SEMI-ARID FOOD GRAINS RESEARCH AND DEVELOPMENT

PROJECT EVALUATION

USDA/OICD Team

September 3, 1984

Washington, D. C.

PREFACE

The SAFGRAD project is a valient effort to apply research technology to the problems of major food grains and grain legumes produced by the farmers in the semi-arid regions of Africa and pass the productive results to these farmers through an active extension program in each country. SAFGRAD was established under the umbrella of OAU to coordinate project activities and better utilize the limited number of scientists scattered among these countries.

Unfortunately those in administrative positions often become impatient over the seeming absence of postive results. Biological cycles require time for maturation and extensive testing. It also takes time to develop the human organization needed to conduct research, test the results and extend only proven technology. It is difficult to place a value on such organization or to fully estimate its long term worth. SAFGRAD has the major elements of such an organization. Under the highly respected leadership of the OAU/STRC Coordination Office, the base exists for developing and organizing the professional talent to focus on the critical food problems of semi-arid Africa.

To evaluate a project that aims to accomplish so much in so many countries in so few years was a major challenge. The evaluation team composed of very competent professionals with many years of experience looked at the various aspects of the project. Though the reports has been closely edited, it is long. Hopefully the more detailed discussions will have value to those involved in project management and the designers of the follow-on project. For those with less interest in project details, the executive summary, major conclusions and recommendations will suffice.

Although the draft report was written prior to our departure from Ouagadougou, the editing and finalizing the report has been the responsibility of the team leader. An earlier draft was circulated to evaluation team members and those involved in project management. Those suggestions received have been considered and included where feasible. It is indeed unfortunate that the team could not reconvene to discuss this report. If there are inconsistencies and errors in the report, the fault is mine.

This final report with minor changes, is issued after a presentation/discussion meeting with Africa Bureau personnel on August 7, 1984.

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LIST OF APPENDICES

ACRONYMS

CC	Consultative Committee (of SAFGRAD)
CDA	Cooperation for Development of Africa
CILSS	The Permanent Interstate Committee for Drought Control in the Sahel
CIMMYT	International Maize and Wheat Improvement Center
CNAR	National Center for Agronomic Research, Bambey, Senegal
FSU	Farming System Unit (Purdue University Contract)
FSR	Farming System Research
IAR	Institute for Agriculture Research, Ahmadu Bello University, Samaru, Nigeria
IARC	International Agriculture Research Center
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDRC	International Development Research Center (Canada)
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
INSAH	Institute of the Sahel
IRA	Institute for Agronomic Research (Cameroon)
IRAT	Institute for Research in Tropical Agriculture and Food Crops
ISC	ICRISAT Sahelian Center, Niamey, Niger
ISNAR	International Service for National Agricultural Research

IVRAZ	Voltaic Institute for Crop and Animal Husbandry Research (Upper Volta)
OAU/STRC	Organization of African Unity/Scientific, Technical and Research Commission
PES	Project Evaluation Summary
SADCC	Southern Africa Development Coordination Conference
SAFRAD	Semi-arid Food Grain Research and Development Project
SODEVA	Agricultural Extension and Development Corporation (Senegal)
SODOCOTON	National Cotton Development Authority (Cameroon)
TAC	Technical Advisory Committee (to CC)

EXECUTIVE SUMMARY

SAFGRAD was initiated in 1977 as a $13.9 million, five year project. Funding was later increased to $19.1 million and the project completion date extended to March 31, 1985. Supporting research on three food grains (sorghum, millet and maize) and two grain legumes (cowpeas and groundnuts), the project also concentrated upon development and promotion of cultural practices appropriate to small farm, low-input, semi-arid farming systems Primary project activities included regionally coordinated research and support to national research, field trials and outreach programs to extend improved technology to farmers. The Organization of African Unity Scientific, Technical and Research Commission (OAU/STRC) served as the coordinating organization. Membership initially included 18 African countries, but later increased to 25 with three more currently applying for membership.

Although a grant agreement was signed with the OAU/STRC in Lagos, Nigeria, an OAU/STRC Coordination Office was established in Ouagadougou, Upper Volta for administration of the project. Less than ten percent of project funds were actually managed by this office. Nearly 75 percent of the funds were in direct contracts between AID and IITA, ICRISAT, Purdue University and individual contracts for Accelerated Crop Production Officers (ACPO). OAU/STRC was not a party to these contracts although the International Coordinator approved project implementation documents.

IITA did research on maize and cowpeas with researchers working both at Ibadan, Nigeria and Kamboinse, Upper Volta. Considerable progress was made in developing improved cowpea varieties. In terms of project objectives the maize breeding program was less successful. IITA concentrated upon breeding and selecting for varieties which do well under moderate levels of fertility (70-40-30 kg/ha) and soil management, rather than under the low input conditions of small farmers in the project area. Varieties developed by IITA yield well under "good" conditions, but generally have not done as well as local varieties under the stressful conditions found in farmers fields.

ICRISAT had responsibility for research in sorghum and millet. The Project Paper had included groundnuts, an ICRISAT mandated crop, but research in groundnuts was never included in their contract. A three man sorghum/millet research team was stationed at the Nigerian ~~International~~ Institute for Agricultural Research ~~Center~~ (IAR) at Samaru, Nigeria. One person, a soil and water management scientist, was stationed at Kamboinse, Upper Volta. A regional sorghum/millet trials coordinator to work in eastern and southern Africa was added to the ICRISAT/SAFGRAD team in September 1982. Rapid turnovers of staff at Samaru resulted in less progress than desired in developing improved varieties and agronomic practices for sorghum and millet. The soil scientist at Kamboinse conducted useful soil and water management research. He could have done more if he had been provided necessary research equipment as specified in his contract with ICRISAT.

The Farming Systems Unit provided under a contract with Purdue University, after an ineffective beginning, altered course and is now providing some valuable information on the national level for Upper Volta. Aside from development of FSR methodology, the research has had little impact on a regional basis.

Five ACPOs are currently located in member countries (Mali, Senegal, Togo, Cameroon and Upper Volta). They provide the linkage between research and extension. All operated somewhat differently, but are generally involved in on-farm research trials and work with both national research and extension programs. Three ACPOs are expatriates and two are local nationals. The Togo ACPO is financed by French aid; the other four by AID. The work of the ACPOs in general is one of the strong aspects of the project.

Management of the OAU/STRC Coordination Office in Ouagadougou, has made a considerable change in style of operation largely due to a critical audit conducted in mid-1982. Because of the audit, the project was brought to a virtual stand-still while both AID and the incumbent International Coordinator attempted to explain discrepencies. Now that the new International Coordinator and Director of Research are in place, a noticable change of direction and sense of purpose has taken place. The USAID/UV Mission is working closely with them to ensure that acceptable accounting procedures are followed. Two internationally qualified accountants have been hired to manage and control project funds. In addition, the Technical Advisory

Committee (TAC) and the Consultative Committee (CC) after a slow start are beginning to function as planned in providing technical and policy guidelines.

While it is much too early for conclusive research results suitable for widespread extension to farmers, SAFGRAD has achieved the following major accomplishments:

- o established an OAU/STRC Coordination office staffed by professionally competent staff with international accepted management and accounting procedures that provides leadership to researchers in member countries and attracts funds from international donors to facilitate research;
- o held 12 technical workshops attended by an average of 58 African scientists from 12-20 countries to exchange ideas and information and plan variety trials;
- o conducted monitoring tours, small groups of 6-8 scientists from neighboring countries, to conduct a peer review of research work and encourage professional excellence;
- o a newsletter is sent to cooperators in the SAFGRAD network to keep them abreast of project activities;
- o provided long term training to 21 research scientists and short term training for 70;
- o established ACPO positions in five countries to provide a bridge between research, extension and farmers--- other countries are requesting ACPO positions, evidencing a growing acceptance;

- o provides funds to ICRISAT and IITA to focus research efforts on the small farmers in semi-arid areas;

Though this evaluation is largely a terminal evaluation, plans are underway for a follow-on SAFGRAD II project. We are of the opinion that a strong foundation exists in the OAU/STRC Coordination Office that could be developed into an effective facilitator for research activities in member countries. A number of suggestions are made for the design team. Perhaps the most fundamental issue is a recognition by AID of the need for developing an institution within OAU/STRC to: (1) establish broad policy guidelines for research activities common within the region, (2) seek necessary funding from international donors, (3) organize and/or finance conferences and workshops that will develop professionalism and camaraderie among professional colleagues in both extension and research and (4) disseminate technical information among member countries. There is a role for SAFGRAD---it needs to be carefully designed and provided with the resources necessary to do the job.

MAJOR CONCLUSIONS

1. The Project Paper designed a well planned technical program to accomplish research objectives. However, it basically ignored the issue of institutional development. As a result, the project has had some serious management problems. If the project had an explicit institutional development objective, a more positive approach may have been taken to create within OAU/STRC a capability to manage

AID and other donors' resources to coordinate research activities of member countries. Despite poor organizational design, the project has succeeded in achieving most project objectives.

2. The new International Coordinator and Director of Research have the respect of their professional colleagues and are assuming responsible management of the SAFGRAD program.

3. The Technical Advisory Committee (TAC) and the Consultative Committee (CC) of SAFGRAD after a slow start have begun to function along the lines planned in the project paper. The TAC has met three times and is scheduled to meet again in July 1984. The CC met twice with another meeting scheduled in April 1984. These committees provide a structure for respresentatives of African member countries and donors to influence program content and to establish policies and mechanisms for carrying out their decisions.

4. While AID signed a grant agreement with OAU/STRC for nearly all of the SAFGRAD project funds, OAU/STRC until recently had responsiblity for managing only about ten percent of all SAFGRAD funds. Most of the funds are committed in direct contracts between AID and IITA, ICRICSAT and Purdue University. OAU/STRC is not a party to these contracts, although they approve project implementation orders.

5. The 1982 AID internal audit was a major trauma for both AID and SAFGRAD. This resulted in a number of changes in the management of the OAU/STRC Coordinator's Office in Ouagadougou. For a relatively small portion of the project

funds, the OAU/STRC office was virtually paralyzed for over a year. USAID/UV and SAFGRAD devoted an excessive amount of time to "clearing" the audit recommendations. As a direct result of the Audit, the USAID/UV Mission has been working closely with the OAU/STRC to develop satisfactory financial management procedures. Two chartered accountants have been hired by the OAU/STRC to manage the funds of AID and other donors.

6. The IARCs have had some success in developing improved grain varieties. It is much too soon to see the results. Promising lines with resistance to pests and diseases show considerable potential.
7. Soil and water management problems are not being adequately addressed and must receive increased emphasis.
8. The Accelerated Crop Production Officers (ACPO) are one of the bright spots in the project. They serve as a major link between research and national extension programs. Only five ACPOs are currently employed, four of them funded by USAID.

RECOMMENDATIONS

With only a year remaining in the project, little can be done to change project direction. We have, therefore, restricted our recommendation to those that project management can address.

1. Cowpea breeding and agronomic research should be continued at present or increased levels with more emphasis on breeding plant types desired by farmers, e.g. indeterminate plant with leaves eaten as vegetables.

2. Recognizing that it is too late in the SAFGRAD project to change the maize breeding program, it is strongly recommended that SAFGRAD through the TAC and CC clearly state the objectives of any future maize breeding program and be firm in seeing that the breeding program is being conducted in such a manner as to achieve those objectives.

3. The FSU should be fully staffed with expatriate researchers as stipulated in the Purdue contract and a training officers should be added in 1984 as recommedned in the TAC Report for 1984. If budgetary restrictions preclude hiring a Training Officer, FSU should investigate other sources of technical assistance to enable a process of wider information dissemination about FSU findings and methods to be launched. The centrally funded Farming Systems Support Project (FSSP) could provide short-term technical assistance for training, development of training materials and networking.

4. During 1984-85 the FSU should plan a series of seminars and workshops for various Voltaic audiences to inform them in depth of FSU findings and to get feedback on the perceived value of FSU research to date. The FSU must try to ensure that its efforts and those of other FSR programs (IRAT and ICRISAT) are also presented for joint review and discussion at the national level in Upper Volta.

5. The 1984 work plan should be pursued as indicated with two additions:

   o FSU should specifically seek to work more closely with the IITA cowpea research program;

- o FSU should include female respondants in the village surveys. If appropriate, female interviewers should be hired as soon as possible to facilitate contacts with female agricultural laborers.

6. A number of specific recommendations are made for the ACPO program. Most are suggestions directed at the OAU/STRC Coordination Office.

7. The ACPO program should be vigorously supported by SAFGRAD. All ACPOs need not be financed under SAFGRAD. There are many countries where trained nationals are available to undertake the role of ACPO. SAFGRAD should encourage these countries to create, fund and staff ACPO programs.

8. SAFGRAD should immediately contact ISNAR for assistance in improving its coordination activities with the research and extension organizations of its member countries.

9. Two senior staff members should be added to the personnel of the OAU/STRC Coordination Office. These are: (1) a Director of Training and Extension and (2) a Planning and Organization Officer.

10. AID should include OAU/STRC as a major party in the negotiation of contracts. This could be achieved by:
    - o Making a grant to OAU/STRC who would then award the contract. As an accompanying measure, AID should assist OAU/STRC in the legal and contractual matters at least in the initial stages, or;
    - o AID could retain the negotiation of the contracts under its responsibility, but include OAU/STRC as a major party and as a co-signer of the contract.

11. The OAU/STRC Coordination Office should explore flexible contractual arrangements to achieve networking of FSR and ACPOs.

12. Efforts should be made to ensure that the various components of SAFGRAD receive the resources that are budgeted in the negotiation of contracts and implementation planning of the SAFGRAD project. Major changes in implentation should correspond to clearly stated policy modification.

13. The preparation of administrative procedures, acceptable to both OAU and AID, should be developed and implemented as soon as possible.

14. OAU/STRC/Lagos should make a clear delegation of authority and responsiblity to the OAU/STRC Coordination Office in Ouagadougou.

SEMI-ARID FOOD GRAIN RESEARCH AND DEVELOPMENT
PROJECT EVALUATION

Methodology

This evaluation is considered to be a "major" evaluation of the SAFGRAD project. It follows the mid-point evaluation of July 1981 and an AID audit of the OAU/STRC Coordinator's Office issued in November, 1982. While it may be considered an end of project evaluation, the project termination date has been extended to March 31, 1985; therefore another evaluation may be required at that time. The evaluation was requested by project management November 22, 1983 (Ouagadougou 06703). A refined scope of work based on this request is included in Appendix B.

The first members of the evaluation team arrived in Ouagadougou on January 28, 1984. Visits were made to project sites in Cameroon, Togo, Senegal, Mali and Nigeria. For project documentation, we relied on the Ouagadougou USAID Mission and OAU/STRC files. Interviews and many thoughtful discussions with those involved in project implementation helped shape the teams impressions of progress being made. A draft evaluation report was prepared prior to the departure of the team on March 1, 1984. See Appendix H for travel itinerary of team members and contacts.

Team members and major area of responsibility included the following:

Jocelyn Albert, Farming Systems/Social Aspects

Solomon Bekure, Agricultural Economist

Elvin F. Frolik, Research Administration

Connie McKenna, Extension/Training

Donald R. Mitchell, Team Leader

Andre Poirier, Administration/Management

Emmy Simmons, Farming Systems/Agricultural Economics

Howard M. Taylor, Research

The team was ably provided logistical and administrative support as well as considerable information about project activities by Roger Bloom, USAID/UV Project Officer, John Becker, USAID/UV. Agriculture Development Officer and Robert Gray, AID/W/AFR/RA.

Primary efforts of the evaluation team were directed towards analyzing past and present actions in reaching project objectives. From this base, the team attempted to raise some of the major issues that need to be addressed in the design of a follow-on SAFGRAD II project, contemplated by AID and OAU/STRC.

Project History

AID has a long history of assistance to regional food crop research, beginning in 1964 with maize, sorghum and millet research in East and West Africa. In 1969 this research was separated into two regional projects, one with the East Africa Community and the other in West Africa with the Institute for

Agricultural Research (IAR) at Ahmadu Bello University, Samaru, Nigeria. The West Africa project was developed in cooperation with the Organization for African Unity Scientific, Technical and Research Commission (OAU/STRC) known as Joint Project 26 (JP 26) and was the beginning of multi-donor research efforts in the region. JP 26 terminated in 1976. The current project became operational in 1977 and is known as JP 31 in OAU/STRC and as project number 689-0393 in AID.

The Semi-Arid Food Grains Research and Development Project (SAFGRAD) was planned to support improvements in three cereal grains (sorghum, millet and maize) and two legumes (cowpeas and groundnuts) along with cultural practices appropriate for small farm semi-arid farming systems and to promote their adoption and use by farmers. Project activities were to fall into two broad areas: (1) regionally coordinated research at three African research centers and (2) support of national research, field trials and outreach programs to further develop, test and extend improved technology to farmers.

To augment crop research, support was to be provided to key research institutions in the region including the IAR; the Centre National de Recherches Agronomiques (CNRA) at Bambey, Senegal and; the Kamboinse Research Station at Ouagadougou, Upper Volta. These three research centers were seen as representative of the region's ecological zones and had on-going programs in cereal and grain legume research. The scientific and technical assistance was to be provided by the International Crops Research Institute

for the Semi-Arid Tropics (ICRISAT), the International Institute of Tropical Agriculture (IITA) and the Institut de Recherches Agronomiques Tropical et des Cultures Vivrieres (IRAT).

A regional Farming System Unit (FSU) was to be established to study crucial issues related to acceptance of improved technologies by farmers. A US university was to be contracted for this effort.

Research objectives for the project were stated as follows:

1. Varietal improvement with an emphasis on breeding desirable characteristics and resistance into promising varieties with broad applicability in the region.
2. Farming systems research to identify approaches and improved technologies which are best suited to small farmers.
3. Soils management research aimed at maintaining and increasing soil fertility.

To facilitate the exchange of information between researchers in the region, the project was to support regional scientific conferences, technical publications and information, uniform crop variety trials, training for African scientists and technicians and other forms of regional cooperation.

To provide the catalytic link between researchers and the farmers, positions for Accelerated Crop Production Officers (ACPO) were established. The ACPOs were to work with national research and extension organizations in conducting field trials. It was planned that ACPOs would be expatriates with provision that participating countries could provide their own ACPOs if

suitably trained individuals were available. The project paper anticipated placing an ACPO in each of the 18 participating countries.

To perform the vital role of regional coordination and administrative support services, a grant agreement was to be signed between AID and OAU/STRC. Program and policy guidance was to be provided by a Consultative Committee (CC) comprised of African national research administrators and representatives of donor and international research institutions. A Technical Advisory Committee(TAC) would do much of the staff work and provide technical advice to the CC. The OAU/STRC would serve as the secretariat for both committees.

Total project cost were estimated to be about $21.4 million over the five year life of the project. Of this amount AID would finance $13.9 million, other donors roughly $6.0 million and the host governments about $1.5 million. The project paper with a grant total life-of-project cost of $13.9 million was signed March 24, 1977. The authorization for the first increment of funding for $1,730,000 was signed April 28, 1977.

The project was amended in FY82 to extend the PACD to March 1985 and increase the life of project funding to $16,475,000. Another amendment in August 1983 further extended the PACD to March 31,1987 for training and increased life-of-project funding to $19,169,000.

MID-POINT EVALUATION SUMMARY

The Mid-Point Evaluation of the SAFGRAD project was conducted during July 1981. The Evaluation Team found the project concept to be an "appropriate response to the technological problem of food production in Africa." However, their major conclusions seemed to be somewhat less optimistic. They concluded:

- Major implementation weaknesses resulted from the inactivity of the CC and TAC with the policy vacuum being filled, in part, by the OAU/STRC Coordinator and the AID Project Officer.
- Most project emphasis had been placed on regional level research with little regard to its relevance to low input small farmers.
- SAFGRAD leadership has seriously neglected the marshalling of research and extension resources in member countries and the coordinating of research and development to attack the problem of increasing food production in the region.
- Revitalization of the CC and TAC was necessary with a relative shift in emphasis from project operation to coordination and integration of research and development resources in the region.
- The permanence of SAFGRAD should be supported by enhancing the role of OAU/STRC relative to that of AID administration.

