counterpart, in entomology, began training in the USA in 1983, and a second one started on a MSc in early 1985, after finishing a BSc also in the USA. A national counterpart in phytopathology joined in 1985.

Buildings and Equipment

The project's laboratory and housing at Sapu is under construction and is expected to be ready at the start of the 1986 campaign. The same goes for a greenhouse (at Sapu) and two screenhouses (one each at Sapu and Yundum). Facilities at five observation posts are being constructed. Three agrometeorological stations have been established and are functioning. The vehicles have been obtained and laboratory equipment has arrived or is in the process of being delivered.

Training

Two researchers (an entomologist and a phytopathologist) presently receive training at the BSc and or MSc level in the USA, and are expected to return in late 1987 or 1988. Nine technicians are being trained locally.

Capability for IPM Research

Mr. Jagne, in his introductory statement, rightly pointed out that the present phase of the project is of an initiating nature rather than fully productive in research results. However, in early 1987, the intended research capacity, in terms of research personnel and equipment, will be in place and functioning, and experience as well as a good set of basic data will have been obtained. He also stressed the importance of having Africans as technical experts.

The group of national IPM researchers at Yundum made the impression of being well informed and eager to develop and implement IPM. Mr. Saqnia's enthusiasm and linguistic abilities in providing translations of discussions were particularly appreciated.

The National Director of CPS confirmed that national funds are available for the two scientists now in training in the USA to enter his Department on their return.

The evaluation team regretted that the cooperation between the national and the expatriate experts does not seem to be optimal in some cases.

Research Results

IPM research in The Gambia has concentrated on millet. Estimates of crop losses given with considerable reserve, especially for insects are:

- insects : 15-20% (very variable, occasionally 100%)
- weeds : 20-30%
- diseases : 10%

Blister beetles, particularly Psalydolytta fusca and Mylabris holosericea are important pests on millet in the Gambia. Phenology, feeding habits, daily activity pattern, crop damage in relation to millet varieties, economic thresholds and abundance in relation to climate and weather factors are studied. This work is important for The Gambia and also for other Sahelian countries where blister beetles occur but do not predominate as pests.

Other insect pests of millet studied in detail include Raghuva albipunctella and Acigona imefusalis.

The incidence and severity of smut (Tolyposporium pennicilliarise) and downy mildew (Sclerospora graminicola) is studied in relation to millet varieties.

The effectiveness of seed treatments, with fungicides and water, respectively, to control smut, was tested.

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Studies on weeding practices to control general weeds and Striga hermonthica have shown that certain weed control practices are highly cost effective, and that the weed control component of an IPM package has considerable potential to increase production and financial returns.

A pilot study of IPM-techniques now available for millet will be performed on farmers' fields in 1986. A pilot study had already been performed in the framework of the IPM project in 1984.

Work on sorghum started in 1985. Insect pests are being recorded, and crop losses by smuts assessed in relation to sorghum varieties. Covered smut predominated in 1985. Control of Striga by herbicides and by intercropping with groundnuts were studied, as well as resistance to Striga of ICRISAT and local sorghum varieties, in relation to Striga density.

Insect pests, diseases, and weeds are studied along similar lines in maize, rice, cowpea and groundnuts.

To summarize, IPM research in The Gambia collects basic biological data for pest management and is of good quality. In early 1987, it will have yielded an IPM-protocol for millet and a preliminary one for sorghum.

Constraints

There have been several constraints to the development of the project in The Gambia. They are essential to the appreciation of the scientific

and technical achievements, but are of an administrative and managerial nature. In view of the terms of reference of this mission, they are mentioned without further analysis:

- The complicated administrative structure created for the management of the project on a national level has tended to delay purchases and payments.

- Project management has been suboptimal. Transport facilities, although available, apparently could not be used for project activities on several occasions owing to lack of fuel. Ordering and delivery of equipment for research as well as construction of buildings has been MUCH slower than necessary. This has delayed research. A satisfactory balance in the delegation of day-to-day decision-making apparently has not been struck.

- Research manpower has been too limited in comparison to the project's objectives; on the one hand because time available for IPM from national research staff has been limited and on the other hand because of late arrival of expatriate experts.

Conclusion and Recommendations

The evaluation team feels that considerable and important basic data and facilities for IPM have been achieved in The Gambia, and that the efforts must be continued. Although the national staff now in place appears to be trained sufficiently to handle general IPM as well as its entomological and phytopathological aspects, the evaluation team did feel concern about the continuation of IPM after March 1987. Judging from the 1984 and 1985 reports, a considerable share of the work on IPM is being done by the external experts. CPS has a heavy work burden and its scientific personnel may not find enough time for IPM when the present project ends and all IPM activities will have to be generated and carried out by them.

Assuming that the details of future efforts in IPM will be developed by CIILSS, the evaluation team makes the following recommendations for The Gambia.

- Funding of day to day costs will be necessary after March, 1987.
- Continue funding of the training of the two researchers abroad at present, until their training is completed as planned.
- Allow (at least) one of the national researchers to spend 100% of his time to IPM (suggestion: Mr. Sagnia).

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- Arrange for training in scientific project management for staff involved in project management (this should also be done regionally).
- Consider repeated short-term consultancies on special problems as a further training for national staff.
- Continue the assignment of an external expert in weed science until the national researcher in this field has been trained sufficiently.

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MALI

SOURCES OF INFORMATION

The evaluation team obtained information on the IPM Project in Mali in the following meetings and visits:

- With the national component, on April 3 and 4, 1986: Mr. Y.O. Doumbia (National Director of the IPM Project), Mr. S.M. Bonzi (FAO principal expert), Mr. M. Traore and Mr. A. Konate (National IPM researchers) and Mr. J.C. Selvaraj (FAO expert);
- With the General Director of the Operation de la Protection des Semences et Recoltes (OPSR), Mr. Cissoko, and the Acting Director of the Plant Protection Service (which is part of OPSR) and Mr. Y.O. Doumbia and Mr. S.M. Bonzi, on April 3, 1986.
- With the USAID mission in Bamako, Mr. W. Thomas (Agricultural Development Officer), Mrs. E. Simmons, Mr. M. Pofana, Mr. J. Jackson, (Asst. ADO) Mr. Richard Newberg (IPM Project Officer), Mr. S. Reddy, and Mr. J. Hann (USAID personnel) and Mr. Y.O. Doumbia and Mr. S. M. Bonzi, on April 3, 1986.
- With the Conseiller Technique of the Minister of Agriculture, Mr. Hassan Drave, on April 4, 1986.
- With the Director General of the Institut d'Economie Rurale (IER) Mr. M.P. Traore, and the chiefs of departments of IER, Mr. A. Coulibaly, Mr. I. Sanogo and Mr. P. Dolo, on April 4, 1986.
- Visit of the IPM laboratory at Sotuba, constructed on the SRCVO field station, on April 5, 1986.

Additional information was obtained from reports (see Annex 3).

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HISTORICAL

IPM research in Mali started from a small unit of research in plant protection at the Sotuba research station. The FAO principal expert had started in 1980 and field work began in 1981. The FAO expert on phytopathology began at the end of 1983. National IPM scientists include 2 entomologists, 2 phytopathologists and 1 weed scientist. One entomologist is temporarily inactive because of health reasons and one phytopathologist sadly has long-term health problems.

BUILDINGS, EQUIPMENT

The project has constructed a well-designed IPM research unit at the Sotuba Research Station, consisting of a building with offices, laboratories and controlled-temperature rooms, greenhouse and insectary, garage, power unit in a separate building, a water tower and a storage building. Shedding for harvested products will be added in 1986. Basic laboratory equipment is in place. Functioning problems with the autoclave, due to insufficient water pressure, were solved once the water tower was in place. The autoclave has not yet been tested fully, however. Problems exist with the greenhouse, which tends to become too hot for the phytopathological work for which it is intended. These problems should be solved by (1) defining the temperature conditions required, by the phytopathologists; (2) having a consultancy to design a cooling system for the greenhouse and (3) constructing this system within the present project. Temperature control of two of the four climaticized rooms for insect cultures also gives problems, which should be addressed by the same consultancy.

The project has obtained seven vehicles and 13 mopeds, a radio system to support pilot projects, and the equipment for the agrometeorological stations.

TRAINING

Mali has taken full advantage of the seven grants budgeted for academic training. Two entomologists and one weed scientist are in training for doctorate degrees in France, one weed scientist and two phytopathologists- virologists are in training for PhDs in the USA. They will return in 1987-1989. This input will add the necessary power to the national research team which, with two staff non-functional, is rather weak at present.

Observers, laboratory technicians and other medium level staff have been trained within the project and receive annual refresher courses. Three observers receive training at the Centre Sanelian de Formation en Protection des Vegetaux (CSPV) at Kolo (Niger). The IPM group also helps with the practical training of pupils of the Institut Polytechnique Rural at Katioukou (near Bamako) at the end of their studies. Till now, 30 trainees have profited from this.

IPM RESULTS

A survey of pests and diseases was made and the importance of some of these was evaluated and natural enemies were identified.

Several pests were studied in greater detail. Bacchuva albipunctella, meloids, sorghum panicle insects, rice stalk borers and leafhoppers as vectors of maize streak.

