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Republic of Guinea Bissau

Food Crop Protection Project

Final Evaluation

(A.I.D. Project Number 657-0012)

Submitted to:

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REPUBLIC OF GUINEA BISSAU

FOOD CROP PROTECTION PROJECT
(A.I.D. Project Number 657-0012)
FINAL EVALUATION

SAMPLE TABLE OF CONTENTS BASED ON CURRENT CODING

ANNEXES

EXECUTIVE SUMMARY

The U.S. $ 1.25 million Food Crop Protection Project (FCP, 657-0012) was authorized on August 23, 1985, as a follow-on activity (Phase III) to two Sahel regional food crop protection projects (625-0928, 657-007 and 625-0916). The purpose of the project was to strengthen the national Crop Protection Services' (CPS) capability to develop and direct a crop protection program, and to implement the on-going program in crop protection ministry departments. In response to the findings of a 1988 mid-term evaluation, the project was amended in August, 1988, to add $ 1 million to provide for construction of necessary zonal-level offices, warehouses and additional commodity procurement.

As of August 1990, significant accomplishments had been realized: participant training was complete or nearing completion for four Bachelors and three Masters degrees under FCP, with three additional FCP staff receiving Bachelors degrees under a regional training project and numerous staff having received third-country and in-country training: four zonal-level warehouses and office and residential facilities were constructed; a national single side band radio net, with fixed and mobile units, was in place and functioning; and over 80 national, zonal, and district-level personnel were providing crop protection services in such areas as storage, biocontrol, diagnostics in entomology and plant diseases, and technical support for other government agencies in plant protection areas, vertebrate pest control, pesticide legislation, and plant quarantine. Thus, the foundations for a solid crop protection research and service in Guinea Bissau exist.

However, given A.I.D.'s decision to cease funding the Crop Protection Service (CPS), the program's continued operations are in jeopardy. The Government of Guinea Bissau (GOGB) has funded and is committed to continuing to fund CPS personnel throughout the country. A.I.D., however, has funded many or the service's operating expenses, including facilities maintenance and office supplies. Thus, although personnel will still be in place and will be paid, they may lack funds to carry out their work. Two primary crop production zones may continue to operate with other donor financing, through area-specific rural development programs, but the other two zones' operations are in question.

The CPS also established impressive linkages with a number of regional and international research and service agencies under A.I.D. funding. Some of these, with U.S. and European organizations, will no doubt continue. Others, with African organizations more dependent on external funding, may cease as travel and communications funds cease. Thus the CPS' ability to diagnose and deal with emergency or new pest problems is in question.

Finally, although the service has grown and developed a number of basic organizational systems in a remarkably short period of time, given conditions in Guinea Bissau, its basic administration and management are still limited. Withdrawing support now

will have a serious impact upon the ability of CPS staff to maintain services and sustain its organization during what is to be a turbulent adjustment period.

The evaluation recommends that, despite the imminent termination of the project, A.I.D. continue to maintain some level of oversight and concern for the CPS, specifically with regard to identification of other potential donors and to continued provision of training and technical assistance through regional A.I.D. mechanisms. Assuming that some continued level of other donor support necessary for operations is found, the evaluation recommends that the CPS maintain and reinforce its links with regional and international agricultural research and training organizations which have provided support in the past, and that it continue its efforts to expand applied research in critical areas. Efforts in training -- of men and women farmers, CPS regional staff, and senior management -- must remain an area of strong emphasis.

In the long run, the GOGB must assume primary responsibility for the staffing and operations of the CPS. A nation's food and fiber supply is dependent upon a strong, well trained, national government crop protection service. Due to A.I.D.'s assistance over the last decade, Guinea Bissau now has such a service. The ability of the country to reach its goal of food self sufficiency will largely depend on the GOGB's willingness and ability to provide continuing support to the CPS.

1. INTRODUCTION AND OVERVIEW

The U.S. $ 1.25 million Food Crop Protection Project (FCP, 657-0012) was authorized on August 23, 1985, as a follow-on activity (Phase III) to two Sahel regional food crop protection projects (625-0928, 657-0007 and 625-0916). The purpose of the project was to strengthen the national Crop Protection Services' (CPS) capability to develop and direct a crop protection program, and to implement the on-going program in crop protection ministry departments. In response to the findings of a 1988 mid-term evaluation, the project was amended in August, 1988, to add $ 1 million to provide for construction of necessary zonal-level offices, warehouses and additional commodity procurement. The complete original and amended project Logical Frameworks are found as Annex A.

As of August, 1990, significant accomplishments had been realized: participant training was complete or nearing completion for four Bachelors and three Masters degrees under FCP, with three additional FCP staff receiving Bachelors degrees under a regional training project; four zonal-level warehouses and office and residential facilities were constructed; a national single side band radio net, with fixed and mobile units, was in place and functioning; and national, zonal, and district-level personnel were providing crop protection services in such areas as storage, biocontrol, diagnostics in entomology and plant diseases, and technical support for other government agencies in plant protection areas, vertebrate pest control, pesticide legislation, and plant quarantine.

Progress in meeting the project's purpose and its original and amended planned outputs was steady but inconsistent. In mid-1990, the Office of the A.I.D. Representative (OAR) in Bissau contracted with Management Systems International (MSI) to evaluate the impact of the activity and to determine the extent of project success in meeting the stated goal (increasing productivity in staple food crops) and purpose. The evaluation was additionally to make recommendations of the necessary steps that the Government of Guinea Bissau (GOGB) would need to take to strengthen the CPS institutional capability in the years to come.

The report that follows responds to general A.I.D. guidelines regarding the conduct of project evaluations as well as specific evaluation questions in the Scope of Work (ref. Annex B). Following a summary of the evaluation methodology (1.1) and acknowledgements (1.2), the report discusses the context and background of the project in section 2, and project performance and issues in section 3. The findings, conclusions, and recommendations are presented in section 4.

1.1 Methodology

The purpose of this evaluation was to conduct a final impact study of the Food Crop Protection activity and to determine the extent of project success in meeting its stated goal (increasing productivity in staple food crops) and purposes (strengthening the CPS capacity to develop and direct a crop protection program and to implement an on-going program in crop protection).

The evaluation was conducted by Management Systems International (MSI) as Delivery Order No. 22 under its Indefinite Quantity Contract with A.I.D. No. PDC-0085-I-00-9059-00 in August 1990. The evaluation team was composed of an Evaluation Research Specialist/Team Leader, Leslie Posner, and a Senior Crop Protection Specialist with experience in the Sahel, George Cavin. Prior to departing for Guinea Bissau, the team conducted a one-day team planning meeting at the offices of MSI in Washington, D.C. The team spent approximately three weeks in Guinea Bissau -- both in Bissau and in the rural areas -- reviewing secondary source materials, undertaking on-site inspections of work in progress, and conducting interviews with GOGB officials, other donor representatives, men and women farmers, and private businesses. Annex C provides a list of documents consulted, Annex D a list of persons contacted, and Annex E locations visited, with reference maps.

Following the Scope of Work, the team focussed its investigations on determining the extent of project success in meeting its stated goal, purpose, and outputs. This is summarized in section 3.1, including an annotated project Logical Framework. Section 3.2 provides a discussion of the organization and staff capabilities of the Crop Protection Service.

The team determined that the "baseline" for an effective CPS in Guinea Bissau was zero, as only extremely limited services had existed prior to the project. The seven functions summarized below are considered as "crop protection" in Guinea Bissau, recognizing that in most cases they do not rest solely with CPS, but may also be incorporated into the duties of other national, provincial or zonal organizations which have responsibility for research, extension, education, health, inspection, and environmental protection. The base functions reviewed were as follows:

- Adequacy of pest survey and detection capabilities, including early detection of newly introduced pests, pest spread from confined areas, and pest populations surveys to define limits and levels of infestation in order to provide an alert system to farmers on which action strategies can be soundly based (see section 3.3);

- Adequacy of pesticide regulations and their enforcement in the use, manufacture, formulation and distribution of pesticides, pesticide storage and safety practices (worker, consumer and environmental), pesticide container disposal and pesticide

selection for most efficient use consistent with minimal environmental contamination (see section 3.4);

- Adequacy of plant quarantine regulations and enforcement, capabilities to assure against introduction (except through landbridge spread) of new pests, the artificial spread of pests from confined areas, the regulation of propagative plant material and other introductions of newly introduced research materials including biological organisms, and pest-free status of exports to other nations (see section 3.5);

- Quality of crop protection assistance to farmers through the provision of technical advice and on-farm assistance; training to the farmers in the techniques of pesticide application, safety, informational material provided and area-wide assistance requiring emergency action (i.e. locust and grasshopper infestation) where individual farmer or village effort is insufficient; and how this crop protection assistance equates with IPM (see section 3.6);

- Quality or quantity of developmental assistance through research and/or the adaptation of research findings to field use readily acceptable by farmers (see section 3.7);

- Quality and quantity of training received and its relationship to the targeted activity it is meant to improve (see section 3.8);

- The capability of CPS and/or the Extension Service to take new or modified techniques to the field (see section 3.9);

As indicated in the project Logical Framework (see section 3.1 and Annex A) and/or in the detailed Scope of Work (see Annex B), section 3 also considers:

- Efforts made to involve women in the program (see section 3.10);

- Efforts made to identify and secure other donor support for future CPS needs (see section 3.11); and

- The degree to which networking has been established with other national and international organizations, individual researchers and private enterprise (see section 3.12).

Where appropriate, mitigative actions are proposed to correct deficiencies identified.

1.2 Acknowledgements

The team wishes to acknowledge the efforts of OAR/Bissau personnel in sharing its scarcest resources: staff time, to provide substantive input into the evaluation findings; and working space, to sort through the voluminous project files. OAR personnel's frankness regarding individual and organizational roles during project implementation was most appreciated. The team also wishes to thank the CPS staff for its time, energy, and willingness to gather and present additional information on short notice. Finally, the team is grateful to the USDA Project Advisor for sharing his vast experience on crop protection programs in general, and on the Guinea Bissau CPS in particular.

2. PROJECT CONTEXT AND BACKGROUND

2.1 Country Context in Brief

Guinea Bissau's per capita income, low literacy, and high infant mortality rates all indicate its status as one of the world's least developed countries. An income of $160, adult literacy of less than 20 percent, and infant mortality of 134 per 1,000 solidly anchor it in this category. The agricultural sector dominates the economy, accounting for nearly 90 percent of employment and approximately 60 percent of GDP. The distribution of the country's population confirms its overwhelmingly agricultural economy; approximately 90 percent of its 900,000 inhabitants live in rural areas. Moreover, half of the population lives in villages of less than 350 inhabitants. The country's 36,125 square kilometers are divided into four Zones, including eight regions and 36 districts.

Following the establishment of its independence from Portugal in 1974, the GOGB had to address the dual problems of damage caused by the war, and the lack of infrastructure development during the colonial period. The war devastated agricultural production, displacing nearly one-fifth of the population, including those who farmed 70 percent of the land. In order to rebuild the economy, the new government focused on public investments in large-scale agro-industrial development, which were financed primarily by external borrowing. The government's increasing dependance on foreign aid was aggravated by inefficient pricing and marketing systems. These practices resulted in decreased exports and increased growth in parallel market activity in neighboring countries.

Increased reliance on foreign aid to finance imports, dramatic growth in government spending, a drought, and depressed market prices for its primary exports all led to a rapid deterioration in the balance of payments by the early 1980's. The GOGB turned to the World Bank and the IMF in 1983 in an attempt to address this situation. The initial Structural Adjustment Program they designed concentrated on currency

devaluation, increasing producer and consumer prices, and imposing higher taxes. By 1986, factors such as declining commodity export prices, an increasing fiscal deficit, and the slow pace of planned institutional reforms indicated that additional measures were required.

Documents and papers prepared in 1986-87 outlined the growth strategies still in effect today. The World Bank's 1986 "Prescription for Comprehensive Adjustment" and its 1987 collaborative IMF and GOGB Policy Framework Paper (PFP) formulated strategies in which agriculture would play a pivotal role in reducing GOGB's balance of payments deficit. For example, increasing exports of its major cash crop--cashews--and reducing rice imports would greatly improve the situation.

The resultant 1987 Structural Adjustment Program instituted a two-year period during which the Bank helped raise $34-40 million for balance of payment support, and arranged for foreign debt rescheduling. It also called for major reform measures in most areas, including state spending; and policies regarding trade and exchange rates, pricing, fiscal and monetary measures, and rural development and development assistance. This first credit effort (SAC I) led to some positive results: a 6 percent growth in real GDP, and agricultural production increases of 10 percent in 1987 and 4.5 percent in 1988. SAC II, begun in 1988, aimed at maintaining a stable macroeconomic environment, increasing growth by removing infrastructural and institutional impediments, expanding trade liberalizing prices, and reforming banking and the public sector.

Institutional weaknesses and the absence of data required for managing the budget and credit programs caused some slippage in meeting these ambitious goals. However, Guinea Bissau continues with its efforts to attain the benchmarks required to implement these policy reforms. Inflation has decreased dramatically, as has the gap between official and parallel exchange rates, which moved from approximately 200 percent in May, 1987 to 30 percent in April, 1990. Among their other objectives, the new policies attempted to shift the terms of the balance of trade from the urban to rural sector, and otherwise encourage agricultural production. Subsequent reports and activities have reinforced the emphasis on the agricultural sector.

Small family farms and manual labor characterize agricultural production. Most families consume the bulk of their produce, and exports are confined to crops such as cashews and palm kernels. Rice is the major food crop, occupying 52 percent of the land area devoted to grain production. Rice not used for consumption serves as a medium of exchange in barter arrangements, or is sold in neighboring countries for hard currency (CFA). Fertilizer consumption averages only 2.9 kilograms per hectare of cultivated land, well below that of neighboring countries. Use of other agricultural inputs such as pesticides and improved seed is also quite low, and restricted primarily to land cultivated with donor project support or belonging to the "Ponteiros," who are commercial, export-producing farmers.

An estimated 12.5 percent increase in 1988-89 rice production over that of the previous year indicates that farmers can respond to economic liberalization policies. Their response, when combined with an assessment of the country's resource base and review of its historical production data, adds weight to the expectation that Guinea Bissau should be able to produce enough rice for export in addition to meeting internal demand.

President Vieira's recent speeches have consistently emphasized the state's new role in the "profound economic transformation of Guinea's society." In a speech to the national Popular Assembly in January, 1989, he stressed the GOGB's gradual shift toward reliance on market forces rather than state planning for allocating capital and labor and helping to restore economic equilibrium. His New Year's Speech declaring 1990 as "the year of stabilization of the economy" demonstrates that the government is maintaining its commitment to economic reform.

2.2 Project Background and Description

The Food Crop Protection Project (FCP, 657-0012) was authorized on August 23, 1985, as a follow-on activity to two Sahel regional food crop protection projects (625-0928 and 625-0007), the sum of which can be conceptualized as a three-phase effort. Phase 1 covered 1979 to 1982, and was administered from the Dakar Sahel regional Food Crop Protection Headquarters. During this period, a U.S. Department of Agriculture (USDA) advisor provided through a PASA (Participating Agencies Services Agreement) was resident in Bissau and advised the GOGB on initial protection activities. Approximately $150,000 was disbursed, largely for in-country and third-country training, and for procurement of transport (four pickup trucks), office and field supplies and equipment.

Phase 2 covered a three-year period from 1980 to 1985, coinciding with the term of a second USDA PASA resident in Bissau, and was funded under the Regional Food Crop Protection Project at approximately $1.7 million. This period focussed on establishment of an elementary headquarters and field staff for the Crop Protection Service (CPS). The CPS established its tiered organizational structure and staffed up at the headquarters, zonal regional, sectoral, and village levels. In some villages, a part-time/as-needed agent was identified to represent the service. These village agents were paid in kind by the World Food Program, and others by the GOGB. Project funding covered the construction of a central warehouse, renovation of a former agricultural school building for use as a separate and distinct facility for CPS, and provision of four-wheel drive vehicles for headquarters and zonal/regional staff and motorcycles for the district level. A strong effort was made to upgrade technical skills of CPS personnel, with project funding covering in-country and third country training in addition to participant training in entomology and plant pathology.

Phase 3 covered August 1985-September 1990, which coincides with the active implementation phase of the FCP bilateral project and the tenure of a third USDA

advisor. Project funding during this period totalled $2.25 million, or approximately $300,000 for technical assistance, $355,000 for services, $350,000 for training, $765,000 for commodities, $300,000 for construction, and $130,000 for oversight. This advisor was not resident in Bissau, instead making four to seven visits per year and spending between four and five months per year on the project. As discussed in section 3, this lack of a full-time resident advisor was perceived as an implementation constraint by OAR/Bissau which, although very thinly staffed, had to assume direct responsibility for a number of the functions previously carried out by the PASA.

During this phase, the CPS staff continued to expand and by August, 1990, nationwide coverage was achieved. The transport system initiated during Phase 2 was completed, with bicycles provided to the village-level agents. A communications system was established with A.I.D. funding, consisting of fixed base (with solar panels) SSB radios at 12 key locations in the country, and mobile sets for zonal supervisors and travelling headquarters staff. Additionally, in response to recommendations of the mid-term evaluation (see section 1.3), four warehouses were constructed to provide improved storage capability for equipment and pesticides at the zonal level. Construction included the zonal warehouses (4) as well as office space, a warehouse at CPS headquarters for spare parts, and the construction of residences (Zones I and II) and office buildings (Zones 1 and II). This physical upgrading was undertaken in tandem with the increased in-country training operation and maintenance in the various systems, as well as provision of 11-month training in Portugal for the CPS Administrative Officer. This individual now controls procurement, inventory, and distribution of materials and equipment in addition to managing the CPS vehicle fleet and various support services.

Technical training continued to receive emphasis. Project-funded participant training under Phase III sponsored two Bachelors and three Masters degrees, complemented by three other Bachelors sponsored by the A.I.D. regional African Manpower Development Project. With the additional technical staff, CPS was able to move from what had been an insecticide usage program to provision of services in numerous other areas, e.g. storage, biocontrol, diagnostic capability in entomology and plant pathology, vertebrate pest control, pesticide legislation, and plant quarantine.

The Project Activity Completion Date (PACD) was originally set at August 30, 1990, but has been extended until July 31, 1991 to enable one participant to complete a Masters degree. A.I.D. has decided not to continue direct support to CPS at this time, although its evolving agriculture strategy may allow for some participation in the future.