- SAFGRAD's major emphasis had been on varietal development research.

Major issues in conducting regional research, included:

- Research resources funded by other donors at Kamboinse were not integrated into SAFGRAD.
- Using national research stations as regional research centers was causing problems.
- Emphasis on development of varieties whose full potential require inputs farmers do not have.
- Soil and water research was given insufficient emphasis.
- The FSU was intended to give SAFGRAD a capability for basing its research and development activities on an understanding of the farmer's decision making environment. The FSU team had concentrated its efforts on village level studies in Upper Volta, raising a question about its relationship with the overall regional thrust of SAFGRAD.
- The ACPO was to have two roles: (1) liaison between national and regional level research and (2) liaison between national research and national extension. Each of the four ACPOs was making his own accomodation to this dual assignment.

Comment: Seemingly the evaluation did not trigger a quick response in project management. A PES was not prepared until after it became the subject of an audit recommendation in mid

1982. The PES is dated April 21, 1983. It indicates actions were already being taken on evaluation recommendations though the record is not clear as to when actions were taken. A copy of the PES is included as Appendix C. The 1981 evaluation did trigger meetings of the TAC and CC in October, 1981 when the draft Mid-Term Evaluation was the major topic of discussion. However audit issues and responses became the primordial management interest of the SAFGRAD Coordination Office and of AID between late October 1981 and mid 1983. There was insufficient follow-up of the mid-project evaluation.

At the time of our visit in February 1984, Dr. Joseph M. Menyonga had assumed the duties of the OAU/STRC Coordinator in May 1983; Dr. Taye Bezuneh had become Director of Research in November 1983. The CC had met in November 1983 with another meeting scheduled in April 1984; the TAC met in January 1984 with another meeting scheduled in July 1984. A positive attitude permeated those working on SAFGRAD, a feeling that they were beginning to control events rather than being controlled by events. In the pages that follow, we attempt to evaluate progress made in the major project components---Research, Farming Systems Unit, Accelerated Crop Production Officer, Training, a review of administration and financial management followed by evaluation of SAFGRAD activities. Each section will include conclusions and recommendations.

While not truly a part of the evaluation, we were asked to make suggestions for a possible SAFGRAD II project. These suggestions are included in the final section of the report.

RESEARCH

Introduction

At the heart of the SAFGRAD project is the development of improved varieties and cultural practices of sorghum, millet, maize and cowpeas to be used by low input small farmers in the semi-arid areas of Africa to increase the production of these food grains. Groundnuts were included in the original project paper, but research was never funded nor included in a research contract. These varieties and practices were to be developed through regionally coordinated research conducted by International Agricultural Research Centers (IARCs) and through support to national research and development programs. Discussion here will be limited to the commodity research program, with farming systems research discussed separately.

The commodity research contracts recognized the crop specific mandates of the IARCs. A contract for maize and cowpea research was developed with IITA while ICRISAT signed a contract to do sorghum and millet research. According to the project plan, performance under the contracts was to be evaluated by the following criteria:

- Cereal and grain legume varieties and cultural practices which provided increased production and profitability under small farm conditions.

- o Cropping systems to maintain soil fertility.
- o Physical demonstration of new technologies.
- o Certain specific varietal characteristics related to growth cycle, pest and insect resistance.
- o Evidence of regional coordination among African researchers.

The Mid-Term Evaluation Team recommended:

> The reorientation of the SAFGRAD thrust which.....would de-emphasize, relatively, SAFGRAD's direct involvement in research and emphasize....SAFGRAD's coordinating and leadership role.....centers for regional level research, ACPOs and FSU, [they] do not, by themselves, constitute a regional research network.....the regional network concept has so far not been exploited sufficiently in achieving SAFGRAD's purposes.

Maize and Cowpea Research

IITA Contract

The contract between AID and IITA specified that IITA would plan and conduct research on:

- o Improved maize production technology for adverse conditions including low soil fertility, periods of drought, presence of harmful insects and diseases and the indigenous practices of mixed cropping;
- o Major insect programs of improving maize and cowpeas in their different production technologies and;
- o Selection of varieties that most effectively utilize available nutrients and water and those which have a superior performance in appropriate cropping systems.

The contract further states:

> The contractor staff will join the National Research Center staff (including Africans and expatriates) at Kamboinse, Upper Volta and selected off-station sites to plan and conduct research directed toward the development of high yielding, disease resistant, insect tolerant, drought resistant, nutritious varieties of cereal and legume food crops.....The contractor staff will assist/guide Accelerated Crop Production Officers (ACPOs) and National Research/Extension Officers in planning and implementing a network of field trials throughout the project area utilizing the research results from the national and regional centers.

The contract provided for a maize breeder, an entomologist, a soil fertility agronomist and a maize production agronomist. In addition, IDRC (Canada) funded a cowpea breeder who worked closely with the IITA/SAFGRAD contract. These five individuals were divided into two teams: (1) a maize breeder and maize agronomist and (2) a cowpea breeder and cowpea agronomist. The Entomologist worked about eighty percent with the cowpea team and about twenty percent with the maize team. Although the IITA contract called for the entomologist to conduct some research on insects of sorghum and millet, the entomologist reported he had not done so.

One of the first tasks facing the IITA team when it arrived in 1978 was to develop facilities for research. The scientists cleared 22 hectares of land at the Kamboinse Research Station, located 13 kilometers from Ouagadougou. The land was ditched, drained or terraced. Two laboratory/office buildings were constructed as well as work sheds and two insect houses or screenhouses---all with SAFGRAD funding.

Maize Research

The maize breeder has released two varieties in Upper Volta and has tested these and several other varieties in one of two regional trials. Two varieties, SAFITA 2 and SAFITA 104, have been released. Other promising varieties developed by IITA/SAFGRAD include SAFITA 2 (Pool 16), TZE 3 and TZE 4. In village trials conducted by the Farming Systems Unit (Purdue University), SAFITA 2 produced more than the locally prevalent variety under "good" conditions but less than the local variety under "stressful" conditions. In addition, the entomologist has conducted an initial screening to identify termite resistant lines of maize.

The Maize Agronomist has shown that yield of maize increases as depth of plowing increases, especially when maize is grown in the upland positions of the topo-sequence. He has also shown that yields of both local and improved varieties of maize can be increased substantially by adopting improved agronomic practices such as maize followng cowpeas, tied ridges and phosphorus fertilization. Cowpeas increased yields of the subsequent maize crop in an amount equivalent to adding 30 kg/ha of nitrogen. He has had some success in water management experiments, such as, cultivation for breaking the soil crust, terrain irregularities to slow down run-off, site selection, use of crop residues for mulch, use of early maturing varieties, appropriate planting dates and plant densities.

The Mid-Point Evaluation Team expressed a major concern about appropriateness of the specific site used by the IITA/SAFGRAD maize breeder for his on-station trials. The site is well supplied with water and nutrients and does not typify farm sites (except for a very small fraction of the land surface occupying similar hydromorphic sites). Sites at Kamboinse were not changed in response to the mid-term evaluation. Correctness of the mid-term concern can be shown readily by examining 1982 Regional Upper Volta Variety Trials---RUVT 1 and 2. In the RUVT 1 trials conducted at eleven sites, SAFITA 2, SAFITA 104 and the local check varieties averaged 3482, 3083 and 3883 kg/ha, respectively. In the RUVT 2 trials conducted at nine sites, SAFITA 104 averaged 4178 kg/ha while the local checks averaged 3767 kg/ha; however, when results from the Kamboinse site were eliminated, the averages were 3828 and 3711 kg/ha, respectively. In comparison, IRAT 178 averaged 4311 kg/ha across the eight sites.

Evaluation of Maize Variety Trials

In 1983, SAFGRAD assembled two types of uniform trials of maize (early and medium maturity) and distributed seed to 24 national programs. Results were received from about fifty percent of the tests. To help evaluate the entries and provide a learning experience for participants, SAFGRAD conducts "monitoring" tours consisting of six to eight national scientists along with IITA/SAFGRAD and IITA/Ibadan scientists, visiting research plots in five to six countries. The personnel make-up

of these monitoring tours and the countries visited are rotated annually. Through these tours and individual visits by members of the SAFGRAD Team, most of the countries participating in maize research are visited annually.

SAFGRAD holds annual workshops with national investigators to discuss the past year's results and to formulate plans for the coming year, especially with respect to entries to be included.

Other Regional or International Maize Research

Maize is grown in varying amounts, at least in the more favorable areas, throughout the semi-arid regions of Africa. The present agencies with more than national responsibility for maize research in the semi-arid regions of Africa, in addition to SAFGRAD, include the following:

IITA/Ibadan: Has an extensive research program by core staff, including four breeders who conduct regional tests. The center has contracts for conducting research on various crops in national programs in Cameroon, Rwanda and Zaire.

CIMMYT: Has world-wide responsibility for maize research and conducts extensive international tests. Has one breeder with another to be added in Nairobi. Also has a breeder stationed at IITA/Ibadan.

IRAT: Has a maize research component and conducts regional trials.

INSAH: Has no breeding program, but conducts regional trials.

FAO: Has no breeding program, but conducts regional trials.

All of the above six agencies are involved in regional (international) testing of maize. They do not all cover the same portion of the semi-arid region covered by SAFGRAD. Some have more than one kind of test at each location, with each participating country designating the number of locations to do the testing. Seed, planting plans and data sheet forms are provided by the agencies to the participating national programs.[1] Following harvest, copies of the data are submitted to the respective agencies. There they are analyzed statistically and the results are sent back to the cooperating countries.

Of the above agencies, SAFGRAD, INSAH and IRAT hold annual workshops to which the national investigators are invited. The past year's results are discussed and plans are formulated for the coming year, especially with respect to entries to be included.

The problem of conflicts between SAFGRAD and other agencies in conducting and coordinating research was discussed by the Mid-Term Evaluation Team in considerable detail in the case of CILSS/INSAH.[2] The differences appeared to be rather serious. A meeting was held in December 1980 with the purpose of avoiding

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[1]This is the general pattern of conducting trials on a regional or international basis. There may be some deviations from the system by individual agencies.

[2]Mid-Term Evaluation pp. 19 and 20.

".....duplication in agricultural research in the member states belonging to both CILSS and SAFGRAD." This meeting apparently accomplished little with respect to INSAH/SAFGRAD division of responsibilities and relationships.

The Mid-Term Evaluation Team's suggested solution was that:

> INSAH should coordinate research, but not perform it. If INSAH comes up with necessary funds SAFGRAD should turn its sights elsewhere.

The matter was further considered and recommendations for corrective measures were adopted at the November 1983 meeting of the CC and at the January 1984 meeting of TAC.

Cowpea Research

SAFGRAD/IITA has a full-time agronomist and about eighty percent of an entomologist's time devoted to this crop. In addition an IITA/IDRC breeder is a member of the team. All are located at Kamboinse. The extent of regional activities by other agencies is not fully known. We were told that IITA/Ibadan, SAFGRAD and EEC program funding cover all of the Africa cowpea research.

In 1983, SAFGRAD distributed seed for two types of trials, one consisting of medium maturing varieties and the other of early maturing varieties. These were sent to 18 countries. In addition a test consisting of varieties with promising striga resistance was distributed to five countries. Seven national programs are conducting cowpea trials to check performance under minimum insecticide umbrellas (two sprays only). In 1983, there were three national programs in cowpea management trials, and six in cowpea/maize relay trials. The cowpea team at Kamboinse has

operated primarily as a unit involved in screening varieties and breeding lines for pest resistance and days to maturity. The team has made substantial progress. Thrip, bruchid, maruca and striga resistant or tolerant breeding lines have been identified. Breeding materials have been found resistant to two earlier identified aphid biotypes as well as the new biotype "K".

The sixty day maturity cowpea developed by IITA represents a major advance for the Sudan and Sahel Savannas. This variety allows the crop to mature and produce several hundred kg/ha of cowpeas during years when the rainy season is short. Normally, if the cowpeas do not mature within about five days after the rainy season ends, complete yield loss often occurs on the shallower soils of the topo-sequence.

Although the Mid-Term Evaluation Team indicated they questioned the value of research on a crop prone to insect and disease damage, the present evaluation team is encouraged by the excellent progress made to date. We would, however, suggest that breeding include indeterminate plant types that produce leaves eaten as vegetables by many people. Emphasis has been placed on seed production rather than the production of vegetation that may be more highly preferred by the African farmer.

Sorghum and Millet Research

ICRISAT

Primary research for sorghum and millet was included in the ICRISAT contract with site locations at Samaru, Nigeria where the breeding work was to be conducted and soil and water management research to be done at Kamboinse, Upper Volta.

Samaru, Nigeria

The plant breeder has screened about a thousand lines of tropical origin sorghum and then tested selected lines for yield and mold resistance. Working with the entomologist, he found significant varietal differences in stem borer resistance in both seedling and mature plants. He also found significant varietal differences in shootfly resistance. Several varieties were found with some resistance to leaf spot, anthracnose, sooty stripe or seed mold. Striga resistant lines of sorghum and millet have also been identified.

The sorghum breeder collected 203 entries from northern Nigeria to test the hypothesis that hybrid races developed under natural selection have high yield and other attributes. The collection showed some lines with stem borer resistance but not with leaf spot resistance. Regional variety trials were set up and seed was distributed for both sorghum and millet.

Significant progress has been made in fitting relay or intercropping systems using sorghum, millets and cowpeas.

The Evaluation Team suggests that the whole question of ICRISAT's participation in SAFGRAD at Samaru should be examined very carefully if a SAFGRAD II project is contemplated. The SAFGRAD component in West Africa is split between two locations with no apparant effort to use the four scientists as a team. The Samaru unit has had considerable staff turnover, much of it due to difficult living conditions peculiar to Nigeria. Even so, maize production is moving northward in Nigeria and sorghum production is trending toward commerical scale production rather

than that produced by the small farmer targeted by SAFGRAD. IAR at Samaru has a well-qualified sorghum breeder who could fill the commercial-type breeder role if ICRISAT scientists were withdrawn from Nigeria. Most of ICRISAT's millet research work will likely be moved to their new millet center at Niamey, Niger. Further, ICRISAT has not reported their sorghum and millet work in a timely manner nor in a manner where SAFGRAD countributions are easily identifiable.

Kamboinse, Upper Volta

Soil and water management research has made considerable progress even with limited resources. Some examples include:

Microcatchments: A microcatchment basin using a 0.5 meter row width yielded 5.2 tons/ha for an improved variety of sorghum and 3.0 tons/ha for a local variety. A microcatchment basis using 1.0 meter row widths yielded 2.6 tons/ha of Souna 3 millet. It was also concluded that the farmer's energy to construct basins was best expended when utilized on high yielding varieties of sorghum and millet.

Mulching: Yield is improved significantly when mulch is applied as a surface treatment. The mulch slows run-off, reduces soil surface destruction due to raindrop impact, reduces evaporation and increases infiltration rate. To be effective, the mulch must be applied at or soon after planting.

Weeding: Microcatchments reduce the amount of time required for weeding. If microcatchments and mulches are both used, weeding is necessary only in "Hot spots" of weed activity.

Animal Traction: An animal traction program has been initiated. Oxen, donkeys and operators have been trained to construct microcatchments, terraces, roads and to smooth field plots.

Water Harvesting: Technicians have been trained to survey and layout runoff plots to measure effects of surface treatment on losses of water, nutrients and applied chemicals.

The soil and water management scientist located at Kamboinse has not had enough scientific equipment to make the routine measurements required for publication in referred journals. He is to be commended for the results he has obtained under the circumstances. The Mid-Term Evaluation stressed the need for more empahsis on soil and water management research. The present Evaluation Team still sees insufficient emphasis on soil and water management, both in the ICRISAT and IITA management at Kamboinse.

Cooperation between the IARCs is somewhat less than would be desirable. For example, an excellent publication by SAFGRAD/IITA on SAFGRAD research in Upper Volta makes no mention of soil management research apparently because it was done by SAFGRAD/ICRISAT---on the same station.

Related Programs of ICRISAT

ICRISAT has a number of programs in Africa dealing with the same commodity crops included under SAFGRAD that should be noted. In addition to national programs in Upper Volta, Mali and Sudan, ICRISAT has or plans to implement the following regional programs:

> ICRISAT Sahelian Center (ISC): A major research center for the Sahel, located at Niamey, Niger. This center will conduct research on millet and groundnuts and will include livestock in cooperation with ILCA. It has a staff of ten professionals and is still growing. It will service millet research for western Africa from northern Nigeria and Senegal eastward (including northern Cameroon) to western Sudan.

SADCC: A recent major development is the ICRISAT/SADCC project with headquarters in Zimbabwe. This program involves the countries of Swaziland, Lesotho, Zimbabwe, Botswana, Tanzania, Angola, Mozambique, Zambia and Malawi. A staff of eight professionals is planned with initial work to be on sorghum and millet. ICRISAT/SAFGRAD at Nairobi will terminate its work in southern Africa and operate principally in eastern Africa.

Sorghum Program for Western Africa: Consideration is presently being given by ICRISAT to establish a major sorghum research program in western Africa to combine and expand their research efforts in this region. Locations being considered include Upper Volta, Mali, Nigeria, Senegal and Cameroon.

Inventory of Research Information

In this report the Evaluation Team has attempted to summarize the regional research resources, duplications in programs with other agencies and to a limited extend, shortfalls in meeting research needs, for the commodities and disciplines relating to crops assigned to SAFGRAD. Obviously, the information included cannot be fully inclusive and may in some cases not be entirely accurate. What is needed is a comprehensive inventory of major constraints in farm production, unmet research needs, existing research resources and cases of undesirable duplication.

It is the understanding of the Evaluation Team that CDA is making a continent-wide study to provide as complete as possible picture of the information needed. Such an inventory is an essential first step in utilizing all available resources to address chronic food production problems of Africa.

CONCLUSIONS

1. It is not reasonable for USAID to expect measurable downstream end product results, such as proven varieties, from plant breeding programs in a five-year program such as the original time period proposed for SAFGRAD. This is especially true in semi-arid locations.
2. Annual workshops for participating national scientists are held annually providing an opportunity to exchange ideas and make plans for the coming year.
3. The maize breeding program at Kamboinse is inconsistant with objectives stated in the Project Paper and has not been directed toward the low input small farmers specified in the USAID/IITA contract. Modest progress is being made toward the goal researchers defined for themselves---high yields with moderate inputs.
4. With six different regional organizations conducting maize variety testing programs there appears to be some unnecessary duplication and over-burdening of national programs to conduct these tests.
5. The cowpea research program of IITA is progressing very satisfactorily.
6. "Monitoring" tours held annually for maize and cowpea researchers are very beneficial in providing an exchange of ideas and helping to upgrade tests.

7. IITA reports their results in a timely manner and identifies them with SAFGRAD funding.
8. The ICRISAT Team at Samaru, Nigeria has made progress in identifying pest resistant breeding lines and in identifying high producing short statured varieties of sorghum.
9. Changing sorghum production patterns in Nigeria raises questions about the advisability of continuing research at the Samaru location.
10. ICRISAT does not clearly identify nor produce timely reports of their results from research supported by SAFGRAD.
11. Soil fertility and water management research was not increased after the Mid-Term Evaluation, despite a strong recommendation to this effect.
12. The centers in existance and those planned will provide an adequate network for sorghum/millet research.
13. No work has been conducted on groundnuts under SAFGRAD as stated in the Project Paper as no funds were provided for this purpose.

RECOMMENDATIONS

1. Cowpea breeding and agronomic research should be continued at present or increased levels of funding with more emphasis placed on breeding plant types desired by farmers e.g. indeterminate plant with leaves eaten as vegetables.
2. If IDRC (Canada) discontinues their support of the cowpea breeder, the position should be funded under SAFGRAD by AID.