In depth studies concerning several subjects have given interesting results:

- pulling and burning of millet plants attacked by mildew within 30 days after seeding;
- pulling and burning of smutted ears;
- certain varieties of rice have shown resistance to rice pyriculariosis for several years consecutively;
- deep ploughing and cereals legume intercropping are effective against Striga hermonthica. A relationship was found between the productivity of millet and the number of Striga plants per pocket;
- certain varieties of millet are less attacked by Acrida and Raghuva albipunctella. In sorghum entomology, emphasis is laid on panicle insects, and the major species are S. jordanicola and Eurystylus marginatus;
- identification of resistant varieties against the main millet, sorghum and maize diseases. As regards maize sowing early reduces attack by streak;
- certain rice varieties are resistant vis-a-vis stalk borers;
- insecticide tests on cowpea showed that 2 interventions instead of 5 or 6 would protect crops and this by using less noxious products;
- resistance of Jorom-Jorom (cowpea) to Striga renardii;
- some sorghum varieties tested at the regional level are more or less resistant to Striga (Pramida);
- certain herbicide combinations enable effective control against rice weeds other than those of wild rice;
- although only a surplus of approximately 250 kg/ha over farmers' plots was generated, the plots of the pilot program were popular with growers, extension staff and the local authorities.

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CAPABILITY FOR IPM RESEARCH AND DEVELOPMENT

A good infrastructure for IPM research and development, in terms of hardware and personnel, has been and is being built. The evaluation team felt concern, however, about the near future i.e. the period between the end of the present project and new efforts as envisaged by CILSS. A gap in funding would inflict serious damage to the research structure now in place. Since the academic trainees returning in 1987 are all MSc. level, it would be wise to consider continued expatriate expertise of some form until this first contingent of returning trainees has been broken in.

The IPM Project is embedded in the "Institut d'Economie Rurale" (IER), "Section de Recherche sur les Cultures Vivrières et Oléagineuses".

Cooperation between researchers in the project and between the project and other research groups and organizations, is good. The following specific cases of co-operation were mentioned: within the SRCVO, with the plant breeders; in the pilot project, with several organizations for rural development; with the plant protection service; with the Compagnie Malienne du Coton and with ICRISAT. The fact that the plant protection service in Mali is under developed in terms of manpower for extension and (transport) facilities is liable to become a bottleneck to implementation of IPM in the future.

CONSTRAINTS

The IPM Project in Mali has had its share of difficulties with ill-adapted vehicles, slow releases of funds, and slow delivery of equipment and supplies for laboratory and field work. Adaptation of

regulations associated with funding in a future project to reduce these problems is a general necessity. The lack of radio-communication at a number of observation posts reduces the adaptability of the present surveillance system to a warning system for pest outbreaks.

In the discussion of the evaluation team, the national component, and the Plant Protection Service, it appeared that the latter service does not yet use the results of IPM research as its priority choice of control tactics. The CPS should be more selective in its choice of pesticides and preferably use the least harmful.

The evaluation team appreciated the interest of the USAID mission in the technical achievements of the IPM projects. It did feel however that this mission would be wise to practice some reserve in its interference with the research process. These matters are the responsibility of the project's national staff and regional direction who are, in the evaluation team's opinion, fully competent. The main USAID spoke-person in the meeting with the mission voiced opinions that demonstrated insufficient comprehension of the subject. This evidently is very confusing for the project's staff. The team's reaction to technical critique commonly voiced by some USAID personnel is given in elsewhere.

CONCLUSION AND RECOMMENDATIONS

The Mali component has made a good start towards IPM and the present achievements must be further developed in a second phase.

The following specific recommendations are made:

- allow academic trainees to finish their studies as planned;
- solve problems with functioning of greenhouse and controlled temperature rooms as indicated;

- consider some form of external support in the initiation in research of the large contingent of staff returning from training (see general recommendations for suggestions);
- establish closer cooperation with the CPS;
- strengthen the extension potential of the Plant Protection Service in order to better ensure implementation of IPM results in the future;
- expand the radio system to connect all observation posts with headquarters;
- funding of day to day costs will be necessary after March 1987.

MAURITANIA

SOURCES OF INFORMATION

The evaluation team obtained information on the project in Mauritania in the following meetings:

- With the FAO representative in Mauritania, Mr. Khalil-Choueri, Mr. Ms. B. Magema (FAO principal expert) and Mr. T. Galledou (National Director of the IPM Project), on March 29 and 30, 1986.

- With the national CILSS correspondent in Mauritania, Mr. Sidi Laghdaf and the national representatives of the IPM project, Mr. T. Galledou (National Director IPM Project), Mr. Ms. B. Magema (FAO principal expert), Mr. S. Diarra, Mr. K. Ba, and Mr. M.H. Ba (National IPM researchers), Mr. J. Delhove and Mr. J.V. Dembele (FAO experts).

- With the Director of Agriculture, Mr. Sy Adama and the Director of the Plant Protection Service, Mr. G. Tanara.

- Audience with the Minister of Rural Development, Mr. Messaoud Ould Boulkhair, Messrs. Laghdaf, A. Sy, Galledou and Magema were also present.

- With the USAID representative, Mr. W.G. Lane and Mr. K. Lizzio, and Mr. T. Galledou and Mr. Ms. B. Magema.

Additional information was obtained from reports (see Annex G).

HISTORICAL

The project started in 1981. The FAO principal expert arrived in that year. Other experts came in 1984 (phytopathologist; extension expert in December; entomologist; associate expert) and 1985 (entomologist). Besides the National Director of the project, there are

three national academic staff (one entomologist and two phytopathologists). There were no research structures for plant protection in Mauritania at the start of the project.

BUILDINGS, EQUIPMENTS

Laboratories have been constructed and equipped at Nouakchott, and Kaedi and restored at Kankossa. Facilities (office/laboratory) at 10 observation posts have been constructed and will be finished at the other two posts in 1986. Most posts have a two-way radio system. In each of four ecological zones, meteorological stations are operational.

TRAINING

Eight academic staff are in training abroad and will return in 1987 and 1988 (2 entomologists, 3 phytopathologists, 1 weed scientist, 1 virologist). Project staff has given several training courses for technicians and observers.

CAPABILITY FOR IPM RESEARCH AND DEVELOPMENT

Mauritania has few national academic staff. Apart from the National Director, who has experience in locust control, there are only two phytopathologists. However, this country has succeeded in utilizing all eight grants available for academic training abroad. Moreover, cooperation of nationals and expatriates appears to be good. In fact, the Mauritanian team of nationals and expatriates is exemplary in that it simply does what it is expected to do, in a spirit of good cooperation.

Cooperation with USAID is also good. Hence, if the present expatriate experts could stay on the job long enough to cooperate with the returning trained national staff for sometime, a good national team for research and development in IPM would result.

IPM RESULTS

Rough figures for pest losses, due primarily to insects and less to diseases, are 10% for grain crops in general. In millet losses are higher, viz. 15-20% and up to 35% in some years. Attacks by meloid beetles are one of the factors inducing farmers to stop cultivating their preferred food crop millet. A traditional control method of these beetles has given satisfactory results.

In cowpea, bruchids can cause over 50% of crop loss. Mosaic virus also causes considerable losses. In rice, weeds are an important factor in crop losses, but their impact has not yet been assessed quantitatively (the project has no weed specialist).

Inventories of pest species present and preliminary assessments of their injuriousness have been made for millet, sorghum, maize, rice, and cowpea. More detailed phenological and bio-ecological work has been performed for some important pests, including Oedaleus senegalesis, Psalydolytta vestita and other meloids, Raghuva albipunctella, and smuts (Sphacelotheca reiliana and S. sorghi) in sorghum and Tolyposporium penicillariae in millet. Control methods have been investigated and crop varieties tested for resistance to certain pests. A system of pest surveillance has been developed, supported by two-way radio equipment

that links (most of) the observation posts with headquarters at Nouakchott. The Direction of Agriculture has supported the installation of this system.

A well-prepared IPM pilot experiment was performed successfully in 1985, in a region where meloid beetles jeopardized millet cultivation.

The project cooperates with the Centre National de Recherche Agronomique et de Developpement Agricole (CNRADA) and with the Ecole Nationale de Formation et de Vulgarisation Agricole (ENFVA).

CONSTRAINTS

Shortage of funds and of trained and experienced national academic staff is the bottleneck for further development of IPM in Mauritania.

CONCLUSION AND RECOMMENDATIONS

The IPM Project in Mauritania has been successful in creating an IPM-oriented capability for research and development in plant protection, where not even the beginnings of such a capability existed at the start of the project.

The present orientation of research is practical and well-adapted to farmers' needs. Some general remarks on the orientation of future IPM efforts, which apply also to Mauritania, are given in a separate section.

The efforts towards IPM must be continued, and a gap between the termination of the present project in March 1987 and the beginning of a new one must be prevented. This remark probably applies to Mauritania (where all achievements are new) more than to some other countries. A gap in funding would almost certainly annihilate several of the very

valuable achievements of the project, such as the surveillance system and the interest in IPM that has been aroused with extension personnel and farmers. Attention should be paid in the next program to the capacity for training in IPM of extension staff.

Expert support should be expanded to cover some areas that have not yet been sufficiently developed (weed science, judicious choice and use of pesticide), and should be continued for some time to initiate the large contingent of returning academically trained staff (all at BSc level!) in research.

The following specific recommendations are made:

- an expatriate expert, in general IPM, will be necessary in the next project;
- support to research on weed control and phytopathology can be given by consultancies;
- a system of repeated short-term consultation should be considered;
- arrangements should be made to enable the 3 academic trainees to finish their training abroad as planned;
- future funding of IPM should be in the framework of the Plant Protection Service rather than in the framework of other externally funded agricultural research projects;
- funding of day to day costs will be necessary after March 1987.

NIGER

SOURCES OF INFORMATION

The evaluation team obtained information in the following meetings:

- With the researchers of the national project, Mr. H. Saley (National Coordinator of the IPM Project), Messrs. H. Hamma, J. Gonda, S. D. Maiga, A. Ndiaye (National (ISRA) researchers), Messrs. O.T. Yonli (FAO principal expert), C.A. Van Elsen and D. Laycock (FAO experts), on April 1, 1986.