2.3 Comments on Mid-Term Evaluation

The evaluation team was asked to make specific comments on the mid-term evaluation (MTE), undertaken by the International Science and Technology Institute in February, 1988. The following comments summarize its primary areas of concern, and emphasize those which have been largely resolved. The team finds that project and

A.I.D. staff seriously explored the MTE recommendations, and made reasonable efforts to follow up on those meriting attention. The difficult operating conditions in Guinea Bissau often explain the apparent "lack of follow up" on some recommendations. However, other identified problems may have been neglected simply because they were not high priority areas; e.g., the CPS library is still a rudimentary and inadequate work place. This changed somewhat in September of 1990 with the addition of about $15,000 worth of books and the arrival of cataloguing materials.

The Mid-term Evaluation team concentrated upon technical and infrastructure matters. It devoted the most attention to pesticide storage and safety, recommending the construction of suitable warehouses in the regions. It also examined existing tangible assets, ranging from vehicles to library facilities. It identified four issues that require comment.

2.3.1 Central versus Rural Emphasis

The MTE team found that the CPS was "relatively well equipped centralized Government agency which still lacked basic facilities in the four designated service zones and other areas of the country." The problem of not adequately focusing on the regions remains. To illustrate this point, this section describes rather than appraises the rural service delivery capability because it is not yet fully operational. The CPS is finally acquiring the infrastructure which will allow it to deliver its services, provided that recurrent costs, logistical, and administrative constraints can be overcome.

The MTE team was concerned with and recommended the construction of warehouses and other basic facilities in the zones, and the project has followed its guidelines. Three out of the four zones do have the necessary facilities, although construction is incomplete in some of them. Construction delays and overseas training have kept several of the Zone directors away from their rural bases. However, their imminent relocation should reinforce the project's regional orientation.

A persistent and potentially longer-term constraint to service delivery is posed by the ongoing logistical and personnel problems in rural areas. Many vehicles need frequent repairs and all sometimes lack fuel. Nor can CPS staff rely on extension personnel to back them up in providing direct services to farmers. Most areas lack these workers, or experience many problems in training and retaining those they have.

Some improvements have been made. Radio communications, which the team emphasized, do make liaison much easier. Training rural personnel in minor vehicle and equipment repairs increases equipment usage and improves durability. However, logistical problems are still important; roads can be impassible, even when vehicles have the fuel to use them. Thus, the problem of adequately serving the regions remains.

2.3.2 Pesticide Usage and Pesticide Safety

Neither the dramatic increase in pesticide usage nor the serious accidents which the team predicted have occurred. Quantities applied remain relatively small, and pesticides are still not available for sale in GB. Section 3 of this report provides more specific figures on pesticide usage and safety.) However, the technical advisor considers that pesticide safety remains the CPS' weakest link.

At least one dramatic incident illustrates potential pesticide safety problems. Empty pesticide drums, reportedly from Senegal, were being used by GB bee-keepers near the border. Radio and even television announcements were used to warn of the danger, and the GOGB reportedly insisted that the drums be recalled.

However, less dramatic and more routine pesticide safety efforts still require additional attention. While some protective clothing was supplied to CPS by the Italian and U.S. Governments, the Service did not systematically collect it from workers, and soon exhausted its supplies. Regarding additional safety measures, despite the MTE recommendation, few emergency antidotes are available in CPS warehouses. Some exposure problems have occurred in autonomous projects outside of direct CPS control. The MTE team mentioned another problem which persists. Many labels are still written in languages not familiar to those likely to be handling drums.

Despite these enduring problems, safety training continues and has had its impact upon the rural areas. Interviews with villagers working with extensionists indicate that they are well aware of basic pesticide safety procedures such as keeping children and domestic animals out of the way.

2.3.3 Training and Training Support Materials

The MTE team found that training emphasized equipment and materials rather than staff training. They suggested better and more frequent use of microscopes and cameras. Neither of these items has been much improved. A microscope defect noted upon delivery has not been corrected. The vendor claims damage was caused in shipping, and local repairmen are unable to correct the problem. While cameras may be available, no one was observed using them. The fact that film is very expensive and not always available does little to encourage their use. Similar supply and maintenance problems continue to plague other equipment; e.g., the slide projector has not been working for several months since ordered replacement bulbs have not arrived.

Given that such problems are endemic in GB, and that market and maintenance conditions have improved significantly since the MTE visit, the present team questions its predecessors' awareness of the working environment. The evaluators tend to agree with the advisor's impression that the MTE recommendations did not always take GB's

difficult working conditions and limited resupply and repair options into account. The same comment applies to their recommendations on vehicle purchase.

2.3.4 CPS Staff Capabilities

While the MTE team did review most of the items indicated in its Scope of Work, its heavy emphasis on technical and pesticide safety aspects of the project may have led to neglect of other important areas. The present team agrees with the Agriculture Officer's memo stating that the MTE team did not adequately examine the issue of staff capabilities. This omission may have had serious consequences. They did note that the project had experienced "less effective implementation" following the full time advisor's departure. They suggested that a Peace Corps volunteer enter the project and assume some advisory functions/duties.

However, the evaluation did not fully explore the matter, either by looking more closely at the consequences of this "less effective implementation," or even at the feasibility of their proposed solution. Since the consequences are not defined or discussed, one cannot determine whether or not they are similar to current administrative and procurement problems. Additionally, accepting a Peace Corps solution prevented further examination of the causes of and potential solutions for this "less effective implementation."

Nor was the PC solution necessarily appropriate given the program's strategy and recent arrival in GB. The country PC strategy at that time required that agricultural volunteers be based in the regions. There is no indication that any of the concerned parties, the CPS, AID, or even the Peace Corps, had any input into this suggestion. Management-organizational-process concerns were dismissed-overlooked into-under almost a "commodities" approach to the solution: "we'll procure and install one of them (volunteers) and see if she works."

3. PROJECT PERFORMANCE AND ISSUES

3.1 Progress in Meeting Project Goal and Purpose

(insert the Annotated Logframe from Annex 3-A, revised to fit with the narrative below.)

Figure 3-1 A provides an annotation of the project's Logical Framework. The project goal was "to increase productivity in staple food crops." The evaluation team found no directly verifiable production increase as a result of project activities. National agricultural statistics showed some recent production increases but these could not be directly linked to project activities. This does not mean that project outputs did not

contribute to crop loss reduction and increases in effective production methodologies to document these linkages exist, but are costly for a small mission to implement.

The project purpose was "to strengthen the national Crop Protection Services capability to develop and direct a crop protection program, and implement the ongoing program in crop protection." Following the original and revised "end of project status" indicators, the purpose appears to be achieved:

1. GOGB adoption of IPM strategy/recommendations for each major crop/pest: rice; sorghum/millet; cassava; stored products.

   As stated in section 3.6.1, strategies have been devised for many pest problems of the major food crops and are being followed in the field.

2. Professional linkages exist between CPS and international research institutes.

   As elaborated in section 3.12, the CPS has established strong working and collegial relationships with several international agricultural organizations.

3. CPS coordinates activities with other GOGB entities.

   CPS is a participant in the GOGB Integrated Agricultural Development plan. As described throughout sections 3.2 - 3.12, coordination takes place where feasible.

4. Performance evaluations are carried out.

   CPS has established a system of performance evaluation, but there is no visible evidence that it has been implemented. CPS has designed job descriptions and established a performance evaluation extending to the monitor level, but these are outmoded and need revision.

5. Service receives significant donor support from other than the U.S.

   As described in section 3.11, donors other than A.I.D. have provided considerable support to the project.

6. CPS has competent field staff implementing plans of work successfully.

   CPS staff quality has greatly improved during the life of the project. Section 3.2 provides a detailed assessment of staff capabilities per position.

7. Professionally trained technical departments at work in the CPS.

   Most technical departments benefit from trained staff. Section 3.2 describes such competencies and lack thereof.

8. National awareness of pesticide safety practices.

   As described in section 3.4, "Guinea Bissau still has a way to go in the establishment of a well-rounded pesticide safety program." Applications are to small, isolated crops and the total hectareage has been small.

All project outputs have also been achieved or will be achieved prior to the end of the project.

1. Trained senior technical staff in CPS headquarters.

   1 PHD, 2 MS, and 2 BS from U.S. universities will be completed prior to the PACD.

2. Trained field supervisors in each zone.

   Zone I, II, and III field supervisors hold BS degrees from U.S. universities. The Zone IV position remains vacant.

3. Functionally trained field agents.

   Training sessions are held each year in April for field agents. Many have received training in other nations, i.e. one monitor just returned after 2 years CILSS training in Niger.

4. Extension infrastructure for CPS fully developed.

   CPS has infrastructure to reach the farmer level. CPS coordinates with the extension service where it exists (Zone I), and has initiated relationships with and provided some training for "extension equivalent" personnel.

5. Develop and implement crop protection strategies.

   Crop protection strategies have been developed for major food crops and are being implemented where extension personnel exist.

6. Storage and distribution centers established.

   The project supported the construction of four warehouses to provide improved storage capability for equipment and pesticides at the zonal level. It also provided improved transportation and communications facilities for improved distribution systems.

7. On-farm storage facilities developed.

   The FCP focussed most of its effort toward the reduction of storage losses at the village level. In Zone I, 56 demonstration silos were built, and in Zone II, five demonstration silos were build. As an adjunct to the demonstration phase, the GOGB will provide cement, forms and scaffolding to villagers who are willing to construct their own silos.

The sections that follow elaborate on the operations of the project and the CPS. Section 3.2 describes the current organization and staffing, and, as described in the methodology section, sections 3.3-3.14 cover the functions of the CPS and special interests of the evaluation.

3.2 CPS Organizational Structure

The Crop Protection Service's organization follows conventional line and staff patterns. The central staff, located at CPS headquarters in Bissau, provides backstopping for the field staff. Due to the small size of the organization and its limited numbers of university graduates some staff officers have had to also assume line functions and vice versa. For example, the person responsible for the stored products pests is officially designated as the staff officer for pesticides. In addition, he is presently acting as Deputy Director for field operations. It is anticipated that it will be the end of 1991 before the organization will level out as degree trainees return to assume their assigned positions.

A complete listing of CPS staff is found as Annex F.

3.2.1 Staff Functions

Persons responsible for each staff function report directly to the Director of CPS. A prior position of Deputy Director for Laboratory Support, to whom the staff formerly reported, has been abolished.

Six staff functions were originally envisioned but, due to a lack of expertise on noxious weeds this responsibility has been transferred to research (DEPA). CPS maintains a contact point for noxious weeds within its organization and it continues to maintain its responsibilities for noxious weed surveys and quarantine enforcement.

Small nations usually cannot support specialists in each discipline so do without or double up. Either route subjects them to greater risk than would occur if a full staff were available. In an attempt to mitigate this deficiency A.I.D. has brought the CPS into close association with nearby specialists in most of these disciplines, to assure them a quick response to emergency needs. Each staff function is responsible for the maintenance of its museum reference collection.

The evaluation team assessed staff members as to their functional proficiency by means of interviews, observations of performance and training and educational records. Findings are presented below.

Stored Products Pests - M. Cassama

This officer is also the designated Director of CPS. He is presently studying for his MS at Kansas State University. KSU in its evaluation of Rice Production in Guinea-Bissau suggests that he should be assigned to Stored Products Pests on a full-time basis. The project advisor says current plans call for Mr. Cassama to return as Director of CPS with staff functions for Stored Products Pests. However, given the shortage of well-trained administrators and changing priorities within MDRA, reassignment is always a possibility.

P. Landim, who is presently Acting in this position, is evaluated under his assigned function--Pesticides.

Plant Pathology - Florentine Jose Fernandez

The assigned officer for this staff function could not be evaluated as he is presently working on his Ph.D. at Louisiana State University. He was originally sent to LSU by the FCP to obtain an M.S. level degree, which he completed in December 1989. After several weeks in Bissau he returned to LSU on a grant/scholarship to work on his Ph.D. He initiated this advanced program on his own, since FCP strategy considers Masters level training sufficient for its staff. His prolonged studies provide an immediate problem for the CPS since it will be deprived of his services for a longer time than predicted. It also raises questions about his return. With his advanced degree, he may opt for a research position within or outside the GOGB rather than resuming his former duties.

The Acting in charge, Maria Rosa Ferreira, has a B.Sc. from Timirazev, Russia. She has the technical knowledge and competence to provide basic technical backstopping until Fernandez's return, if no unforeseen emergencies occur.

When fully staffed (Fernandez and Ferreira) it could be the strongest of the CPS staff functions. Particularly, it should be strong in plant viruses, bacteria, fungi, rusts, molds, but may be weak in the non-pathological organisms, nematodes and parasitic

plants, which are also included. Some seminar and consultancy assistance has been provided by the FCP in these disciplines. In nematology, lack of equipment for screening is a problem. (See Annex H, part 4 and 5 for technical backstopping available).

Entomology - Lourenço Abreu

The staff officer for this function could not be evaluated as he is working towards his M.S. at Texas A&M. His backup, Alfesene Balde, has received his B.S. in entomology at the University of Arizona. He lacks adequate field experience as it relates to IPM. In addition to his staff work in entomology he has line responsibility for crop protection in the autonomous capital region (greenbelt vegetable-growing region surrounding Bissau). This provides him with needed field IPM experience, but limits his time available for handling staff responsibilities. This staff function also handles mites and vertebrate pests. On-the-job training has been provided by Denver Wildlife and they now consider Mr. Balde capable of carrying on the work which they had started.

Pesticides - Pedro Landim

The staff officer in charge of this function also has the additional duties of Acting Deputy Director for Field Operations (line function) and Acting in charge of Stored Products pests (staff function). These latter functions distract greatly from his duties in pesticides and pesticide regulation. His education is in Agro-Chemistry from Patrice Lumumba University, which fits well with his assigned staff responsibility. The distraction of his other duties makes it difficult to make a valid assessment of his true capabilities in his assigned field. Draft pesticide legislation is moving very slowly through the government bureaucracy and may be an indication of lack of aggressiveness on his part. Pesticide storage problems also need addressing, but they are not likely to receive attention as he devotes a majority of his efforts towards his other assignments.

Plant Quarantine - Luis Tavares

The staff officer assigned to this function returned to Guinea-Bissau on August 8, 1990, following receipt of his B.S. degree from the University of California at Davis. Prior to his return he received special instruction in the preparation of Plant Quarantine Regulations from a former USDA Plant Quarantine Regional Director. Model regulations have been provided to him and the FAO model is also available. Upon his return he has acted quickly in initiating preparation of a list of quarantinable pests. He has also submitted draft regulations to the CPS Director for consideration. His efforts to date indicate a decisive attitude and desire to get things done. The training he has been afforded by the FCP has been good (University of California and USDA/APHIS) and sufficient to initiate plant quarantine activities, but follow-up technical assistance is desirable to assure implementation without excess regulatory action. FAO has an on-

going technical assistance program in plant quarantine so is the logical organization to provide this technical assistance.

3.2.2 Line Functions

CPS Zone Directors essentially have two bosses. Administratively they are directly responsible to the Director of Agriculture for the zone and are governed in their activities by his priorities. Technologically, they receive instructions from the Director, CPS through the Deputy Director for Field Operations. Zone Directors have no operational budgets (nor does the CPS as a whole) for their zonal activities and must rely strictly on allocations from the CPS Director to enable them to perform their activities (fuel, equipment, salaries, travel expenses, etc.). They are in the unenviable position of having to compete for limited resources on an almost daily basis with all other segments of the CPS in order to meet the demands of the zonal Agricultural Directors. Thus, it can be expected that those with closest access to the CPS Director will be most likely to obtain needed resources.

There are four Zone Director positions, of which three are filled, and a Director Position for the Autonomous Capital Region, which is also filled. Each Zone Director is supported by Regional Officers (monitors). Not all monitor positions are filled. Each monitor is assigned a number of enquadrados, who work directly with the rural farmer. Enquadrados do not receive a monetary salary but are paid for in kind with commodities provided by the World Food Program, when they are available. There are about 200 enquadrado positions overall.

Only the CPS Zonal Directors have been evaluated individually. Monitors and enquadrados were evaluated as a group based on a field sampling of a relatively small number encountered during field visits.

The greater emphasis by the FCP and its predecessor RFCP has been in Entomology. The zone directors, as a whole, are better versed in this discipline than the other crop protection functions, so they are able to operate more independently of staff backstopping in entomology than in the other crop protection disciplines.

Director for Zone I - G. Menout

This officer received a mid-level degree in agriculture in Algeria and at AMDP expense, a B.S., with emphasis on Integrated Pest Management at Colorado State University. Due to his excellent command of English, French and Portuguese, he is often picked to escort visiting consultants. This provides him an advantage over the other zone directors in the increase of his knowledge base. He is keen to learn new techniques and when possible, quickly puts them into practice. He is widely known and accepted by other agricultural officials and even the rural farmers. He thinks clearly and decisively when left to his own devices. He is well qualified for his position and is constantly on the lookout for ways and means to better his position both within and outside the CPS, so he may not remain long with CPS if a better opportunity comes along.

Director for Zone II - D. Tchentckelan

This officer received his B.S. degree from Louisiana State University at AMDP expense, in agronomy with emphasis on IPM. He speaks five languages in addition to the local Crioulo. He has a good command of his zonal operation and a firm hand on his subordinate personnel. He is knowledgeable of the major pest problems within his zone. He is well regarded by the Regional Directors of Agriculture and his counterparts in other governmental agencies and the private sector. He is hampered somewhat by his zone's lack of operable equipment and permanent housing, office and storage facilities, but is innovative enough to make do until the completion and acceptance of new facilities being provided through the project. He appears better adapted to life on the frontier than is the Director of Zone I.

Director for Zone III - C. Varela

This officer has a project-funded B.S. degree from the University of Missouri, with prior education at Tifton, Ga., where he received an associate degree. The evaluators were unable to work with him within his zone, so had to make a value judgment based on a personal interview and the opinion of others. This officer's first action upon receiving this assignment was to reassign his monitors, who were concentrated in Catio, to field locations in each sector. Since there is no extension service in Zone III, his next act was to recruit and train enquadrados to reach the rural farmer level. He has established good relations with DEPA, which provides him with technical support and personnel assistance as needed. Working under extremely difficult conditions of isolation he has established a workable organizational structure. He has a keen interest in Biological Control and was instrumental in introducing and colonizing the cassava mealy bug parasite in Guinea-Bissau.

Director for Zone IV - Vacant

A Fernando Embana has been named for this position but, he is not yet on the rolls of the CPS and no date has yet been set for him to report for duty. Little information could be obtained as to his education, training and technical and managerial backgrounds. He is supposedly a recently returned graduate from Russia and is presently in training in Portugal at the expense of the Portuguese government.