3. Recognizing that it is too late in the SAFGRAD project to change the maize breeding program, it is strongly recommended that SAFGRAD through the TAC and CC clearly state the objectives of any future maize breeding program and be firm in seeing that the breeding program is being conducted in such a manner as to achieve those objectives.

4. ICRISAT should be required to report their results in a timely manner and in sufficient detail to allow performance evaluations to be made on an annual basis.

THE FARMING SYSTEMS UNIT

Historical Overview

The Farming Systems Unit (FSU) was envisioned as the SAFGRAD mechanism for linking the commodity research conducted by the selected international agricultural research centers (IITA and ICRISAT) to the national agricultural research systems and to small farmers in the semi-arid tropics. The FSU was to be physically headquartered at the Kamboinse Research Station in Upper Volta, but was to expand its focus and activities to the region as a whole within a year or two of project start-up. The FSU was assigned five major areas of responsibility:

1. To analyze small farm conditions and the application of new technologies to those conditions;
2. To design, help to organize and analyze farmer field trials and studies;
3. To formulate strategies regarding the development and application of small farm technology;
4. To develop recommendations regarding physical research priorities;
5. To develop farming systems research methodologies of general application throughout the region and to assist new and ongoing FSR programs in SAFGRAD countries.

It was expected that the FSU would work collaboratively with other SAFGRAD and national commodity research entities in order to ensure that "new technologies....[are]....compatible with small farmer farming systems. A 'low infrastructure,' low risk technology is needed."[1]

Purdue University responded to an RFTP issued by AID in early 1978 and won a two-year contract. AID and Purdue signed the contract in mid-1978 and Purdue had part of its technical assistance team on the ground in Upper Volta by early 1979.

For the 1979-81 period, the FSU/Upper Volta staff consisted of three expatriate researchers (an agricultural economist who was also chief of party, an agronomist and an anthropologist), one Voltaic researcher with a Master's degree in economics and a number of locally hired enumerators and agronomic technicians as well as office and computer staff. Much effort was expended by project staff in the first two years to define a workable FSR methodology and to conduct on-farm trials.

1981 Evaluation Findings and Recommendations

In July 1981, an evaluation of the SAFGRAD project reviewed in considerable detail the experiences of the FSU and made fairly extensive recommendations on the changes needed to bring the FSU activities more in line with the spirit and purpose of the SAFGRAD project. Evaluators found that the first FSU researchers did not function as a "team." Rather, each pursued an

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[1]SAFGRAD Project Paper, p. 12

independent line of disciplinary research and carried out parts of the general methodology: village surveys, on-farm trials and socio-economic observations. Although they shared office space at Kamboinse with the commodity oriented researchers from IITA, there was little interaction within this group, either on research problem definition or on a program of on-farm trials. The research effort of the FSU was strictly limited to Upper Volta and there were no firm plans to "regionalize" the effort.

By mid-1981, the economic and anthropological surveys had generated an abundance of raw data, some of questionable quality. While only a few preliminary analyses and publications had been completed, the agronomic research program continued more or less on the basis of initial assumptions without the benefit of more refined information on farm-level constraints. Efforts to clean the data had repeatedly run into problems even though additional staff and computer equipment had been added to try to salvage the detailed data base and analyze it.

Although animal traction seeders showed some promise of increasing yields, primarily through increased tillage at seeding time to trap moisture, improved sorghum variety trials showed no appreciable increase in yields over local varieties. Trials also showed that the benefit from the rock phosphate applications appeared only in the second year, due to its low solubility.

The 1981 evaluation also pointed out that an underlying thrust of the FSU work---that it would be worthwhile to "identify and improve upon the extensive portion of the farmers' production

system...[was]....rather at variance with the rest of SAFGRAD, where the emphasis is upon the development of an intensive...agricultural system."[2]

In sum, the 1981 Evaluation Team concluded:

- o the FSU had been assigned too many objectives without being given the resources to accomplish them;
- o the staff was not as experienced as would have been desirable;
- o early decisions on FSU methodology had led to a program focussed only in Upper Volta instead of the region as mandated, and had still run into serious conceptual and management difficulties;
- o salvage operations were needed in order to "put...the FSU back on the track of carrying out adaptive research to develop improved technologies intended to integrate into existing farming systems."[3]

Four recommendations (1-4 below) were made in an effort to improve the effectiveness of the FSU in the two years then remaining in the project life. Two other recommendations (5-6 below) were made, directing FSU to establish better linkages with the commodity research elements of SAFGRAD and national FSR programs---these linkages were intended primarily to lead toward a more effective follow-up project. The Evaluation Team also reaffirmed the belief that "a strong FSR program is essential to the linking of agronomic research and extension activities at all levels---regional and national---throughout the SAFGRAD region."

Paraphrased, the six recommendations made in 1981 were:

1. the FSU should "cut its losses" in analysis of the intensive surveys and should focus on analysis of that portion of "most relevance to the trials program;"

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[2]Mid-Term Evaluation, p. 34.

[3]Ibid., p. 40.

2. the adaptive research focus should be made "a formal part of the Voltaic national agricultural research and extension structure."

3. the survey program should be slimmed down and turn around time on data collection and analysis should be reduced;

4. the ICRISAT-sponsored symposium on FSR should be used to "begin" a dialogue with IITA and ICRISAT scientists on regional level priorities;

5. the FSU should have a regional orientation (e.g., networking, assisting national research centers to set research priorities and providing expert assistance to SAFGRAD nations on setting up and conducting FSR and training;

6. ACPO operations should be integrated within national FSR programs.

Apparently, neither these recommendations nor the implications of the importance of the relationship of the FSU and other SAFGRAD entities were ever formally reviewed or accepted by the FSU, OAU/STRC or AID. The FSU responded directly to only two of the above recommendations (1 and 3) in its annual work planning efforts, but continued to further refine and restrict their objectives.

FSU Performance, 1981-1984

The FSU has changed considerably since 1981 and most of the changes have been positive. The Purdue contract personnel have been completely replaced---twice, in fact. Although the prior FSR experience of the second team of researchers has not been any greater, the 1982/83 research program was positively affected by improved professional teamwork. The "third" team of technical assistance is now on the ground albeit incomplete. There are more reports and publications available. The village level

research approach has been considereably modified. Turn around time on data generation and analysis has been improved, particularly for the farmer managed trials. An experienced and well trained Voltaic field staff is now in place to ensure data are of reliable quality.

The original project objectives placed much of the responsibility on FSU for translating the commodity research efforts, undertaken by the IITA and ICRISAT, into a program that would have an impact on food grain production on small farms in the semi-arid tropics. Not only was the FSU to conduct farm level research, it was also to play a role in ensuring that other SAFGRAD research entities carried out their responsibilities more effectively. As the 1981 Evaluation Team noted, the orginal project design placed the burden of coordination of other SAFGRAD project components on the FSU without demanding reciprocal coordination efforts from the other SAFGRAD research groups. In addition, the FSU was to be a leader in developing and extending methodologies of farming systems research throughout the region.

The 1981 Evaluation Team judged the original project objectives to have been overly ambitious and to have been wisely reduced in practice by the first FSU Team. Of the five original objectives, the FSU in 1981 had given up work on the development of recommendations for research priorities for the regional commodity research and any activities to assist new and ongoing FSR programs in SAFGRAD countries. All small farm analysis and farmer field trial efforts had been restricted to Upper Volta. Since then, other and orginial objectives have been down played.

Strategy formulation for development and application of small farm technology was de-emphasized. Initially this seemed to imply that the FSU would take a global view of the linkages between commodity research, on-farm research and extension as well as a longer term research focus. It also implied articulating a concerted course of action for achieving specific development objectives. This definition seemed to be in keeping with the overall objectives of the SAFGRAD project.

The first agronomist with the FSU seems to have addressed himself to such a task. He outlined an agricultural production strategy for Upper Volta arguing that, based on the country's economic resources, soils deficient in phosphate, and the prices of cereals produced, Upper Volta should seek to more fully exploit local rock phosphate in cereal production. FSU's research strategy under his leadership followed from this view; a series of on-farm trials was begun to establish the utility of Volta phosphates in cereal production. While this strategic view was never adopted by the technical scientists in the SAFGRAD/IITA team, who contined to work on fertilizer trials involving considerably greater inputs of compound fertilizers, it has continued to have some impact on the work of the rest of the FSU staff as the on-farm trials program continues to emphasize Volta phosphate. Whether the results of these trials have caused a rethinking of this strategy is not clear. But there have been no further written efforts by the FSU to formulate alternative development strategies. The present research strategy basically

adopts the very general view originally laid out in the Project Paper---that those technological interventions appropriate to limited resource based farmers are likely to be most useful.

Recommendations conceivably affecting physical research priorities have been made by the FSU in reports of its own field activities in 1982 and 1983. But the FSU has apparently made little progress in encouraging IITA and ICRISAT (SAFGRAD) scientists to act upon those recommendations. Nor have the scientists apparently sought FSU advice in determing their research agendas. The reluctance of the IITA and ICRISAT scientists to define the activities of the FSU as "research" in interviews with the Evaluation Team is one indicator of difficulties in communications. This, combined with the disproportionate burden for liaison placed on the FSU in the Project Paper, has probably contributed to the FSU's down playing this objective.

The rationale for the FSU not carrying out regional training and consulting activities and for restricting its training focus in the last two years largely to their Voltaic field staff has never been clearly articulated. The FSU, however, has continued to accept its regional mandate since the regional focus is frequently mentioned in Purdue's correspondence with AID since 1981.

The most plausible reason for this lack of regional activity rests largely with the communication difficulties in Africa, making regular consulting and communications needed to play a regional training and networking role very time and energy consuming. Fluency in both French and English is essential as is

time to send and receive cabled or written messages. Face-to-face dialogues require expensive plane fares and substantial blocks of personal time. The FSU already exceeded its planned budget in simply conducting its work in Upper Volta.

Its limited publication record to date apparently reflects the shortness of time that staff found to do all the needed analysis. All of these elements make it difficult to achieve the interaction required to establish an effective regional information exchange network, while at the same time, carrying forward an ambitious program of on-farm and village level research in Upper Volta.

It was orginally envisioned that the FSU would provide consulting and advisory services for FSR activities in West Africa. The need largely unmet by FSU, for such assistance is strongly perceived by many West African national researchers. For example, a high level Senegalese scientist asked the Evaluation Team why AID did not fund a CIMMYT-like farming systems team for West Africa. His own program could benefit tremendously, he felt, from short-term technical assistance for training in survey methodology, data collection and analysis of on-farm trials.

The FSU experience raises serious questions about SAFGRAD's ability to build up and support the kind of farming systems research staff to fulfill the needs for technical assistance and training of national FSR programs in several SAFGRAD countries while at the same time personally conducting village level research in one or more countries. It could be argued that

Purdue should have recruited more senior and more experienced staff from the outset, capable of devoting more resources to analysis, outreach, and consulting in support of the ambitious regional goals. On the other hand, given the staff that Purdue actually recruited over the years and given the amount of time and money they had available to them, it could be argued---as the 1981 Evaluation Team did---that it was reasonable for the FSU to redefine its goals to fit the capabilities of the resources.

Refined FSU Objectives

In the 1982 Annual Report, the FSU outlined its present project objectives:

1 To identify the principal constraints to increased food production.

2. To develop and implement a multi-disciplinary research method which can guide production technology and production research to directly address these production constraints.

3. To identify the elements of that method which can be implemented in national farming systems research programs.

4. To train Voltaic personnel to assume increasing responsiblity in the continuation of this work.

In terms of these more nationally oriented objectives, let us consider the performance of the FSU in attaining these objectives.

Analysis of Small Farmer Conditions

In the 1979-81 period, emphasis was placed on household level interviewing and the collection of a broad variety of social and economic data. Several of the reports available for review during this evaluation presented information from surveys on household labor use and general analysis of the labor constraint. It is our understanding that much of the raw data from these surveys is still unanalyzed.

In 1982 and 1983, the FSU continued to collect socio-economic data to better refine its working hypotheses concerning farmer behavior and production constraints. A sample of 150 households in three villages was drawn in 1982 and input/output data were collected on a thrice-weekly basis, using a fairly standard transaction reporting format, as the basis for a broad constraints analysis. Data confirmed farmer perceptions that labor is a major constraint, while land quality was found to influence the mix of crops actually planted. Animal traction was available to many households, to a majority in some villages. Fairly detailed analyses are underway to understand the effects animal traction has on overall production and productivity. These findings have had some influence on the design of on-farm trials, but more thorough analysis remains to be done.

Socio-economic research during 1982 and 1983 used a series of one-time "special theme" surveys. Since the general characteristics of farm households in these villages were already known, each survey could be focussed on obtaining detailed information on specific research questions. Such socio-economic

investigations have included a systematic look at marketing practices, non-cereal food consumption, risk behavior and off-farm opportunity cost of labor, goals and objectives of farmers, yield expectations, and a qualitative questionnaire on farmers' problems and needs.

These "special theme" surveys seem to be a potentially useful approach to getting the kind of broader socio-economic data on village households needed without the expense of maintaining a large permanent sample and subjecting it to an overdose of questionnaires, possibly repeating the 1979-81 experience of generating an enormous quanity of undigestible data. Unfortunately, no reports based on these special theme surveys were available, so our assessment of the utility of this approach is incomplete.

Analysis of small farmer constraints and conditions is also part of the FSU approach to assessing the profitability and risk associated with the technologies tested in on-farm trials. These include seed variety trials of particular interest to the commodity breeding programs, and the tests of agronomic practices (fertilizer use, tied ridges) identified by the FSU as promising technologies. To date, only two socio-economic variables are considered explicitly to constrain farmers adoption of these technologies: labor and cash.

In addition, in the researcher managed trials, there has been an attempt to plant certain crops on land normally not considered appropriate for their cultivation, such as maize on village field land. Ownership of animal traction equipment is

also taken into account. Only in the 1983 on-farm trials are samples stratified by use of animal traction. Since it made for a significant difference, it may be useful to consider more explicit attention to this variable in the future.

The 1983 data analyses on the profitabilty and risk associated with on-farm trials were ready, in a preliminary form, for the January 1984 TAC meeting. The French translation was circulated to the research community and to the Voltaic regional development organizations (ORDs) in February. This speed of report production reflects well on the management of the data collection and manipulation systems put in place in 1982 and 1983.

Management of On-Farm Trials

The FSU worked in three villages in 1982, conducting eight researcher managed trials and one farmer managed trial on 30 household plots in each village. In 1983, the FSU expanded to five villages. There appears to be a great deal of personal involvement by the Ouaga-based Purdue staff in all field efforts, but there appears to have been little involvement of IITA or ICRISAT scientists in this on-farm work beyond some reported consultation at the design stage. The types of on-farm trials conducted represent a logical continuation of the earlier team's focus on alleviating soil fertility and water constraints.

The general approach used in the on-farm trials seems to be fairly straightforward, with large (1000 sq. meter) plots and fairly large numbers of participants per village (an average of ten in 1982). Animal traction is used by those farmers who have

it. After two years of a consistent on-farm trials approach, farmers interviewed in Nedogo were impressive in their abilities to recall the experiments associated with the different colored stakes used to delineate the experimental plots. They were also candid in their assessments of whether they would or would not apply similar techiques or inputs off the test plots. So far, they do not appear to be rushing to apply techniques tested.

Farmer Participation

The farmer managed trials associated with the FSU approach, have transferred some real resources to farmers (fertilizers, ridging blades, seeds), resulting in willing participation of the greater part of the villages households. However, the FSU approach seems to be biased against direct participation of female agricultural laborers in the on-farm trials. Since the FSU is using animal traction for ridging in some experiments, for example, it would seem to be the most direct and efficient in practical terms to work with those who perform the task. Farmers in Nedogo, a project village, told the evaluation team that while women do use donkey traction, the FSU had taught only men to use the ridgers and they in turn, had taught their wives. This seems a round about way to transfer simple information.

Results

In general, the results of the on-farm trials continued to show that many of the techniques and new varieties tested do not yet promise enough in the way of returns to be attractive to the average small farmer. The Volta phosphate/tied ridges trials on

millet have proven to be uneconomical after two seasons and were only continued to determine the residual effects of Volta phosphates. Sorghum trials showed more promise and will be repeated with the fertilizer/tied ridges combinations. Although considered in the 1983 report to be somewhat risky in generating yield increases high enough to cover the opportunity costs of labor, use of tied ridges in the maize trials is to be continued because the technique does not involve actual cash loss. Still unclear is where the current trend of research will lead. It appears to be dependent on the personnel actually in the FSU. While there is a linearity in the research directions pursued by the FSU itself, there seems to be little input from or impact on the research being conducted by other components of the SAFGRAD project.

Further, the FSU has not attempted any farmer managed cowpea trials. Results from researcher managed legumes trials indicated in 1982 that costs for single crop spraying exceed the value of output. Test results from cowpeas intercropped with millet were negligible. Yet the results from the SAFGRAD cowpea improvement efforts are widely thought to be among the most exciting prospects emerging from the commodity oriented efforts. This raises a question regarding communication between the various elements of SAFGRAD. Is the FSU experience being taken into consideration by the IITA team, or should the FSU team be modifying their tests to improve the chances for on-farm success?

Implications of On-Farm Trials for Development

Earliest survey data showed that approximately 50 percent of the farmers in FSU's selected villages had access to animal traction. Donkey and oxen traction have since been an important element of all of FSU's on-farm trials, although care has been taken to include farms with only manual power as well. Other inputs to on-farm trials include fertilizer (Volta phosphate and urea), improved seed and a ridger. Unfortunately, public agricultural credit to purchase these inputs has been greatly curtailed in the past few years, making formal credit tight and virtually unattainable by farmers who do not participate in the project villages.

The 1984 special theme survey on informal access to credit will begin to describe the importance of credit as a constraint to production. During an Evaluation Team visit to Nedogo, farmers told how they obtained some of their farm implements through the personal intervention of the first FSU agronomist. They also laid the challenge to the new team by asking them to intercede again on their behalf with the credit agency. While the FSU does not feel it is their role to do so, the farmers raised an interesting point---to what extent is the FSR researcher obligated to intercede with agricultural institutions in behalf of farmers to obtain inputs?

These observation are not made to imply that FSU should not pursue a line of inquiry necessitating presently inaccessible inputs or to suggest that it should take on the responsiblity of intervening to make sure the supply system works, at least for

the FSU cooperating villages. Rather, it is intended to highlight the critical interaction between agricultural policies, input delivery systems and research. It underlines the importance of the FSU and other faming systems research efforts continuing to collaborate closely with the development agencies to inform them of the potential benefits from using inputs. Information on the farm-level access to inputs might support more action to overcome the bottlenecks in the input delivery system.

Development of a Model for Upper Volta

The FSU, in its efforts to design a working model for a national program, has placed its focus on the design of technology for Voltaic farmers. A qualified research agronomist as well as an agricultural economist on the team ensured that the technology trials could be designed and supervised by the FSU itself. This approach is somewhat different from the two other FSR models in Upper Volta, although certain features are shared.

The model used by the ICRISAT Economics Unit differs in its definition of its primary client, viewing its principle role as helping to guide the research of ICRISAT's bilogical and physical scientists. The methodology of on-farm trials and the use of frequent interviews to record input/output transactions are very similar. In addition, the ICRISAT Economics Units maintains permanent research relationships with a set of villages selected by roughly the same criteria as those used by the FSU. The French recherche-developpement model is geared to the extension of what the researchers feel to be a scientifically valid technology package. It is thus less experimental than either the

FSU or ICRISAT approach and places considerably less emphasis on socio-economic factors in technology development and application.