- With Mr. M. Bernardi, FAO expert on bioclimatology for the IPM Project, stationed at AGRHYMET, together with Mr. H. Saley and Mr. O.T. Yonli, on April 1, 1986.

- With the Director General of Agriculture, Mr. Ibranime Oumarou, together with Mr. H. Saley, on April 1, 1986.

- With the USAID representative, Ms. L. Graybeal, together with Mr. H. Saley on April 2, 1986.

- With the FAO representative, Mr. Salah Niase, together with Mr. H. Saley on April 2, 1986.

Additional information was obtained from reports (Annex 3).

HISTORICAL

The project has had three full seasons of field work. The FAO principal expert (IPM specialist) started in this function in 1983; and the FAO experts in entomology and seed science began in 1984. An FAO expert on Crop Loss Assessment has worked in Niger in 1983-1984.

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BUILDINGS, EQUIPMENT

Office facilities have been constructed at the project's main station at Maradi, and at 7 observation posts. The laboratories at Tarna and Maradi have been constructed within the framework of a CIDA funded project. A greenhouse and a garage will be added from IPM funds. In total there are 11 observation posts; four use existing facilities. The project obtained a total of 10 vehicles and various research equipment. However, part of the equipment has been delivered incomplete, or instruments that could not be used were delivered instead of the items ordered. These difficulties seem to arrive from the confusion created by USAID regulations on ordering major materials for the project.

TRAINING

Although the project's budget mentions seven grants for academic training of Nigerian national staff, only one trainee has been sent abroad to date (A. Sabeirou, Oklahoma State, USA: BSc). A second candidate, who received permission for training eight months ago, has not yet been accepted at a university. FAO (which implements the training system) should try and find a university that allows the candidate to start his studies without further delay.

The evaluation team regretted that this very important aspect of the IPM program has been fulfilled so minimally and learned that government rules make it very difficult to find candidates. Apart from having sufficient basic schooling, candidates in Niger must have been in Government service for 3 years.

As far as the remaining training grants are concerned, the National and Regional Directions should suggest solutions to remove the difficulties mentioned earlier. If this appears impossible, the possibility of using these funds for short-term or medium-term training (particularly of observers) should be explored.

IPM RESULTS

The most important activities concerned millet and cowpea pests since the phytosanitary problems of sorghum are less acute. Interesting results on the Raghuva albipunctella have been obtained:

- varieties with compact ears seem to be resistant to this insect;
- two periods of intervention in case of use of insecticides have been defined: earing and the appearing of tines, and the most effective product is deltamethrin;
- parasites had been identified
- under experimental conditions, pupal diapause can be broken: emergence of adults takes place 15 days after moistening of the soil.
- Insecticide treatments for cowpeas could be reduced from seven to two.

An inventory of weeds was carried out throughout the country.

Striga was also the object of intensive studies. Cropping practices, such as the rise of nitrogen, pulling of Striga plants before seed set, sowing dates, intercropping and the use of resistant varieties could minimize Striga multiplication.

As regards diseases (mildew and smuts of millet in particular) emphasis is on varietal resistance.

In the pilot program carried out in 3 villages, the IPM plots proved superior to the farmers own plots.

CAPABILITY FOR IPM RESEARCH

If the capability for IPM research in Niger had to depend entirely on the achievements of the IPM project, the project would be weak to say the best. National academic staff in the project consists of 2 phytapathologists and two entomologists, and a plant breeder who has supervised the pilot experiments in 1985. As explained earlier, no support from returning staff-trained within the framework of the IPM project can be expected in the near future. However, it seems that support can be expected from the project funded by CIDA. Two entomologists and one phytapathologist trained in Canada under this project are expected to return in 1986. They will be placed in the IPM project. It appears that both national and expatriate researchers on the project have contributed their own efforts in a separate way; no system of close counterpart cooperation seems to have been developed.

Expatriate researchers from other bilaterally funded programs have incorporated in the IPM Project but the national staff was very critical about the nature of their contributions, and probably rightfully so. Also, the situation of technical staff is unsatisfactory. In 1984 and 1985 eight out of thirteen observation posts were manned by Peace Corps personnel. They seem to have departed since, and the evaluation team did not get a clear picture as to their replacement by nationals. The project has had several directions, each of them having been in function for a short time, and this apparently has reduced the quality of project management.

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The evaluation team found the present National Coordinator, Mr. H. Saley efficient and a valuable discussion partner, who deserves full confidence. It seems, however, that a division of responsibilities between him and the National Director has not yet taken place..

CONSTRAINTS

IPM development in Niger have suffered severely from suboptimal project management and unrealistic regulations vis-a-vis candidates for academic training. The first factor, either or not in combination with insufficient help from the USAID mission in coping with USAID regulations, has made that usability of acquired scientific equipment suboptimal.

Personal relations within the research group leave much to be desired.

CONCLUSION AND RECOMMENDATIONS

Although a valuable set of data has been collected over three seasons and elements of IPM can be introduced into existing cultural practices, such work still has to be done before IPM protocols for the main crops will be available. A surveillance system as a basis for a pest outbreak warning system is not yet operational, owing to lack of personnel. Personal relations and project management urgently need improvement. The agro-economic situation does require that effective efforts towards IPM be continued.

RECOMMENDATIONS

1. All parties concerned should use the time remaining under the present project to put things in place;
2. an analysis should be made why fruitful cooperation between national and expatriate researchers in Niger has not been possible; if personal problems are identified, appropriate action should be taken;
3. depending on the results of (2), negotiations between relevant government services and USAID should be started to try and use the grants for academic training that have been budgetted under the present project (see TRAINING for detailed recommendations);
4. national staff should replace Peace Corps Volunteers as observers at the observation posts;
5. improved project management and closer cooperation between researchers are indispensable for the success of a second IPM program.
6. a second IPM program should include external expertise in weed science until the national researcher in this field is back in place.

8. SENEGAL

Sources of Information

The evaluation team obtained information on the IPM-Project in Senegal in several meetings and visits :

- Meeting in Kaolack on March 26, 1986 with the National Director of the IPM Project, M'Baye M'Doye, the national research staff, Messrs. S. Dogo, O. Kamara, E. Dieme, A.B. Bal, D.P. M'Baye, and Y. M'Bodj, the FAO-experts, Messrs. E. Pytizas, W.S. Bos, R.T. Gahukar, and V.S. Bhatnagar, and the Research and Extension Coordinator of USAID-Dakar, P. Can.
- Visit, on March 27, 1986 of the Research Station of Nioro du Rip.
- Meeting with Messrs. J. Bayles (ADO), P. Can and M. Diop of USAID-Dakar on March 28, 1986
- Audience of the Minister of Rural Development, Mr. Palmara Sagna, on March 28, 1986; Mr. P. Can and Mr. M. Diop of USAID/Dakar also attended.
- Meeting with Mr. Fallilou Diop, Director of the Plant Protection Service; P. Can and M. Diop (USAID/Dakar) also attended.
- Meeting with the deputy-representative of FAO in Dakar, Mr. J. Windericks.

Additional information was obtained from reports mentioned in the Annex G.

Historical

In Senegal, the IPM Project had a relatively early start. The FAO principal expert started in August 1980, and three FAO experts in entomology (for insects of grain and legume crops, biological control, and crop loss assessment, respectively) began in 1981.

Three national counterparts, one in phytopathology and two in entomology, worked on the project from 1981. Others came later. Data on four complete growing seasons (beginning in 1982) are now available.

Buildings, Equipment

An entomological laboratory has been built in Niore du Rip, at the Research Station of ISRA, in a region where Rachuva albipunctella occurs abundantly, and a phytopathological laboratory has been constructed at the ISRA research station in Djibelor, in the Casamance rice area, where Pyricularia brizae is an important pest. These laboratories are equipped with the basic necessities for entomological and phytopathological work, such as an insectary, a controlled environment cabinet, sterilizers, etc.

11 vehicles and 20 motorcycles and mopeds are available for transport.

The evaluation team visited the laboratory at Niore du Rip and found it functional. It has a back-up power unit that kicks in if power from sources external to the station fails or is insufficient. The controlled environment cabinet, a pre-fabricated unit placed in a separate building, was not yet operational owing to difficulties with dissipation of heat generated by the unit. Actions to solve this problem are underway. The laboratory has an IBM-PC computer with printer. Several insect pests of

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stored products are reared, as well as one of the parasite of Raghuva, Bracon hebetor. Methods and equipment for easy and cheap multiplication of this parasite at the village level are being developed.

Construction of facilities for observation posts, planned at Raffrine, Gossas, Sokone and Thyse, has not yet begun. These facilities were planned in the project amendment of 1983.

A considerable amount of money available for construction and acquisition of equipment seems to have not been spent.

Training

Three national staff are in training in the USA, to obtain a PhD in weed science and MSc's in entomology and phytopathology, respectively.

Fourteen technical assistants of the project have received on-the-job training in each of the past four campaigns.

Some training has been given to extension personnel of the Division for Plant Protection and to farmers (those who cooperated in the pilot studies). However, the objectives set in this respect have not been achieved as yet, because of the lack of co-operation of the national direction of the project with the Division of Plant Protection. This point will be dealt with below.

Capability for IPM Research and Development

Relatively, such research on IPM has been done in Senegal under the auspices of the present project. All planned external experts were put in place in an early stage. IPM research is well integrated in the Senegalese Agricultural Research Institute (ISRA). Good work, relevant

to practical problems in subsistence farming, has been, and is being done by national and expatriate researchers. Cooperation between researchers generally seems to be good. The national academic staff is relatively strong (2 phytopathologists, 3 entomologists, 1 weed scientist).

The evaluation team very much regretted that implementation of research results on the farmers' level is stagnant apparently because of organisational and personal problems.