Director for the Autonomous Capital Region - Alfesene Balde

This officer has a BS degree from the University of Arizona. His multiple duties, Acting Staff Entomologist, Staff Officer for Vertebrate Pests and Director of the Capitol Region, dilute his efforts to supply the management and direction desirable for his primary function the director of the capitol region. His interests appear to be more toward his technical staff functions than managerial. This aptitude is apparent from his quick grasp of the techniques required in the continuation of the rodent studies initiated by the Denver Wildlife Center. He will likely be of greater value to the CPS in his technical staff duties as Director of the Autonomous Capitol Region.

Monitors

Most monitors are high school or technical school graduates. A few have received some higher education to the associate degree. All have received practical field application training in many aspects of crop protection, provided by the CPS at the annual April training sessions. Some have received out of country training on specific pests or pest complexes which affect certain food crops. An example is the recent return from two years of training in Niger of a Zone I monitor. His training was sponsored by CILSS. Much of their training has been directed towards chemical pest control and pesticide safety with only minimal exposure to other IPM techniques such as cultural and biological controls. In future training sessions for monitors these latter pest control techniques need emphasis.

Enquadrados

This is the level which reaches to the rural farmer level. Enquadrado training has been almost entirely pointed towards insect control with chemicals. Their training has been principally in the realm of insect survey and detection, the determination of threshold levels which require control, pesticide application and safety. Since the enquadrados live and work with the rural villagers on a daily basis and are considered the village expert on corp protection measures, they have great influence on the direction in which crop protection proceeds in Guinea-Bissau. Their present orientation towards chemical pest control needs an immediate turn-about before the villagers become fully reliant on pesticides for all their crop protection needs. Lacking much in the way of education the enquadrados take their leads from the teachings of their superiors which

appears to have neglected applicable IPM techniques in favor of the more visible and generally more rapid other pest control measures.

Zone III personnel appear to be far more oriented towards IPM than the other Zones. This is likely due to the orientation of the zone director who has a particular interest in biological control and received specialized training in IPM techniques at Purdue, Texas A&M, and the University of Florida in addition to his University of Missouri degree education.

3.3 Pest Survey and Detection

This is undoubtedly the strongest functional area within CPS. Detection surveys conducted jointly with project advisors/consultants enabled the CPS to find, prior to its becoming established throughout the nation, the cassava mealy bug and green spider mite. This provided the time needed to colonize E. lopezi parasites of the mealy bug. Research is still studying the green spider mite, but as yet has not reached a practical solution.

Timely delimiting surveys enabled the CPS to prevent a major grasshopper outbreak from spreading beyond controllable bounds (1987). In the following year (1988) Desert Locusts were detected in time to avert a potential disaster.

Pest population surveys are conducted by CPS on all major crops on a seasonal basis, to provide an alert system to farmers and establish a basis for strategic control planning and action. Annex II provides annual scheduling for CPS employees in Zone II. It includes the timing and duration of scheduled surveys to detect invading locust swarms and grasshopper egg and larval surveys.

Survey personnel (monitors and enquadrados) and their extension service counterparts are reasonably well-versed in most of the survey techniques for the major crop pests of Guinea-Bissau. Weaknesses are most evident in weed science and the detection and identification of nematodes.

Reference collections of the principal pests, insects, weeds and plants showing plant disease symptoms have been established. Although not large as yet, these collections are a good start towards increasing the Service's knowledge of its nation's pests. With the assistance of the Denver Wildlife Research Center, a collection of vertebrate pests has just been established. Denver Wildlife has trained CPS personnel in the identification of rodent habitat, trapping and other collecting methods, identification and the mounting of specimens.

The mid-term evaluation provided lists of the principal pests and diseases known to occur in Guinea-Bissau. There have been no recent additions to those lists.

3.4 Pesticides

3.4.1 Pesticide Regulation

Most, if not all, pesticides in Guinea-Bissau have been received through multilateral and bilateral organizations (A.I.D., Italy, Japan, and the joint provincial-EEC cotton and peanut project). Few, if any, pesticides have been imported by the government or by entrepreneurs. At the present low usage rate the quantity of pesticides within the country could be sufficient for a rather lengthy period. Guinea-Bissau has a history of limited pesticide use, with reliance for crop protection primarily on biological and cultural controls. Thus, Guinea-Bissau is a good example of Integrated Pest Management in action.

Except for the ULV Malathion and Carbaryl-Sevin-4-Oil for emergency locust/grasshopper control, pesticides have not been procured by A.I.D. for project use. Some small quantities for research and demonstration purposes, principally fungicides, have been donated to the CPS by the manufacturers.

The malathion and carbaryl provided by A.I.D. appear fully compatible with the FCP's orientation to IPM, as they are of low mammalian toxicity and as yet there are no effective non-chemical controls available against the pests for which they were intended. The remaining malathion can be effectively used against localized grasshopper outbreaks and some mite problems as organophosphate resistance has not yet occurred.

None of the carbaryl has been used. It is in secure storage and the drums are in good condition, but due to probable degradation, and the complexity of the preparation prior to use, it is not expected to be applied and merits disposal. Jensen (1990) proposed five options for disposal. This evaluation supports her suggested option of returning the pesticide to the manufacturer.

3.4.2 Pesticide Storage

Jensen evaluated four CPS pesticide storage facilities using thirteen basic storage criteria (Table 3-1). The evaluation team visited five additional CPS pesticide storage facilities and graded them using the identical criteria.

Most problem areas found by Jensen at Bachille will be mitigated upon final acceptance of the new pesticide storage facility at Bula. Leaking insecticide at Bissora will be transferred to new drums which were recently purchased by A.I.D. and all pesticides will be transferred to Bula to mitigate the problems at Bissora. Similarly, the problems at Bafata (old storage) will be mitigated upon acceptance of the recently completed new storehouse in Bafata.

The Farim, Sao Domingo and Ingora storage facilities are old multi-use Ministry of Rural Development and Agriculture warehouses. They are basically unsuited for pesticide storage, but are the only structures available. It is doubtful, due to their age and wear and tear, that they can be reconditioned. Mitigation would require new construction.

The steps taken by the project to integrate at a single location (Zone I, Bula) with other agricultural projects, including extension, was good. Providing new staff housing, offices, and pesticide storage has gone a long way towards assuring that the newly-trained staff (Zone Directors) will accept field assignments. It has also demonstrated to the government that pesticide storehouses require special design and construction. Just any old warehouse will not do. As the Table shows, all of the problem locations have not been rectified by the project. Now it is up to the GOGB or other donors to come forward to provide for the still-needed new construction.

3.4.3 Pesticide Legislation

There is no commercial formulation, manufacture, or distribution of agricultural pesticides in Guinea-Bissau. No pesticide legislation presently exists.

Legislation has been drafted by Portuguese specialists, whose lodging was provided by the FCP project/A.I.D. The draft has been reviewed by A.I.D. and USDA and their recommendations have been included in the second draft. The Minister of Agriculture has approved the draft with these amendments and has forwarded it to other Ministries (Commerce, Health) which will be a party to the proposed legislation. Establishment of regulations will follow the enactment of the enabling legislation. Model regulations have been provided by A.I.D. and the CPS has begun the task of drafting regulations. They will need help in the drafting of regulations and their review prior to enactment.

Although no legal authority yet exists, the CPS has begun to regulate the import of pesticides through an informal agreement with donors to restrict importations to those registered by USEPA for the same or similar uses and/or those for which USEPA has an established tolerance on the affected food crop. For pesticides of non-USA manufacture and not registered with USEPA, importation will be limited to those on the FAO list of approved pesticides.

To control pesticide importation by large foreign invested plantations and quasi-government joint ventures, CPS has enlisted the aid of the Ministry of Commerce, and the office of Customs.

3.4.4 Pesticide Container Disposal

Used pesticide containers (metal drums) are a valued item in Guinea-Bissau. Fortunately, due to limited pesticide usage most drums are rusted beyond use by the time all the pesticide is utilized. These empty containers are then returned to the CPS for storage. No provision has yet been made for their eventual disposal. Crushing and burial would appear to be the most logical disposal method. A disposal expert available to select the disposal site and supervise crushing and disposal would be desirable.

According to reports, some 200 metal used pesticide drums recently appeared on the market in Bafata, brought by truck from Senegal. Drums reportedly carried labels of those materials used in the recent locust/grasshopper control program. Since they came from Senegal, they may have been reconditioned in advance of sale, though some reports say that small quantities of pesticides were still in the drums. Many of the drums were supposedly sold to bee keepers for the storage of honey. This could not be confirmed by the evaluation team, but points out the need for quick legislative approval of the pesticides regulation act.

3.4.5 Pesticide Safety

Guinea-Bissau still has a way to go in the establishment of a well-rounded pesticide safety program. It is the weakest link in their activities utilizing pesticides. Spills often occur during the transfer of pesticides from large drums to small containers for field use. Donors should eliminate the shipment of pesticides to Guinea-Bissau in large containers. Their field needs can best be filled through small containers. Small containers, however, are the type most suitable for drinking water jugs so care must be taken to assure destruction and proper disposal following their use. Some worker exposure problems were mitigated by Italy and USAID through their provision of protective clothing, gloves, goggles, etc. However, the numbers available fall far short of need. A.I.D. has provided hand trucks to move large drums to prevent worker injury, pallets to get drums off the floor to reduce drum rusting and leakage, and new, empty drums to replace leaking drums and hand pumps for pesticide transfer. CPS pesticide applicators and warehousemen have been provided training (both formal group training and on-the-job training) in pesticide use and safety practices. Repeat training is provided each year in April in all Regions of each Zone. Training can be credited with preventing any excessive exposure problems among CPS and extension employees, but exposure problems which are reported as common in the autonomous projects such as cotton are presently outside direct CPS control.

3.4.6 Environmental Protection

Most pesticide applications in Guinea-Bissau are to small isolated crops. The exceptions are larger cotton plantings which, to a large extent, are isolated from each other. Only during emergency outbreaks of grasshoppers and locusts has the CPS been

involved in the treatment of larger contiguous areas. Even then the total hectareage has been small.

Treatment of rice paddies provides the greatest environmental hazard due to the plants' close association with water. Most pesticide applications to rice are by the autonomous rice project and remain outside the realm of CPS authority until passage of pesticide legislation. CPS applications to rice are principally to isolated rural paddies for termite control when the paddies are dry.

A clear picture of pesticide use on food crops is shown by total size of the area treated in 1988, which was an unusual year due to the large infestation of Desert locusts and grasshoppers. With a total land area in Guinea-Bissau of 3.612 million hectares, only 5,763 hectares received pesticides, or 0.16%.

3.5 Plant Quarantine

Until now Plant Quarantine has not existed in Guinea-Bissau. No one had been trained in this discipline. The introduction of the cassava mealy bug and greed spider mite point out the need for this service. Some inspections, principally at the port, have been conducted by the officer in charge of the capital region. Occasional fumigations have been made to satisfy the phytosanitary requirements of the importing country. The evaluation team obtained a copy of the type of phytosanitary certificate issued by the CPS (Annex G). CPS did agree that their certificates did not conform to the FAO format.

Since the return from training by the staff officer for this function, development of a list of quarantinable pests has been initiated. Proposed Plant Quarantine legislation has been sent to the Minister (MRDA) for consideration. The P.Q. officer is at a disadvantage in that he lacks an office and laboratories. No provision was made for P.Q. in the design of the primary CPS headquarters office. A separate building is currently being built nearby with funds provided by the GOGB.

The GOGB has never subscribed to the International Plant Protection Convention. The reason given is that until now they have been unable to meet the prescribed IPPC service requirements.

3.6 Crop Protection

Crop Protection is the lifeblood of the CPS organization. It is the most visible of all its functions and therefore receives the most support. It is also the function that can reap the most damage if pest problems are not properly addressed. Crop Protection includes all CPS functions so the field staff require capability in a variety of disciplines with adequate technical backstopping at the headquarters level. The field staff must be provided a means to transfer research technology to practical field operations. The CPS

appears capable of doing an adequate job in most field functions. What they lack can be provided in the annual training programs conducted for field level employees. In special cases such as weed control and nematology training, outside consultants may be needed to conduct seminars and on-site demonstrations.

Guinea-Bissau is fortunate that it has not gotten on the pesticide bandwagon. However, it is headed in that direction if donor nations and organizations continue to bow to its wishes for additional pesticides. As agriculture becomes more intensified (large corporate type agriculture and single crop agriculture as practiced by some projects now in existence), the pressures for expanded pesticide use will intensify. The pesticide use problem is often also exacerbated by the willingness of nations and organizations responding to emergency requests for pesticides as a humanitarian gesture to real or perceived emergencies. After their experience in the last locust/grasshopper outbreak (no accounting of the $188,000 they provided) Sweden has adopted a policy of non-response to emergency requests for assistance.

The A.I.D. FCP project was designed and operated on the assumption that effective crop protection can be achieved with only minimal use of pesticides (IPM). In the five years of operation of the FCP project no funds have been expended for pesticides.

3.6.1 Control

This is the function of crop protection field operations which has seen the most attention. A field force trained in the various components of control is strategically located in all regions of the nation. The rural farmer level is reached through the use of "enquadrados," villagers trained primarily in surveys for crop damage in the principal food crops, the judicious use of pesticides and their safety in use. The enquadrados make the applications of pesticides, when needed, rather than leaving it up to the farmers. The project has provided bicycles for the enquadrados so that they may service more than their own village and have access to their supervisors (monitors). Enquadrados receive their salaries in the form of food for work. The food for work program has been on hold for nine months, but is due to begin again shortly after a long delay in obtaining signatory agreement with the GOGB. Though rather a distasteful program in the eyes of The World Food Program Director in Guinea-Bissau, it enables the CPS to maintain a direct line to the villagers. Otherwise, CPS would have to rely solely on the extension service for farmer-level operations. The extension service is active only in Zones I and II. Crop Protection is but one of a multitude of duties which extensionists have. Crop Protection, when functioning properly, is a highly specialized science rather than the more generalized extension service. CPS personnel must therefore maintain their own farmer-level contact on a daily operational basis.

The CPS field staff's emphasis on pesticide application may be largely attributed to A.I.D.'s original response in 1975 to Guinea-Bissau's request for the development of

brigades of pesticide applicators. A major FCP project role has been to turn this emphasis around and towards the concepts of IPM. This has not been a problem with the educated staff, but for the lower echelon, old habits are harder to change. However, IPM concepts have taken hold in the CPS. Strategies have been devised for many pest problems of the major food crops (millet, corn, sorghum, rice, cassava) and are being followed in the field (see Schedule of Events Annex).

Worldwide, cotton is, in nearly all countries, the crop which receives the largest quantities of pesticides. CPS admits to little or no control over pesticide use on cotton as its production is controlled under a France-Provincial agreement administered directly by the MRDA. Only upon passage of pesticide use legislation will CPS be in a position to assume control.

The CPS has only minimal capabilities for large scale emergency pest control actions involving pesticides. Training has been along IPM lines rather than emergency actions. The CPS lacks equipment, resources and the technical and organizational knowledge, including logistics, necessary for large-scale emergency action, so if emergencies exist, outside assistance will be required.

The CPS claims to subscribe to the use of biological controls wherever possible. This is illustrated by its colonization of the parasite E. lopezi in all the principal cassava production areas for control of the cassava mealy bug. However, it is moving very slowly in the arena of new introductions as the research organization, DEPA, has no capabilities in this field and the CPS lacks facilities for parasite introduction, isolation and screening of potential beneficial species prior to their release. Dr. Jack Drea, USDA/ARS biological control specialist, arrives in September 1990 under FCP sponsorship, to provide guidance for future action.

Dr. Illharco, entomologist, Oeiras, Portugal, has made three trips to Guinea-Bissau under project sponsorship, for the purpose of entomological laboratory organization, assessment of the aphid problems in the greenbelt and identification of species and the production of alternate crops to cassava such as potatoes, due to the many pest problems of cassava.

3.6.2 Stored Products Pests

This is the end product in the chain of events which lead to the project goal of increased food crop production. Although the field control of plant pests, improved cultivation, fertilization, improved varieties, etc., may dramatically improve crop yields, these are of little value if these gains are lost in storage. Estimates of crop losses in Guinea-Bissau vary widely, from a low of 10% to as high as 80% annually. Most estimates concede that the greatest losses, except during pest outbreaks, occur in storage.

The FCP project focused much of its effort toward the reduction of storage losses at the village level. Various specialists were brought in (Dr. V. Wright, KSU; D. Seck, INSA, three visits) to assess the problem and proposed remedial action. In Zone I, 56 demonstration silos have been built in an effort to replace traditional silos in which losses are excessive. Another five silos are yet to be built in Zone II utilizing project funds. As an adjunct to the demonstration phase, the villagers are expected to construct their own silos with cement, forms and training provided by the GOGB. At the very least, farmers would be expected to install rat guards on the legs of their traditional elevated storages.

The project has not taken hold as planned. Various explanations are given, such as lack of credit available to the villagers to finance their construction costs; village mobility (some ethnic groups move often to new locations), and cultural tradition (in the demonstration silos there is no means to separate rice held for marriages from the rest of the family supply). Regional agricultural directors recognize these problems, but note that some of these constraining conditions are changing. Villages are becoming less mobile to protect their traditional territorial rights from being gobbled up by large plantations. An anthropologist found that in cases where some attempt is made to accommodate for traditional storage patterns, the groups may gradually adopt more effective model silos. The Directors advocate continuance of the demonstration phase of the program until completion.

3.6.3 Weeds

Weeds are the major crop pest field problem in Guinea-Bissau, yet no one in the CPS has been specifically trained to a high level of competency in the weed science. In 1990 the project provided the three-week consultancy of P. J. Terry, weed specialist from the U.K., who conducted a seminar on weeds and field-trained CPS staff in Zones I and II on the identification and control of weeds and prepared a report outlining recommendations for future action by GOGB. The CPS claims to be transferring the knowledge gained from Terry to the farmer level, but it will likely be years before any visible results can be expected.

In Guinea-Bissau farm size is related to family size and its ability to weed the cultivations by hand. There is little labor for hire willing to do this job and that which is available is expensive. Some of the new, larger plantations use mechanical cultivation, but the use of herbicides is practically non-existent.

Guinea-Bissau's prospects for increasing food crop production may largely depend on CPS ability to train farmers to undertake effective, early season weed control. Continued technical assistance in this field is required.