In developing its working model for Upper Volta, the FSU has trained what they consider to be excellent field interviewers. FSU staff, both Voltaic and expatriate, have established strong ties with participating villagers. With the improvements that have been made in managing this model since 1981, the FSU has confirmed the general findings of FSR programs in Upper Volta and elsewhere, indicating:

- o there is a role for rapid surveys as well as in-depth surveys of farmer behavior;
- o continuity of both staff and participants help to establish a situation where field work can produce statistically reliable results;
- o an achievement of results leading to major improvements in productivity at the farm level is more difficult and time consuming than many project designers envision.

The FSU has also proven that socio-economic research not supported by solid agronomic and commodity research in high risk, low productivity areas of SAFGRAD countries, is likely to have a very limited impact.

The FSU has not yet demonstrated how the FSR approach developed by the Purdue Team can be linked effectively into a national research and extension system. The FSU is currently largely isolated, both physically and organizationally, from all other SAFGRAD entities; from national research programs in Upper Volta, and from other international research organizations. There are many reasons for this separation: lack of space at the

Kamboinse Research Station; no strong working relationships with the commodity research scientists; the slow moving reorganization of the national research system around IVRAZ and; the fact that the FSU is a regional entity rather than a national entity as far as funding is concerned gave it no real status in the national system. The apparent lack of collaboration with other FSR entitities in Upper Volta, even given the methodological differences, is more surprising although the relatively rapid turnover of FSU staff has probably had some effect. In any event, with the exception of the successful coordination with ICRISAT to organize the September 1983 ICRISAT/IRAT/FSU workshop on "Farmer Participation in the Development and Evaluation of Agricultural Technologies," collaboration has been almost non-existent.

This organizational independence of the FSU is perceived as a positive thing by the Unit itself, apparently because it has simplified the day-to-day functioning of the project. In terms of the SAFGRAD project's institutional and long-term development objectives, however, this isolation has no redeeming features and undercuts the rationale for SAFGRAD creating FSU in the first place. For whatever reasons it may have come about, it is our view that the FSU's present organizational isolation or independence holds such serious consequences for the future effectiveness of the FSU effort that it may be the most important challenge for the coming year. While the FSU model can be transferred into a functioning national FSR program, there are many factors to be explored in determining the best method to actually accomplish this goal.

Training of Voltaic Personnel

The training of its Voltaic field staff---most of whom have less than secondary school educations---is clearly one of the proudest accomplishments of the FSU. Four Voltaics are presently in the US for long-term training; none of them have returned and none appear to have a long-term commitment either to the FSU or to IVRAZ. The question of what will happen to this trained manpower after the present SAFGRAD/FSU project is over has not yet been, but should be, addressed.

Methodology Comments

Data collection and analysis, while much more timely and relevant than in the earlier days of the FSU, are still not as comprehensive or rigorous as would be desirable. The evaluators feel there are some potential methodological soft spots bearing on FSU analysis that should be taken into consideration in conducting farming systems research in West Africa.

Large Family Field Bias

By collecting commercialization data only on the farm family's main field, FSU analysis over estimates the household's subsistence orientation. In fact, the family cereal field is destined to feed the family. Cash sales by both male and female farmers appear to emanate mostly from the surplus grown on personal fields. Recognizing that a strictly "large family field" analysis could be misleading, the FSU plans to examine total market sales including sales from personal fields in its 1984 surveys.

Women's Agricultural Labor

There are several methodological problems stemming from FSU's apparent treatment of the female labor input. First, women's agricultural labor time is calculated as equivalent to 0.75 of men's labor time for all activities. FSU's unpublished econometric analysis of family labor productivity, shows that males and females are equally productive at planting but that women were .75 as productive as men only at weeding. Continued application of this conversion factor may well lead to an under estimation of total labor requirements and the real constraints women face in allocating more labor time to certain activities. At the same time, ethnographic and economic studies done on various ethnic groups in Upper Volta describe the clear, but highly variable difference between ethnic groups and gender differences in labor tasks and crops.

The combination of gender differences and under valuation of women's labor time may lead to missed opportunities for technology development and transfer. For example, among the ethnic groups in the FSU project villages, women do much of the seeding and most of the weeding, both acknowledged labor bottleneck periods. The family labor availability at these times is the FSU's fundamental assumption guiding their research plan and is considered to be a major constraint to increasing agricultural production. It may be more precise---and more significant---to know if the constraint is <u>women's</u> labor time. It is strongly recommended that FSU determine the opportunity cost of seeding, ridging and weeding labor to both men and women

and then think creatively about possibilities for shifting women's labor from less to more directly productive activities (assuming that on-farm trials and the socio-economic studies indicate that weeding is more productive than the present alternatives). To get at this information, women agricultural workers must be included in the survey sample. Interviews presently are conducted by the all-male FSU field staff with a de jure male head of household. Given that Swanson's statistics show that at least 50 percent of agricultural labor is provided by women, and that women control over half the number of the household's fields (though not half of the hectarage), asking the male head of household to describe his wives' activities and to estimate the time they spend on their personal as well as family fields is likely to severely bias the household labor data as well as marketing and decision-making analyses.

These factors indicate a possible source of analytical bias. In addition to gender-specific data handling, we suggest that experience elsewhere has shown that it may be easier for women interviewers to speak with women farmers. The FSU might wish to consider pilot testing this in Upper Volta by hiring at least one female interviewer for the 1984 season. The female Peace Corps Volunteer presently attached to the FSU can help train these women.

Single Household Production Function

Anthropological and economic studies done by the FSU assume a single production function of essentially a simple good (food) for the entire household. Not only does this approach assume

that all family members share the same objectives, but it further assumes that the only---or at least major---concern is crop production. Gender analysis similar to that proposed above needs to examine the intra-household dynamics to determine various family members' access to and control over productive resources, sources and uses of income, incentives to production and decision-making. 1984 data collection efforts will include information on off-farm income. Hopefully these data will be used in modeling farm budgets and in doing partial analysis to determine the relative importance of crop production vis-a-vis other sources of both farm and off-farm income.

Purdue Team Staffing

At present Purdue intends to field three American researchers for the 1984 work program, but only two (the agronomist chief of party and the junior agricultural economist) are currently in Ouagadougou. The senior agricultural economist has already spent two years in Ouaga and is scheduled to leave in May. For reasons of AID/Purdue contract negotiation delays, his replacement is just being recruited and the very real possibility that the FSU will not have a complete and/or an experienced staff this year must be recognized. While the Voltaic economist who has been associated with the FSU for several years may be capable of stepping in to cover the departure of the senior agricultural economist, there is no written evidence of his ability to do so and we were unable to meet with him as he was off on a short-term training course in Zimbabwe.

Further, it has been the experience of past Purdue teams that it takes at least one year of field experience in Upper Volta for the researchers to develop relatively efficient data collection approaches. Because the present agronomist was able to overlap a few months with the 1982-83 agronomist, and the field trial methodology and directions have become considerably more "set" in the last couple of years, the learning curve may be altered this year, but it seem unlikely. There will be no joint field experience opportunities for the senior agricultural economist (just leaving) and the junior agricultural economist (just arrived). Purdue will have to recruit a senior agricultural economist willing to carry out the program already planned for 1984 (and just that) if the FSU is to achieve the research objectives already set. Some candiates may balk at the lack of flexibility, but it seems important to try to fit the professional to the task rather than to allow, at this late date, the task to be redefined.

In addition to the possible agricultural economist gap already noted, the FSU itself has pointed out the need for a "training officer," defined as someone to develop training program materials based on FSU experience in Upper Volta to date and to organize and conduct sessions using these materials. This seems an excellent suggestion, especially given the publication record to date and the already full research agenda for the present staff in the coming year. The FSU clearly feels it will not be able to accomplish the objective of extending their methodology elsewhere in the SAFGRAD region unless such an

additional staff member is brought on board. Materials developed by the trainer should be useful to the IFAD/SAFGRAD and other national programs.

Cost-Effectiveness of the FSU

It is quite clear that the FSU has not generated any quantifiable "benefit" to date. Yet just over $3 million have been expended by the Purdue FSU contract and it is appropriate to question whether these resources have been well spent. In this section, we consider not only the post 1981 FSU but also that of the 1979-81 period. Cost effectiveness is considered here with regard to four FSU activities:

- o field studies at the village level (roughly $1 million);
- o analyses and publications (approximately $1.2 million);
- o training ($100,000);
- o networking (less than $100,000 for workshops in January 1981 and September 1983).

FSU backstopping by Purdue accounts for the residual funds (just under $900,000) and could not be even roughly allocated among the activities. Such backstopping is estimated to have absorbed about 30 percent of project resources.

Field Studies

Since 1981, the FSU has concentrated its village level investigations in three to five villages, down from seven in the first years of the project. This restriction in the number of villages has probably permitted significant economies to be

achieved in travel expenses and data collection/supervison costs as well as generally increasing overall staff effectiveness. Villages appear to be representative of relevent agro-ecological zones and it should be possible to extend analytical results to larger areas of Upper Volta (although it is not clear how this will actually be done, if ever). The salaries of FSU field staff are relatively attractive (40 to 60 percent higher than the Government of Upper Volta salaries for comparable skills) and turnover has been relatively low.

The real measure of effectiveness of field studies is the information generated. The Evaluation Team agrees with the self-evaluation of the FSU that the initial approach---with a larger number of villages, small sample sizes per village and relatively large numbers of data items collected per respondent---was cost-ineffective. It produced data of considerably lower quality than is presently being achieved with fewer villages, larger sample sizes per trial, and fewer pieces of information collected on more specifically defined research questions. As will be noted below, there is still some room for increasing the cost-effectiveness of the FSU funds in village survey operations.

Analyses and Publications

Since the 1981 Evaluation, the FSU has increased the number and improved the quality of its publications. The bibliography attached to the TAC report, includes 23 published reports with seven more in progress.

The 1982 Annual Report represents a major improvement in quality and writen analysis. The recently produced summary report on 1983 on-farm trials results, distributed to the ORDs, represents another positive information/dissemination step for the FSU. Feedback on its utility and readability should be solicited.

The analyses to date have been largely confined to description. Analyses leading to more actionable recommendations (either methodologically or in terms of agricultural technology development and transfer) are still only in early stages of drafting. The considerable effort expended in 1979-81 on developing a data base for more formal modelling efforts seems to have been totally written off by present project staff. The current effort being made to analyze project data on animal traction, however, is expected to lead to some further work on modelling with regard to that technology. There is a recognized need to develop some general farm budget analysis techniques to take advantage of the data base assembled and permit preliminary assessment of proposed technologies without actually carrying out on-farm trials. It is apparently the intent of the agricultural economist just leaving to undertake further modelling work once back at Purdue.

In general, the reports prior to 1982 are poorly edited and reproduced and do not reflect what one would expect of Purdue professional staff. The 1982 and 1983 preliminary reports are welcomed exceptions and set a new standard for future publications.

The FSU has not thus far been effective in disseminating analytical results either to collaborating SAFGRAD entities, to the Government of Upper Volta, or to other national or regional FSR efforts. Several reports, especially the early ones, may contain interesting information on the agricultural situation in Upper Volta, but they are unavailable in the country.

FSU performance in the area of analyses and publications on the whole, has been unacceptably expensive.

Training

It is too early to say whether the majority of training expenditures have been effectively used. The four candidates now at Purdue are working toward PhD or MS degrees with apparently no guarantee of employment upon their return to Upper Volta. The training of the FSU Voltaic staff, stressed by the FSU team as their most important training effort, has obviously been important in assuring quality data from the village level studies.

In the five years of the project to date, the FSU provided relatively limited training opportunities to Purdue or Voltaic graduate students and none at all to FSR staff from other SAFGRAD countries.

Drawing from information in the annual reports and interviews, it appears that in the first three years of the project, only two Purdue graduate students have been engaged in FSU work in a junior professional capacity and even these were only brought in to handle the data glut from the initial field

surveys. In the last two years, the record of Purdue student involvement has been better---with two students having participated in the special monthly theme surveys now back in Purdue writing up results. Three Voltaics have also been involved in FSU research activities in the last two years and two of these have subsequently been able to draw upon these data for dissertation preparation. No Voltaic professionals have been involved in the FSU work, even on an "associate" basis. In addition, a Stanford graduate student will use project data he helped collect for his PhD dissertation.

Peace Corps Volunteers have worked on the project as field supervisors and provided considerable assistance in the FSU/ICRISAT/IRAT workshop but apparently no attempt has been made to encourage them to participate actively in data analysis or toward further education at Purdue.

Networking

While funds were budgeted for the FSU to hold an annual workshop, only two have been held--with comparatively little FSU involvement. The first, in January 1981 was held in Dakar and was, according to the agenda, introductory in nature. The September 1983 workshop held in Ouagadougou was more thoughtful and more widely attended. With ICRISAT as head organizer, FSU's participation consisted of a substantial financial contribution, collaboration between the FSU project agronomist and ICRISAT's economist to coordinate the conference and administrative/clerical support provided by FSU staff and by the

Peace Corps Volunteers assigned to the FSU. The publication of papers from this workshop will contribute to the growing FSR literature in Africa.

It is somewhat surprising that no workshop geared to the farming systems research issues in Upper Volta alone has been initiated under FSU auspices, especially since the thrust of the FSU activity has been so avowedly national. While it is clear that more active networking (through personal travel or sponsoring of workshops) might have further reduced time for research, it might have forced more attention to the use of research results and spurred greater analytical efforts on the part of FSU staff.

SUMMARY

The FSU has conducted farming system research from its base in Ouagadougou, Upper Volta since early 1979. Purdue University was awarded the contract by AID/W to implement this component of the SAFGRAD project in 1978. Between 1979 and 1983, Purdue has fielded three research teams: the first included an agricultural economist, an agronomist and an anthropologist; the second team---an agronomist and an agricultural economist---came on board in 1982; and a third team, again with the agronomy and agricultural economics composition, will be in place for the 1984 season.

The major responsibilities in the orgininal project paper included: application of new technologies to small farm conditions; conducting studies in farmers fields; formulating

strategies for applying small farm technologies; recommending physical research priorities; and developing farming systems research methodologies applicable to other SAFGRAD countries.

The FSU has focussed its research efforts only in Upper Volta, with emphasis on village level, on-farm research. Other objectives, particularly those involving regional action, have been narrowed or eliminated. Formulation of strategies for development and application of small farm technology have been restricted, for example, to the formulation of a strategy for conducting on-farm trials in Upper Volta. The provision of recommendations regarding physical research priorities has been down played; more emphasis has been given to developing a method to guide research. Regional training and consulting activities have been limited to the training of FSU's Voltaic employees and to identification of a method which could be implemented in national FSR programs.

The FSU is physically isolated from other components of the SAFGRAD project and apparently has little interface with the commodity research scientists. As a result, the FSU has established their own agenda of agricultural practices to be tested in on-farm trials; conversely, it has had little impact on defining commodity research priorities or in getting other SAFGRAD researchers involved in farm-level activity.

CONCLUSIONS

1. The FSU initially started with a team that was inexperienced in farming systems research and quickly became bogged down with an over abundance of data that has yet to be analyzed and put into a useful form. This initial "wrong" direction continues to haunt the FSU Team.
2. The FSU component of the SAFGRAD project was originally planned as a regional effort and was intended to provide both information useful to improving farming systems in the region as well as to providing methodological information useful for the conduct of farming systems research elsewhere. Since the FSU has only worked in Upper Volta, little information on technologies tested there can be readily applied elsewhere in the region. The methodology for conducting research may have potential value to other countries in the region, but has not yet been transferred elsewhere---and there are presently no plans. beyond a few publications, to do so.
3. Purdue University has provided less than half of the FSU staff from its own faculty, although in recent years all or the majority of the team members have come from the faculty. Presently, there is concern over the replacement of the agricultural economist of the 1982-83 team. AID has been unable to assure Purdue of funding beyond April 1984, and this has delayed recruitment of a replacement.

4. Although the FSU team originally shared office space at the Kamboinse Research Station with other SAFGRAD researchers (commodity oriented), the FSU recently moved to independent office quarters in Ouagadougou. In the process, the FSU has isolated itself from ICRISAT, IITA and Voltaic researchers at Kamboinse and reduced the potential interaction with this group.

5. The major effort of the FSU has been expended on field surveys and on-farm trials in five to seven Voltaic villages. The quality of data collected and the analysis of the findings has steadily improved over the more than five years of the FSU existence. One can still critique certain aspects of both methodology and analyses (for example, subsistence farmer bias, inadequate examination and involvement of women and a continuing need to take additional factors into analytical account), but overall, the development of a consistent methodology and increasingly fast turn around on data collection and analysis must be applauded.

6. To date, the FSU has not generated a quantifiable benefit in development terms---either in Upper Volta or in the SAFGRAD region. Analysis and publication costs ($1.2 million) have been unacceptably high. While a few of the recent FSU reports are excellent, the overall publication record is poor. Many reports are still being written; some of the earlier ones are unabailable. Considering that the field studies upon which the analyses are to be based have also

cost some one million dollars, the cost-effectiveness of the project as a source of information for agricultural development in Upper Volta or in the SAFGRAD region can be questioned. A relatively small amount of project funds have been allocated for training, with only four Voltaic candidates for MS or PhD degrees currently studying at Purdue University.

SUGGESTIONS AND RECOMMENDATIONS

Rather than asking the FSU, the SAFGRAD Coordination Office and AID to make heroic efforts to alter the course of project implemenation, we are making only three recommendations that we believe are actionable between now and the project termination date. However, several suggestions are made that we believe would strengthen FSU accomplishments.

Recommendations

1. The FSU should be fully staffed with expatriate researchers as stipulated in the Purdue contract and a training officers should be added in 1984 as recommedned in the TAC Report for 1984. If budgetary restrictions preclude hiring a Training Officer, FSU should investigate other sources of technical assistance to enable a process of wider information dissemination about FSU findings and methods to be launched. The centrally funded Farming Systems Support Project (FSSP) could provide short-term technical assistance for training, development of training materials and networking.

2. During 1984-85 the FSU should plan a series of seminars and workshops for various Voltaic audiences to inform them in depth of FSU findings and to get feedback on the perceived value of FSU research to date. The FSU must try to ensure that its efforts and those of other FSR programs (IRAT and ICRISAT) are also presented for joint review and discussion at the national level in Upper Volta.

3. The 1984 work plan should be pursued as indicated with two additions:

   - o FSU should specifically seek to work more closely with the IITA cowpea research program;
   - o FSU should include female respondants in the village surveys. If appropriate, female interviewers should be hired as soon as possible to facilitate contacts with female agricultural laborers.

Suggestions

1. Purdue/FSU should seek ways to improve the analysis and publication record of the FSU between now and March 1985 by:

   - o editing some of the earlier publications and re-issuing them in an acceptable professional format;
   - o providing technical writer/editor assistance as necessary, particularly to ensure that draft documents from earlier team members are put into publishable form and also to assist present team members to move rapidly toward publication;
   - o providing data to graduate students seeking to do analytical papers, theses, etc.
   - o installing a word processing package in Ouagadougou backed up by a letter-quality printer in West Lafayette;
   - o providing the current project agricultural economist, Mahlon Lang, the opportunity to analyze and write for a year;

2. FSU should seek to establish collegial contacts with other FSR projects in the Sahel for the purposes of:

   - o sharing ideas on FSR techniques;
   - o sharing analytical results; and
   - o identifying useful exchange/training and networking opportunities.

3. AID and the Government of Upper Volta should give serious attention to continuing FSU research activities by locating them in the core of a national farming systems research program with bilateral funding from AID.

4. The issue of project office location should be seriously reconsidered and criterion of maximizing opportunities for research interaction be developed.

5. SAFGRAD, in developing any follow-on project, should take into account the experiences of the FSU to date, particularly those regarding personnel/institutional linkages, technique/methods, data management and analytical time requirements.