Until now, the IPM Project was placed under ISRA which is part of the "Ministère des Recherches Scientifiques et Techniques" (MRST).

Implementation of IPM has suffered from the lack of cooperation with the "Division de Protection des Végétaux (DVP), which is part of the "Ministère du Développement Rural" (MDR).

In the new system of division of tasks at the ministerial level, which is in the process of being implemented, ISRA (and with it the National Director of the IPM Project) will be placed under the MDR; the IPM Project will be placed under the DVP which remains under the MDR. Although this is an improvement from an organizational point of view ISRA (and the national director of IPM) and DVP would be under different "Conseillers Techniques" of the MDR. Moreover, the main problem may well be of a personal nature, and this no organizational change can solve. Since the present director of the IPM project has considerable responsibilities at ISRA. It would be desirable that this institute designate another national director of the IPM project.

These facts must be mentioned if a fair assessment of the capabilities for research and development in IPM in Senegal is to be made. However, in view of the terms of reference of the evaluation mission, no further analysis is attempted.

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Pests are rated second in importance for limiting agricultural production in Senegal after availability of water. Grasshoppers are a particularly serious cause of crop losses. Pesticide use is fairly heavy. The Director of the DPV, whose comments the evaluation team appreciated, felt that IPM could eventually supply the techniques for solving pest problems with less use of pesticides, and that the DPV, through its grip on local extension personnel, could help in implementing viable IPM techniques. Moreover, close cooperation between IPM research and the DPV would create the feedback needed to adapt the scientific program to practical needs, if and when necessary.

The evaluation team noticed that other USAID funded projects have important pest control aspects. The relations of these activities embedded in ICRA have to be sorted out and steps should be taken to optimize coordination.

IPM Results

The pest spectrum of the important subsistence crops has been assessed and research has concentrated on their main species: Raghuva albiguttata in millet, Pyricularia oryzae in rice, and weeds, particularly Setaria. Other pests, and pests of other crops such as maize, cowpea, and sorghum, have also been studied as time permitted.

For Raghuva, population counts in the different stages of the insect conducted in connection with damage assessments have provided most of the data necessary for the establishment of economic thresholds, a mathematical model for forecasting crop losses, a warning system, and the economic assessment of control measures.

Work on a practical technique for pest population assessment in a sufficiently early stage for forecasting purposes is being continued; light-trapping of adults is not satisfactory, however. Since 1983, work to isolate the pheromone of Raghuva is going on in co-operation with CIBC.

Non-chemical methods of Raghuva control are being developed: biological by rearing and releasing the polyphagous parasite, Bracon hebetor, and cultural, by selecting resistant millet varieties, fertilization and soil cultivation to destroy diapausing pupae. Microbial pesticides are being tested (Bacillus thuringiensis and Mamestra trassicae polyhedrosis virus).

The work on Bracon hebetor as a possible control agent is of particular interest for several reasons, including its potential for regional application. As yet, however, little information is available on its control impact, and on its durability as a control technique (possible susceptibility to hyperparasite build up). Work to test this should be given high priority.

Rice diseases have been surveyed and their importance assessed. For Pyricularia oryzae, a method of crop loss assessment has been developed. Rice varieties have been tested for resistance to Pyricularia and several partially resistant varieties have been found. Fertilization with nitrogen stimulates Pyricularia, to degree depending on the degree of resistance of the rice variety considered and the nature of this resistance. Effects of soil treatment on Pyricularia incidence have also been studied.

Work on weeds is still fairly limited in Senegal. Cultural and chemical control techniques of weeds are investigated in rice. Losses due to weeds have been estimated in 1984 and were between 10 and 11%.

In other crops, research on weeds has not yet been expanded beyond the stage of surveys of incidence of attack and species present.

Bio-ecological information of a more fragmentary nature has been collected for a number of pests of secondary importance occurring on the main crops, including several lepidopterous species, blister beetles, gall midges; thrips of cowpea, and downy mildew and smuts of millet.

Pilot experiments, with the objective to test a preliminary protocol of IPM on millet and to introduce the concepts and techniques of IPM with farmers and local extension personnel, were started in 1985. The training aspect of extension personnel did not develop favorably, for reasons mentioned earlier.

Pest problems of stored products are also studied. An inventory of the most important pests has been made and Sitotroga cerealella in stored millet has received special attention in susceptibility tests of millet varieties. Losses of up to 9% occur in the dry season.

Constraints

As indicated earlier, the major constraints of research and development IPM in Senegal concern general project management. Apparently, research activities have repeatedly been hampered in 1984 by lack of funds or fuel.

Problems have occurred between the national director and researchers, particularly expatriate staff. These quarrels have been a handicap for research.

Similarly, a good working relationship with the DSV has not been established.

Conclusions and Recommendations

Valuable basic information on pest incidence in the main crops, and on bio-ecology of the key pests, crop losses, economic thresholds, and control techniques has been obtained and a preliminary protocol for IPM in certain crops will have been tested at the end of the project. A considerable part of the results obtained also have regional importance.

The evaluation team feels that the national expertise in phytopathology is amply able to cope with this discipline's share in future IPM efforts. This remark applies to the quality, rather than to the quantity of manpower for phytopathology. IPM in Senegal has benefitted from a strong input of expatriate expertise in entomology. Entomology should receive external support from consultants after the present expatriate experts have been withdrawn. Also, external support for weed science will be necessary.

Research work on IPM has to be continued and expanded to fully include other crops than millet, as well as certain pest problems that have not been attacked in the present project (e.g. grasshoppers).

The following specific recommendations are made :

- future research and development on insect and weed control should receive external support. A system of repeated short-term consultances is suggested.
- For insect control, it is suggested that consultant support is sought from a group specializing in biological control.
- Testing of the effectiveness and durability of biological control of Ragnuva using Bracon hebetor should receive priority in the last year of the present project, and in future IPM efforts.

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- The national scientists presently in training abroad should be enabled to finish their training as planned.
- A (regional) project management course should be given for staff involved.
- In view of the numerous tasks in ISRA of the present director of IPM, another director should be designated.
- Closer cooperation with the CPS should be established.

C. THE REGIONAL DIRECTION OF THE PROJECT

Introduction

At the outset, the Regional Component of the IPM Project was entirely in charge of its management. In a short period of time structural difficulties appeared within the project administration which severely impeded the execution of the project as originally envisioned. These difficulties were well perceived by the evaluation team in 1982.

Following a redesign of the project in 1983 and subsequent decentralization of the project management, new tasks were assigned the Regional Direction which consist of: coordination of the technical aspects of research activities to administer their efficient implementation, supervision and coordination of the publication of research results, coordination of the participation of national researchers in technical meetings, seminars and international symposia, and organization of project task force meetings and seminars. It is to be noted that USAID-Chad and Mauritania would not accept the management of project in the new decentralized structure. This is one reason why these two components continued to have problems in the acquisition of supplies and equipment.

Analysis of Objectives

- The Regional Direction has successfully accomplished its tasks viz:
- regularly scheduled meetings of the working groups.
 - two seminars were organized, one dealing with IPM and the other considering the problem of meloids,

- furnished consultants to the national components when requested,
- for the large part, requests from the national components for attendance at seminars and meetings useful for the researchers have been satisfied.
- project publications which have been received by the Regional Direction have been reviewed and edited.

Constraints

Under this administrative structure the Regional Direction has had the following major constraints:

- the team size to cope with problems,
- difficulties in communications, and
- the size of the region to be covered.

Conclusions

The evaluation team believes the present structure for the Regional Coordination is useful; it needs to be maintained as a technical coordination unit, preserving its current responsibilities.

The management team should be sufficiently strong in quality and quantity to be able to guide the young national researchers who will replace the FAO technical experts at the end of Phase I activities.

Moreover, and most importantly, the strengthened region co-ordination unit should be in charge of the development of proposals on research and crop protection legislation as mentioned in the recommendations of this report.

D. Pilot Programs (Action Pilote-Mil)

1. Introduction

Interest in the Pilot Program concept had had been recognized for a long time by the IPM Project. At the project's meeting in Bamako, March 1984, the idea of testing a "package" of practical tactics at the farmer level in millet production was presented. Such a "package" would incorporate various pest control techniques, direct (pesticides) and indirect cultural methods. Farmer participation would serve to demonstrate the benefits of improved technology to cooperating farmers and also to farmers of villages not in the program.

The first such program was initiated in the Gambia in the 1984 cropping season. This program was criticized by participants at the Seminaire Lutte Integree in Niamey in 1984. Discussions at that time resulted in suggestions concerning clearly stated objectives, design, and analysis of demonstrations.

In 1985, Burkina Faso, Chad, Mali, Mauritania, Niger and Senegal components initiated Pilot Programs in each of their respective countries.

2. Analysis of Objectives

The precise objectives had to be defined by each of the participating countries because they were not clearly defined in the available reports.. Presumably the pilot program is an on-farm demonstration using the advantages of specific tested and approved interventions such as phytosanitation, improved agronomic practices including fertilization, and specific pest control measures.

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If the objective is to demonstrate to a broad range of farmers with varying interests and abilities one would draw on a random group of farmers for participation in the pilot program. This would assure an unbiased demonstration and should yield a more reliable estimate of farmers acceptance of the IPM program.

On the other hand, if the objective of the demonstration is showing maximum production under IPM management then the project director would select the best farmers of a given village which would provide for optimal production in either traditional or IPM management systems. Analysis of farmer acceptance (across a range of farmer ability) would be biased and not provide a realistic view of the general acceptance of new practices.

These objectives are not clearly delineated in the reports with the exception of Mauritania.