3.6.4 Vertebrate Pests

The FCP obtained the services of R. Bruggers, Director of International Programs, Denver Wildlife Research Center, USDA/APHIS during September-October 1987, to evaluate the bird pest problem, including species identification, and recommend measures for control. Various control methods were demonstrated. Ovicides were not recommended because the principal problem species (Qualea and Village Weavers) nest in environmentally sensitive areas. There is little evidence of follow-up by CPS of Dr. Bruggers' visit other than occasional efforts to destroy nests by hand.

In October-December 1989, Wildlife Biologist G. K. LaVoie, from Denver Wildlife, conducted a rodent damage survey to identify the problems for the CPS, determine species and their economic importance, and provide suggestions for their control. LaVoie estimated damage to standing field crops at three percent, but much higher in vegetables.

LaVoie's consultancy was followed in July-August 1990 by Wildlife biologist L. Fielder, who established field plots for further determination of species and damage potential by population density. Training was provided to Alf. Balde, who Fielder now believes is fully capable of carrying on this work on his own.

CPS is following up these latter two consultancies through regularly scheduled observations and population density analysis and a reference collection has been established.

3.7 Adaptation of Research Findings to Field Use

With a complete lack of research capability in crop protection in Guinea-Bissau, the FCP project has assisted the CPS in establishing both a Regional and Global networking system upon which they can call in time of need. Included in the system are FAO, CILLS, the international research centers of ICIPE, IRRI, IITA, ILRISAT, the Denver Wildlife Research Center, ORST OM, OEIRAS, WARDA InterAfrican Phytosanitary Council (OAU), the many universities from which CPS employees have received participant training, and the USDA/APHIS International Programs Area Office at Abidjan, Ivory Coast (Annex I).

Until the return of participant trainees to the staff of CPS they will be short on talent to take basic research findings through the process of field trials, demonstrations and pilot projects. However, it is believed that the talent will be there when all have returned from schooling.

3.8 Quality and Quantity of Training Received

Training was at the same time one of the project's most important elements and its principal means of delivering services. Managers received professional level technical training to help them design project strategies and services, and to coordinate them with domestic and overseas support resources. Other staff members learned how to identify crop protection problems and to determine appropriate measures for dealing with them. Extensionists and other support personnel also received training in basic CPS strategies and service delivery methods. And farmers, the ultimate beneficiaries, also learned basic crop protection strategies. Training was the core of the program.

The comments on training are therefore divided into several sections. One deals with "Who", i.e., the different audiences for training, and discusses measures appropriate for dealing with each of them. For example, training activities addressed at professional staff differ from those suitable for extensionists or farmers.

Another aspect deals with "What." There are two primary content categories of training: 1) technical knowledge, whether at a professional, administrative or direct field delivery level; or 2) administrative, logistical, or support skills required to permit the delivery of that knowledge to farmers.

"Where" the training was delivered required comment because of the limited opportunities for advanced technical or professional studies in GB. Acquiring university or advanced training usually requires overseas study. The type of the training determines "When" it will occur and how long it will last.

Combining all of these elements with the project's funding and monitoring requirements, leads to the use of terms and categories such as short-term domestic, long-term overseas professional, short-term third-country technical, etc. In short, many people learned many things, and many terms help classify how and what they studied. The following comments summarize some of the strategy and results attached to this effort.

3.8.1 "What" Type of Training

The primary area of training was that of technical skills and knowledge related to CPS activities: entomology, phyto pathology, etc. The depth of concentration in these fields depended upon the program's need for these skills, and the trainee's level of responsibility. For example, the non-resident advisor's conviction that crop protection functions require applied rather than basic scientific knowledge means that Master's level studies were sufficient. Program managers studied these areas at the Master's level, both in order to provide basic knowledge to the service and the Ministry, and to be able to serve in a liaison capacity to overseas institutions offering technical support. Discussion of the various levels of technical knowledge, and those acquiring them follows in section 3.7.2.

The secondary content area of training was that of support skills: administrative, logistical, and maintenance capabilities which help the technical specialists train and serve their clients. These skills are in short supply in GB, and employees needed to acquire them. Warehouse organization, installing maintenance and distribution systems, motorcycle repair, and preparing seminar and publicity materials, provide examples of support skills training attended.

3.8.2 "Who" was Trained

While project managers required the most comprehensive level of technical knowledge, almost all CPS employees needed basic information. Position responsibilities at lower levels in the organizational hierarchy necessitated a different balance between purely technical and logistics skills. Following basic technical introductions, staff learned many of these skills on the job.

Supervisory personnel had often attended such training; they therefore had to acquire administrative skills to help them distribute this knowledge to the farmers through the mid and lower level employees they supervised. Mid-level employees also had to coordinate with colleagues in other agricultural groups to help deliver CP services directly to the villages. In some cases they had to train these cooperating employees, either in basic information or related areas such as safety procedures. In others, they modeled direct delivery methods for farmers in the villages.

Almost all of the staff members selected for advanced training successfully completed their degree programs and returned to the country and their positions within the service. This fact indicates that selections were appropriate and support and liaison activities adequate. A report evaluating A.I.D.-funded overseas study indicated that the project's record in this area is very strong. ("A.I.D. Bissau Training Program Evaluation" Labat-Anderson, Inc., December 1989). Participants sponsored by other projects often had difficulty completing their programs and sometimes did not return to GB. While some CPS participants took longer than expected to complete their course work--usually because they required extra time for language training--nearly all of them have returned to the program. The two potential drop-outs include a participant who has extended his program, and whose wife is also overseas, leading to speculation that he might not return. The other is now enrolled in doctoral level studies despite the fact that the agreement he signed with A.I.D. requires him to return upon completing his M.A.

The evaluation team was not able to meet with all those who had received training in logistics and support. Principal contact was with two support specialists, one in the general administration area, and the other in training management and coordination and materials design. Information was gathered through interviews and inspection of their facilities, existing records, and documents prepared upon request. They each had different histories and roles within the program, and disparate learning opportunities.

The training specialist, who had already attended an overseas teacher training program, also benefitted from the mentoring of long and short term expatriate specialists in her area of responsibility. Early in the project, she worked directly with the expatriate agricultural extensionist, both in materials preparation and with the women's gardening groups. In the fall of 1987, she worked with another short-term expatriate specialist who helped her develop an agenda for the annual two-week CPS seminar, and prepare a model for the delivery of mini-programs to village level farmers. She also worked on the design of new training related materials, including a crop protection calendar and series of handbooks. She also attended short-term training in Portugal. She therefore had extensive help and good models for coordinating her training officer responsibilities.

The administration and logistics manager did not receive any formal training until 1988, nor did he have as many mentors or models available. The up-to-date status of the warehouse cardex records, and other administrative and tracking systems can be considered as evidence of effectively applied overseas training. He has accomplished a remarkable amount in a short time. He is also providing regional warehouse personnel in each of the zones with similar training. He would be an excellent candidate for further training in related areas, since his quick to apply and propagate his learning.

3.8.3 "Where" Training Took Place

Training locations ranged from village gardens to CPS facilities to regional and international research institutions and universities. While much of the advanced degree work occurred in traditional university settings, innovative venues and approaches were also used. The non-resident advisor's experience with the positive results of "on-the-job" or apprentice ship type training led him to initiate many of these working visits. In some cases, CPS participants visited research laboratories while already overseas for their long-term studies; in other cases, they made special visits to the facilities offering training. Most of these contacts were intended to create or reinforce links with organizations and individuals who will offer technical support services to CPS in the future.

Several of the technical consultants on TDY were also expected to provide mentoring or tutorial services to designated CPS staff members. In several cases, their contracts specified and allocated time for these mentoring services along with other responsibilities. Due to his familiarity with individual expatriate specialists' capabilities, as well as with the service's basic competency and individual training needs, the non-resident advisor could be an especially effective matchmaker.

3.8.4 Training Materials

Two different categories of materials were produced: those intended for internal CPS staff and extensionist training, and those addressed to farmer clients. While concepts and models for training materials were comprehensive and ambitious, logistics, supply and contractor problems limited their production and delivery. For example, plans

for custom-designed farmer-oriented materials included: a crop protection calendar with a different service-related agricultural theme for each month; a set of basic handbooks geared to minimal literacy levels; and several series of posters. Unfortunately, local systems for supplying and preparing printed materials were just emerging in Bissau. Thus, paper was unavailable, had to be ordered from Dakar and took much longer to arrive than planned. Machines for working with poster size paper were not available. Local graphic artists capable of preparing book and calendar sketches already had their time committed to other donor agencies, etc.

In summary, the project commitment to encourage and develop local resources resulted in long delays and rescheduling. Thus, the calendar appeared only in three out of five years, books which should have been ready in less than one year took three, etc. Meanwhile, farmers expecting next year's calendar or the new book or poster had to wait. So did the CPS' efforts to build a sense of continuous involvement with the farmers. While most of the materials did not or will shortly appear, a sense of project continuity may have been diminished. The possibility of designing simple substitute materials for village use does not seem to have been considered.

The CPS staff also caused some of its own delays in preparing internal training and communications materials. Its ambitious newsletter, the "Bombolon," sometimes suffered the fate of internal newsletters everywhere; contributors didn't turn in their articles on time. However, the newsletter itself is lively and informative, containing a wide range of articles and activity reports, and many illustrations. Additional training materials were brought in directly or translated from other regional crop protection programs. Publications provided to CPS staff are listed as Annex H.

The library, which was criticized by the mid-term evaluation team, still needs improvement. Books are still gathering dust on open shelves, and are borrowed on unlimited and uncontrolled loans. While there is some idea as to which staff member is most likely to have books on a particular subject, no record-keeping exists. A major end-of-project book order has been placed, and there are plans to set up an index card system for tracking publications. Most of the publications ordered are in English, which limits staff access to them. Locating some of the books available in Portuguese or French may have been appropriate. Staff members who do not speak English already complain that they sometimes feel cut off from colleagues and resources and seeing only English language books may further reinforce their impression. It should be noted, however, that the major international technical language is English and the current work on crop protection tends to be in English. See Annex G.

3.8.5 Languages and Training

The non-English speaking staff members' comments introduce an important sub-theme in the training materials and general project operation areas. While almost all of the staff members are multi-lingual and competent in at least one other major training

country language, Portuguese is the only language they have in common. This creates problems of access to expatriate consultants and further training opportunities as well sa to library material. Obviously, staff members speaking the appropriate languages will have disproportionate access to these opportunities, while their colleagues who are equally or perhaps even better qualified in the technical areas but not the languages will be excluded.

The history of G.B.'s political affiliations means that students have received scholarships to study in--and therefore speak the languages of--Portugal, Russia, France, Cuba, and the U.S., Algeria, etc. Some staff members who do not speak English suggested organizing better and more technically oriented English language training so that they can work more effectively with colleagues and consultants. While some basic training has been offered, they claim it is inadequate. The GOGB English language program was canceled due to strained relations between Senegal and the U.K.

3.9 Capability of CPS and/or Extension Service

CPS staff and line officers have had the education and training necessary to take proven techniques that do not require adaptive research (Methods Development) directly to the farmer. However, the techniques must be simple and easily adaptable for incorporation into present rural farming practices for them to be acceptable. The Extension Service, in most instances, lacks this capacity. Sweden plans to concentrate during the next ten years on uplifting extension service capabilities in its demonstration area. The Peace Corps, however, plans to discontinue its agricultural sector participation following the completion of its present commitment due to mounting problems within the extension service which the Director believes completely hampers their ability for progress.

3.10 Involvement of Women in the Program

CPS has employed and trained women professionals and technicians, recruited female expatriate specialists in fields where they are by no means heavily represented, and provided services to women clients. All of these activities were treated as "standard operating procedure" for CPS, and represent a strong though never explicitly stated commitment to women.

The project's direct services to women were most heavily concentrated during the period when a female expatriate extension specialist was on site (1984-86). At this time, she established an outreach effort in the Quaker-sponsored "Greenbelt" project targeting women vegetable growers. Approximately one hundred fifty women gardeners producing vegetables on the State Farm Pessube were organized into four groups. They learned to collaborate with CPS staff, providing information on pest problems and receiving direct CPS services, including surveys, pest identification and pesticide application and safety

usage instruction. Some related assistance, in the form of seeds and small gardening tools, was provided with alternate funds.

Women received additional benefits during the project's early stages. The extensionist trained a female counterpart and together they designed many of the early educational outreach activities with women clients in mind. For example, a 1985 cloth printing and distribution project featured graphics and a message linked to the African cassava mosaic. The two meter pieces were distributed to farmers during training, and later appeared in household decoration and even personal clothing, both likely to be created by women seamstresses. They also designed a carnival act-scenario, where dancers illustrated other CPS messages.

While this direct association was terminated after the expatriate's departure, CPS still works closely with the Bissau region Greenbelt project, and indirectly with other women's gardening groups. For example, it often trains extensionists working with women gardeners. It even invited some of these extensionists to come to the CPS annual seminar and update staff on Greenbelt activities and training needs. Despite this ongoing collaboration, CPS's shift from providing direct to indirect contact and services has not always met the expectations of women accustomed to receiving them. Occasionally, women who once benefitted from CPS assistance, or know of others who did, came to Bissau headquarters and demanded it.

Women involved in similar gardening projects in other regions received more limited services. Since the CPS personnel had to rely on extensionists to alert them to problems, areas without or with limited access to these workers often received very little attention. (Some expatriates working with these groups felt that these services are not always adequate). The apparent neglect was often aggravated by the fact that women tend to do their gardening during the dry season, while the CPS is most active during the rainy season. The impact of fuel shortages, non-functioning vehicles, and other maintenance and supply limitations during the less active season further restricted delivery of services to women gardeners.

A Peace Corps worker associated with two regional Greenbelt projects described how difficult it can be for women to get CPS services during the dry season. She tried during two different dry seasons and from two different regions to reach the CPS people for help with pest problems. Acting on behalf of her village's absent extensionist, she tried to reach one CPS representative for a month and half, but was never able to contact him. Since the women's gardens were all concentrated in one area, the pest problem had a serious impact on all o f them. The women lost kilograms of tomatoes since they could not get CPS help in obtaining fungicides, sprays, or even advice.

In the second region, she was able to contact a CPS worker from a nearby village who was covering for his closer counterpart, temporarily working in Bissau. The back-up representative explained that he was not able to come to the village to help since he

did not have enough gas to travel outside of his immediate area. thus, she learned that CPS service limitations and supply shortages could include not only pest control products but also the gasoline necessary to bring workers to villages. She summarized her concern that women were not getting services by adding that in the two years that she worked with gardeners, she never saw any CPS people delivering services to them. However, she added that CPS people had a good reputation: they were known for working hard during the rainy season and for keeping the keys to their warehouses.

She noted that the CPS was not the only service neglecting women's gardening activities. In her opinion, other service providers also tend to neglect , ignore or discount them, regarding them as a "no priority area." As further evidence of neglect, she described the problem ambitious women gardeners who wanted to expand their operations had in getting seeds. She is surprised that so few seeds are sold or distributed locally. Women who want seeds must often go to Senegal to buy them, and some women who do produce seeds locally prefer to sell them in Senegal for CFA.

Interviews with women in tow villages in Zone I indicated that they had learned basic IPM methods and been visited by CPS staff. They could explain pesticide safety procedures, and complained about not receiving follow-up information on tests and surveys conducted last year.

While CPS has not been operating at full strength in this region, since the zone director is not yet on-site, plans were made for increased cooperation with the Swedish rural development project. These called for pooling each project's materials and expertise, including ideas and experience in gender-appropriate activities. A preliminary meeting during the evaluator's field visit outlined these efforts. Participants included: the CPS Zone I Director, Training Officer and pathologist (the last two are both women), and the Swedish program's female agricultural socio-anthropologist.

Two of the women sent to third countries for short-term training under the project now occupy the key positions of CPS training officer and Directrice of the MDRA library and documentation center. Both women are quite knowledgeable in the agricultural training and materials production field, and could be invaluable resources to other projects conducting similar activities. As of the PACD, the training officer planned to coordinate CPS programs and capabilities with those of the Swedish Integrated Rural Development Program in Zone I.

3.11 Efforts to Identify and Secure Other Donor Support

Donors other than A.I.D. have provided considerable support to the project, principally in the form of commodities and access to training. Commodities donated include vehicles, pesticides and materials related to their application. The most typical training opportunity was attendance at overseas technical seminars. Annex J gives details of commodities and technical contributions by A.I.D. and other donors.

The concern as of the PACD is whether or not CPS will be able to maintain the support it has received, and attract additional contributions. It appears that most donations to date either originated in areas of obvious and mutual donor-CPS benefit, and/or were initiated by the non-resident advisor. Swedish vehicle donations are an example of the first category. The CPS cooperated directly with the Swedish sponsored Integrated Rural Development program at Bula, training its extension workers to serve farmers. Donated vehicles obviously benefit Swedish farmer clients because they help CPS workers reach their villages.

The extensive technical and training exchanges illustrate the second case. Several of the European- and American-based research institutions are planning to continue consulting and training assistance. Their African counterparts also want to continue their involvement. The non-resident advisor's connections and conviction that forging regional links is important generated the close collaboration with these institutions. Equally important was his persistence in meeting the bureaucratic and financial challenges of bringing representatives from one African based organization to another. The advisor cautions, however, that the CPS needs to formally request assistance from overseas institutions and follow up on the necessary administrative procedures.

While the first category of donations may continue, provided that certain administrative procedures are followed, the second is more problematic. The Swedes can be reassured that their donated equipment is being effectively used, especially now that maintenance and record-keeping procedures have improved. However, working with regional research organizations requires writing sufficient lead time; finding the funds to support field visits and occasionally per diem; and tending to the necessary follow-up reporting and paper work. Even the experienced advisor sometimes lost patience with this administrative detail. The CPS staff will need to rely upon its planning and logistics skills in order to continue this activity.

Even more problematic is the matter of obtaining future support. There are one or two potentially promising initiatives for obtaining donor assistance. The FAO, which has already provided some help, is especially interested in plant quarantine storage efforts. Initial discussions regarding support in this and perhaps other areas will be followed by a consulting team's visit in November or December.

Since the CPS is well-trained in storage, and has already conducted demonstration field trials, it is ready to expand its activities. FAO support would enable it to do so. The German GTZ is interested in biocontrol matters and has been approached for support in this area. Japan has reportedly offered several vehicles and the spare parts required to keep them in working order. Additional vehicles would greatly reinforce CPS capacity to serve its farmer clients.