ACCELERATED CROP PRODUCTION OFFICERS

Background

The Accelerated Crop Production Officer (ACPO) program is an important component of SAFGRAD, providing a bridge between national research and extension programs in member states. According to the Project Paper, the ACPOs were to be "involved in implementing national field trials, studies and other related functions." ACPOs were seen as the "SAFGRAD response to a critical weakness in crop research programs.....weaknesses in getting research results disseminated, tested, adapted and to the farmer." ACPO programs were envisioned as being somewhat different in each country due to differing national research and extension organizations, capabilities and priorities. The Project Paper provided for responsibilities in three main categories:

- Conduct field trials and studies under various conditions to test the adaptability, deficiencies and potential of various recommended crop varieties and practices;
- Provide a linkage to crop research and development programs elsewhere in the region to enable the participating country to benefit from and contribute to regional progress.
- To coordinate with national research and extension/development agencies in arranging for broader national testing and demonstration of those varieties and cultural practices that appear technologically superior and otherwise suitable.

No individual ACPO was expected to perform all functions. They were to be assigned functions depending on country needs and priorities. The Project Paper anticipated that most ACPOs would initially be expatriates provided through bilateral arrangements between individual participating countries and individual donors. African ACPOs were to be trained with "the knowledge and orientation to deal with the broad issues related to translating research into benefits in farmers' fields." They were to be integrated into national research and development programs under the direction of the national research director. Further, the Project Paper anticipated:

- ....this arrangement is to ensure ACPOs will be responsive to national needs and will command resources and have influence on the way research is directed, tested and applied.
- .....only if ACPOs are permitted by national authorities to function with a fair degree of regional coordination will the benefits of outside research be shared among SAFGRAD countries.

Regional guidance for ACPOs was to be provided by the OAU/STRC International Coordinator using materials and information developed by regional, national and/or international researchers, including FSU. The Project Paper projected ACPOs in 18 member countries with funding from several donors including USAID.

Mid-Term Evaluation

The Mid-Term Evaluation noted:

- The Accelerated Crop Production Officer (ACPO) was to have two roles in the country to which he is assigned: (1) liaison between national and regional level research and (2) liaison between national research and

national extension. In the former case this has meant his being responsible for regional trials of varieties and technologies coming out of the regional level research centers and in some cases from national research programs.

- Each of the AID supported ACPOs contacted by the Evaluation Team (ACPOs assigned to Senegal, Mali, Cameroon and Upper Volta) has made his own accommodation of this mandate to the resources and opportunities found in his country of assignment. Except for the ACPO in Senegal, whose assignment was so recent that no judgment of performance could be made, each appears to be doing an excellent job.

- The Accelerated Crop Production Officer (ACPO) program insofar as a regional orientation exists, should ideally have promoted an integration of regional with national research, but in fact has not. In those countries in which the ACPO has a regional function, the integrating device---the regional trials of the technologies produced by IITA and ICRISAT---has largely been something the ACPO does and is not an integral part of the on-going program of the national research institution.

- The ACPOs seem to function well administratively within their national environment and the lines of communication are in place. However, the information exchange among ACPOs is dependent on individual initiative and travel since the proposed annual meetings between ACPOs have not been taking place. Additionally, the degree of involvement of the ACPO in regional concerns is a chance result of the national situation and not (as foreseen in the Project Paper) a result of active SAFGRAD coordination efforts.

The Mid-Term Evaluation briefly described the ACPO program and its operation in Senegal, Mali, Upper Volta and Cameroon.

Major recommendations made were:

- That the ACPO role be limited to liaison between national research and national extension, with permanent research staff at national centers taking responsibility for conducting regional research trials.

- That the ACPOs be assigned to national farming systems programs to provide leverage to the farming systems' extension activities beyond the immediate geographic areas in which they are working.

Present Program

The present evaluation finds the ACPO situation generally unchanged conceptually, organizationally and adminstratively from the descriptions provided in 1981. In February 1984, visits were made to Cameroon, Upper Volta, Togo, Senegal and Mali where are ACPOs. The following comments are provided as an update on the 1981 evaluation findings.

Cameroon

The work of the ACPO is well integrated into the Institute de Researches Agronomiques (IRA) program centered in Maroua, Cameroon. There appears to be an excellent understanding and an appreciation for the ACPO contribution to making research-extension linkages.

The ACPO program in Cameroon started in 1979. Over time the emphasis on the major task of the ACPO has undergone an evolution from total on-station trials to total on-farm trials. Initially the Maroua Center did not have sufficient researchers to screen materials provided by the IARCs. So the ACPO assisted in this work. Subsequent testing was conducted on research sub-stations. Only then were promising locally adapted varieties selected for pre-extension on-farm trials. Liaison with the national extension program was initiated in 1980 through cooperative trials implemented by services of the Ministry of Agriculture and the principal development corporation, SODECOTON.

Since 1982, the Cameroon Government has placed two cowpea entomologists and a breeder each on sorghum, groundnuts and maize at the Maroua station where the ACPO is based. With this reinforcement of the research capability of the station, the ACPO and his national counterpart no longer conduct on-station trials. Instead, they now work directly with on-farm trials (using improved varieties selected at the station), consumer preference tests and initial multiplication of seeds of varieties accepted by the farmers. Seed of selected varieties is delivered to national seed multiplication and extension officials who receive advice from the ACPO on methods of extending research results to small farmers.

Extension work in Northern Cameroon is conducted by SODOCOTON which has been in cotton production since the 1940s. Their extension system which has proven its effectiveness is francophone in style and is highly hierarchical.

The Government of Cameroon has given the added responsibility of extension work in food production to SODOCOTON. Obviously, SODOCOTON has little experience in this area. In response to this directive, SODOCOTON has asked the Maroua Research Center for assistance in food production technology. The ACPO is working closely with SODOCOTON in developing protocols and training materials. SODOCOTON is planning to incorporate food crop production into the existing year-long training program for its employees. Under these circumstances the ACPO has an excellent entre into a system backed by proven research results of improved varieties and cultural practices ready for transfer to a large number of farmers. Although agricultural extension

and research are managed by two autonomous administrative bodies, the Cameroon ACPO has successfully demonstrated the necessity and effectiveness of workng with both to help the farmer increase food production even without formal agreement.

It is important to note that the ACPO work is limited to the semi-arid region of Northern Camerooon. Because of the relatively small geographic area, efforts can be more intensive. A comparable situation does not presently exist in the rest of Cameroon where there is no ACPO activity nor effective extension system. However, Cameroon has indicated that the ACPO has proven the value of on-farm work as a beneficial linkage between research and extension. The Government of Cameroon administration has indicated the research centers would provide for this work even if SAFGRAD did not do so. They are also studying ways to strengthen the extension program throughout the rest of Cameroon. Unfortunately, the ACPO who has been so successful in the SAFGRAD program in Maroua plans to leave in February 1984. To find an equally able, dedicated and innovative replacement will be a challenge. Since the national counterpart has not yet received higher level training, he is not yet prepared to take over full ACPO responsibilities. Therefore, the continued impact of SAFGRAD is potentially at risk.

UPPER VOLTA

The program in Uppér Volta was started in 1979, using an expatriate ACPO as an integrated unit in the national research system. Pre-extension trials as well as on-farm trials were conducted mainly within the 500 to 800 mm rainfall ecological

zone. Low soil fertility and low water retention capability are common to most soils in this zone. Several varieties of maize, sorghum and cowpeas were included in the study. Since 1981 emphasis has been placed on the use of rock phosphate and improved cultural practices (such as tied ridges) shown to increase yields subtantially when both local and improved varieties are used.

In January 1981, a national counterpart was identified to work with the expatriate. In 1982 the expatriate ACPO left the SAFGRAD program and the national counterpart has been the ACPO since that time. However, the expatriate ACPO and the counterpart had not worked closely together. The expatriate had for example, a close working relationship with the Purdue Farming Systems Unit (effectively a national research project). Unfortunately, the national ACPO had not been involved in this work. The lack of close ties to national research is a weakness in the Upper Volta ACPO program.

The communications problem, cited in the 1981 Mid-Term Evaluation, between the autonomous ministries responsible for research and extension still exists. In August 1982, the government created the Service National de Vulgarisation Agricole and attached the ACPO to its Section Experimentation et Prevulgarisation (pre-extension). This new organization brought together two previously autonomous units: Le Service d'Experimentation et d'Etudes d'Accompagnement and Le Service de Vulgarisation et de Formation. It was hoped that this new arrangement would facilitate their cooperative efforts, including

the ACPO's work. However, this has not been the case. There has been internal dissatisfaction with the arrangement in the Ministry and another reorganization is in process. Even so, the ACPO reports that there is joint discussion of his annual work plan by the Chef de Service and head of the section to which he is attached. At this time, national continuity for providing ACPO direction is uncertain.

In spite of the difficulties resulting from confused administrative lines and inadequate operational support (a technician has yet to be provided by the Upper Volta Government though previously agreed upon), the ACPO has continued on-farm trials. Further, the ACPO has involved himself in training for extension agents where he has shown results of on-farm trials, explained protocols used, demonstrated techniques and has provided hands-on training.

TOGO

Unlike other ACPOs who are financed through USAID, the Togo ACPO activities are funded by FAC (French aid). The ACPO, a French national, and his Togolese counterpart, assisted by three agricultural technicians, are the only ones involved in on-station as well as on-farm trials on the SAFGRAD crops in northern Togo. The on-farm trials are located mainly on the farmer's fields involved in a government resettlement scheme in the Kara Valley where more than 900 families have been settled.

Although some encouraging results have been obtained from some trials such as the use of rock phosphate as a locally available fertilizer and control of striga by a resistant high

yielding sorghum variety, lack of a back-up team to conduct on-station research is a major constraint. If not corrected, it could greatly limit the possibilities for achieving increased food production at the farmer level in Togo.

According to information secured in interviews in Togo, the expatriate ACPO provides relatively little leadership in the SAFGRAD program. Apparently most of the work is conducted by the national counterpart and technical assistants. Another weakness is the program's isolation from USAID operations. Because the ACPO program is funded by FAC and the Kara site is a considerable distance from Lome, USAID/Togo has not had the technical expertise to interact effectively with the SAFGRAD project team. USAID is planning to initiate an animal traction program in the Kara area and expects there will be more collaboration in the future.

SENEGAL

The ACPO program started in 1980 with a Senegalese national, an Ingenieur Agronome with university training. Since 1977, he had been associated with the National Agronomic Research Center at Bambey. As an integral part of the national agricultural research system, the ACPO has helped to complement national research activities at the Nioror and Sefa stations. Evaluation of several sorghum varieties resulted in the identification of four promising lines currently being used in pre-extension trials. Several improved millet varieties were also screened. Four high-yielding lines have been included in pre-extension

trials. Five promising lines of cowpeas were identified for further evaluation. Studies on cultural practices relating to the improvement of soil fertility indicate that maize yields are substantially improved when preceded by cowpeas (rotation and relay trials). During the current cropping season, several on-farm trials on maize, millet, sorghum and cowpeas are in progress.

Although the work of the station is promising, it is difficult to isolate the ACPO's contribution to the overall effort. The ACPO's last annual report included the work of two seasons and did not acknowledge the on-farm research input effort contributed by the development corporation, SODEVA. Further, there are indications from the head of the Bambey Farming System Unit (the ACPO's parent organization) that his variety and agronomic trials have not been sufficiently rigorous in execution resulting in "weaker" conclusions than might be normaly expected.

Although the tie to regional results through the work of the IARCs is valued, there appears to be inadequte channels of communication between SAFGRAD and USAID/Senegal and between Senegal national research and extension programs. Internal Senegalese communication does not fill this gap. Additionally, there appears to be considerable overlap in the on-farm testing being done by the SAFGRAD/ACPO and those of other cereal grain and legume projects in Senegal.

An interview with the Director of SODEVA revealed that the working relationship with SAFGRAD is unsatisfactory. The SAFGRAD relationship has been more demanding than collaborative. The ACPO has used SODEVA to facilitate contacts with farmers to allow

on-farm trials of materials not previously agreed to in the SODEVA/SAFGRAD joint work plan and has improperly used extension agents to assist in non-authorized work.

SODEVA plans to operationalize a large audio-visual unit with a sizable production capacity and several fully equipped mobile units. In addition to the technical expertise that is available locally, an outside consultant will be employed for at least six months as advisor to provide backstop support for the audio-visual project. The major constraints to furthering this teaching effort includes the lack of new information from research and a shortage of funds for supportive educational materials.

MALI

The ACPO program was started in 1978 with pre-extension tests at 26 sites. The theme of the preliminary on-farm tests was on increased yields based on improved varieties of sorghum, millet, maize and fertilizer application. The results indicated that the improved varieties of cereals and grain legumes (cowpeas and groundnuts) were generally yielding less than the local varieties. In general, yields were improved through fertilizer application.

After analyzing data of the pre-extension trials, the ACPO in collaboration with the national research and extension staff, included trials designed to improve soil fertility. Since 1979, rock phosphate trials with other improved practices have been conducted on farmers' fields in the major ecological zones of Mali. During the 1983 crop season, there were 260 such trials.

In most of the regions, yields of millet, sorghum, maize and groundnuts have substantially increased. The yield increase due to rock phosphate (applied once only), using both improved and local varieties, reached its maximum during the second year in some regions and during the third in others.

The success of the ACPO program in Mali has been ascribed to a good understanding and cooperative attitude between the ACPO and the national research and extension services. Fortunately, both fall within the same administrative structure. From the beginning of the ACPO program in Mali, national officials were concerned about the weak link between research, extension and the Malian farmers. Farmers were appreciative of the role the ACPO could play in strengthening this linkage.

Pre-extension trials are conducted in farmers' fields with material inputs provided by the ACPO and based on national research results. Overall project supervision is provided by the ACPO or one of his staff with the extension agent providing the on-going supervision of work done by the cooperating farmer. Each trial is based on written instructions which the ACPO has thoroughly explained to extension agents before the trial begins.

The expatriate ACPO also began working with regional development agencies to establish pre-extension teams in each extension organization. Once these teams are fully operational, it is expected the ACPO will have less direct involvement in field trials. More time will be spent coordinating the work of pre-extension teams. However, this aspect of the ACPO program appears to be proceeding more slowly since the expatriate left the program.

Since September 1982, the ACPO program has been conducted by a trained national assisted by a team of several Malians. He has continued the highly successful program implemented by his predecessor. A concern for the future is the development of a positive working relationship with the Farm Production System Division, a separate organization also instructed to work with on-farm trials.

Generally recognized as the most effective ACPO program is SAFGRAD, the Mali ACPO program was the first to be implemented and has had excellent leadership and administrative support throughout its history. This program has yet to evolve through the final research-extension link---full integration of positive results proven in selected on-farm trials into the general extension programs for small scale farmers in large numbers.

ACPO Program Strengths

1. Generally recognized as one of the most successful aspects of the SAFGRAD project, ACPOs have:
   - o Strengthened linkages between national research and extension organizations.
   - o Have responded to the unique opportunities, priorities and constraints found in each country.
   - o Provided a bridge between on-station testing and testing under the conditions actually found in farmer fields.
   - o Conducted farmer managed trials directly in farmers fields.

- o Helped identify candidates for both long and short-term training programs.
- o Provided highly valued on-the-job training for national counterparts.
- o Provided informative reports which are generally received on schedule.

2. Program support covers the recurring costs for countries not able to provide them.
3. OAU member countries without ACPO programs are asking to have ACPO programs started.

ACPO Program Weaknesses

1. There were several flaws in the project design which became apparent during implementation of the ACPO program. Some probably could not have been foreseen, such as:
   - o The complexity of transferring useable research findings to general adoption on small farms was not fully recognized. One ACPO cannot simultaneously perform all the steps in a major developmental process covering a vast geographic area with poor roads, inadequate transportation and other almost non-existant channels of communication.
   - o SAFGRAD did not recognize the essential division between research and extension responsibilities in the research-extension linkage. The transition from on-station trials to on-farm trials is still a part of the research chain. While on-farm trials do, in fact,

represent selected site demonstrations, the end results of trials cannot be predicted and in fact may not outperform local varieties and practices. This kind of demonstration is experimental, a part of applied research and should not be considered an extension demonstration, even if performed in collaboration with the local extension agent. Rather, these trials represent the last link in the research chain---the pre-extension testing (local adaption) essential before improved varieties or cultural practices are ready for mass dissemination and promotion. True extension demonstrations promote technology known to be effective.

- Job performance expectations for the ACPO were too broad and managerially impractical. It was unrealistic to expect that one ACPO per country, working administratively under the national research ministry could (a) single handedly impact on national research priorities, (b) be substantially involved in on-station and on-farm trials, as well as (c) significantly impact on a national extension system that is usually in a different and often resource competitive ministry.
- The Project Paper did not stress the importance of clearly defined ACPO position responsibilities at the time contractual arrangements were being made to initiate the program in each country.

- o There are multiple lines of authority possible for the ACPO position. The authority chain appears to have as many as nine levels of management for some ACPOs, appears to allow by-passing of national supervisors in some cases, and does not significantly involve local USAID Mission ADOs in others.

2. A complaint often expressed by ACPOs was that researchers when visiting national centers in their country did not usually allow time to visit on-farm trial sites related to their work nor did researchers plan consultative visits with the ACPO to respond to questions and offer advice and clarification of research underway and to learn about farmer raised issues and problems related to their crop research work.
3. Not all countries have provided the national resources (whether technicians or other staff) agreed upon when the ACPO program was accepted.
4. The ACPO network which was to be supported in large part through annual ACPO conferences has not been set in place.
5. No difinitive action toward implementing the 1981 Mid-Term Evaluation recommendations is apparent.

Conclusions

1. The ACPO program has tailored research and extension activities to the needs of the participating country. While much remains to be done, the ACPO program has made a major contribution in meeting SAFGRAD objectives. It should be continued.
2. There is clearly a need for a more formal in-country support mechanism that specifies program and administrative relationships with research and extension entities.

ACPO Program Recommendations

1. Strengthening of the liaison and consultative roles between researchers in international and regional research centers is needed to gain national support for the ACPO program.
2. The SAFGRAD/ACPO program in Senegal appears to duplicate the work of other national programs and should be phased into an appropriate national program, including transfer of funding responsibilities. Senegal agricultural support available is sufficient for that country to be able to finance ACPO positions as part of other programs.
3. As ACPO contracts come up for renewal, OAU/STRC should renegiotiate position responsibilities to clarify performance expected. The phase in the research-extension-farmer continuum could serve as a guide. (See Appendix E.)

ACPO Program Suggestions

1. The ACPO program should be reassessed regularly by the OAU/STRC Coordinator's Office to:
   - o Determine where in the research-extension-farmer continuum each ACPO program is as described in Appendix E.
   - o Assess the nature and capacity of national research, extension and/or other organizations to conduct programs compatible with SAFGRAD objectives.
   - o Determine the most effective administrative placement for the ACPO to operationalize the phase(s) considered to be most critical in the research-extension continuum.
2. Continue to submit annual line item budgets for each ACPO program to the OAU/STRC Coordination Office. Once approved, authority for day-to-day expenditures and within budget line shifts resulting from ad hoc ACPO requests should be transferred closer to local site management. Transfer of approved funds to a location closer to program operation (local AID Mission or host country institution) would provide for more direct management, avoid delays in processing routine paperwork, allow faster response to local problems and concerns, and reduce the need for inter-country communication. The present process has compromised SAFGRAD ability to make timely program decisions.

3. Operationalize the ACPO network proposed in the Project Paper to facilitate the sharing of information and methodology across SAFGRAD countries. SAFGRAD should support an ACPO network including people in programs funded by others performing research-extension-farmer linkage functions.

4. Country specific recommendations are as follows:

   o Set up Cameroon and Mali as showcase ACPO training centers by providing the support needed to fully implement each phase in the research-extension-farm continuum.

   o In Mali where the ACPO is attached to the Multi-Location Trial Unit within the research system, enter into a separate contractual agreement to use Ingenieurs currently on the pay-roll, but not utilizing their technical capabilities due to lack of operational funds as part of SAFGRADs work force. Since that unit already has an administrative head, managable work relationships with the ACPO (who is more highly educated and more experienced) will have to be specified as part of the negotiated agreement.

   o In Upper Volta, one of two alternatives should be considered:

      - The ACPO role should be negotiated with both national research and extension entities to specify the responsibilities of the ACPO and their office/staff collaboration in a cooperatively negotiated contractual agreement. A collaborative

and collegial relationship should be encouraged with the FSU, but the ACPO should not be administratively placed in the unit at this time.