The Mauritania component had the advantage in planning their program through consultation with a Socio-economist, the Director and the Conseiller Technique Principal of the Regional Direction of the Project, and the specialization of Mr. I. V. Dembele, FAO Expert, Extension. Such assistance should be provided other components.

3. Protocols for Pilot Program-Millet

In general the protocols utilized in each of the country pilot programs were similar having been previously discussed in Niger in 1984. Protocols will by necessity vary across ecological zones.

Variation of interventions such as parasite release against *Raghuva* in some but not all pilot plots, and added traditional and 'modern' methods are experimental and should be discouraged in demonstrations. An agreed upon general strategy using the same

protocols where possible should be employed across the region i.e. same number of farmers per village, same number of villages etc.

Usually three villages were selected, and within each, as many as five farmers were chosen using a survey for selected participation in the program. Each of five fields were divided into a portion utilized for implementation of IPM technology and the other aliquot was reserved for traditional agricultural practices used by the farmers. As mentioned above, various interventions and cultural practices were utilized in the IPM technology.

4. Results of Pilot Programs

In general the program demonstrated the benefit of improved technology to the village farmers. Data collected by each of the programs included damage estimates due to insect, diseases and other pests. Social and cultural constraints were identified as well as technological. Certainly much was learned by the farmers and the program directors as well as staff in each of the countries.

As already stressed, the pilot program is judged as a success because it demonstrated the advantages of rather simple technologies to the farmers. Increased yields of basic food crops such as millet most certainly makes an impact on the village farmer. The 1984 Gambian program also supports this observation.

The yield data obtained in Mauritania were compared on the basis of the different villages with the minimal food needs per person per year. Yield minima per hectare to cover basic food needs were extrapolated from population and area cultivated data. In comparing the data, the IPM implementation resulted in more than the minimum

production per hectare to cover food needs, whereas traditional methods provided yields consistently below the minima required.

Analyses of this type are very beneficial and emphasize the need for improved practices in food deficit countries.

The pilot program suffered in some countries due to administrative and financial constraints (e.g. Chad) and such problems should be eliminated to provide the best possible atmosphere for continued demonstration programs.

5. Conclusions

The pilot Programs conducted in 1985 demonstrated to village farmers the usefulness of phytosanitation, improved agronomic practices including fertilization, weeding, thinning, etc. In general such demonstrations are useful.

The simple tactics imposed are of obvious value even if not resulting directly from IPM research and development programs. It does however raise questions - some of which have been addressed in the analysis of the Pilot Programs. Major questions concern the use of fertilizer and pesticides, given:

- a. the economic plight of the peasant farmer i.e. how can they afford the monetary inputs?
- b. can they provide or pay for the labor of improved agronomic tactics?
- c. given that they can afford each of the above, is there a marketing system available for any surpluses?

These questions are basic to acceptance by the farmers. The farmers in such demonstrations should be continually observed to determine the acceptability of IPM technologies.

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6. Recommendations

A consistent set of design variables should be developed for Pilot Programs and utilized where such programs are put in place. Adoption of the systems used in Mauritania would be useful.

Follow up of farmer acceptance of interventions used in 1985 should be incorporated into the design in 1986, and beyond.

Use the knowledge and expertise of specialists in socio-economics in the regional component together with extension specialists more fully in program design, development, implementation and followup.

Analyse Pilot Program data to determine with assistance of socio-economist, the additional labor requirements needed to use the management strategy put in place. The added labor inputs may be a deterrent to farmer acceptance and for a variety of reasons.

2. Socio-economic Component

1. Introduction

Currently there is no regional socio-economist located at Ouagadougou. The FAO expert Mme Sanou, Socio-economist, who had worked in the region as an FAO Technical Expert has left Ouagadougou and will not be replaced. However the Pilot Programs especially in Mauritania and Burkina Faso have had the benefit of an FAO consultant socio-economist, Mr. J.L. Michard of "Communaute d'Etudes du Developpement Regional et d'Aménagement des Territoires" a private french firm dealing with problems in integrated rural development.

The evaluation team was fortunate to be able to discuss with Mr. Michard his work on the Pilot Programs during 1985.

In 1984, Mr. Michard and Mme Sanou considered her ambitious program and he selected from that program the essential elements to be considered. In addition he suggested in 1984 that the Pilot Programs include a better cross section of various ethnic groups to better understand acceptance/rejection of various IPM inputs in demonstrations.

In August 1985 the consultant visited Burkina Faso and examined the Burkina Faso Pilot Program and made suggestions regarding the design of the program for the 1986 cropping season. He played an active role in the plan of operation of the Pilot Program in Mauritania in 1985.

The consultant's approach is more qualitative than that of the FAO expert and he attempts to determine which agricultural techniques present problems and why. He cited an example of "demariage", thinning of plant stand, as a problem. Villagers don't like to do thinning because it is against their respect for life/fertility.

He also said that Mauritanian farmers were at first suspicious that the harvest in the Pilot Program plots would be sub-standard, or if above average, they would not reap the benefits because they would be taken away. When they discovered that neither was the case they were very positive about the program. Farmers not in the Pilot Program were very aware of the IPM Pilot Program Protocol. Farmer acceptance of the program in Mauritania was good because it allowed the farmers to grow their favorite crop, millet.

The consultant prefers a qualitative approach at this time because he believes that conducting a detailed quantitative study

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using a complicated questionnaire would almost certainly produce false information. His approach is talking with farmers in the presence of a local extension agent, who acts also as interpreter, gives him the background information which is necessary to develop a more quantitative approach.

Asked whether a socio-economist would be a valuable addition to each of the national components Richard responded that he believes that continuous support by a socio-economist is necessary. He feels that you need a person to continuously monitor the demonstration programs for minor problems. Without such support he believes that Pilot Programs may well be successful for 1 or 2 years only to be abandoned sooner or later.

He emphasized that he feels that the demonstration of a group of new techniques is the primary objective of Pilot Programs.

Hence the usefulness of a socio-economist in developing Pilot Programs and on farmer participation trials has already been well documented where they have been included in planning and program analysis. The socio-economist establishes parameters designed to determine factors which influence innovation. Community mores, social structures, and familial relations, the dynamics of social environment, traditional farming systems are to name a few of the important parameters influencing acceptance of changing technologies.

1. Conclusion

The needs for socio-economists and economists in studying technological development in peasant agricultural systems is well documented. They have an important role to play in the design and

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implementation of Pilot Demonstrations, farmer participation in /on farm trials and in analysis of the results of these demonstrations and studies.

3. Recommendations

A socio-economist is essential to support the project as a short term consultant to assist in design and analysis in connection with Pilot Programs. Continued consulting with the FAO consultant is recommended to backstop the national programs planning pilot programs.

If the project continues beyond March 1987, redesign should include one socio-economist for each of the national components and provision should be made for assistance for short term consultants, when needed.

Use of the expertise of the socio-economists should be increased as well as the use of agriculture economists particularly in on farm trials.

F. Agrometeorological Component

1. Introduction

AGRYMET (Agrometeorological Hydrology Program) is an institution chartered by CILSS in 1975. The purpose and program of AGRYMET was developed by WHO/UNDP and CILSS to enable Sahelian farmers, herders, and national planners to make short term and long-term decisions, on their agricultural and livestock production planning based on timely and accurate weather and climatic data. The

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purpose of AGRHYMET was to develop a regional system which would produce this data and which in turn could be provided to the appropriate clientele.

In 1981, the IPM Project had created a unit for bioclimatological research in IPM. This unit is centered at the AGRHYMET premises in Niamey, Niger. Advanced computer capacity will be available in 1986 through the installation of a VAX computer.

The IPM Project through FAO placed a technical expert agro-meteorologist at AGRHYMET facility in Niamey to develop the activities of the unit.

2. Analysis of the IPM-Bioclimatological Component

The project has actively developed a data bank of biological information on insects, weeds and diseases of major importance in the Sahel. The data bank includes phenological information for different crops. Also maintained are climatological data for the countries of the region.

The expert has utilized information provided through the Centre des recherches Agronomiques du Niger located at Tarna and meteorological data collected at Maradi airport to develop an unverified simulation model for Raghuva which will permit forecasting of damaging populations of this serious pest. Such information would be useful for much of the Sahel region. The status of the model is now at the point where the expert will in 1986 verify validity in a "real time" mode.

In addition, the expert is also working on a model (GSE) which will forecast outbreaks of the grasshopper Oedialus senegalensis. The

results of this activity have been encouraging and deductions from the model very positive. Information to be obtained in the 1986 season in Mauritania and Senegal will help verify its usefulness.

The IPM-bioclimateological component has assisted in the development and equipping of observation-posts and also developed a manual for observers which provides information on instrumentation and observations necessary for phenological and meteorological data inputs.

The program relies heavily on rapid communications networking. Such a system is not now available to the bioclimatologist and he may not receive information from observers for a matter of weeks. He also needs to rely heavily on observations made at each of 58 posts. Under these conditions he should be commended for his contributions to forecasting models. How the system works will depend on future communications improvements.

3. Conclusions

The IPM-bioclimateological component is serving a useful, truly regional service for acquisition and retention of valuable bioclimateological data. The operations have been hampered because of insufficient computer time and capabilities but this will be alleviated in 1986. A major problem with the studies is the lack of the necessary communications network with which to rapidly acquire bioclimateological data from observation posts in each of the countries. Getting the information from the field to communication post is major constraint. AGRHYMET has put in place in each country of the region a computer which under good telephone conditions, not

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now available could be utilized through a MODEM to transmit information to Niamey, thus alleviating the time delay in receiving bioclimatic information. Currently all information is transmitted via ASECNA (Agency for Safety of Air Traffic in Africa) which first transmits its own priority data and only then will they transmit IPM bioclimatological data, thus delays are constantly encountered. No national counterpart with whom the FAO Expert can work is a definite short coming. ^{The expert} / does have computer hardware in the form of a PC and printer, plus software he has developed which greatly enhances his efforts at developing models. In addition he has active consultation by Messrs Jones and Mishie, University of Florida, Gainesville, who have made recommendations regarding data acquisition and storage systems, and the development of prediction models.