Identifying and soliciting new areas of potential donor assistance is far more speculative. The strategic planning, marketing, and negotiating skills required to do so

are in short supply. The resident advisor described his staff coaching sessions before a meeting with a major donor. The staff had originally come to him with a "wish list" of commodities and related assistance. He encouraged them to add a rationale and some budget and other supporting figures, and spent a day or two coaching them on how to present their information. However, at the donor meeting, the staff offered only its wish list. This situation is far from uncommon in GB. The Galli paper indicates that donors are accustomed to, and frustrated by, similar behavior at all government levels.

Given this low level of familiarity with the techniques and assumptions involved in presenting requests to donors, more than short-term coaching is required to overcome it. Consistent practice, gained through de-briefing of internal activities and consistent exposure to role models, is necessary. The CPS had neither. Again, emphasizing the acquisition of managerial as well as technical skills may have left the staff better prepared to deal with donors.

3.12 Linkages with External Organizations

The CPS has established strong working and collegial relationships with several international agricultural organizations. Although instituting a minimal number of connections was necessary in order to train staff and provide support services, CPS relationships definitely exceed the minimum. The USDA advisor's long association with African crop protection programs and with agricultural training methods has helped him design a solid cooperative model for the service. He has selected researchers with attention to their organizational affiliation and training ability as well as to their technical skills. Thus, he has assured that project researchers consulting in GB not only provide technical expertise, but also collaborate with and help train designated CPS counterparts.

Initiating specific collaborative relationships is one of many steps taken to encourage the maintenance of organizational linkages following PACD. Concentrating on regional African research institutes is another. The International Institute of Tropical Agriculture (IITA) and the International Center for Insect Ecology and Physiology (ICIPE) in Kenya, and the West African Rice Development Association (WARDA) in Cote d'Ivoire, have all worked with the service. Additionally, the International Crops Research Institute for the Semi-Arid Tropical (ICRISAT) in India, through its Sahelian Center in Niger, has contributed to the research visits of the CPS plant pathologist and sent one of its own pathologists to GB.

The most comprehensive relationships have been established with IITA, which has provided training, sent staff on technical visits, and initiated a joint program on the cassava mealy bug. Cooperation with WARDA has been less productive as exchanges have been interrupted during the past two years because of the Association's administrative and related difficulties. Nonetheless, some CPS staff have trained at WARDA facilities and working relationships have recently been re-established.

Two European-based organizations have also assisted the service. In Portugal, the Instituto Nacional de Investigacao Agraria, Estacao Agronomica Nacional (FAN), has sponsored many exchange and training visits for CPS staff. Dr. J. Ferraz, head of the EAN Plant Pathology Department, and Dr. Ilharco, a pathologist, have been engaged in these activities. The French-sponsored Office de Recherche et Technique d'Outre-Mer (ORSTOM), has a laboratory in Dakar, which has assisted the CPS with plant nematode surveys and training for a CPS pathologist. The three-month program will take place both in Dakar and Montpellier, France.

The United States department of Agriculture Agricultural Research station Biological Control Unit (Beltsville, Maryland, USA) recently introduced its facilities and training capabilities to a CPS staff member learning about biocontrol. Dr. Jack Drea, who coordinated his visit to the Beltsville headquarters and the BioControl Introduction Laboratory (Newark, Delaware), visited GB for two weeks in September.

While the existing relationships and accomplishments are impressive, maintaining them will require considerable CPS initiative and some external funding. Many of these organizations have formal service and visit request procedures, and require lead time for planning activities. The CPS will need to persist and comply with both external and administrative requirements to continue these exchanges. (More detailed information on these relationships is contained in Annex I).

3.13 Vehicle and Equipment Maintenance and Repair

CPS maintains a small vehicle maintenance and repair facility within a secure compound at Bissau. The facilities are only adequate for minor maintenance (washing, lubrication, oil change, tire change, brake realigning, etc.). Repair facilities and equipment are sufficient for only minor repairs. Major repairs must be done at the Ministry facilities. Some maintenance and repair of equipment has been provided by A.I.D. through the project (washrack, motorcycle platform jack, battery water distillation equipment, etc.). CPS has standardized on Toyota, 4-wheel drive, diesel powered passenger carrying vehicles and pickup trucks for senior line and staff officers. Monitors utilize Honda motorcycles (trail bikes). Three load carrying vehicles, gifts of Sweden and France, and in good condition, are utilized for the transportation of materials and equipment to the field.

For most vehicular equipment provided by donors, spare parts were lacking. In order to maintain some semblance of operations the CPS has had to cannibalize some vehicular equipment in order to keep a few operable. For instance, in Zone II, which has been allocated nine motorcycles, six have been cannibalized for parts. In the four regions of Zone II, only three have any means of mobility. Zone III is completely lacking in motorized vehicular transportation, so the Zone Director is temporarily assigned to the CPS headquarters.

The CPS attempts to assure adequate and timely vehicular maintenance and repair, but too often it appears to be unsuccessful. Bad roads, particularly during the rainy season, lack of skilled mechanics in the more remote locations, and lack of provision of spare parts contribute to the problem. All FCP-provided vehicles carry a log book for a record of main maintenance and fuel consumption. The evaluation team made a check of several vehicle log books and found them in order and up to date.

The evaluation team believes there is a need for an analysis of CPS vehicular requirements to determine if smaller, more efficient and more economical equipment would suffice. Given Guinea-Bissau's perennial fuel problem, this should be a priority in advance of additional donor assistance to the CPS vehicular fleet. It also recommends that some of the funds still remaining at PACD be designated for the purchase of spare parts.

3.14 Procurement

All documents and comments confirmed the excessive proportions and weight of procurement activities under the project. Project-related notes illustrate the high activity costs for submitting forms and tracing their progress. CPS staff were very frustrated with the long delays, whether brought about the suppliers and contractors, or by the A.I.D. administrative procedures and structure.

A.I.D. staffers were equally annoyed at the project's procurement demands. When asked for comparisons with other ongoing projects, the Mission Director called the demands "inordinate." Several staffers noted that the technical advisor's periodic absences further complicated the problem. Requests which were in process when he left were often put on hold and had to be resurrected when he returned.

This procurement burden compounds the constraints already posed by GB's economic and trade systems, and the scarcity of "routine" supplies on the local market. Local entrepreneurs were often ill-equipped to deal with A.I.D.'s forms, bidding procedures and long payment delays. Some entrepreneurs put themselves at considerable risk while awaiting payments which were long in coming. A few suppliers eventually refused to provide materials unless they were paid in advance.

While both OAR/Bissau and the CPS staff had to deal with these frustrations, AID was far more capable of doing so. For its staff, the paperwork, no matter how cumbersome, was still "standard operating procedure." However, CPS staff were learning A.I.D. regulations along with the primary lesson that no procurement could occur without following specific procedures. A shortage of operating funds necessary to buy even the basic supplies partially explained the absence of procurement forms, regulations, or even the concept itself. The non-resident advisor related that when he asked staff about how they had previously ordered materials, they said they relied on personal contacts within

the Ministry to supply them, one even mentioning that he had asked the Minister for pencils.

However, the most serious consequence of the procurement burden may have been the administrative models acquired during its implementation. The CPS staff's lack of management experience and the lack of a full time advisor left them without a management model. They had to look to the A.I.D. employees to fill a management vacuum. Though A.I.D. employees may not have been aware of their role as agents in the transfer of management skills, they nonetheless filled that function. They may have even played their management model role too well. So much time was spent on activities and dialogue relating to procurement that the CPS staff may have received the impression that "procurement equals management." They were so absorbed by the "doing" aspects of procurement that they had little time to do much management planning or analysis. Moreover, their interaction with A.I.D. staff provided neither an impetus to or a model for doing so.

The advisor's absences further aggravated this emphasis on procurement activity. Each of his trips was preceded by a speed-up in and followed by checking the status of items on order. Thus, it is not surprising that A.I.D. staff connected-linked his trips with procurement problems. Some of them felt that the part-time status "caused" the overload problems.

This situation led to tension between the CPS and A.I.D. staff regarding procurement. When the advisor was away, Mission staff would often try to put off CPS personnel inquiring about orders by telling them that nothing could be done until the advisor returned. Alternatively, they gave conflicting reports and excuses, leaving the CPS staff wondering whether or not they knew their jobs.

A.I.D. personnel offered an equally bleak picture of CPS staff incompetence. They claimed that CPS people did not know or follow A.I.d. procedures; e.g., they made it difficult to trace problem items by not keeping copies of their order-processing documents. Since the project was dependent upon the Mission for ordering even small items such as pens, procurement activity was especially heavy. Moreover, CPS staff did not become experts in procurement planning. Even though they tried to make up lists of what they need for the year, they often ran out of supplies or omitted items. Near the project's end, they stocked up on items because they knew they would not receive any more.

The fact that A.I.D. procurement procedures are so slow did not help. Staff usually waited a month before cabling to Abidjan or Dakar to check on the progress of an order. Shipments were often delayed. It took five months for auto parts to arrive from Bonn. Payments could be slow. Some local suppliers risked losing their businesses while awaiting payment. The food supplier for the April training seminar had to wait four months to be paid for his $4,000 order.

Moreover, the GOGB provided no support to CPS staff involved in procurement. For example, the administrative officer responsible for supplies and procurement had no access to a car to help him handle his work. He had to ask others to do the errands for him. The fact that the telephone was often out of order further complicated his tasks.

This low level of Ministry-GOGB support highlights one of the primary constraints on the project. The government could provide neither the resources nor the infrastructure required for management.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The CPS Project has made major accomplishments despite the difficult operating conditions in Guinea Bissau, intermittent support from its USDA-PASA advisors, and reduced oversight and administrative assistance from A.I.D. At project completion, most of the major outputs had been accomplished: personnel are trained, planned construction is finished or nearing completion, vehicles and other equipment have been purchased, and farmers are receiving crop protection services. Thus, the foundations for a solid program exist. The purpose objectives were met and detailed investigation could yield linkages to goal achievement.

However, the sustainability of the CPS is in question. Several factors contribute to this situation. Most important is that of continued financial support. A.I.D. funding is ending and the GOGB has not explained how or whether it will assume recurrent costs. While talks have been initiated with one or two international organizations which may contribute to specific project components, no major donor has been identified to date.

The matter of uncertain financial support strongly influences the second factor: maintaining CPS's capacity to provide direct services to farmers. Without continued funding, the delivery infrastructure is threatened. Vehicles, fuel, facilities, and office supplies have all been supplied by project funds. While the personnel may still be paid by the government, they would not be able to provide any IPM services without ongoing operations support. The fact that Guinea Bissau lacks a national extension service means that no existing back-up system can reliably substitute for the CPS' farmer contact activities. Only the two zones participating in other donor funded development programs could still get crop protection assistance while others would have to do without it.

The third factor, maintaining liaison to regional and international agricultural organizations, also depends partially upon continued funding. While the CPS can now provide some basic services to farmers, it is not yet capable of dealing with new or emergency situations internally or incorporating research findings developed externally unless it maintains these organizational contacts. Again, some external assistance is required, particularly in the case of regional African organizations. This factor is all the

more important given the strong networking system and training relationships which the advisor has so carefully established.

The last factor, managerial and administrative aspects, deals with the staff's ability to coordinate and administer the three preceding elements under working and economic conditions which are likely to remain challenging in the near future. Since so many of the managerial personnel are just returning from overseas training, they are still forming the CPS' operating style and procedures. Withdrawing support now would have a serious impact upon their ability to maintain services and perhaps sustain their organization during what is bound to be a turbulent adjustment period.

4.2 Recommendations

General Recommendations

1. That the Government of Guinea-Bissau recognize the importance to maintaining consistent crop protection and related services--both to its farmers and to its emerging agricultural export trade--and therefore assume full administrative and fiscal responsibility for the CPS.

2. That A.I.D., despite its withdrawal of direct financial support, nonetheless continue to maintain some level of oversight and concern for the CPS, especially regarding:

    a. the identification of potential donors

    b. continuing access to A.I.D.-sponsored opportunities for consulting services and professional training and development opportunities such as study tours under HRDA.

3. That the Ministry of Agriculture (MDRA), in conjunction with other responsible parties (including A.I.D.) make a concentrated effort to identify other donor organizations to support either the entire CPS service or some of its specific functions with the view to gradually assuming recurrent costs over time.

The evaluation team recognizes that there may be both ideal and realistic levels of potential donor support. The advisor and CPS staff have already targeted several service functions which correspond to individual donor priority areas, e.g., the FAO and Plant Quarantine. They have approached several of these organizations for assistance and some have expressed initial interest. However, the team is concerned that while specific technical functions may receive support, the overall CPS organization may still not get help reinforcing its emerging managerial skills. It therefore recommends that if only

critical target area support is possible, that "managerial capacity" also be recognized as an essential function meriting donor assistance.

Internal CPS Recommendations

1. That the CPS establish an adaptive/applied research capability within its organization. Without such a capability, it will show little, if any, progress in transferring new IPM developed technology into its service repertoire.

Since Guinea Bissau has only basic agronomic research capabilities, the CPS cannot readily incorporate new IPM developed technology into its present control practices. Its geographic isolation hampers immediate access to those international research centers which provide it with essential technical support services. Therefore the team also recommends:

2. That the CPS maintain and reinforce its links with the regional and international agricultural research and training organizations which have been providing support. This will require that either the organizations themselves, or donors provide the funding required to assure the delivery of these services.

The advisor's long experience with regional and international organizations, individuals, and cooperative relationships has helped him establish a network which can serve as a model to other emerging agricultural service delivery groups. However, the CPS can maintain its relationships with these organizations, particularly with regional ones, only by obtaining external funding. Encouraging relationships with these institutions can increase opportunities for regional specialists to apply their expertise and thereby strengthen technical support networks.

3. That the CPS, in cooperation, with the GOGB encourage the field testing of new IPM technology which may be developed elsewhere, but is applicable for the principal food crops of Guinea-Bissau. The relatively minor use of pesticides within the country makes it a choice location for proving field applicability of research findings.

4. That the service emphasize a full farming systems approach to crop protection. Establishing this approach requires both additional support from the MDRA and a refocusing of CPS farmer education philosophy and activities.

5. That the CPS reinforce its links with and services to its ultimate clients, village farmers. It must develop strategies for working with regions which have no extensionists and improve its coordination with and support for extension personnel.

6. That CPS training and outreach activities be redirected toward maintaining continuous and consistent contact with farmer clients and those who help them. Target groups for these services are extensionists in those areas where they are working (e.g.,

Zone I), and those providing similar services in other regions. Examples of these efforts include:

- Designing, producing and distributing less complex more simple educational materials; posters, brochures, etc. Distributing new and previously produced materials on a more frequent and predictable basis (i.e., calendars should appear every year).

- Providing frequent, short-term training in villages and regional centers to accommodate for rapid turnover in or lack of extension personnel, transportation problems, etc.

7. That further staff training be provided in areas designated as high priority and to individuals considered most likely to benefit from it. These areas and individuals include but should not be limited to:

a. Managerial Training: Formal courses or on-the-job mentoring opportunities for technical staff with supervisory responsibilities.

Many sections of the evaluation indicate that CPS staff exposure to improved managerial skills was limited. Additionally, the only short-term management training course was offered in 1985. The two CPS participants left for overseas shortly after completing this course and it is doubtful whether they or the service has been able to benefit from their training.

b. Administrative Training: Advanced administrative training for the incumbent manager, M. Quintino, who has demonstrated his exceptional capability for transferring his skills throughout the organization.

c. Language Training: English language training for professional technical and administrative staff.

8. A considerable portion of unobligated project funds remaining can best be utilized in purchasing the vehicles (pick-up trucks and motorcycle parts) necessary to provide operational mobility during the next cropping season.

4.3 The Future of Crop Protection in Guinea Bissau

Crop protection is an essential government service. It cannot be conducted by the private sector, nor by the individual provinces lacking national government participation. A nation's agricultural products for export must be certified by skilled agents who are authorized by the national government that the product is free of dangerous agricultural pests and diseases. Likewise, in order to grow and diversify, a nation's agriculture must be protected by the national government from the accidental or deliberate introduction of

exotic insects, weeds and plant and animal diseases through import regulations, port, border and field inspection and eradication.

National governments have an obligation to: assist the nation's farmers in the control of emergency pest outbreaks; demonstrate new and improved pest control techniques; conduct surveys to keep abreast of pest population levels and alert farmers to potential problems and problem areas; maintain liaison with other crop protection services and international crop protection organizations to keep current on worldwide agricultural import regulations and worldwide agricultural pest control actions and their coordination; the regulation of manufacture, import, sale and distribution of toxic agricultural chemicals and biological organisms and the development of safety standards for their use.

A nation's food and fiber supply is dependent upon a strong, well-trained national government crop protection service. Guinea Bissau has such service. The ability of Guinea Bissau to reach its goal of food self-sufficiency will largely depend on its willingness to provide support to its crop protection service.

ANNEXES

LOGICAL FRAMEWORK

FOOD CROP PROTECTION III
(657-0012)

LOP Funding: $1,250,000
PACD: 10/30/90

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Outputs 1. Trained senior technical staff in CPS headquarters. 2. Trained field supervisors in each zone. 3. Functionally trained field agents. 4. Extension infrastructure for Crop Protection Service fully developed. 5. Develop and implement draft crop protection strategies.	1. 3 Masters degrees (U.S.), 2 Bachelors degrees (U.S.). 2. 2 Associate degrees in Brazil or Portugal. 3. Training plan for in-country training and extension plan. 4. Organigram for CPS. 5. Competency guidelines developed for field agents. 6. Job descriptions exist for all positions & functional performance evaluation system. 7. IPM recommendations generated and are implemented by field agents.	1. Training reports. 2. Project Implementation Reports.	1. Trained staff will return to Bissau & be assigned to serve. 2. Field agents can meet minimum standards for certification. 3. Vehicles remain in good working order.
Inputs (See Cost Estimate for Breakdown) U.S. - TA $ 350,000 Training 350,000 Commodities 550,000 $1,250,000 GOGB - Salaries $420,000 Fuel 150,000 Office space/ utilities 300,000 $870,000 Other Donors $690,000 Total Project $2,810,000			1. U.S. assistance is timely & is obligated according to schedule. 2. GOGB continues to provide employment in service at present levels. 3. Crop Protection Service will obtain continued & increasing other donor assistance.