- Since the national organizational structure has not yet stabilized and there is the possibility that the FSU program will become a national research project, an expatriate ACPO is needed to do the task described above. It will be easier for an outsider to establish new working patterns than for the present national counterpart to do so. Meanwhile, the national counterpart should be sent for graduate level training so he can become fully qualified to take over the ACPO position when he returns.

o Although small, the ACPO program in Togo is making a positive impact. The national counterpart is ready for training. His out-of-country training should get underway as soon as possible so he can take full charge of the program.

TRAINING

The SAFGRAD training program was undertaken to stimulate the development of African research capacity and the capacity to organize, implement and evaluate applied research programs including the development of information and result sharing mechanisms. Training programs were to include on-the-job training, short courses and formal academic degree programs.

Some short term participant training was specified in the respective AID contracts with IITA, ICRISAT and Purdue. The IITA contract was the most specific with regard to training and calls for the contractor to:

> .....identify and train African scientists and specialists both on-the-job and short-course training at their headquarters or other mutually agreed sites, to strengthen manpower capabilities in national and regional semi-arid food crop research and production programs. It is estimated that this effort will include at least ten trainees annually for an average of six months each. The contractor will also advise on the fields and persons for graduate training abroad financed from other sources.

The SAFGRAD project also called upon OAU/STRC to:

> arrange to coordinate with participating countries an inventory of the regional manpower needs in crops and soils researchers as part of the initial planning for the projects'participant training program.

Table 1

Current Distribution of ACPOs in SAFGRAD Member States[1]

Member State	Donor	Location	Name of ACPO	Date ACPO Started Service	National Counter-parts working with ACPO[2]
Cameroon	USAID	Maroua	Owen Gwathmey (Expatriate)	May 1979	Martin Fobasso
Mali	USAID	Sotuba (Bamako)	Lamine Traore (National)	September 1982	
Senegal	USAID	Bambey	Mankeur Fall (National)	February 1981	
Togo	FAC	Lama-Kara	Robert Martin (Expatriate)	June 1982	Batussi Mpo
Upper Volta	USAID	Kamboinse	Moussa Kabore (National)	May 1982	

[1]An agreement was signed with the Republic of Benin since June 28, 1980 but no ACPO has been appointed for Benin.

[2]After initial on-the-job-training by the expatriate ACPO, the national counterpart is expected to undergo advanced university training. When the national counterpart completes training, he is expected to fully take over ACPO responsibilities. Neither of the national counter-parts have yet undergone advanced university training.

A comprehensive report on the SAFGRAD training program was completed in 1983 under a USAID contract with Bill Garvey. His report included the period through July 1983. Equivalent fourth quarter data were not available to the Evaluation Team. Since the situation as stated in the Garvey Report is essentially the same as now, the Evaluation Team accepted its conclusions. These are presented in condensed form in Appendix D.

A current review of training program participants is presented in Table 2. Information was based on follow-up to data extracted by Garvey from PIO/Ts, USAID quarterly financial reports and training office files. This was supplemented by personal interviews in ACPO program countries and with personnel in the USAID Training Office. A working document on training prepared for the January 1984 TAC meeting lists an additional eight trainees in the IITA six-month program (four from Mali and one each from Guinea, Somalia, Sierra Leone and Togo) plus an additional one in the ICRISAT six-month program. Because these numbers could not be substantiated by documents reviewed, they are not included in the figures presented in Table 2.

Some differences between Table 2 and other earlier presentations may also result from the deletion of persons named on previous lists who never matriculated, resigned or were terminated. These include two MS candidates from Guinea who were terminated; one each from Cameroon and Senegal who were not accepted by the several US universities to which they applied, one from Mali who resigned and; one from Upper Volta who refused to start in the program after being accepted. Also one person is

listed by Purdue for both the MS and PhD program, but since current enrollment is for the MS, it is the only count included in Table 2.

Training Program Strengths

- SAFGRAD has unquestionably made significant, though relatively small, inroads in filling a great need for improved research capability at all levels of its operation in the semi-arid countries of Africa.

Training Program Weaknesses

- The Project Paper states: "Under SAFGRAD, Training support will be arranged by the AID Project Manager and the OAU/STRC, in consultation with host governments and the CC following an appraisal of manpower needs." There is no record that this appraisal was conducted.
- SAFGRAD countries were expected to nominate candidates for long-term training under SAFGRAD auspices yet insufficient criteria for their selection was provided.
- As noted in the CC recommendations of November 1983, and reiterated in the TAC recommendations of January 1984, there are inadequate records in SAFGRAD headquarters (OAU/STRC) of long term training participants' performance and subsequent placement i.e., academic records, dates of return and placement in SAFGRAD countries.

- Processing necessary documentation for long term training participants has been cumbersome and slow for some countries and some candidates.
- The training section of the SAFGRAD project paper states:

> The development of African research and outreach capability is a matter of great concern to participating countries....and African ACPOs must be trained who have the knowledge and orientation to deal with the broad issues related to translating research into benefits in farmers' fields.

Yet even initially, expatriate ACPOs were not required to have extension background or experience. There was no apparent plan for training them or African ACPOs in extension methodology or practices.

- Initiating formal training for ACPO national counterparts has generally proceded very slowly, thereby extending the time expatriates are needed in the ACPO program and increasing its cost.
- The level of funds available in the training program has been considerably less than proposed in the Project Paper.

CONCLUSIONS

1. Both long and short term training programs have proven effective and should be strengthened and continued.
2. The amount of training provided at all levels has fallen short of the maximum provided in the initial SAFGRAD training budget.

RECOMMENDATIONS

1. Make provision under SAFGRAD to continue uninterrupted funding for degree candidates who are presently participants in the long-term training program.
2. The OAU/STRC Coordinator's Office should organize and maintain files on both long and short-term training programs and participants. Both the OAU/STRC Coordinator's Office and USAID should collaborate in finding ways to expedite processing paperwork related to training.
3. Conduct short-term training in the language of participants, not through translation. The shorter the length of training program the less time available to develop the language comprehension necessary to absorb new content being presented.

Suggestions

1. Make every possible effort to get national counterparts who already have on-the-job experience. This should make them better SAFGRAD employees and make advanced degree training more meaningful. Other donor support should also be aggressively sought by the OAU/STRC International Coordinator.

2. Before making commitments for additional long-term or short-term training, except for national counterparts already identified for long term training, the OAU/STRC Coordination Office should conduct a training needs assessment as called for in the original Project Paper. This can identify the numbers needed in the various levels of professional and technical support for the SAFGRAD program in each participating country.

TABLE 2

DISTRIBUTION OF TRAINING PROGRAM PARTICIPANTS
(Currently in process or already completed)

	Long-Term Training (Including Purdue)							SHORT-TERM TRAINING				
Country	PhD	Area of Study +	MS	Area of Study	BS/NON	Area of Study	Total	IITA	ICRISAT	PURDUE	Total	Total Training/ Country
Benin							0		5		5	5
Botswana	1	PS	1	BR/S			2	2	1		3	5
Cameroon							0		3		3	3
Chad			1	BR/MZ			1	1			1	2
Gambia							0	3			3	3
Ghana			1	* AG/CP			1				0	1
Guinea			3	SL*,BR,PS	1	EN*	4	4	4		8	12
Mauritania							0	1			1	1
Mali	1	EC	3	AG*BR,AG	1	AG	5	1	1		2	7
Senegal			1	AG/S/M			1	1			1	2
Togo			2	BR/S/M,EC			2				0	2
Upper Volta	3		2	EC,EC			5	5	15	1	21	26
Zambia							0	1			1	1
Totals	5		14		2		21	19	29	1	49	70

* Completion of long-term training

\+ Area of study key (Major/Commodity)

MAJOR
AG-Agronomy
BR-Breeding
EC-Ag.Economics
EN-Ag.Eng
PS-Plant Science
SL-Soil Science

COMMODITY
S-Sorghum
M-Millet
MZ-maize
GN-Groundnut
CP-CowPea

PROJECT MANAGEMENT

Introduction

This evaluation of project management follows a classical approach by first examining the planned objectives and resources in an effort to evaluate implementation management in conjunction with organizational design and policy definition followed by an analysis of organizational design and policy procedures.

Efficient management, be it fiscal or research management, is not a goal *per se*. Good management is a tool to achieve the objectives of a project. Good management will normally go unnoticed. Bad management is obvious.

Project management cannot be totally disassociated from research and financial management or administrative relationships between the OAU/STRC International Coordinator's Office and other parties in the SAFGRAD project. Each area is discussed followed by suggestions and recommendations as indicative avenues to be taken to solve management problems. There are often other ways of reaching a similar result.

Project Management Resources

Project Goal

According to the Project Paper, the broad goal of the SAFGRAD project is for:

> ....the establishment and development of a coordinated research and testing program for cereals and grain legumes, related farming systems and training of a cadre of African agricultural research scientists and technicians in semi-arid African areas.

Expected Outputs

The Project Paper lists the following expected outputs:

- Problem oriented applied research;
- Basic research in plant breeding;
- Agronomic and managment practices for sorghum, millet, maize, cowpeas and peanuts;
- Field testing programs in various ecological zones;
- Direction for national programs in seed multiplication and crop protection;
- Feedback for scientists conducting adaptive research;
- Farming systems research under small farm and low input conditions;
- Increased liaison among researchers throughout the region through conferences, planning sessions and technical publications;
- Result sharing among member countries;
- Training of African agricultural scientists and technicians.

The first of the specific objectives is: To develop a semi-arid African regional perspective in conducting research activities. This regional definition transcends preoccupations of the national research programs of member countries and the broader geographical and ecological scope of the major contractors in the project, IITA and ICRISAT. This regional definition is also different from those adopted by other regional organizations or programs such as, INSAH covering only the Sahelian countries, or IRAT catering mainly to the Francophone countries.

The SAFGRAD regional definition extends the exchange of experiences between Sahelian and other semi-arid countries of Africa irregardless of their Anglophone or Francophone agricultural research traditions.

Another objective of SAFGRAD is: To focus attention on low input, small farm agricultural conditions. This objective is clearly expressed in the Project Paper and is also addressed in two status papers prepared by USAID/UV in mid-1983 entitled, "IITA in SAFGRAD" and "ICRISAT in SAFGRAD." Both papers further amplified this objective by stating the project is to:

> Plan and conduct research on improved cereal production technology for adverse conditions including low soil fertility, periods of drought, the presence of harmful insects and plant diseases and the indigenous practice of mixed cropping.....selection of varieties that most effectively utilize available nutrients and water...

This strategy is well adapted for the regional dimension chosen by SAFGRAD. It is highly probable that major changes in methodology and inputs could do much to increase food production in Africa. However, in many SAFGRAD countries the ecological and

economic situation will not permit such broad changes. In other member countries, high input and high technology farming could bring important improvements in national food production, but such an agricultural revolution would most probably not be conducted in the semi-arid sections of those countries. Unless one does not see the displacement of entire populations as a limiting factor, the agricultural research directed at production improvement in semi-arid Africa has to accept the constraint of the small farm and low input situation for the foreseable future.

A third objective of SAFGRAD is: To develop linkages between national agricultural research programs, including farming systems research and pre-extension activities. Such linkages assume intensified liaison among researchers of both the research contractors used by SAFGRAD and those of the national programs.

Inputs Provided

According to the Project Paper the following inputs were to be brought into SAFGRAD:

- Senior Crop and Soil Scientists - These scientists were/are grouped in teams under IITA and ICRISAT contracts. The IITA team is stationed at Kamboinse, Upper Volta. The ICRISAT "team" was divided, with one person at Kamboinse, three at Samaru, Nigeria and one at Nairobi, Kenya.
- Farming Systems Research - A contract with Purdue University provided four researchers to work in a Farming System Unit in Upper Volta. For a time this

team was located at Kamboinse with IITA and ICRISAT, but later moved to an office in Ouagadougou.

- Accelerated Crop Production Officers (ACPO) - Currently five of the 25 member countries have ACPOs. Four are funded by USAID. They provide technical assistance and support for field trials at the national level.
- Donor Support - In addition to financing the research contract and the OAU structure, USAID and other donors have contributed technical support. They have participated in the Technical Advisory Committee (TAC) and the Consultative Committee (CC). A Project Manager was provided by USAID during most of the project period.
- OAU/STRC Coordination - The Project Paper does not elaborate on the OAU/STRC coordination structure, other than by listing the roles that are expected. This central structure of the SAFGRAD project will be analyzed in more detail in the following section.

Relationship of Inputs to Outputs

The expected outputs were both numerous and ambitious. The results are covered in more detail in other sections of this report. However, it should be stated that SAFGRAD contractors left to themselves, IARCs and Universities alike, will provide research within their institutional framework and will tend to conduct it within the mainstream of their research programs and

resources. Any SAFGRAD specific orientation of these research activities must be enforced by the organization responsible for their funding.

The input of the ACPO component was adequately linked to the expected output. The ACPO was basically linked to operations within one national program.

Donor support is very important to SAFGRAD, but donors should not be expected to implement the activities or even be a major factor in the planning of these activities. The OAU/STRC Coordination Office has major responsibility for monitoring project activities. Together with the TAC and CC they should set overall policy and program guidelines. Since SAFGRAD plans to have more than one donor, it is important that clear research policies be established or donors may pull SAFGRAD in directions other than those planned.

The OAU/STRC Coordination Office

Functions

The functions of the Coordination Office are listed in the Project Paper (pp. 73-74). However, the list does not go far in defining implementation mechanisms and nowhere does the Project Paper provide evidence of an organizational design effort for this all important component of the project. The Project Paper did not relate the functions of the Coordination Office to

project objectives. When this is done, it becomes clear that the Coordination Office had the responsibility for:

- o Orienting research toward specific SAFGRAD objectives by:
  - Orchestrating the planning process and preparing the TAC agenda;
  - Preparing research contracts with the research contractors.
- o Ensuring regional diversification of field testing and the small farm low-input orientation by:
  - Obtaining national program participation;
  - Monitoring research activities of contractors;
  - Being regularly present in the field.
- o Organizing feedback and liaison among researchers by:
  - Organizing conferences, workshops and by circulating publications;
  - Working with other programs and coordinating agencies.
- o Developing a balanced training program by:
  - Assessing needs in relationship with national programs;
  - Defining selection criteria and establishing links with universities;
  - Following up on trainees during training and after they return to Africa;
  - Organizing short-term non-degree training sessions.

- o Encouraging member countries and IARCs interest in SAFGRAD by:
  - Promoting the SAFGRAD concept;
  - Defining specific member country contributions to the research and development within individual national programs;
  - Preparing the CC agenda.
- o Widening international donor participation by:
  - "Marketing" well defined sub-elements of the SAFGRAD Project;
  - Enlarging the network of institutions to conduct training.

This rather impressive list of areas of responsibility and related activities is the minimum expected of the Coordinating Office to maintain regular progress toward reaching the project objectives. No actual research activities are conducted by this office. Even related work such as the preparation and publication of committee, conference and workshop proceedings or the preparation of periodical progress reports and news letters that should be part of the scope of work, have been ommitted from this list. Nothing has been said of the responsiblities for administrative and financial management required for the day-to-day project implementation.

Resources of the Coordination Office

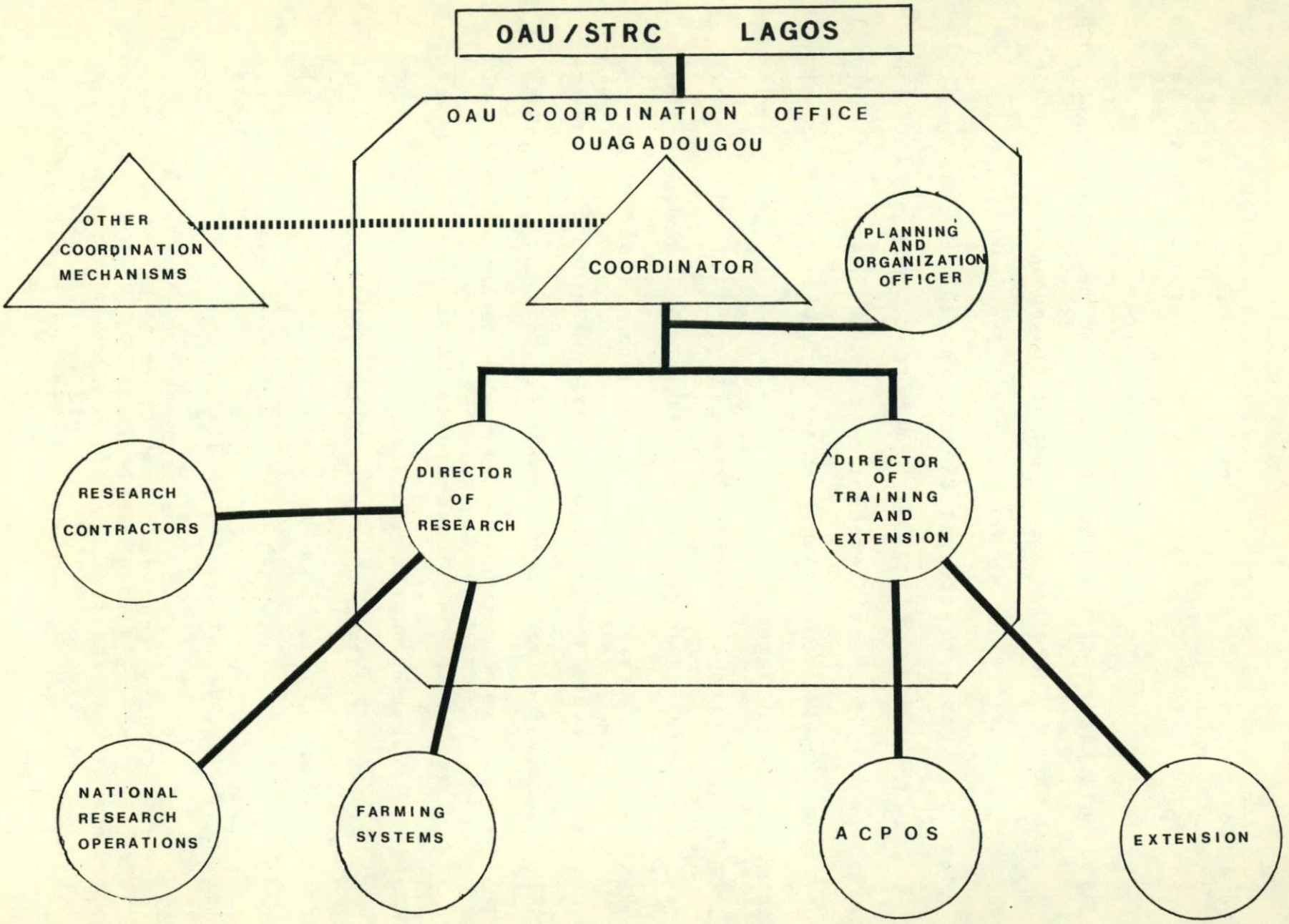
The Project Paper says little about the resources needed in the Coordination Office to carry this work load. According to the AID Audit Report of November 16, 1982: "The Project Paper envisioned the OAU Coordinator's Office in Ouagadougou as a small office with a staff of two to four people. The operating budget for the office was projected at $50,000 annually." The Audit concludes that with a staff of nineteen, the office is overstaffed. This broad statement of overstaffing could not, according to the USAID/UV Controller and Agriculture Development Officer, be substantiated.

In fact, during the period from 1979 to 1983, the senior staff of the Coordination Office consisted of the Coordinator and the USAID Project Manager. This was evidently insufficient to conduct essential activities to make reasonable progress toward SAFGRAD objectives. The lack of senior personnel was compounded by the fact that well trained medium level technical personnel were scarce and by the first Coordinator's strategy of almost exclusively conducting public relations.