4. Recommendations

The IPM-bioclimatological component should be encouraged in their efforts through the development of an adequate tele-communications system to permit rapid transmission of newly acquired bioclimatological data. This is critical to the usefulness of prediction models.

A Sahelian counterpart should now be sent to an appropriate university for training. This individual should be trained for a minimum of 9 months (before PACD March 1987) and assume the role now played by the FAO Expert at the regional center in Niamey.

The bioclimatological component has stressed the need for IPM researchers to provide quantitative crop loss assessment data to compliment the work conducted at Niamey. The FAO Expert, Niamey

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Rip, Senegal has worked with the bioclimatologist to assist in this aspect. Since the Senegal component is the major contributor to crop loss assessment due to Raghuva it is recommended that a closer association between the projects be developed. It is also recommended that greater input be required of other country components by utilizing the information developed across the region. In this manner significant loss estimates, control strategies etc. can be developed.

III. RESPONSE TO USAID DRAFT AUDIT REPORT, 1986

The subject Audit Report has been reviewed by the USAID-PAO-CILSS evaluation team, and they have considered the technical critique only. Presumably USAID/Burkina will respond to the management critique.

The amended Project Paper of 1983 describes a neat, text book type program, as well as an ideal IPM research program conducted under the best of conditions and with adequate financial resources and infrastructure, sufficient technical personnel, scientific and bibliographic resources, etc. A major design flaw was the expectation of results of the kind imagined in the PP amendment, given the constraints against major accomplishments, in a relatively short period of time in the Sahel. Curiously, the Audit Report recognizes these problems but does not seriously consider them when criticizing the results to date.

The draft Audit Report continues to perpetuate the myth that IPM tactics should have been "packaged" and passed to the extension services and farmers. It was an unreasonable requirement resulting from the project design. IPM is a strategy for management of pests using a variety of tactics and which has to be considered in varied and dynamic ecosystems. Development of tactics into a sound strategy takes time and is a continuous response to changing needs. Such programs undertaken in the US have taken a minimum of 5 or more years to develop given sufficient funds, personnel, and communications systems!!

The Sahel IPM Project of the bad image presented in the Draft Audit Report, also generally accepted by AID/W, has resulted from design flaws in the original and amended Project Papers, both of which were approved by USAID. The delays in start up and research productivity until 1984 is not the fault of the interested parties (researchers, technicians and

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recipients of control tactics); rather it was because of unacceptable project design and management approved by USAID.

The reference (pg 8) in the Audit Report concerning termination of support of the IPM Project "there is no assurance AID's integrated Pest Management project investment will be protected or used" and elsewhere a reference to protecting a 20 million dollar investment seems almost ludicrous. To protect an investment requires continued attention and maintenance. Not to enter into a project redesign, and funding a follow-on, Phase II, project will be catastrophic as was stated in the PP amendment (pg 1-24) and will not protect AID's investment. In addition, it does not seem scientifically or politically expedient to discontinue a project that has been underway only four cropping seasons. Continuity in funding seems to be economically, scientifically, and politically the most feasible approach to agricultural development and institution building.

"Phase II support, at least, would be highly desirable to derive maximum benefit from AID and CILSS' investment in IPM" (pg 1-25 PP amendment). The current evaluation team agrees with this conclusion, with certain reservations.

ANNEX A
RECOMMENDATIONS OF 1984
USAID MID-TERM EVALUATION TEAM

* 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.

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 "skeln" to preserve the progress made to date and to insure the continuation of a network system in the future.

ANNEX B
REVELANT CABLEGRAMS

RELEVANT CABLES

<u>Date</u>	<u>Number</u>	<u>Subject</u>
September, 1985	Nouakchott 04766	IPM Project (625-0928)
November 26, 1985	Ouagadougou 26459	Tripartite Evaluation Mission - Integrated Pest Management Project (625-0928)
February 3, 1986	Rome 02844	USAID (CILSS) FAO Tripartite Evaluation Mission - Integrated Pest Management Project (625-0928)
February 15, 1986	State 048766	Integrated Pest Management (625-0928) Tripartite Evaluation
February 19, 1986	Rome 04381	Integrated Pest Management (625-0928) Tripartite Evaluation
February 10, 1986	Ouagadougou 00790	Burkina/Integrated Pest Management (625-0928): Tripartite Evaluation
February 26, 1986	Ouagadougou 01149	Burkina/Integrated Pest Management (625-0928): Tripartite Evaluation
March 14, 1986	State 078857	Integrated Pest Management Project (625-0928) Tripartite Evaluation

WD 2872f

ANNEX C
CILSS-PAO-AID TERMS OF REFERENCE
1986 EVALUATION MISSION

TRIPARTITE EVALUATION OF THE IPM PROJECT

TERMS OF REFERENCE

To examine the efficiency and the conformity of the project's realizations in relation to the objectives as redefined by the restructuration and to determine in which way this contributed to strengthening the technical capabilities of host governments.

The mission shall specifically look into the following areas:

-Results obtained as regard to:

the strengthening of the potentials of the national institutions concerned.

the training of local staff.

the project's formeable impact.

-To evaluate the role of the surveillance network as a system which should result in containing certain pests.

-To assess and to evaluate the technical results obtained or in the process of being obtained in the light of their use within the context of a pest management strategy taking into consideration the potentials of the farmer.

-To evaluate the results of the socio-economy program and its impact on facilitating the dissemination of pest management techniques.

-To appreciate the usefulness of pilot actions when used as predissemination exercises.

-To evaluate the usefulness and the possibilities of making use of forecasting of some pests (*Oedaleus senegalensis*, *Ragnuva*).

-To evaluate the value and the importance of the working group's annual meeting in relation to the technical functioning of the project.

-To evaluate in what way the project is supported by the government, is integrated in the national program and linked to the other projects concerned.

-To make specific recommendations aimed at the orientation of future IPM programs.

WD 2867E

S&T/AGR/AP:RALTman:zw

3/27/86

ANNEX D
TEAM ITINERARY

UNCLASSIFIED
AID 03/18/86
AID:AIDREP:THBALL
AID:DMSONGER
AID:ADO:AHARTMAN
AID AMB CHRON

THB
DMS
AH

AMEMBASSY PRAIA
AMEMBASSY OUAGADOUGOU PRIORITY
AMEMBASSY NOUKCHOTT PRIORITY
AMEMBASSY DAKAR PRIORITY
AMEMBASSY BANJUL PRIORITY
AMEMBASSY BAMAKO PRIORITY
AMEMBASSY NIAMEY PRIORITY
AMEMBASSY NDJAMENA PRIORITY
INFO SECSTATE WASHDC
AMEMBASSY ROME

AIDAC

ROME FOR FODAG

E.O. 12356: N/A

SUBJECT: INTEGRATED PEST MANAGEMENT PROJECT
- (625-0928): TRIPARTITE EVALUATION

REFS: (A) OUAGA 0790 (B) STATE 048766 NOTAL
(C) 85 STATE 373544 (D) 85 ROME 29584

1. SUBJECT EVALUATION SCHEDULED TO BEGIN 20 MARCH AT PRAIA. TEAM MEMBERS ARE DR. DON PASCHKE, AID MEMBER AND TEAM LEADER; DR. GRUYC, FAO MEMBER; AND DR. BRAHIMA SIDIBE, CILSS MEMBER. DR. PASCHKE WAS A MEMBER OF THE 1984 IPM EVALUATION TEAM. THE TEAM WILL BE USING THE UNPUBLISHED 1984 EVALUATION REPORT AS A RESOURCE DOCUMENT.

2. ITINERARY AS NOW PLANNED IS:

- MARCH 20 - 21: PRAIA
- MARCH 22: ARRIVE DAKAR VIA VR 700 FROM PRAIA
- MARCH 22 - 23: DAKAR; MEETING WITH REPRESENTATIVES OF THE IPM CHAD COMPONENT WHILE IN DAKAR
- MARCH 24 - 25: 09H00, TO BANJUL VIA WT 911 . BANJUL -- USAID (AS APPROPRIATE) MIN. RURAL DEVELOPMENT IPM COMPONENT MEETING

L-25

Tom Haggard

FAO
AID
CILSS

<i>Wed</i>	MARCH 26:	08H00, TO <u>KAOLACK</u> , SENEGAL (CAR) SENEGAL -- IPM LABORATORY, NIORO-DU-RIP	
<i>Thurs</i>	MARCH 27:	IPM COMPONENT MEETING MEETINGS, CONTINUED	
<i>Fri</i>	MARCH 28:	DAKAR -- DEPARTURE FOR DAKAR -- USAID (AS APPROPRIATE) CROP PROTECTION SERV. MIN RURAL DEVELOPMENT	<i>- Baylis</i>
<i>Sat-Sun</i>	MARCH 29 - 30:	16H00 TO NOUAKCHOTT VIA DS 557 MAURITANIA -- USAID IPM COMPONENT MIN RURAL DEVELOP- MENT	<i>AID ? Sat</i>
<i>Mon</i>	MARCH 31:	<u>09H30</u> TO NIAMEY VIA RK 350	<i>afternoon AID</i>
<i>Tue</i>	APRIL 1 - 2:	NIGER -- USAID (AS APPROPRIATE) IPM COMPONENT MIN RURAL DEVELOPMENT	<i>conclude mission</i>
<i>Wed</i>	APRIL 2:	17H10 TO <u>BAMAKO</u> VIA ST 933	
<i>Thurs - Sat</i>	APRIL 3 - 5:	MALI -- IPM COMPONENT USAID (AS APPROPRIATE) MIN AGRICULTURE CROP PROTECTION SERV.	<i>AID</i>
<i>Sat-Sun</i>	APRIL 5 - 6:	<u>16H45</u> TO OUAGADOUGOU VIA RK 300	
<i>Mon</i>	APRIL 7 - 8:	BURKINA -- IPM COMPONENT USAID MIN AGRICULTURE AND LIVESTOCK	
<i>Tue</i>	APRIL 9 - 15:	BURKINA -- KAMBOINSE IPM LAB DRAFT EVALUATION REPORT PREPARATION.	
<i>Wed</i>	APRIL 16:	BURKINA -- DEBRIEFINGS: USAID, CILSS, FAO, IPM REGIONAL DIRECTION	
<i>Thu</i>	APRIL 17 - 24:	BURKINA -- PREPARATION OF FINAL EVALUATION REPORT	