ORIGINAL LOGICAL FRAMEWORK

FOOD CROP PROTECTION III
(657-0012)

LOP Funding: $1,250,000
PACD: 10/30/90

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Goal: To increase productivity in staple food crops.	Increased production of cereal and tuber crops due to reduced losses to pre- and post-harvest pests.	1. National agriculture statistics. 2. Food aid imports.	1. National agricultural policy reforms continue & increased incentives to produce are realized. 2. No catastrophic natural events affect agriculture.
Purpose To strengthen the National Crop Protection Services' capability to develop and direct a crop protection program, and to implement the on-going program in crop protection ministry departments.	EOPS 1. GOGB adoption of IPM strategy/recommendations for each major crop/pest: *Rice *Sorghum/Millet *Cassava *Stored Products 2. Professional linkages exist between CPS & International research institutes. 3. CPS coordinates activities with other 4. Performance evaluations 5. Service receives significant donor support from other than the U.S. 6. CPS has competent field staff implementing plans of work successfully.	1. Research results. 2. Evaluation reports. 3. Government reports. 4. Reports of international research institutes. 5. Donor documentation. 6. Trip reports.	1. Crop protection through IPM is an effective & economic means of reducing crop loss. 2. IPM research will provide new information applicable to GB agriculture. 3. AID and GOGB develop and maintain strategy for addressing recurrent costs.

AMENDED LOGICAL FRAMEWORK

FOOD CROP PROTECTION III
(657-0012)

LOP Funding: $2,250,000
PACD: 09/30/90

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Goal: Same	Same	Same	Same
Purpose: Same	EOPS: ADD: - Professionally trained Technical Departments at work in the CPS. - National awareness of pesticide safety practices.	ADD: - Site inspections. - National media and regulations regarding pesticides.	Same
Outputs: - Storage and Distribution Centers. - Special Projects-A series of research, policy analyses and educational exercises. - On-farm Storage Facilities	ADD: - Two Zone Bases, two Warehouses, on-farm storage facilities built. - Studies and other documents issued.	ADD: - Consulting engineer's reports. - Site inspections.	Same
Inputs: US: Construction $ 300,000 Goods 215,000 Services 355,000 Oversight 130,000 $1,000,000	AID-records.		Same

ANNOTATED PROJECT LOG FRAME: COMPLETED ACTIVITIES

Goal: To increase productivity in staple food crops	**Measures:** The project is designed to reduce crop losses rather than increase productivity while these two are linked. There is no verifiable production increase as a result of project activities. National agriculture statistics show recent production increases but, food aid requirements increase at a proportionately greater rate than the population increase.	**Assumptions:** 1. National agricultural policy reforms continue and increased incentives to produce are realized. 2. No catastrophic natural events affect agriculture.
Purpose: Strengthen the national Crop Protection Services capability to develop and direct a crop protection program, and implement the ongoing program in crop protection.	1. CPS is a participant in the GOGB Integrated Agricultural Development plan. Professional linkages have been established between the CPS and many regional and international research organizations. 2. Simple plans of work are prepared and work is basically carried out as planned where necessary equipment and materials are available (see constraints). 3. Educationally and training wise the staff is competent for each of the CPS's fields of endeavor. 4. CPS has established a system of performance evaluation but, there is no visible evidence that it has been implemented. CPS has designed job descriptions and established a performance evalution extending to the monitor level. There is no evidence that the performance appraisal system has been implemented.	1. Crop Protection through 1 p.m. is an effective and economic means of reducing crop loss. 2. IPM research will provide new information applicable to GB agriculture. 3. A.I.D. and GOGB develop and maintain strategy for addressing recurrent costs.
Outputs: 1. Trained senior technical staff in CPS headquarters. 2. Trained field supervisors in each zone. 3. Functionally trained Field Agents. 4. Extension Infrastructure for Crop Protection.	1 PhD, 2 MS and 2 BS from U.S. universities (not all yet completed), 3 BS degrees from U.S. universities. Zone IV position remains vacant though a candidate named., Training sessions held each year in April for field agents. Many have received training in other nations, i.e., one monitor just returning after 2 years. CILLS training in Niger., CPS has infrastructure to reach farmer level. CPS coordinates with Extension Service where it exists (Zone I), and has initiated relationships with and provided some training for "extension equivalent" personnel.	1. Trained staff will return to Bissau and be assigned to serve. 2. Field agents can meet minimum standards for certification. 3. Vehicles remain in good workin order.

ANNEX B

ARTICLE I - BACKGROUND

The Food Crop Protection Project (657-0012) was authorized on August 23, 1985 with an obligated amount of $1,250,000 and a project completion date (PACD) of August 30, 1990. It was designed as a follow-on activity to two Sahel regional food crop protection projects (625-0928 and 625-0916) including a bilateral project (657-0007) which provided approximately $1.8 million in Guinea Bissau for participant training, laboratory construction, technical assistance and commodities. These initial efforts were made in response to the Government of Guinea-Bissau's (GOGB) request for assistance in organizing and training brigades of workers to deal with national pest problems. It was also an early effort to establish a crop protection capability within the Ministry of Rural Development.

The current project was subsequently initiated with the following stated purpose: "to strengthen the National Crop Protection Service's (CPS) capability to develop and direct a crop protection program and continue to implement the on-going program in Crop Protection based on Integrated Pest Management Strategies." Toward these purposes, the project envisioned inputs of technical assistance ($350,000), training ($350,000) and commodities ($350,000). Designed outputs were 1) trained senior technical staff in CPS headquarters, 2) trained field supervisors in each zone, 3) functionally trained field agents, 4) extension infrastructure for the CPS and, 5) development and implementation of draft crop protection strategies.

By the end of the project, the design also envisioned the GOGB's adoption of an integrated pest management strategy for each major food crop, the establishment of professional linkages between CPS and international research institutes, the capability of CPS to coordinate crop protection activities with other Ministry departments, the development of a competent staff to implement work and, finally, the existence of significant non-U.S. donor support.

For a complete description of the project see the Guinea-Bissau Food Crop Protection III (657-0012) Project Paper (PP) dated August 23, 1985 and the Project Grant Agreement dated August 26, 1985.

In February 1988, a mid-term evaluation was completed. It noted that the project "made significant contributions to the headquarters and senior technical and administrative staff...." It also noted, however, that the project had "not emphasized fulfilling rural farmer level crop protection needs", resulting

in a "centralized government agency that continues to be in need of basic facilities in the four zones...." The evaluation expressed particular concern with the over-reliance of the CPS on pesticide usage rather than biological control and more integrated pest management practices. Inadequate chemical storage facilities, untrained pesticide use and the lack of a relevant GOGB pesticide policy were identified as shortcomings of the project.

The other main concern of the mid-term evaluation was the necessity of developing a more rural-based approach by the CPS to promote the desired increases in food productivity. (for more information see the February, 1988 project evaluation done by the International Science and Technology Institute, Inc.)

Subsequent to the mid-term evaluation, a PP supplement was authorized on August 5, 1988, adding $1,000,000 to the project and reorienting activities to address project needs identified in the evaluation. In this PP supplement, A.I.D. agreed with the mid-term evaluation's concern regarding pesticide usage and the lack of a CPS outreach or extension capability; A.I.D. criticized the report for its failure to include any type of "cost benefit relationships regarding pesticide use." However, the decision was made to augment A.I.D. funding to the project with the 9/30/90 PACD in an attempt to address the shortcomings identified in the evaluation.

These additional activities were expressed in the PP supplement budget as follows: construction ($350,000), commodities including vehicles, and their spare parts, training materials, office supplies, storage and safety equipment and reference works ($240,000), technical assistance services ($380,000) and audit and evaluation reports ($30,000). Since the signature of amendment 2 under the Project Grant Agreement on August 23, 1988, construction has almost been completed on the regional CPS Facilities in Bafata, Bula, Catio, Bissau and Bolama; technical assistance has been provided in stored products techniques, plant quarantine mechanisms, pesticide legislation procedures, plant pathology, entomology, vertebrate pests and survey procedures. Future technical assistance shall be provided in the areas of biological control and weeds.

Commodities including vehicles and spare parts, training materials and warehouse/office maintenance supplies have been provided. Long short term training activities have continued in the project's targeted technical areas. The PACD was also extended until July 31, 1991 to permit the graduation of the CPS Director from his masters degree program at Kansas State University. All other project activities are scheduled to conclude on September 30, 1990.

Progress in meeting the original and amended project outputs has been steady but inconsistent; even though the PP Supplement called for a long-term USDA project manager, an inexplicable shift to semi-monthly visits was made early in the project. Because of OAR/Bissau staff constraints, this small mission's (2 U.S. Direct Hire) ability to effectively administer yet another management intensive project has hindered further progress. (for more complete background information see the Food Crop Protection III Project Paper Supplement dated August 5, 1988 and Amendment Number 2 to the title project Grant Agreement).

ARTICLE II - TITLE OF PROJECT TO BE EVALUATED

Guinea Bissau Food Crop Protection III Project
PROJECT NUMBER: (657-0012)

ARTICLE III - OBJECTIVE

The purpose of this evaluation is to conduct a final impact study of the Food Crop Protection activity and to determine the extent of project success in meeting its stated goal (Increasing productivity in staple food crops) and purposes (strengthening the CPS capacity to develop and direct a crop protection program and to implement and on-going program in crop protection).

The evaluation shall make a general assessment of the impact of the project and examine if project objectives were met. The evaluation shall also make recommendations on the necessary step that the GOGB will need to take to strengthen the CPS institutional capability in the years to come.

ARTICLE IV - STATEMENT OF WORK

A. General

The evaluation team shall consist of an Evaluation Specialist and a Plant Protection Specialist, both as described below. The team of specialists shall conduct an initial document and interview review for a <u>total</u> of two days prior to their Guinea Bissau field work. The team shall use existing project development documentation, reports and other available data to understand the program environment. Once in the country, the team shall initiate field work and conduct interviews and reviews with project and GOGB counterparts.

B. Evaluation Topics

The final evaluation shall draw upon any available baseline surveys of pest problems in traditional agriculture, as well as crop loss assessments, and will focus on the project's accomplishment of outputs, achievement of purpose and contribution to the attainment of the goal. The evaluation shall also assess the kind and degree of impact that the project has had - and will continue to have - on the CPS's national approaches to reducing plant pests and on the rural population of the country. Any measurable change in agricultural production or harvest losses must be examined for linkages to CPS services. The evaluation shall also review the progress made in addressing the problems raised by the mid-term evaluation, particularly involving the national use of pesticides and the rural extension capability of the CPS.

Of particular interest are the following issues:

1. Planning and management capability of the CPS senior staff: examples of clear objectives and logical planning to implement the mandate of the service should be evident as should the extension of these skills to other personnel through in-service training.

2. Performance of field agents: guidelines and job descriptions should be complete and a performance evaluation system should be ready if not activated.

3. CPS support services for field operations: to include operational state of the vehicle fleet (examples of responsible use and care of vehicles should be noted) and CPS control of non-expendable equipment.

4. Accomplishments in national strategies for crops/pests: at least one strategy should be implemented on a country-wide basis, and all others drafted.

5. Efforts to involve women should be evident.

6. Degree to which other ministry departments have cooperated in field operation should be explored.

7. Existing examples of other donor support already provided should be noted as well as the potential for additional donor funding for future CPS needs. Recurrent costs that must be met in hard currencies should be of particular emphasis.

8. Expansion of CPS activities into non-food crop areas should also be noted (protection of forest areas for pest attacks, import/export quarantine, pesticide legislation, etc...).

9. The maturity of CPS as a self-reliant institution should be examined and recommendations made for the future needs of the organization as USAID funding support is ended.

10. Recurrent cost issues, especially those requiring hard currency, should be addressed. Can the recurrent costs of the CPS be met to ensure the viability of the department?

11. The extent to which any CPS activities have relevance for adoption by the private sector. (i.e. future pesticide use by private sector traders after CPS certification programs.)

C. Individual Scope of Work - Evaluation Research Specialist - Team Leader:

1. The Evaluation Specialist (Team Leader) shall be responsible for managing the overall evaluation effort and for preparation of the final report.

The Evaluation Specialist shall identify and assemble the relevant background documentation and be responsible for establishing individual work plans in fulfilling this scope of work. The Evaluation Specialist shall ensure that the objectives of the evaluation are met and that the topics requested herein are addressed in the final report. In addition to the topics identified above, the Evaluation Specialist shall ensure incorporation of the following topics in the final report:

a) an assessment of whether the project was implemented as planned. If so, what aspects contributed to project success? If not, what were the primary reasons?

b) and assessment of whether the relevant issues raised in the mid-term evaluation were rectified and how. (The team shall interview the USDA project technician to get his views on the inadequacies of the mid-term evaluation.)

c) an assessment of the institutional capacity of CPS (staffing/facilities, etc...) to carry out its mandate, and if and how A.I.D.'s assistance contributed to that capacity.

d) an assessment of whether this activity, inclusive and exclusive of any other donor activity in the project area,

was cost effective. This assessment should take into consideration the cost of the various project interventions, the short and long-term benefits resulting from these activities and identify those constraints which are preventing the full impact of the CPS efforts to be realized. An attempt should also be made to determine cost/benefit relationships of pesticide usage by CPS.

e) an assessment of the viability of the CPS in terms of financial, economic, and institutional sustainability. In particular, the issue of recurrent costs should be addressed, and/or cost recovery if the CPS is used to provide services to other GOGB entities or private sector entities. The assessment should make recommendations on how the CPS and A.I.D. might become involved in any proposed courses of action.

f) To the extent possible, and to the degree baseline and other quantitative data exist, the Team Leader shall also make an attempt to gather additional information in order to measure the impact of the project's interventions on the project area. If this is not possible during the time-frame planned for the evaluation, recommendations should be made regarding the resources, skills and methodologies required to make such measurements.

2. Level of Effort - Team Leader/Evaluation Specialist

The Evaluation Specialist will be required for a total of 28 person days as outlined below:

- One day in the U.S. For document review.
- 18 days in Guinea Bissau for further document review, preparation of work, plans, meetings with project and GOGB counterparts, field investigations and drafting of evaluation report.
- Five days in the U.S. for completion of the final report.
- The remaining four days shall be for necessary travel time between the U.S. and Guinea Bissau.

D. Individual Scope of Work - Evaluation Research - Crop Protection Specialist:

1. This specialist shall report to the team leader and be responsible for the technical analysis of the CPS capability in the broad range of pest problem management (i.e. plant quarantine, biological control, integrated pest management,

emergency pest outbreaks, pesticide usage, etc...) and in the various strategies associated with pre and post harvest crop losses. On a general level, this specialist shall assess the CPS institution's potential and capability as a provider of technical crop protection services to the food producing community in Guinea Bissau. CPS' outreach/extension capability and its abilities in various methods of pest control should be examined.

More specifically, the Crop Protection Specialist shall review A.I.D. project documentation to evaluate how the project met its stated goal and purpose and how the project impacted upon the following areas:

a) CPS pest surveying and detection capabilities
b) CPS assistance to villagers
c) Biological control programs used and planned by CPS
d) Relevance of project training provided to CPS
e) Extension of integrated pest management techniques by CPS
f) Pesticide usage, safety and control capabilities of CPS
g) Plant guarantine capabilities and needs of CPS
h) CPS national program plannings and emergency pest outbreak reaction abilities.

Working in conjunction with the Team Leader, the Crop Protection Specialist shall also assess the end of project status of the CPS by reviewing the Service and its major components:

- Human Qualifications (ability and capacity of CPS staff to carry out assigned tasks and the appropriateness of project funded training on staff capabilities);

- Physical Plant and Equipment (conditions of the physical facilities, maintenance, adequacy of space, laboratories, storage, and repair shops, use of vehicles, communications and supplies);

- Administrative Procedures (preparation and use of effective work plans, budgets, job descriptions, operational guidelines, inventory procedures and management controls);

- Program Operations (effectiveness of field operations, quality of laboratory work, accuracy of reporting, quality of pest data collection and references, quality of pest control procedures);

- Training Programs (the use by CPS of adequate training plans and realistic targets, quality of training material and field guides, effectiveness of outreach activities and the numbers and types of period being trained); and

- Coordination (extent of CPS collaboration with related national and international institutions).

The specialist shall also contribute to the evaluation's investigation into cost/benefit aspects of the project and the evaluation topics identified in Article IV B. above. The specialist shall also outline the projected program needs of the CPS and recommend which inputs might be most beneficial in strengthen the capabilities of the Service in the future.

2. Level of Effort - Crop Protection Specialist
The Crop Protection Specialist will be required for a total of 23 person-days as outlined below:

- One day in the U.S. for document review.

- 18 days in Guinea Bissau for further document review, preparation of work, plans and meetings with project and GOGB counterparts, field investigations and drafting of evaluation report.
- The remaining four days shall be for necessary travel time between the U.S. and Guinea Bissau.

ARTICLE V - REPORTS

The contractor's team will be responsible for providing a final draft evaluation report two working days prior to departure of the evaluation team. This report is to be submitted in English, should not exceed 50 pages (exclusive of annexes) and should conform with evaluation guidance contained in A.I.D. Handbook 3, Chapter 12 and the A.I.D. Program Design and Evaluation Methodology Report No. 7 (A.I.D. Evaluation Handbook). After this draft has been reviewed and commented upon by USAID/Bissau prior to the team's departure from Bissau, the contractor will be responsible for having the evaluation report finalized in the U.S. and translated into Portuguese with 15 copies. The English version of the final report shall also be provided in 15 copies. The evaluation report will contain the following sections (described in greater detail in the A.I.D. Evaluation Handbook):

Executive Summary
Project Identification Data Sheet
Table of Contents
Body of Report
Appendices

Within five weeks of departure of the evaluation team, the contractor shall incorporate comments provided by OAR/GB and produce the final evaluation report. Submission of the report shall be in fifteen (15) English versions, and fifteen (15) Portuguese versions directly to the USAID/Guinea-Bissau. Internal A.I.D. distribution will be made subsequently by the mission. The mission will be responsible for conducting the final evaluation review and for accepting the final report.

ARTICLE VI - TECHNICAL DIRECTIONS

Technical directions during the performance of this delivery order will be provided by USAID/Bissau: Paul Neifert, GDO, pursuant to Section F. 3 of the IQC contract.

In addition, the contractor will be represented by the team leader who will be directly responsible to the A.I.D. Representative, Guinea-Bissau, or her designate. The A.I.D. Representative will be responsible for providing general guidance to the evaluation team and for ensuring that appropriate contacts are established between the evaluation team and the host country counterparts. The team shall take immediate and daily direction from the USDA PASA employee who has had primary responsibility for the project over the last three years. The contractor's crop protection specialist will report and be directly responsible to the team leader.

ARTICLE VII - TERM OF PERFORMANCE

A. The effective date of this delivery order is August 8, 1990 and the estimated completion date is October 31, 1990.

B. Subject to the ceiling price established in this delivery order and with prior written approval of the Project Manager (see block 5 of the Cover Page), Contractor is authorized to extend the estimated completion date, provided that such extension does not cause the elapsed time for completion of the work, including furnishing of all deliverables, to extend beyond 30 calendar days from the original estimated completion date. The contractor shall attach a copy of the Project Manager's approval for any extension of the term of this order to the final voucher submitted for payment.