In response to Recommendation 3 of the Mid-Term Evaluation, indicating attention should be given to the permanence of SAFGRAD, i.e. institution building, the summary attached to the PES of April 21, 1983, states the following:

> Until the evaluation, the permanence of SAFGRAD was of secondary concern. The USAID emphasis was, rather, on mobilizing research and transferring the information expeditiously to the member states....an expanded role for OAU/STRC should await the arrival of a new management team in the Coordinator's Office.

ORGANIZATIONAL CHART 1



The starting elements of a new management team in the OAU/STRC Coordination Office are now in place with the appointment of the new International Coordinator and Research Director. They are highly respected by the research contractors, considered competent and honest by USAID/UV Mission personnel and they have favorably impressed the members of the evaluation team. In addition, two well qualified accountants with internationally accepted creditentials have been hired.

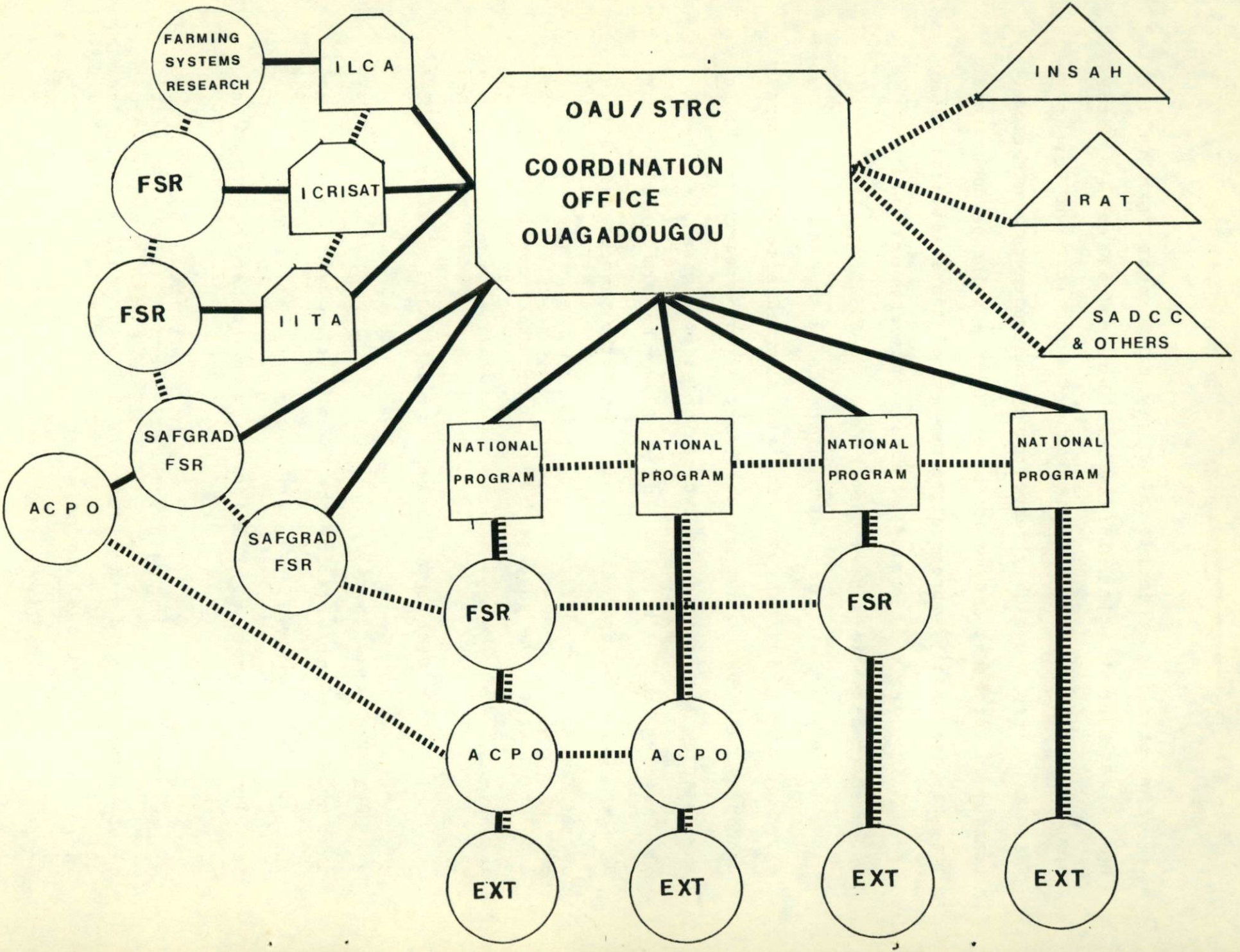
If the OAU/STRC Coordination Office is to realize what is expected of it, and by doing so give substance to the SAFGRAD concept, the Coordinator and the Director of Research should be supported by the addition of two senior staff members, a Director of Training and Extension and a Planning and Organization Officer. Organizational Chart 1, presents the suggested structure of the Coordination Office. A description of the qualifications and functions of the suggested additional staff are presented in Appendix G.

Operational Network of SAFGRAD

Organizational Chart 2, illustrates the operational network that should be activated by the Coordination Office to realize the SAFGRAD objectives. The purely administrative aspects have been left out as they will be addressed in another section of the report.

As can be seen in Organizational Chart 2, three main areas of operations are identified in the SAFGRAD project under the OAU/STRC International Coordinator. One area relates to the production of SAFGRAD oriented research by IARCs with OAU/STRC

ORGANIZATIONAL CHART 2



entering into a contractual relationship. A second area relates to the networking of Farming Systems Research in SAFGRAD member countries. The third area, focuses on the networking of the national agricultural research programs of member countries with ACPO and extension officer networks as a part of this area. Finally, a fourth more informal set of relationships would link the SAFGRAD regional approach to the often complementary operations of other regional entities like INSAH and IRAT.

Relationship with International Agricultural Research Centers

Until now the contractual agreement between SAFGRAD and IITA and ICRISAT basically resulted from bilateral negotiations between the principal donor, USAID, and the IARCs. This has enabled the IARCs to pursue their own agenda with little or no guidance from AID or OAU/STRC. This procedure should be modified by making grants to OAU/STRC, who would then contract with the IARCs and be responsible for seeing they follow the general research policy guidance and priorities established by the TAC and CC.

The Evaluation Team supports this grant approach. As an accompanying measure USAID should assist OAU/STRC with the legal and contractual matters, at least for an initial period of time. This could be achieved by ensuring that OAU/STRC have access to highly competent legal and contractual counsel. USAID should fund this contract support so that it would have a strong say in the selection of legal and contractual expertise. This should ensure an orderly transition from the present situation to a more

responsible contract management for OAU/STRC. If, however, USAID has reasons for retaining the responsibility for negotiating these contracts, it should make OAU/STRC a major party in these negotiations and explore the possibility of having OAU/STRC co-sign the contracts.

The basic objective of the contracts with the IARCs is to obtain research skills and resources directed at the specific SAFGRAD agricultural development objectives. The Coordination Office as the operative OAU/STRC agency must develop an operational definition of those objectives and priorities from guidance provided by the TAC and CC. Given these objectives and priorities, the contractual management strategy of SAFGRAD should clearly take into account the institutional strategy of the contracting parties, namely IITA and ICRISAT.

IITA

The IITA/SAFGRAD management approach at Kamboinse has been successful in bringing together scientists, not all of them financed by SAFGRAD, to work as a team on the maize and cowpeas. The IITA team leader seems effective in generating team work and organizing the regional testing and monitoring effort required. He has also proven to be a good organizer in preparing conferences and workshops, and generating collaboration between donor and coordinating agencies. However, his efforts seem to have aborted when trying to establish intensive collaboration with the Kamboinse stationed group of ICRISAT scientists, one of whom is SAFGRAD financed.

ICRISAT

It has been difficult to identify the management strategy underlying ICRISAT's participation in SAFGRAD. The implementation outposts are scattered throughout Africa---soil and water specialist in Upper Volta, a sorghum breeder in Kenya and a small team working on sorghum and millet in Nigeria. As can be imagined, there is little feeling of "team" spirit among these widely scattered team members.

ICRISAT has the IARC mandate to work on the SAFGRAD crops of sorghum, millet and groundnuts. No work has been done on groundnuts under the SAFGRAD contract nor was such work stipulated in the ICRISAT contract. ICRISAT is establishing a major millet and groundnut research center in Niger to cover a region similar to SAFGRAD's regional interest for these crops. There have been discussions in ICRISAT of the possibility of establishing a major sorghum program in West Africa. SAFGRAD should recognize the emerging regional strategy of ICRISAT and treat it as a positive opportunity rather than as a limiting constraint.

Farming Systems Research Network

Presently, one Farming Systems Research project is funded under SAFGRAD, the Farming System Unit in Upper Volta. In the coming months, SAFGRAD with IFAD funding plans to implement new farming systems research project activities. Aside from these

SAFGRAD funded FSR projects, there are other FSR operations in the SAFGRAD region. The IARCs also have FSR operations. In addition, many national programs have FSR projects of their own.

SAFGRAD could play an important role in FSR network by facilitating exchange of information among different FSR operations within the region. The objective of the network is to bring together researchers through conferences and workshops, and encourage farming systems research groups to address regional issues, related to the other SAFGRAD research components.

Management of the FSU Project

The Purdue University team's network of management relationships is very complex. It includes links between the team and USAID/UV; links between the team in the field and Purdue University; links between Purdue and USAID/Washington; links between the team in the field and the national agricultural program in Upper Volta, namely ORDs; links with other components of SAFGRAD research such as IITA, ICRISAT and the Upper Volta ACPO; finally links with the OAU/STRC Coordination Office.

While most of those relationships have been successful and well managed, this complexity may in itself explain that some links such as those with IITA, ICRISAT and the Upper Volta ACPO were not as close as they should have been. This web of contractual and operational relationships is largely outside the OAU/STRC sphere of operation. This complexity did little to enhance the OAU/STRC coordination role, a role that could have resulted in a better integration of the three different types of

research carried by the IARCs, FSU and the ACPO. The relationship with OAU/STRC Coordination Office and the FSU team has improved markedly since the appointment of the new Coordinator and Director of Research. Work programs, preparation for workshop participation and planning for linkages with other farming systems groups in the SAFGRAD region have been discussed.

The relationship of the Purdue Team with USAID/UV has been mostly related to the administrative process of project implementation and exchanges have been satisfactory. The FSU field team has had indirect bearing on the relationship between Purdue and AID/Washington, as it is consulted before extensions are negotiated to the contract.

The relationship of the FSU team with Purdue University have been satisfactory both on the administrative matters, as on the more substantive aspects of the project. Adequate support has been provided to the field team by Purdue, particularly through the presence at the University of an International Coordinator. Staffing has been provided mostly from Purdue regular staff, and in certain cases, effective overlap of personnel has been achieved.

Relationships with the national agricultural program of Upper Volta, specifically with ORD, have been activated in recent months, since the FSU team feels it now has sufficient data to have something to "sell."

Relationships with the IARCs have been weak and may have suffered from the decision of the FSU team to move its headquarters from Kamboinse to Ouagadougou. There has been some interaction with the breeding and agronomic operations of IITA

and with operations of SAFGRAD and non-SAFGRAD personnel of ICRISAT, such as the agricultural economist. The relationship with the Upper Volta ACPO has been minimal.

From the managerial point of view, the performance of FSU has been as good as that of the other institutional contractors. If one looks at the regional impact objective of SAFGRAD, FSU has had little impact. The target has been, in fact, readjusted to a more Voltaic approach for the model building phase. At this point in farming system research development, the FSU team feels that the model is in place and ready for regional impact. They favor achieving this impact by bringing people from various national programs to train in the FSU facilities. Participation in workshops on Farming Systems Research would also be a way of achieving regional impact. The FSU team has no plans to reproduce their experience in other SAFGRAD member countries.

The ACPO Network

From the management standpoint, the ACPO program appears quite simple, though it has proven difficult to handle. The administrative complexity of establishing ACPOs in member countries may explain why so few ACPOs have been installed. On the substantive issues relating to their programs, it seems that the ACPO component of SAFGRAD was well managed. Timely progress reports have been transmitted to OAU/STRC. During monitoring tours and on other occasions OAU/STRC has kept in contact with the ACPOs.

The administrative aspects of the ACPO program is difficult to describe. When ACPOs are USAID funded expatriates, they are under direct USAID personal services contracts and relate to USAID/UV through the local USAID mission in the country where they are located and eventually also through the regional USAID office in Abidjan. National ACPOs operate under various contractual arrangements and are at least partially funded by AID. There is also a case of a French expatriate ACPO financed by French aid. The question of the ACPOs administrative arrangements from the management standpoint is clearly something that should be studied in order to develop more clearly defined policies.

While the actual work of the ACPOs is seen as productive, highly valuable and well managed on the substantive issues, the administrative handling of the ACPOs has created problems. This may have limited the benefits that ACPOs could have brought to the national agricultural organizations and to the SAFGRAD project. The ACPOs should be clearly linked to a national organization. The administrative process should be streamlined and their networking relationship with the OAU/STRC Coordination Office should be enhanced. to maximize the exchange of experience among the ACPOs. The expansion of the ACPO operations beyond the five countries now participating should be encouraged.

During the first phase of about four or five years, it appears more efficient to utilize expatriates as ACPOs. National counterparts may be trained during this period amd supporting staff trained. Contractual arrangements could accommodate both expatriate and national ACPOs. The expatriate ACPO could have a

SAFGRAD/OAU/STRC based contract whereas the national ACPO would be under contract with a national institution. In the latter case, a complementary contract agreement should be negiotated by OAU/STRC to support the national ACPO and ensure that he will be in a position to participate in SAFGRAD networking activities.

National Programs Network

All member countries of SAFGRAD have national agricultural research operations that are structured in many different ways. The objective of a SAFGRAD network of national research programs is not to standardize the organizational format, but to share experiences considered to be mutually beneficial to members. Such results have been attained by workshop participation, training programs, regional trials and visits on monitoring tours. Countries where research centers or ACPOs are located generally have more intensive participation in SAFGRAD. This may also be the case for those countries where members of the CC or TAC reside.

It is the responsibility of the OAU/STRC Coordination Office to reflect on the conditions of membership and to propose for adoption by the CC, a policy on contributions by member countries. This would not necessarily take the form of a membership fee and such a policy should have suffient built-in flexibility to adapt to the varying conditions of the national programs.

The Coordination Role of SAFGRAD

The coordinating role of SAFGRAD may seem duplicative in view of a proliferation of international and regional institutions such as IITA, ICRISAT, CIMMYT, IRAT and CILSS/INSAH. However, a closer analysis of each one of them reveals that they are limited in scope and geographic coverage.

Among the SAFGRAD crops IITA covers only maize and cowpeas. ICRISAT covers only millet and sorghum and CIMMYT only maize. Furthermore, IITA covers only West and Central Africa, while CIMMYT covers only Eastern and Southern Africa. Even in West Africa, it is highly unlikely that IITA would have started research in the semi-arid zones to the current extent had it not been for the SAFGRAD project. IRAT is engaged only in the Francophone countries, while CILSS/INSAH is limited to the eight Sahelian countries of West Africa.

SAFGRAD, due to its OAU umbrella has been able to bridge the rift not only between eastern and western Africa but also between Anglophone and Francophone Africa. SAFGRAD is seen as an African institution, building other African agricultural institutions. Its acceptance by African Governments is much more positive and receptive than that employed by most other external bilateral and international institutions. SAFGRAD has also the potential for mobilizing political support for the cause of agricultural research in Africa whenever it is required.

Among the international institutes ICRISAT and CIMMYT have global mandates, which tend to dilute their African focus. The mandate of the IARCs limits them only to research activities.

The extension and development implications of new technologies are areas where they are reluctant to become involved. For instance the ACPO program for creating the necessary linkage between national agricultural research institutions and the extension programs would have been unthinkable by the IARCs.

SAFGRAD provides an OAU mechanism for channeling additional funds for agricultural research and training in Africa. Already IFAD is providing the Director of Research and considering funding of a three year US$3.79 million farming systems research project. The current management team in the OAU/STRC Coordination Office is competent and should succeed in attracting more funds from the international donor community during SAFGRAD II.

Furthermore, SAFGRAD should be able to promote better cooperation between IITA, ICRISAT and other research partners in carrying out joint agronomic research in areas common to all crops (e.g. striga control, animal traction, soil and water management and farming systems research). The current lack of institutional cooperation is inimical to advancing technology generation. SAFGRAD should be able to achieve this through the influence of its CC and TAC, of which these research institutions are members.

USAID Research Management of SAFGRAD

Outside of the Project Manager's role in developing the OAU/STRC Coordination Office and laying down the basis for networking activities during the first years of the SAFGRAD

project, USAID has had little to do with the day-to-day management of actual research. However, on the more strategic, long-term planning level, it has had much bearing on the development of the activities that have taken place.

By its participation in the TAC and CC meetings, USAID was in a key position, as the main donor, to influence the planning and the management strategy of SAFGRAD. The policy of USAID has been to maintain a low profile at these meetings. This policy can well be defended and could increase the viability of SAFGRAD in the long-run, as well as make participation by other donors more attractive. However, AID could have exercised more pressure to have more frequent meetings of the TAC and CC particularly in the early years of the project without departing from this policy.

It was by negotiating direct contracts with IITA, ICRISAT, Purdue University and the ACPOs that USAID has had its most important influence on the research activities. These contracts have, in fact, determined the actual amounts committed to the various components of the SAFGRAD program. Direct negotiations of contracts by AID may also have minimized the actual integration of the program and retarded the development of the coordination capacity, so central to the SAFGRAD concept.

The purpose of using the OAU structure to bring coordination in the research effort may have been significantly defeated by depriving OAU/STRC the power of contract negotiations. Direct negotiation of the contracts by AID may also have limited the input of the Coordination Office in the definition of issues and

priorities to be incorporated in the content of those contracts. It must be recognized, however, that the decision to negotiate directly with the research contractors may well have accelerated the implementation of the project.

The CC and TAC as Management Tools

The Project Paper correctly anticipated the complexity of managing the SAFGRAD project by stating:

> Overall, SAFGRAD program direction is likely to suffer from the normal apathy of national governments in directing regional projects. Projects like SAFGRAD, despite their great aggregate importance to the region, do not loom large enough vis a vis individual national perceptions or budgets to command significant national management resources....The membership of the CC and its subcommittee appear relatively unwieldy from a management point of view.[1]

For most of the projects's life these committees were relatively inactive. Activation of the TAC and CC started about the time of the Mid-Term Evaluation in 1981 when a strong recommendation was made that these committees should meet. The OAU/STRC International Coordinator sees the value of these committees and from all indications a well prepared agenda and staff work for the November 1983 meeting of the CC and the January 1984 meeting of the TAC invited active participation by members.

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[1]SAFGRAD Project Paper, p. 106.

At the meeting of the CC, the question of effective definition of membership in the CC and TAC has been tackled and resolved in a satisfactory manner. Participation by other coordinating agencies such as INSAH has been assured and an effective representation formula has been devised for member countries. The summary of proceedings from the CC reveals a clear grasp of the situation and of the avenues that must be explored. Many recommendations of this Committee are supported by the Evaluation Team.

The present management of the OAU/STRC Coordination Office is utilizing the CC and TAC along the lines envisaged in the Project Paper. We applaud this effort and encourage regular meetings of both the TAC and CC. We would, however, caution that while benefits can accrue to SAFGRAD from the efficient working of the CC and TAC, it does not transform these entities into effective executive tools of research management. The actual research management must be conducted by the contracted IARCs and universities and under the direction of the various national research programs. The actual research coordination mangement will be conducted by the staff of the OAU/STRC Coordination Office. The role of the CC and TAC in a management sense will be that of establishing policy guidelines for general planning, identification of research problems of a regional significance, monitoring progress toward their solution and establishing corrective courses of action where needed.