3. THIS ITINERARY WAS DEVELOPED BY THE IPM REGIONAL DIRECTION IN CONSULTATION WITH THE COUNTRY TASK FORCE IN EACH IPM COUNTRY. IT IS EXPECTED THAT MINIMAL, IF ANY, LOGISTICAL OR ADMINISTRATIVE SUPPORT WILL BE NEEDED FROM THE ADDRESSEE USAIDS BY THE EVALUATION TEAM. WE WOULD, HOWEVER, APPRECIATE ANY ASSISTANCE THAT MIGHT BE POSSIBLE SHOULD PROJECT VEHICLES BREAK DOWN OR OTHER GLITCHES OCCUR DURING THE VISIT OF THE EVALUATION TEAM.

4. WE HAVE ATTEMPTED TO USE THE ADMINISTRATIVE STRUCTURE THAT HAS BEEN ESTABLISHED WITHIN THE IPM PROJECT FOR AS MANY OF THE DETAILS CONCERNING THIS EVALUATION AS POSSIBLE. USAID IPM PERSONNEL SHOULD WORK AS CLOSELY AS POSSIBLE WITH THEIR COUNTRY TASK FORCE DURING THE NEXT SIX WEEKS TO INSURE THAT THE TRIPARTITE NATURE OF THIS EVALUATION IS SUCCESSFUL.

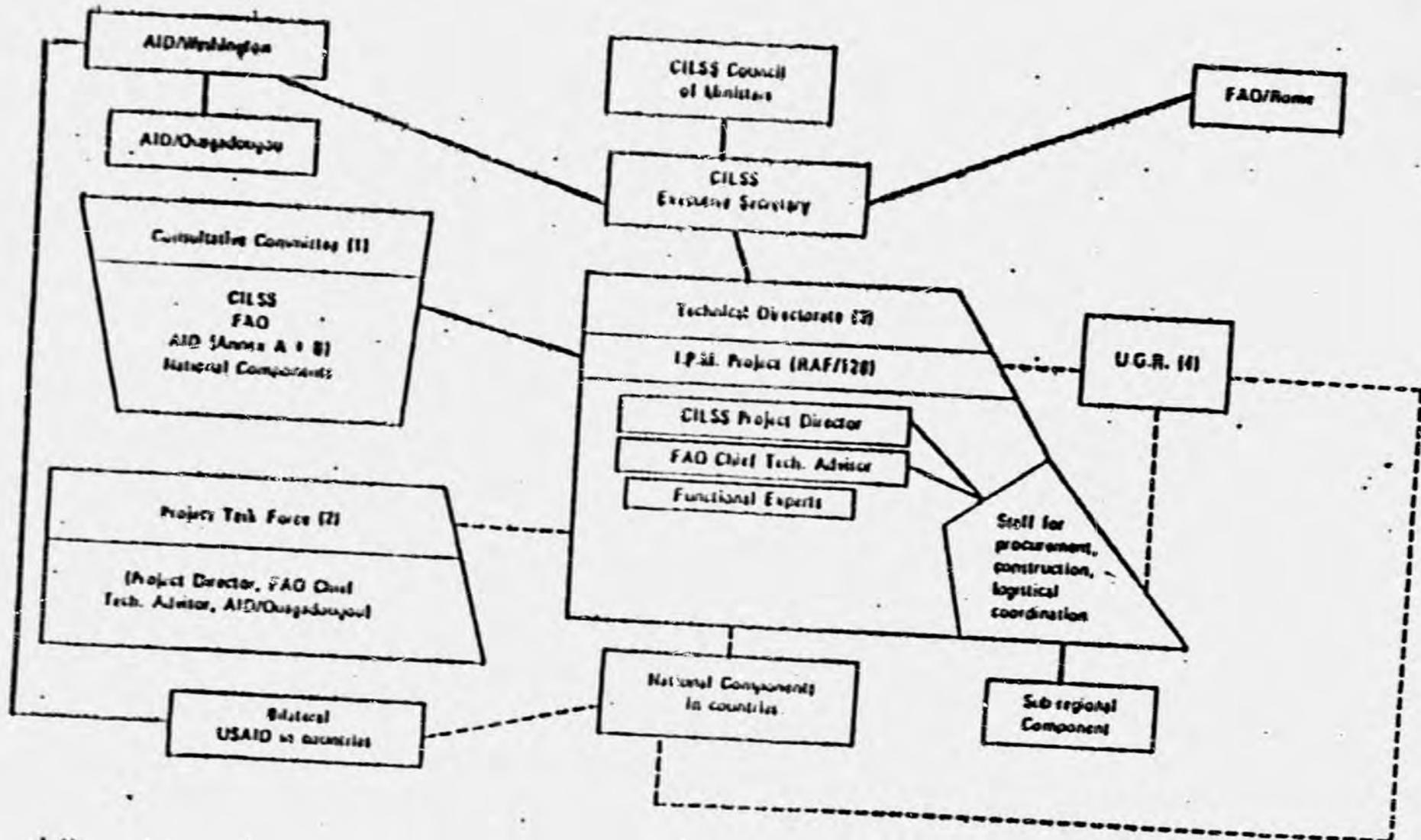
5. PLEASE SEND ANY COMMENTS CONCERNING THE EVALUATION TO BOTH PRAIA AND OUAGADOUGOU. CHEERS.
REECE##

ANNEX E

**IPM PROJECT ORGANIZATION CHART
PAST 1983 PROJECT PAPER AMMENDMENT**

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Annex A-3 Organization Chart



A-16

1. Meets regularly at least once a year, but more often at the request of any one member. Reviews and approves policies and plans.

2. Meets quarterly for sake of operational coordination.

3. Technical Direction operates under formal delegation with full operational authority for implementation of approved policy and plans.

4. Responsible to Executive Secretary for monitoring, reviewing and preparing staff work in support of the execution of his responsibility for or interest in Annexes A, B and others.

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ANNEX F
PERSONS TRAINED UNDER
AUSPICES OF IZM PROJECT

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

<u>Name</u>	<u>Country of study</u>	<u>Field of study</u>	<u>University/ location</u>	<u>Degree</u>	<u>Dates</u>		<u>Position intended upon completion</u>
					<u>Start</u>	<u>Concl.</u>	
<u>BURKINA FASO</u>							
A. Ouédraogo	U.S.A.	Entomology	Univ. of Idaho, Moscow 1/	M.Sc.	6/84	6/87	Entomol
A. Combari	France	Weed control	ENSAIA, Nancy	Doctorat de 3è cycle	5/10/83	4/10/86	Weed co
A. Zampalégré	U.S.A.	Entomology	Texas Tech. Lublock	M.Sc.	24/8/86	23/4/87	Entomol
D. Paré	France	Plant Pathology	ENSA, Rennes	Doctorat de 3è cycle	10/84	6/88	Plant P
D. Tracré	U.S.A.	Integrated Pest Mgmt.	Univ. Of Idaho, Moscow 1/	M.Sc.	7/84	4/87	Special IPH
<u>GAMBIA</u>							
H.E. Njie	U.S.A.	Entomology	Oklahoma State Univ., Stillwater 2/	B.Sc. + M.Sc. 3/	8/83	5/87	Entomol
H.B.S. Canteh	U.S.A.	Plant Pathology	N. Carolina State Univ., Raleigh	B.Sc.	12/83	9/87	Plant P
<u>MALI</u>							
K. Touré	France	Entomology	université de Paris-Sud, Orsay	Doctorat de 3è cycle	11/83	12/87	Entomol
A. Hassadoun	France	Entomology	Université Pierre et Marie Curie, Paris	Doctorat de 3è cycle	11/83	12/87	Entomol

Name	Country of study	Field of Study	University Location	Degree	Dates		Position Intended Upon completion
					start	conclu.	
MALI C. Danbele	France	Weed control	ENSAM, Montpellier	Doctorat de 3 ^e cycle	11.83	12/87	Weed Scienti.
Y. B. Kouyate	U.S.A.	bacterio-virology	Mississippi State Univ., Mississippi	Ph.D.	4.84	5/89	Bactério-viro
F. Sacko	France	plant pathology	CEAT, Montpellier	Maîtrise	9.83	9/87	Plant Pathology
M. Diourte	U.S.A.	plant pathology	Texas A and M Univ., College Station	M.Sc.	5.84	5/87	Plant Pathology
MAURITANIE							
M.A. Cheikna	Morocco	phytopathology	Institut Agron. et Vétérinaire Hassan II, Agadir	B.Sc.	11.83	7/87	Phytopathologie
Aly Sy	Morocco	phytopathology	Institut Agron. ET Vétérinaire Hassan II, Agadir	B.Sc.	11.83	7/87	
A.Y. Kida	U.S.A.	entomology	Univ. of Idaho, Moscow,	B.Sc.	8.84	12/88	Entomologist
A. Sana	U.S.A.	bacterio virology	Texas Tech Lubock	B.Sc.	1985	1989	
B. Diop	U.S.A.	entomology	Texas Tech Lubock	B.Sc.	1985	1989	
M.M. San	U.S.A.	entomology	Texas Tech Lubock	B.Sc.	1985	1989	
O.A.B. Cheik Bouya	U.S.A.	phytopathology	Texas Tech Lubock	B.Sc.	1985	1989	
I. Kane	U.S.A.	Weed control	Texas Tech Lubock	B.Sc.	1985	1989	