C. It is the contractor's responsibility to ensure that Project Manager-approved adjustments to the original estimated

completion date do not result in costs incurred which exceed the ceiling price of this delivery order. Under no circumstances shall such adjustments authorize the Contractor to be paid any sum in excess of the delivery order.

D. Adjustments which will cause the elapsed time for completion of the work to exceed the original estimated completion date by more than 30 days must be approved in advance by the Contracting Officer.

ARTICLE VIII - WORK DAYS ORDERED

A. Functional Labor Specialist	Delivery Days Ordered	Fixed Daily Rate	Total
Eval. Research (Team Leader)	28	$584.10*	$16,355
Eval. Research	23	542.52*	12,478
		.....	$28,833

*Based on a multiplier of 1.98 (Consultants)

B. Subject to the prior written approval of the Project Manager (see Block No. 5 on the Cover Page), contractor is authorized to adjust the number of days actually employed in the performance of the work by each position specified in this order. Contractor shall attach copy of the Project Manager's approval to the final voucher submitted for payment.

C. It is the contractor's responsibility to ensure that Project Manager-approved adjustments to the work days ordered for each functional labor category do not result in costs incurred which exceed the ceiling price of this delivery order. Under no circumstances shall such adjustments authorize the contractor to be paid any sum in excess of the ceiling price.

ARTICLE VIX - CEILING PRICE

(1) For Work Ordered	$28,833
(2) For Other Direct Cost	21,637
Ceiling Price (1) + (2)	$50,470

The Contractor will not be paid any sum in excess of the ceiling price.

ANNEX C

DOCUMENTS CONSULTED

A.I.D. INFORMATION

A.I.D. Congressional Presentation Fiscal Year 1990 Main Volume

A.I.D. Evaluation Handbook

A.I.D. Evaluation Special Study No. 33 Report of a Preparatory Evaluation Workshop on the Management of Agricultural Projects in africa (Jan. 1986 A.I.D.)

A.I.D. Program Evaluation Discussion Paper No. 11 Effective Institution Building; A Guide for Project Designers and Project Managers Based on Lessons Learned from the A.I.D. Portfolio (March 1982; USAID)

The Informal Sector: Issues in Policy Reform and Programs (Report on the East and Southern Africa Regional Conference; Nairobi, Kenya April 27-29, 1989)

A.I.D. Guinea-Bissau Strategy Review May 1988 Howard, R. Handler, Robert J. Maushammer, et. al.

A.I.D. Country Program Strategic Plan FY 1991-1995 May 1990

A.I.D. Program Assistance Approval Document: Guinea-Bissau Agricultural Sector Assistance Program (Authorized 8/24/89)

A.I.D. Technical

"Integrated Pest Management (IPM) for Food Crops in the SAHEL; A.I.D.-Funded Accomplishments, Present Status, and Proposed Activities" Dr. Patricia C. Matteston, Consortium for International Crop Protection, College Park, MD February 5, 1990 (Prepared for A.I.D.)

A.I.D. Evaluations

Project Evaluation: Guinea-Bissau Food Crop Protection III (657-0012) International Science and Technology Institute, Inc. Washington, D.C. February 12, 1988

Evaluation of the South Coast Agricultural Development Project in Guinea-Bissau DAI Washington, D.C. 1987

Final Project Evaluation: The South Coast Agricultural Development Project No. 657-0010 Experience, Inc. Washington, D.C. March 1990

Evaluation of The Technical Skills Training Project for the Tri-Lateral Commission in Guinea-Bissau DAI Washington, D.C. November 1987

USAID/Bissau Training Program Evaluation (Draft) Labat-Anderson Inc. December 1989

Guinea-Bissau Background Information

Galli, Rosemary E. Development Strategy in Guinea-Bissau: The European Community's Contribution (Bissau, December 1989)

Guinea-Bissau: An Introductory Basic Economic Report (In Three Volumes) Vols. I and II Report 3529-GUB (World Bank May 1982)

Guinea-Bissau: A Prescription for Comprehensive Adjustment World Bank Western Africa Region March 26, 1987

Republic of Guinea-Bissau Second Structural Adjustment Credit April 25, 1989 (Report No. P-4980-GUB) World Bank

Republic of Guinea-Bissau: Social and Infrastructure Relief Project World Bank Staff Appraisal Report April 19, 1989 (Report No. 7606-GUB)

Anuario Estatistico 1988 Ministerio do Desenvolvimento Rural e Agricultura, Gabinete de Planeamento Republica da Guinea-Bissau (Bissau/Dezembro 1989)

Inquertio Anaul Sobre as Superficies Rendimentos e Producoes; Resultado da Campanha Agricola 1989/90 (Marco 1990)

Anuario Estatistico 1988 Ministerio do Desenvolvimento Rural e Agricultura, Gabinete de Planeamento, Divisao de Estaticas Agricolas

Resltats du Recensement National de L'Agriculture 1988/1989 Tome I: Resultats Nationaux et Regionaux Ministere du Developpement Rural et del l'Agriculture; Cabinet de Planification Mai 1990

Republic of Guinea-Bissau Round Table Geneva July 1988 UNDP

Women/Gender

Overholt, Catherine ed. Gender Roles in Development Projects: A Case Book Kumarian Press West Hartford, Conn. 1985

Women in Development: A.I.D.'s Experience, 1973-1985 (Vol. 1. Synthesis Paper) A.I.D. Program Evaluation Report No. 18 April 1987

African Women in Development (AFWID) Bureau for Africa (698-0529) A.I.D. Washington, D.C. December 12, 1989

A. **Project Produced Reports**

1. **Pesticide Storage and Disposal in Guinea-Bissau, West Africa** (July, 1990) Janice K. Jensen, Environmental Protection Agency, U.S.A. English/Portuguese

2. **Weeds of Guinea-Bissau: A survey of Weeds and their Control** (July, 1990) P. Terry, University of Bristol, Long Ashton Research Center, U.K. English/Portuguese

3. **Report on Travel to Guinea-Bissau: Status and Recommendations for the Plant Pathology Department of the National Plant Protection Service** (1986) Ethel M. Dutky, Plant Pathology Department, University of Maryland, U.S.A. English

4. **INITIATION AUX COMMUNICATIONS RADIOELECTRIQUES ET A L'UTILISATION DES POSTES RADIO EMETTEUR-RECEPTEUR DU TYPE IC735** (1989) Firm in F.R. NYOUKI, Chef de la Division Avertissement Agricole, Natural Plant Protection Service, Senegal French

5. **Project de la "Ceinture Verte" de Bissau** (1987) Francis Can, Extension Specialist, USAID (Casamance) Project, Senegal French

6. **Rapport sur les missions effectuees en Guinee Bissau 23-27/02/87 et 13-16/03187: aux techniques de denematisation des sols** (1987) Pierre Baujard Laboratoire de Nematologie, ORSTOM France (Senegal) French

7. Trip Report: Review of proposed National Pesticide Legislation and status of pesticides (excess) and containers within Guinea-Bissau (1990) Carl Castleton, USDA-APHIS (Cote d'Ivoire) English/Portuguese

8. **Relatorio da Visita a Guine-Bissau Direccao dos Servicos de Proteccao Vegetal** (Status of maintenance and repair of Service motorcycles: training and recommendations) (1987), Pedro Meuneir, Chief motorcycle mechanic, Honda, (Portugal) Portuguese

9. Trip Report: Efforts to increase use of graphics and speed development of training materials and their production and evaluation by the Crop Protection Service. (1988) Dennis Hannapel, USDA-APHIS English

10. Trip Report: Guinea-Bissau (September 17-October 11, 1987) — Assessment of bird pest situation. (1987) Richard Bruggers, Denver Wildlife Research Center, Animal Damage Control, USDA-APHIS, (USA) English

11. Trip Report: Guinea-Bissau (October 21-November 11, 1989) — Evaluate the pest status of rodents and train a counterpart in the National Plant Protection Service (1989) G. Keith La Voie (organization as for Bruggers above) English

12. Trip Report: Rodent Pests in Guinea-Bissau (July 22-August 18, 1990) — Continuation of La Voie's work. (1990), Lynwood A. Fiedler (organization as for Bruggers above) English

13. **Relatorio de uma missao de apoio technico aos Servicos de Proteccao Vegetal da Republica da Guine-Bissau (Trip Reports):**

    20-28 May 1988
    8-23 July 1989

    Fernando A. Ilharco, Instituto Nacional de Investigacao Agraria, Estacao Agronomica Nacional, Oeiras (Portugal) Portuguese

14. **Relatorio de um Seminario sobre Producao de Batata — Semente na Guine** (20-22 February, 1990). F.A. Ilharco and Jose F.P. Ferraz, (organization is same as noted above for Ilharco.) Portuguese

15. **Rapport de Mission en Guinea-Bissau du 19 au 30 Juin 1989**: Potential for and value of silos in Guinea-Bissau and Identify methods for reducing pest losses in traditional stores. (1989) Dogo Seck, Programme Stockage, Institut Senegalais de Recherches Agricoles (Senegal) French

16. **Rapport de Mission en Guinea-Bissau du 13 au 23 Mars, 1990 dans le cadre du project de protection des culture, vivrieres de Guinea-Bissau**: Establishment of silo construction project and how to conduct training on reduction of losses in traditional stores at the village level (1990). Dogo Seck. See above paragraph for organization French

17. **Reflecao Sobre Defesa Sanitaria dos Produtos Armazenados na Guine-Bissau.** 1988 Mustaffa Cassama, National Plant Protection Service (Guinea-Bissau) Portuguese

Project Papers scheduled to be completed before project conclusion:

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2. Drea (USDA-ARS) 8-21 September 1990 Review of the long term potential of biocontrol of plant pests in Guinea-Bissau and the establishment of a simple rearing facility.

3. D. N'Doye\D'MBaye (ISRA-(Senegal) 3-14 September 1990 — Survey/Review of the Sorghum/Millet Insect and Disease Pest problems of potential economic importance in Guinea-Bissau to include review and update of National IPM Strategy for sorghum and millet

4. J'MBodj (ISRA-Senegal) 3-14 September 1990 — Survey/Review of the Rice Disease Complex i Guinea-Bissau to include review and major update of National IPM Strategy for Disease Problems of Rice.

5. Maehler (USDA-Plant Quarantive/Retired) July, 1990. Report: Summary of PQ review/training of G-B, CPS, PQ design (L. Tavares) with proposed Plant Protection Quarantive Legislation (Prototype) for G-B.

ANNEX D

PERSONS CONTACTED

Leila Abu-Gheida
Peace Crops Volunteer
EEC/FED Melhoramento das Bolhanas, Gabu
(EEC Project Director: Sylvie Forel)

Antonio Aime
CPS Acting Director
Zone I

Rui Daniel B. Andrade
Responsavel do Servico Extensao Rural
Cacheu
M.D.R.A./P.D.R.I. Zona I co. P.No.79

Marie-Jose Araujo
Directrice du CDEA (Documentation Serviec of the Ministry of Agriculture)
Bissau

Ana Balde
CPS Training Officer
Bissau

Alfesene Balde
CPS Zone Director, Autonomous Zone of Bissau
CPS

John Dale Blanken
Former United States Ambassador to Bissau

Joao Carvallio
Director, PDRI Center Bula

Jeanne Clemenceau
Directrice Adjointe
UNDP Bissau

Basilio de Costa
CPS Head Officer
Oio Region

Mr. Robert Collingwood
Delegate of the EEC
Bissau

Carlos Correia
Ministre d'Etat en Developpment Rural et d'Agriculture
Bissau

Souleimane Dabo
CPS Sectional Officer
Mansaba
Oio Region

Carlos J. Delgado
REgional (Head) Officer
CPS Gabu

Senfo Djalo
CPS Head Officer
Cacheu Region

Eva G. Dotterr-Jansson
Socio-Antropologa
PDRI Zone I Bula

Lynwood A. Feidler
Wildlife Biologist, Research
Internation Programs Seciton
Denver Wildlife REsearch Center
USDA

Maria Rosa Evora Ferreir
Entomologist?
CPS, Bissau

John Franklin
Guinea-Bissau Food Crop Protection Project Manager
USDA/APHIS

Antero Matias Gomez
Extensionista VIII
Bula

Fernando Julio
Manuel Julio
Graphic Artists/Illustrators
Ministry of Education
Bissau

Bengt Kjeller
Coordinator
PRDI Zone I Bula

Walterr Knausenberger
Entomology Advisor: Pest and Pesticide Management
AFR/TR/ANR/NR

Pedro Landim
Pest Reguilation Specialist
CPS Bissau

M.A. Andeke Lengui
Representant de la FAO
Bissau

Care Lifton
Anthropological REsearcher
Yale University
Bissau

Michelle Marks
Peace Corps Volunteer
Bula Rural Extension Program: Ingore (1989-90)
Quaker Friends Service Women's Vegetable Gardening (1988-89)

Marcellion Martins
Director Projecto "Cintura Verde"
MDRA/SAAB
C.P. No. 71, Bissau

Malam Mandjam
Responsavel de Protecao Vegetal CPS
Zona II Gabu

Geraldo Menout
Zone I Director
CPS

Enga. Maria Da Conceical Moura
Directrice Adj. dela Direction du Service de Controle et Certification de Semences (MDRA)
Chefe de la Section de Pathologie de Semence, Bissau

Bessafrate Nambr4ama
Provincial Officer
Responsible for Provincial-France Groundnut and Cotton Project
Mansaba, Oio Region

William Overholt
Pest Management Specialist
SANO T/AGR
AID/Wahsignton

Paula Pereira
Presidente da Associacal das Mulheres
Tabanca de Co (Utonk)

Jorge Alberto Santos Olivera
Director General da Agricultura
MDRA Bissau

Dag Ruwe Havgluwd
Representante Principal
ADDP
Plantation de Lesti
(Donor: Denmark)

Ann Mulvaney
Administrative Officer
Peace Corps, Bissau

P{aulo Onim
Responsible Officer for Crop Protection
DEPA
Contubuel

Francine Panfietti
Assistant Program Officer
AID Bissau

Gilbert Pouho
Assistant Project Officer
AID Bissau

Fernando Quade
Director for Rice Project Center
Carantaba

Stephen Sandiford
UNDP Program Officer
Bissau

Ann Stodberg
Primera Secretaria
ASDI
Swedish Embassy, Bissau

Luis Tavares
Staff Officer, Plant Quarantine
CPS Bissau

Domingos Tchentchelan
Director, Zone II
CPS, Bafata

N'Bunde Yualam Te'
Extension Supervisor
Bula Sector

William Thomas
Entomologist-Plant Protection Specialist
AFR/TR/ANR/NR

Cirilo Varela
Director, Zone III
CPS, Catio

Marcellino Vas
Acting Director
CPS, Guinea-Bissau

Mon S. Yee
Soil Scientist
SCS/USDA
Protland, Oregon

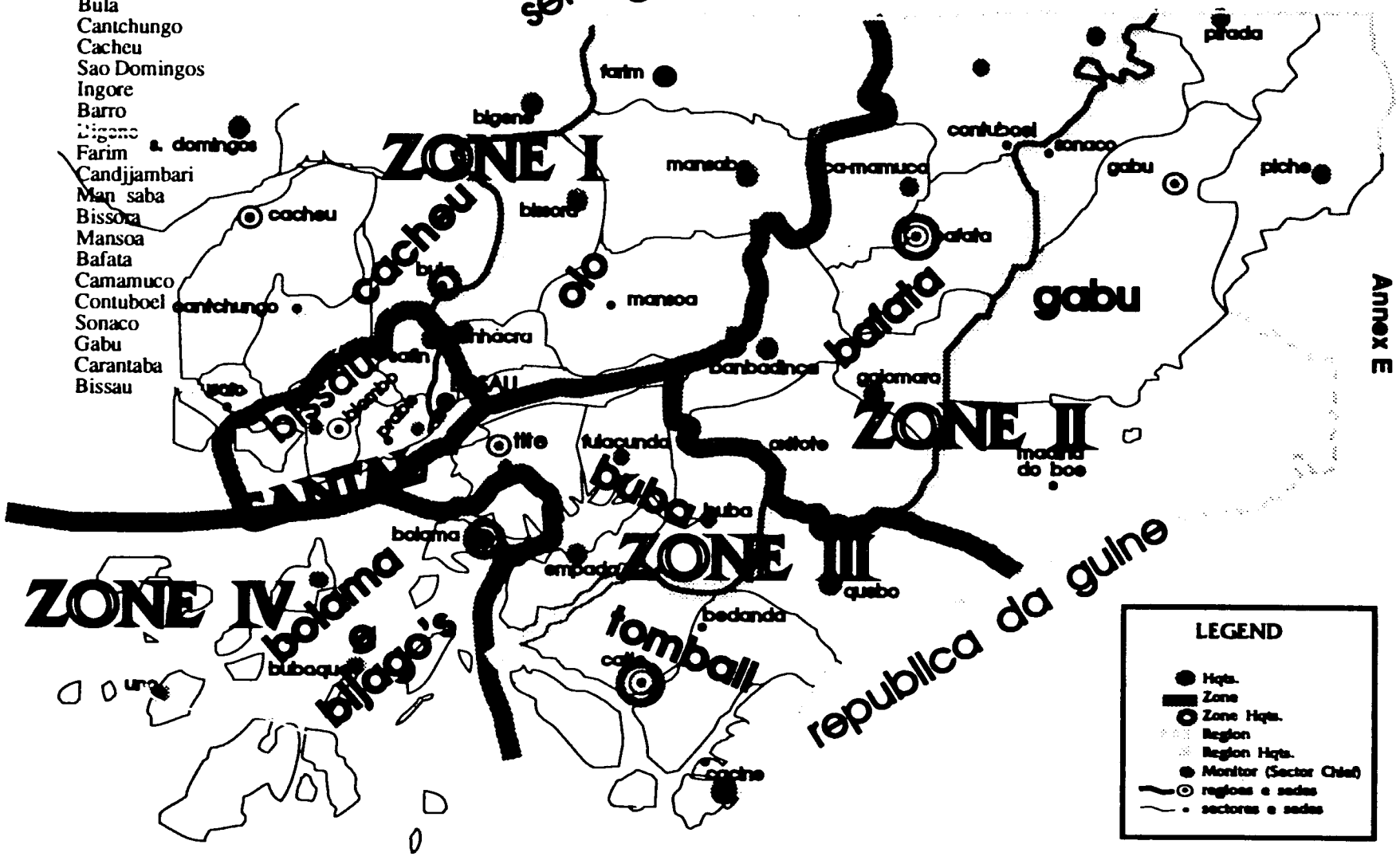
1544-020
(12/90)

GUINEA-BISSAU
National Crop Protection Service
August 1990

1. Divisão Administrativa

Locations Visited by Evaluation Team

Bula
Cantchungo
Cacheu
Sao Domingos
Ingore
Barro
Bigene
Farim
Candjjambari
Man saba
Bissora
Mansoa
Bafata
Camamuco
Contuboel
Sonaco
Gabu
Carantaba
Bissau



Annex E

1544-023
(12/90)

ANNEX F

CPS PERSONNEL, AUGUST 1990

1 – Mustafa Soares Cassama
2 – Marcelino Vaz
3 – Florentino José Fernandes
4 – Lourenço Monteiro Carvalho de Abreu
5 – Pedro Correia Landim
6 – Alfesene Baldé
7 – Maria Rosa Evora Ferreira
8 – Geraldo Sariot Menout
9 – Domingos Tchentchelan
10 – Cirilo Travares Varela
11 – Luis Antonio Tavares
12 – Ana Marcelina Vieira Indoi Baldé
13 – Basilio da Costa
14 – Viriato José da Silva
15 – Serifo Jalé
16 – N'Queba Cia
17 – Malam Mandjam
18 – Quintino Lopes Correia
19 – Claudino Andrê Pereira
20 – Bunha Nanbundé
21 – Augusto Vaz
22 – Julio Nassulnaté
23 – Carlos Joaquim Delgado
24 – Luis Tchama Tchigna
25 – Lassana Seidi Celu
26 – Martinho Sanca
27 – Embana Cé
28 – Bibano da Silva
29 – Joâozinho Quim
30 – José Pedro Serra
31 – Augusto Bobé
32 – Fernando Cé

33 – Amadu Sissoco

34 – Rogério Betagda

35 – Anténio Simões

36 – Abreu M'Bali Calabus

37 – Jorge Lamine Camará

38 – Sebastião Quimora

39 – Joaquim Quinhau Embundé

40 – Dembo Djassi

41 – Bulna Quebi

42 – Fodé Cassama

43 – Augusto João Nhaga

44 – Victorino Gomes Indi

45 – Sanha N'Canha

46 – Amadu Djau

47 – José Manuel da Silva

48 – Djan Uri Camara

49 – Carlos Alfredo Dias

50 – Raul Correia

51 – Suleimane Dabó

52 – Coio Mana

53 – Domingos Pereira Tavares

54 – Pedro Dias

55 – Vicente Mereque

56 – Jorge Almeida Baptista

57 – António Ensa Camará

58 – Mamadu Cassama

59 – Duarte Bormin Té

60 – Duarte Tavares Timbana

61 – Ângelo Anibal Pereira

62 – Sidia Malam Casama

63 – João M'Bemba Camara

64 – Sana Sissé

65 – Umaro Gano

66 – Mutaro Embalo

67 – Fonseca Alqueia Sambu

68 – Alexandre Manuel Fonseca

69 – Silvestre Antonio Onofre King Cabral

70 – Rui da Silva Nhaga

71 – Manuel Joaquim

72 – Pedro Mana

73 – Flife Bedente

74 – Tchico Balanta

75 – Teresa de Oliveira

76 – Elvira Carvalho de Alvarenga

77 – Joâozinho Mendi

78 – Umaro Darame

79 – Andrê Gomes

80 – Gabriel Fernandes Barbosa

81 – Joaquim Manuel Antonio Albino

82 – Feliciano Pinto Biague

83 – Aguinelo Nanque

84 – Matias Vieira

85 – Malam Bissorâ Fati

86 – Malam Cassama

ANNEX G

PUBLICATIONS PROVIDED TO CPS ZONE LOWER LEVEL CPS EMPLOYEES AND SELECTED EXTENSION AGENTS

Number of Copies	
200	**Guia Para o Uso de Pesticidas: Manual Prático Para Extensionistas Africanos** (1989) W. Overholt and C. Castleton, USAID
20	**Note:** The above Pesticide Users Guide (Overholt and others) was also provided in 1987 in both English and French
40	**Manual das Pragas das Culturas Hortícolas da Batata-Doce e da Mandioca** (1990) A.M.L. Faria, Van Harten, A. and others, Instituto Nacional de Investigaçao Agrária, República de Cabo-Verde.
2000	**Terçeiro Livro de Protecçao Vegetal: Patologia Vegetal** (1990) E. Dutky, University of Maryland, U.S.A.
2000	**Segunda Livro de Protecçao Vegetal: Entomologia** (1990) L. Abreu, National Crop Protection Service, Guinea-Bisseau.
50	**Les Larves des criquet du Sahel** (1989), G. Popoo. Overseas Development Natural Resources Institute, U.K.
500	**Directrizes para Utilizaçao Efricaz e segura de productos fitofarmaceutícos** (1983) Groupement International des associations Nationales de fabricantes de Productos Agroquimiques
2000	Calendars (Crop Protection Oriented Posters) 1987/88
2000	Calendars (Crop Protection Oriented Posters) 1991
2000	Poster Stirga (1990)
2000	Poster Smut (1990)
2000	Poster Pesticides (1990)
10	**Guide Pratique du Maraichage au Senegal.** J. Beniest, Centre pour le Developpment de L'Horticulture, Camberece, Senegal.
1000	**Instruçoes Para or Emprego Seguro e Eficaz dos Produtos Fitofarmaceutícas**

*Where 500 or more copies involved, distribution was to village level.

A. **Project Produced Reports**

1. **Pesticide Storage and Disposal in Guinea-Bissau, West Africa** (July, 1990) Janice K. Jensen, Environmental Protection Agency, U.S.A. English/Portuguese

2. **Weeds of Guinea-Bissau: A survey of Weeds and their Control** (July, 1990) P. Terry, University of Bristol, Long Ashton Research Center, U.K. English/Portuguese

3. **Report on Travel to Guinea-Bissau: Status and Recommendations for the Plant Pathology Department of the National Plant Protection Service** (1986) Ethel M. Dutky, Plant Pathology Department, University of Maryland, U.S.A. English

4. **INITIATION AUX COMMUNICATIONS RADIOELECTRIQUES ET A L'UTILISATION DES POSTES RADIO EMETTEUR-RECEPTEUR DU TYPE IC735** (1989) Firm in F.R. NYOUKI, Chef de la Division Avertissement Agricole, Natural Plant Protection Service, Senegal French

5. **Project de la "Ceinture Verte" de Bissau** (1987) Francis Can, Extension Specialist, USAID (Casamance) Project, Senegal French

6. **Rapport sur les missions effectuees en Guinee Bissau 23-27/02/87 et 13-16/03187: aux techniques de denematisation des sols** (1987) Pierre Baujard Laboratoire de Nematologie, ORSTOM France (Senegal) French

7. Trip Report: Review of proposed National Pesticide Legislation and status of pesticides (excess) and containers within Guinea-Bissau (1990) Carl Castleton, USDA-APHIS (Cote d'Ivoire) English/Portuguese

8. **Relatorio da Visita a Guine-Bissau Direccao dos Servicos de Proteccao Vegetal** (Status of maintenance and repair of Service motorcycles: training and recommendations) (1987), Pedro Meuneir, Chief motorcycle mechanic, Honda, (Portugal) Portuguese

9. Trip Report: Efforts to increase use of graphics and speed development of training materials and their production and evaluation by the Crop Protection Service. (1988) Dennis Hannapel, USDA-APHIS English

10. Trip Report: Guinea-Bissau (September 17-October 11, 1987) — Assessment of bird pest situation. (1987) Richard Bruggers, Denver Wildlife Research Center, Animal Damage Control, USDA-APHIS, (USA) English

11. Trip Report: Guinea-Bissau (October 21-November 11, 1989) — Evaluate the pest status of rodents and train a counterpart in the National Plant Protection Service (1989) G. Keith La Voie (organization as for Bruggers above) English

12. Trip Report: Rodent Pests in Guinea-Bissau (July 22-August 18, 1990) — Continuation of La Voie's work. (1990), Lynwood A. Fiedler (organization as for Bruggers above) English

13. **Relatorio de uma missao de apoio technico aos Servicos de Proteccao Vegetal da Republica da Guine-Bissau (Trip Reports):**

    20-28 May 1988
    8-23 July 1989

Fernando A. Ilharco, Instituto Nacional de Investigacao Agraria, Estacao Agronomica Nacional, Oeiras (Portugal) Portuguese

14. **Relatorio de um Seminario sobre Producao de Batata — Semente na Guine** (20-22 February, 1990). F.A. Ilharco and Jose F.P. Ferraz, (organization is same as noted above for Ilharco.) Portuguese

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17. **Reflecao Sobre Defesa Sanitaria dos Produtos Armazenados na Guine-Bissau.** 1988 Mustaffa Cassama, National Plant Protection Service (Guinea-Bissau) Portuguese

18. Relatorio de uma Missao de Apoio Tecnico aos Servicos de Proteccao Begetal da Republica da Guine-Bissau (1989), F.A. Ilharco, (same as 13 above).

19. Relatorio de uma visita a Guine-Bissau: Review of staff capability and laboratory facility with recommendations. (1988) J.F.P. Ferraz, Instituto Nacional de Investigacao Agraria, Estacao-Agronomica Nacional, Oeiras, Portugal

20. CPS Annual Report, M. Vaz 1985
1986
1987
1988
1989

21. Identification and Frequency of Cucurbit Viruses in Southeastern Louisiana (1989) thesis: F.J. Fernandes, National Crop Protection Service, Guinea-Bissau (Louisiana State University).

22. Effect of Resistant and Susceptible Maize Genotypes on the Biology of Chilo partellus Swinhoe (Lepidoptera, Pyraledale) and the parasitoid Apanteles sesamiae cam. (Hymeroptera, Braconidae). (1990). Thesis: L. Abreu, National Crop Protection Service, Guinea-Bissau (Oklahoma State University).

Note above title was tentative. Work was done in Kenya.

23. Observations des Methods de Stockage Pratiquees Don Les Exploitations Agricolas et villages of Guinea-Bissau (1987) V. Wright, Kansas State University, U.S.A. and D. Seck, ISRA, Senegal

Project Papers scheduled to be completed before project conclusion:

1. Baujard (ORSTOM) 24-28 September 1990 upated procedures and training for seed-bed fumigation

2. Drea (USDA-ARS) 8-21 September 1990 Review of the long term potential of biocontrol of plant pests in Guinea-Bissau and the establishment of a simple rearing facility.

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ANNEX H

LINKAGES WITH EXTERNAL ORGANIZATIONS

1. International Institute of Tropical Agriculture (IITA) Ibadan, Nigeria (and for BioControl-Benin)

   (A) This institute provides technical support for commodity improvement in Africa for root crops (Cassava, Yams), Legumes (Cowpea, Soybean), Plantain, Maize and Rice. Work on rice is being transferred to WARDA.

   (B) Most of the programs with which IITA is charged are of interest to G.B. Agriculture. An aspect of their program for improved production is reduction of losses caused by pests. Currently of particular interest to the CPS are the work on several pests of Cassava (mealybugs, spidermites, grasshoppers, zonocerus sp., and mosaic). Plantain diseases, particularly preventing the introduction of "bunchy top" are of interest to the CPS plant pathology and quarantine departments.

   (C) Efforts to develop and establish long term working relationships included:

      1. Training of CPS Staff by IITA

      2. Technical visits by IITA biocontrol staff to Guinea-Bissau.

      3. Joint working program established on the biocontrol of the cassava mealy bug.

      4. Testing in Guinea-Bissau of possible resistant (cassava mosaic) cassava progative material provided by IITA

      5. MS research on a plant pathology problem on cassava at IITA (Note: while planned — this was cancelled when F. Fernandes' program at LSU took an extra year due to university entry requirements).

2. West Africa Rice Development Association (WARDA) Boauke, Cote d'Ivoire)

   (A) WARDA is charged with the improvement of rice production in West Africa (Chad to Senegal), airfed/upland (Cote d'Ivoire) and mangrove rice (Sierra Leone). An aspect of their program is reduction of losses caused by a variety of rice pests. WARDA has had contacts (almost non-existent over the past two (2) years) with both Guinea-Bissau's National Research Service (DEPA) and CPS. This is largely due to WARDA's administrative and other difficulties during the last few years. Hopefully this has now changed with naming of Director General.

B. Training and the development of pest control techniques (cultural, resistance, etc.) by WARDA Researchers particularly in the area of Mangrove Rice are of great interest to a major component of Guinea-Bissau's Agriculture.

C. Relationships have been developed through CPS Entomologist and plant Pathologist visits for training to Sierra Leone (WARDA Station) and WARDA visits to Guinea-Bissau. More recent is the effort by CPS to develop a working relationship to

3. International Crops Research Institute for the Semi-Arid Tropical (ICRISAT), India

(A) Serves as world center for the improvement and increased production of several mandated crops which include sorghum, millet and groundnuts.

(B) Of the three (3) crops noted above sorghum and millet are of particular interest to CPS particularly in the area of their related diseases. The diseases of most interest are several sorghum smuts and Dowing Mildeur of Pearl Millet.

(C) The CPS Plant Pathologist has had over the past several two (2) trips to the ICRISAT Sahelian Center, Niger. One trip was totally financed by the Project with the second largely by ICRISAT. The pathologist was also accompanied by a horticulturist attached to the Zone 1 Rural Extension Project. More recently, at the request of the CPS, a plant pathologist from ICRISAT (accompanied by the plant pathologist from INSA, Bombay, Senegal) visited Guinea-Bissau and with the CPS plant pathologist visited the Zone 1 program. This has led to the scheduled return of the referred to Senegal Plant Pathologist.

4. Instituto Nacional de Investigacao Agraria, Estacao Agronomica Nacional (FAN), Portugal.

(A) This station provides various agricultural research and diagnostic services to Portugal and on a limited basis to Portugal's former colonies.

(B) Of the services of interest, to the Guinea-Bissau National Crop Protection Services (CPS), are those involving Plant diseases and Anthropod pests such as insects and mites. A limited amount of back-up support for the CPS Entomology (Ent) and Plant Pathology (PP) Departments can be provided through the foreseeable future. This can consist of assisting with identifications that are too complicated to make with existing equipment and references. They can also provide biodata and copies of available literature on possible controls or combinations of controls that could be considered.

(C) A strong working relationship has been established between EAN and CPS's Plant Pathology Department since early 1988. This has been through a series of exchange visits (6) by Dr. J. Ferraz (In charge, EAN Plant Pathology Department) and three (3) visits for training CPS Plant Pathology Staff (Cia/Ferreira). These three training sessions, conducted by Dr. Ferraz and his staff, ranged from 5 to 8 weeks each. This series of exchanges has coordinated the development of a viable Plant Disease Lab along with a systematic development of CPS staff PP diagnostic skills appropriate to the conditions off Guinea-Bissau. A similar effort was undertaken in Entomology with a CPS Entomologist (Balde) undertaking training (4 weeks) under Dr. Ilharco. Dr. Ilharco visited the CPS facility and worked with the Entomology Department on 3 occasions.

5. Office de recherche Scientifique et Technique d'Outre-Men (ORSTOM). This French Research Organization, headquartered in Paris works in a number of subjects ranging from Agriculture to Fisheries outside of France. One of their laboratory facilities is located in bordering Senegal in Dakar. There they have established one of the largest nematology research sections in Africa.

(A) The ORSTOM nematodology laboratory has conducted nematode surveys of vegetable crops, identified potential problem was in production and suggested various solutions. They have also on two occasions provided fumigation of seed-beds training to CPS staff who in turn are to provide these services where needed (i.e., Greenbelt Project)

(B) ORSTOM/Dakar can provide back-up services to the CPS Plant Pathology Department in the area of nematode specie identification and assistance in developing solutions to identified problems in Guinea-Bissau. Plant Nematodes constitute a difficult area of work due to their

small size and the frequent failure of farmers to recognize them as a problem. ORSTOM is also a source for nematode-related training.

(C) Starting in 1985 ORSTOM nematologists have made 6 visits to Guinea-Bissau to work with the CPS and meet with DEPA (Guinea-Bissau National Agriculture Research Service) scientists. Surveys, training and meetings to explain the services provided by the nematode laboratory in Dakar were conducted. The CPS Plant Pathology Department has worked closely with ORSTOM during these visits. ORSTOM has recently extended an invitation to CPS for the training (3 months) of a CPS plant pathologist in nematology to be split between Dakar, Senegal and Montepellier, France. We understand this will be financed by French Cooperation.

6. International Center for Insect Ecology and Physiology (ICIPE), Kenya.

(A) This center conducts research and attempts to find solutions to insect-related problems associated with plants and animals.

(B) This center works (or has) on a variety of pest problems of interest to Guinea-Bissau Agriculture such as termites and stem borers. They also conduct workshops on selected entomology topics (i.e., cowpea entomology).

(C) L. de Abreu has developed a working relationship with various members of ICIPE particularly in the area of biological control. Mr. Abreu (In charge, CPS Entomology Department) conducted his research on biocontrol of stem borers, over a 5 month period, at the ICIPE MBita Paint Station in Western Kenya.

7. United States Department of Agriculture, Agricultural Research Station, Beltsville, Maryland, U.S.A. (Biological Control Unit).

(A) This Unit of the USDA's Agricultural Research Service provides National coordination of the U.S.'s biological control (BS) program in congress-designated areas of national interest. They have several laboratories around the world to assist in the collection of potential agents that could reduce crop losses with reduced or minimal reliance on pesticides. They have a wide range of experts covering Insect diseases: nematodes and insect parasites and predators.

(B) USDA-ARS can provide some back-up support in identification (toponomy) and exchange biocontrol of materials of mutual interest for a variety of insect pests, disease vectors and weeds. Some advice and literature can also be made available upon request. Referrals can also be made to other experts in other countries.

(C) Dr. Jack Drea coordinated a two-week visit to ARS facilities (Beltsville), meetings with ARS Scientists and the BioControl Introduction Laboratory (Newark, Delaware) to acquaint Mr. Abreu with USDA resources and capability in the area of biocontrol. In addition, the USDA is conducting a literature search to help Mr. Abreu learn more about potential approaches/contacts for Insect pests of Guinea-Bissau. Dr. Drea will visit Mr. Abreu for two (2) weeks in September to help work out approaches to BC in Guinea-Bissau and determine to what extent rearing capability should be considered.