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NIGER

A. Zaberou	U.S.A.	Weed Control	Univ. Oklahoma	B.Sc.	1986 - 1990
A. Diop	U.S.A.	Entomology	"	M.Sc.	1986 - 1988

SENEGAL

A. Niassy	U.S.A.	Entomology	Univ. Oklahoma	M.Sc.	1985 - 1987
A. Diouf	U.S.A.	Phytopathology	Univ. Oklahoma	M.Sc.	1985 - 1987
D. Ba	U.S.A.	Weed Control	Univ. Oklahoma	PhD	1985 - 1989

TOCIAD

N. Doulan	Canada	Phytopathology	Univ. Laval	M.Sc.	1986 - 1988
J. N'Gona	à rechercher	Entomology	à rechercher	B.Sc.	1986 - 1990

DIRECTION REGIONALE

P.G. Kafando	- Burkina	France	Socio-écon- omale	Montpellier	Doctorat 3è cycle	1983 - 1986
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ANNEX G

DOCUMENTATION CONSULTED 1986

DOCUMENTATION REVIEWED

BURKINA FASO

- 1986 Rapport Annuel de la Composante Nationale (IPM)
Included Separate Reports for each discipline and project
- 1986 Rapport de campagne Action Pilote Mil
- 1983 Proclamation describing structure and function of the Ministry of
Agriculture and Animal husbandry
- 1983 Plan d'Operation (Revision No. 1, 1983-1986)

CAPE VERDE

- 1986 Rapport Annuel de la Composante Cap Vert
- 1986 Syntese des Resultats de Rapport Annuel 1985
- 1986 Information provided by J. Hartmann regarding persons under AID
project 655-0011, Food Crops Research
Personnal communication
- 1985 Plan de travail, Composante du Cap Vert
- 1985 FAO Progress Reports April 1985-December 1985
- 1985 Relatório de actividades referente ao ao de 1984 - Ministry of
Rural Development
- 1984 Ibid., 1983. Ministry of Rural Development
- 1984 Organogram of Ministry of Rural Development (MDR)
- 1983 Desenvolvimento e Pesquisa no longo prazo em Cabo Verde: mesa
Redonda. A cargo de Abreu and Horacio Soares
Instituto Gulbenkian de Ciencia (In an English and Portuguese)

CHAD

- 1986 Rapport Annuel d'activites de la Composante Nationale du Tchad
(1984-1983)
- 1986 Rapport Technique Annuel de la Composante Nationale du Tchad
- 1984 Rapport d'une mission au Tchad. Arnold Van Huis (Projet Regional
de formation pour la Protection des Vegetaux des pays membres du
CILSS (annex 22)

THE GAMBIA

- 1986 Integrated Crop Management at the Village level - P.D. Manser Report, FAO Project (ICP/GAM/4505 (I))
- 1986 Report on the 3rd Integrated Crop Management Workshop - FAO and Ministry of Agriculture of The Gambia
- 1986 Annual Report of The Gambia Component
- 1984 The Gambia pesticide regulation legislation
- 1983 Plan d'Operation (Revision No. 1, 1983-1986)

MALI

- 1986 Rapport Annuel de la Composante du Mali (1985)
Entomologie, malherbologie, phytopathologie, Tome I Mil, Tome III
Autres Vegetaux (sorgho, riz, etc.)
- 1986 Rapport Annuel de la Composante Nationale du Mali,
Phytopathologie du Sorgho (1985)
- 1986 Rapport Annuel de la Composante nationale du Mali,
Phytopathologie du sorgho (1985)
- 1986 Rapport annuel de la composante National du Mali, Action Pilote
de Lutte Intégrée (Mil) (1985)
- 1986 Synthèse sur le Project Lutte Intégrée
- 1985 Doumbia, Y.O., S.M. BONZI, A. KONATE, and A. SOW. Alectra
Vogelii une nouvelle plante parasite du niébé - FAO Pl.
Protection Bull., 33,124-125
- 1984 BONZI S.M. and Y.O. DOUMBIA Importance de la cécidomyie en tant
que facteur limitant la production du sorgho au Burkina Faso et
au Mali - Proc. Internatl sorghum Entomology, workshop, Texas A
and M University, 16-21 July 1984 (ICRISAT)
- 1983 Plan d'operation (Revision No. 1, 1983-1986)

MAURITANIA

- 1986 Rapport technique annuel, composante de Mauritanie (1985),
Entomologie, Phytopathologie
- 1986 Rapport technique annuel, Action Pilote Mil (1985)
- 1986 Actions et Perspectives de la Composante de Mauritanie
- 1985 Compte-rendu du séminaire d'élaboration du programme Pilote sur
le mil en Mauritanie - Kaedi, 19-23 mars 1985.

- 1985 Note complémentaire au Rapport de mission en Mauritanie, 11-24 mars 1985
- 1983 Plan d'operation (Revision No. 1, 1983-1986)
- 1980 Copy of legislative action establishing the structure and function of the Ministry of Rural Development

NIGER

- 1986 Synthèse des Résultats de la Campagne 1985 - Composante Nationale du Niger
- 1986 Rapport Annuel de la Composante Nationale du Niger (1985) Entomologie, phytopathologie, malherbologie
- 1986 Rapport de campagne 85, Project Pilote Lutte Intégrée
- 1985 Protocole d'Essais Pilote Lutte Intégrée
- 1985 Synthèse des méthodes de Lutte recensées au Niger
- 1985 Procès verbal de la Deuxième réunion semestrielle d'évaluation du project (janvier 1985)
- 1985 Procès verbal de Réunion du Country Task Force (groupe de travail national du Project du 26é08é85)
- 1985 Rapport annuel de composante nationale du Niger (1984)
Miscellaneous tables regarding construction and vehicles funded by project
- 1983 Plan d'Operation (Revision No. 1, 1983-1986)

SENEGAL

- 1986 Contribution de Composante Nationale du Sénégal Synthèse des Premiers Résultats de la campagne 1985
- 1986 Appuis récents en Entomologie du mil au Sénégal
- 1986 Recherches sur le stockage du mil au Sénégal
- 1986 Aperçu sur la méthodologie de conservation et d'élevage de Bracon hebetor en milieu paysan et les résultats préliminaires des lâchers contre les larves de Ragnva albipunctella dans un champ de mil traditionnel au Sénégal (1985)
- 1986 Aperçu des activités de recherches, de développement et de formation du cours-programme de lutte biologique de janvier à décembre 1985 au Sénégal

1986 Action pilote mil, Rapport annuel de la campagne agricole 1984-1985

1986 Gahukar, R.T., H. Guvremont, V.S. Bhatnagar, Y.O. Doumbia, M. N'Doye, and G. Pierrard. A review of the pest status of the millet spike worm, Rahguva albipunctella and its management in the Sahel. Insect sci. appl. #, (In press)

1983 Plan d'operation (Revision No. 1, 1983-1986)

In addition numerous reprints of scientific articles produced by FAO experts and annual reports dating from 1982.

A list of publications of the Project IPM since 1981 through 1985.

MISCELLANEOUS - CILSS/FAO/AID DOCUMENTS

1986 Protection des Végétaux. Stratégie commune: Programme 1987-1990, (CILSS). Coordination technique régionale - Programme Régional (CILSS)

1986 Activités de la Cellula Régionale de bioclimatologie de composante régionale - Bioclimatologie

1986 Draft Audit Report, Regional Integrated Pest Management Project, 625-0928 - January 1986 (USAID)

1986 Compte-rendu Project de Lutte Intégrée, Recherche et Développement de Lutte Intégrée contre les Principaux ennemis des cultures dans le Sahel - Praia 11-22 mars, 1986 (CILSS) Direction Régionale

1986 Compte-rendu du Séminaire International du Project CILSS de Lutte Intégrée - Niamey, Niger, 6-13 décembre 1984. Direction Régionale (CILSS)

1984 Unpublished Mid-Term Evaluation Integrated Pest Management and Final Evaluation Regional Food Crops Protection Project (USAID)

1984 Synthèse des rapports techniques annuels de la campagne agricole 1984 - Direction Régionale (CILSS)

1984 Rapport préliminaire sur l'utilisation de neem (Azadirachta indica) dans le traitement phytosanitaire et la fertilisation azotée en Basse Casamance (Sénégal) Protection des Végétaux (PIDAC), Ziguinchor - Sénégal

1983 Integrated Pest Management (0625-0928), Project Paper - Amendment, USAID August 1983

1983 Plan d'Opérations, Revision no. 1, IPM/625/0928 octobre 1983 au 30 septembre 1986 (USAID/CILSS) Annexes I' II' III' IV' V' VI' VII, (does not include Tcnad

ANNEX B
PERSONS CONTACTED

PERSONS CONTACTED

BURKINA FASO

Salifou TRAORE	National Director, IPM Project and Director Crop Protection Service (Protection des Végétaux) Ouagadougou
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Roger Bloom	ADO, USAID, Ouagadougou
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E. BA	Counterpart, Entomologist

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D. P. M'BAYE	Plant Pathologist

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F. SAGNA	Minister of Rural Development
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