Financial and Administrative Management

SAFGRAD 1978 - 1985

Fiscal management of SAFGRAD has been the center of attention of USAID/UV, AID/Africa Bureau and OAU/STRC for over two years. Triggered by a USAID/UV requested audit of the OAU/STRC Coordination Office, the audit questioned the use of funds managed by the previous Coordinator amounting to about ten percent of the total project funds used at that time. Before discussing the audit, it would be well to look first at the overall expenditure of project funds.

The evolution of funding and expenses of the SAFGRAD project is presented in Table 3. It shows that the USAID funding for the SAFGRAD project was approved at $14 million in 1977 and has subsequently been increased to $19 million for the period ending March 1985. The increased funding is not surprising since the planned five year life of project has been extended to eight years.

Given the delays in initial implementation, a comparison of the data for the end of 1983 and that of the original budget provides a global view of financial performance. In doing so, it becomes clear that financial control over-all has been very good. Less than $14.5 million was spent by the end of five years. A closer analysis of Table 3, reveals, however, that the absolute and relative appropriation of funds among the various components

TABLE 3
SAFGRAD PROJECT

EVOLUTION OF FUNDING AND EXPENSES

Project Components	Estimates in Project Paper ($ 000)	%	Earmarked as of 11-13-83 ($ 000)	%	Estimate Expenses to 12-31-83 ($ 000)	%	Estimate Expenese to 3-31-85 ($ 000)	%
PURDUE	1423.50	12.40	3336.80	22.00	3131.80	21.60	3909.10	20.90
ICRISAT	2280.50	19.80	2184.10	14.40	1972.50	13.60	2723.80	14.50
IITA	1423.50	12.40	4316.90	28.40	4214.50	29.10	5305.50	28.30
ACPO	2562.50	22.30	1587.10	10.40	1612.60	11.20	2004.80	10.70
TRAINING	2000.00	17.40	949.10@	6.30	890.50@	6.20	1169.10@	6.30
COORD.&CONFER.	550.00	4.80	1676.50	11.00	1492.00	10.30	2171.90	11.60
CAPITAL & OTHER	1247.00	10.90	1141.90	7.50	1159.90	8.00	1447.90	7.70
Total	11487.00*	100.00	15192.40**	100.00	14473.80**	100.00	18732.10**	100.00
PROVISIONAL	2411.00							

@ The training components of the contractors activities included
* Estimates based on project paper of pp.52-53.
** Estimates based on funding of $19,169,000 by USAID/UV, Controller's office and does not reflect the total life of project.

of the project are far from the budgeted allocations. Such discrepencies are not necessarily detrimental to the achievement of project objectives, but they do warrant further scrutiny.

Before turning attention to the variation between budgeted and actual funding of the various components, it should be noted that the column entitled "Earmarked" in Table 3 as well as in the USAID financial documents provided for this evaluation, should not be used as benchmark references. It may be used as a reference point to follow-up on the actual distribution of funds among components since it includes actual expenditures in various contractual arrangements during the life of the project. Since there were no significant amendments to the project, one gains the impression that actual funding of the various components resulted more from the negotiating ability of the various contractors and from the implementation constraint of certain planned actions than from the planned redefinition of the strategy.

Turning to the actual discrepencies observed between the planned and actual expenditures, the following conclusions can be drawn:

- The first contractors to start work under USAID negotiated contracts have largely exceded their share of funds i.e., IITA and Purdue. Purdue was to receive 12.4 percent of the funds, while present estimates are that they will receive 20.5 percent. IITA will receive 28.3 percent compared to 12.4 percent budgeted. In contrast ICRISAT started work late and its share will be 14.4 percent compared to the 19.8 percent budgeted.

Since ICRISAT, according to the project paper, is to work on sorghum, millet and groundnuts, it is quite clear that those crops which were supposed to receive maximum attention, will have been provided the least funds.

- Globally the three international research contractors, IITA, ICRISAT and Purdue were to spend close to 45 percent of SAFGRAD funds. By March 1985, they will have spent over 63 percent of the funds appropriated.
- The OAU/STRC Coordination Office also obtained a much larger share of funds than was budgeted. Even if a very small part of this difference can be explained by some mismanagement of funds, the largest part is due to errors in design of the initial project. It was not clearly understood at the beginning that the Coordination Office was the key element for the implementation of the SAFGRAD concept. Both the mid-term and the present evaluation reached this conclusion. The increased budget of the OAU/STRC Coordination Office resulted from adjustments to this fact, but this project component is not sufficiently developed.
- Capital and other costs were kept in line with what was initially budgeted, in absolute dollars. The decrease in percentage is due in part to the non-appointment of a USAID Project Manager for a period of the contract

and in part to the fact that many captial costs were not recurrent as the project's life was extended.

- The big losers in the distribution of project funds were the ACPO and Training components. The ACPO program was to receive the most important share of funds with 22.3 percent. In fact, they will come out fifth in 1985, with 10.5 percent. The present evaluation concludes that the ACPO program is not only one of the most effective components of the program, but also one that will create long-term effects on the national programs of SAFGRAD member countries. Even if it remains difficult to estimate lost benefits due to the relative lack of development in the program, such losses can be considered important.

  The training component has lagged behind target funding, even more than the ACPO program. By project end, less than 60 percent of the funds budgeted for training in 1977 will have been spent. In relative terms, training that was to receive 17.4 percent of funds, will have received 6.3 percent. If one considers that training of African nationals could be one of the most productive and longest lasting investments that SAFGRAD can provide, the loss is necessarily important.

The important differences between budgeted and actual expenditure cannot be linked to major amendments that would have modified the implementation strategy. Rather the linkage appears to be related to negotiating capacity and ability by the institutional contractors to use additional funds and to the implementation constraints of the ACPO and training programs. Funds have not been spent on the planned activities and the loss of benefits due to the much reduced activities in ACPO and Training programs could be quite important. The observed imbalance might have been reduced if the Coordination Office had had a larger say in contract negotiations and if that matter had been brought to the attention of the CC early in the project.

OAU/STRC Coordinator Office Audit

At the request of the USAID/Upper Volta, the AID Regional Inspector General for Audit, Abidjan, Ivory Coast, performed an audit from July to October 1982 on the OAU/STRC Coordinator's Office to determine:

> .....the amount of cash shortage and to review the records and financial practices....as they relate to the property of expenditures made with AID funds....review AID's follow-up procedures to determine whether it had taken appropriate action on the recommendations of an Evaluation Report that had been made of the SAFGRAD program.

The Audit Report was officially issued November 16, 1982 noting rather serious evidence of project mismanagement. Among the major findings they reported:

- o The Coordinator's office was budgeted for an annual expenditure in the project paper of $50,000 for a staff of two to four people. By February 1982, the budget

had grown to $247,000 with a staff of 19 people. "Financial policies and practices of the office were deficient in almost all respects."

- o An unexplained shortage of $27,739.
- o AID financed construction contracts awarded without competitive bidding and/or AID approval.
- o USAID's financial monitoring was found to be "deficient." The Project Officer administratively approved financial reports without any substantive review or knowledge of the OAU Coordinator's financial management practices. To compound matters, USAID Controller personnel did not review the financial practices of the Coordinator's office during the first four years of the project.
- o The Project Evaluation Summary (PES) was not prepared for the Mid-Point Evaluation conducted in 1981.

The IG/Audit made ten recommendations to improve financial and administrative management of the project. As a result of the Audit, the contract of the first SAFGRAD OAU/STRC Coordinator was not renewed, other staff changes were made and the OAU/STRC Office in Lagos dispatched financial management staff to establish a financial management system and efforts were made to recover the outstanding cash. The USAID/UV Mission has taken steps to provide responsible financial and administrative management of project funds. The audit recommendations have been cleared per Action Memorandum for the Assistant Administrator for Africa from William H. Naylor, Jr. AFR/RA dated August 18, 1983.

A major US accounting firm, Arthur Anderson, has reviewed the financial and management control procedures in the OAU/STRC Office in Ouagadougou and Lagos to strengthen their accounting practices. The Firm has produced a set of forms and procedures that are gradually being implemented under the supervision of the USAID/UV Controller.

The vouchers prepared by the Coordination Office in Ouagadougou are routed to OAU/STRC/Lagos for approval and are then submitted to USAID/UV for payment. Given the present set-up of delegation of authority between OAU/STRC/Lagos and OAU/STRC/Ouagadougou, this is felt to be necessary in order to reflect the accountability of the OAU/STRC/Lagos. Given the difficulty of communications in Africa this measure has some obvious draw-backs and alternatives should be pursued.

As a reaction to the Audit, a clarification of responsibility was affected within AID, between AID/Washington and AID/UV, not unlike that suggested for OAU/STRC:

> ....AFR/RA must officially transmit to OAU/STRC/Lagos notice that USAID/Upper Volta is designated as an additional representative of the US Government. In particular, OAU/STRC/Lagos should be notified that all official communications regarding project implementation, monitoring, evaluation and completion should be sent to USAID/Upper Volta as the primary respresentative of the US Government. OAU/STRC/Lagos should also be advised that any communications concerning major changes in the project requiring modifications to the project agreement should be sent to AFR/RA.[2]

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[2]Source: Clarification of USAID/Upper Volta Project Management Responsibilities of the Semi-Arid Food Grain Research and Development Project, dated 3/21/83 drafted by John A. Becker, OAG Attachment I to a memorandum drafted by R. Gray of conversation on SAFGRAD Project, Ouagadougou, February 14, 1983.

This proposal encourages more efficient management of the SAFGRAD project and places administration closer to the action. It may be more efficient, however, for OAU/STRC/Lagos to delegate authority and responsibility for day to day financial management to the OAU/STRC Coordinator in Ouagadougou. If such action is taken, the voucher routing procedure through Lagos could be avoided.

Very commendable work has started on the preparation of a procedural package for the fiscal management of SAFGRAD. This package contains a mixture of OAU and AID procedures, mutually agreeable to both parties.

Two internationally accredited accountants have been recruited for the OAU/STRC Coordination Office in Ouagadougou. The selection panel included the Chief Accountant of the Regional Financial Center, USAID/Nairobi. These accountants, one IFAD funded and the other AID funded, have joined the OAU/STRC Coordination Office in Ouagadougou. With these additions, the Coordination Office is now in a good position to implement an effective accounting and control system.

The USAID Project Manager

During the evaluation it became apparent that USAID/UV and the OAU/Coordination Office did not share the same views on the role of the Project Manager to be appointed by USAID for the SAFGRAD project. The Coordination Office prefers an experienced agricultural officer who would be a professional colleague and could essentially fill the position of the Planning and

Organization Officer outlined in Appendix G. Having just come through a rather painful audit, USAID/UV saw this person as someone who could assure the Mission that proper implementation procedures were being followed i.e., more concern with the process than with the substance of the SAFGRAD project.

Given the fiscal management background of this project, perhaps these two functions should not be combined in the same person. As indicated above, the issues of fiscal management are of central importance to a smooth operation of the project. The Planning and Organization Officer should be a permanent member of the OAU/STRC Coordination Office executive staff. The AID project manager will, of course, need to concentrate on the USAID interests in the management of the project. Even so, the Project Manager will be a contract employee and, hopefully, may also be able to help with the general organizational work of the Coordination Office. A direct hire Project Officer will still need to sign official documents. The relationship of the USAID Project Manager and Project Officer needs to be carefully studied in the development of the SAFGRAD II project to see that both the needs of USAID and OAU/STRC are met.

SUMMARY

The SAFGRAD Project was designed to plan and conduct research on cereal grains in the semi-arid areas of Africa. Unfortunately, the designers did not recognize the need for

developing the institutional framework to support the research and extension network for transfer the results to the ultimate user---the farmers.

In this section the administration and fiscal management aspects of the project are analyzed by first discussing the project paper in retrospect. We then considered the events that have transpired during project implementation. Discussion centers on the OAU/STRC Coordination Office and its relationship with the International Agriculture Research Centers, coordination with other donor/regional organizations and SAFGRAD's role in establishing networks for the research, ACPO, farming systems and training components of the project in the member countries.

While there are many management problems, the OAU/STRC Coordination Office under new leadership and activation of the TAC and CC appears to be in a good position to exert a positive influence on research and extension of food grain crops in the 26 member countries.

As a result of the AID Audit, financial management of the Coordinator's office is much improved and two internationally acceptable accountants have been hired. A positive working relationship exists between OAU/STRC and the USAID/UV Financial Management Office as they work out the details of an acceptable financial management system.

To date the OAU/STRC Coordination Office has had little to say about the expenditure of more than 60 percent of project funds as AID contracts directly with IITA, ICRISAT and Purdue University. OAU/STRC is not a party to these contracts.

Globally expenditures of project funds has been about as planned, although the institutional contracts have exceded planned financing at the expense of the ACPO and Training components of the project.

CONCLUSIONS

1. The 1982 AID internal audit was a major event in the SAFGRAD project that resulted in changes in staff and operating procedures.
2 While the project funds have increased from $14 to $19 million since the project was started in 1977, in a global sense it has spent the funds about as orginally planned.
3. Far more funds were spent on institutional contracts than was originally planned and far less on training and ACPOs.
4. It appears that negotiating ability of the institution may be more important in obtaining funds than the importance of a particular commodity in the project. For example, ICRISAT received about half the funds received by IITA, even though sorghum and millet are perhaps the most important crops for the target farmers.
5. A new management team is in the OAU/STRC Coordination Office is now in place with the appointment of an International Coordinator and Director of Research. Both are highly respected and acting responsibly in activating the CC and TAC.

6. The basic objective of the institutional contracts AID has signed with IITA, ICRISAT and Purdue is to obtain research directed at specific SAFGRAD agricultural development objectives. The OAU/STRC is not a party to these contracts and has little to say about their progress.

7. While the actual work of the ACPO is seen as productive, highly valuable and well managed on the substantive issues, the administration management of the ACPOs has created problems that have limited the benefits they could have brought to the national agricultural organizations and to SAFGRAD.

8. Relationship with other agencies continues to be an area of concern, but coordination is being explored in the TAC and CC.

9. By negotiating direct contracts with the institutions, AID had its greatest influence on research activities. While this procedure may have accelerated the start-up phase of the project, it may have retarded the coordination of research activities---a major objective of the project.

10. The present contractual arrangement with IITA has provided a multi-disciplinary, multi-crop team to work specificially for SAFGRAD and is well within IITA's global strategy.

11. The ICRISAT contract provided for team members in widely scattered locations that was difficult to manage.

RECOMMENDATIONS

The recommendations listed below, are made for improving SAFGRAD project management as agreements or contracts are negotiated during the current project and beyond.

1. Two senior staff members should be added to the personnel of the OAU/STRC Coordination Office in Ouagadougou: A Director of Training and Extension and a Planning and Organization Officer.
2. AID should include OAU/STRC as a major party in the negotiation of contracts. This could be achieved by:
   - o Making a grant to OAU/STRC who would then award the contract. As an accompanying measure AID should assist OAU/STRC in the legal and contractual matters at least in the initial stages, or;
   - o AID could retain the negotiation of the contracts under its responsibility, but include OAU/STRC as a major party and a cosigner of the contract.
3. OAU/STRC Coordination Office should explore flexible contractual arrangements to achieve networking of FSR and ACPOs.
4. In the negotiation of contracts and implementation planning of the SAFGRAD Project, efforts should be made to ensure that the various components of SAFGRAD activities receive the resources that are budgeted. Major changes in the implementation of the project should correspond to clearly stated policy modifications.

5. The procedures developed for the administrative and fiscal management should correspond to the present situation of the organization of the OAU/STRC Coordination Office. This situation is no longer the one discovered at the time of the audit. The preparation of a procedural package based on OAU and AID procedures should be pursued as diligently as possible and implemented.

6. OAU/STRC/Lagos should make a clear delegation of authority and responsibility to the OAU/STRC Coordination Office in Ouagadougou.

ECONOMIC ANALYSIS

The center piece of the SAFGRAD concept is the explanation of low agricultural output in the semi-arid regions of Africa due to the lack of improved agricultural technologies adapted to small farm conditions. The major thrust of SAFGRAD was, therefore, aimed at the generation of such technologies for the major crops grown in the zone, namely sorghum, millet, corn, cowpeas and groundnuts. In the SAFGRAD project paper, nearly 45 percent of the total cost of $13.9 million was allocated for generating such technologies through regional research. About 22 percent of the project funds was earmarked for the ACPO component aimed at fostering linkages between:

- regional research and national research activities and;
- national research and national extension programs.

The training of African scientists and medium level research personnel was considered paramount and allocated about 17 percent of the project funds. The remaining 16 percent was earmarked for financing the SAFGRAD Coordination Office, which was charged with the responsibilities of coordinating regional research by organizing scientific conferences and workshops, promoting regional variety trials on experiment stations and farmers' fields and facilitating the exchange of scientific information through reports and publications.

All these components of the SAFGRAD project have been implemented with varying degrees of vigor and success. However, the relative proportions of the actual expenditures have been drastically altered. To begin with the total allocation of funds have been increased to $19.16 million. Expenditures on generating technologies have been nearly 64 percent as compared to 45 percent in the project paper. The ACPO component constituted only 11 percent of the total project cost instead of 22 percent as envisaged in the project plan. The training component registered only 11 percent of the total project cost instead of the 17 percent allocated to it in the project planning document. Expenditures for the SAFGRAD Coordination Office are estimated at 19.3 percent of total project cost as compared to the planned 15.7 percent. For detailed analysis of project expenditures see Table 3.

It is very difficult to attempt to relate the benefits attributable to the different components of SAFGRAD for the estimated $19.16 million invested. The generation of new technologies in the form of new varieties of crops and improved agronomic practices to bring about significant increases in agricultural production ordinarily takes a long period of time. It must be recognized that efforts to develop these for semi-arid regions is at the most difficult end of the research spectrum and will require an even longer time than research in the more favorable agro-ecological zones. The experience of ICRISAT in the Indian sub-continent (with a rich and long tradition of national research) shows that it takes up to seven years to

develop technology options under research conditions. It takes more than two years to conduct on-farm verifications of these options and more than two years to prepare the technology package for dissemination to farmers. ICRISAT estimates that up to 20 years will be required for the widespread adoption of technology in the ecologically suitable area (ICRISAT, 1982). The time required for the development of technological break throughs in unfavorable semi-arid regions of Africa should not be underestimated.

The importance of continuing to support research activities and their potential impact can only be realized by considering the alarming food crisis in the semi-arid regions of Africa, where close to 90 million people rely on these crops for their subsistence. Per capita food production in Africa has declined during the last decade in the face of rapid population growth. FAO estimates that the index of total food production per capita declined by ten percentage points from 1970 to 1980, while population was growing at nearly three percent per annum. Cereal outputs in the semi-arid regions of Africa has been growing by one percent per year. This increase is primarily due to expansion of cropped area, implying that agricultural productivity is in fact declining. All of the Sahelian countries are net importers of cereals, averaging about 425,000 tons annually. This is an important foreign exchange drain on their vulnerable economies. Furthermore, the steadily growing population is upsetting the long standing traditional adaptation of food crop production to the fragile soils of the semi-arid

regions. Grass fallows are giving way to permanent cultivation or to shorter duration of fallow. More marginal soils are being cropped leading to a deterioration of the resource base.

Reversing this unfavorable trend of a burgeoning food gap accentuates the need for bolder approaches and substantial increases of investment in agricultural research and development. The development of drought and disease resistant cultivars of food crops and farming systems suited to small farmers in the semi-arid regions of Africa will have enormous economic benefits. First, there will be the direct benefits to be derived in increased food production per unit of land through increased yields and reduced losses due to disease and pests. Secondly, there will be increased availability of fodder for livestock to produce meat and milk as well as provide power for the production of food. Third, it has been amply documented that farmers in the semi-arid tropics suffer from inadequate nutrition. Increased food production at the farm level will not only ameliorate the situation but will also increase the effectiveness of the labor supply to produce more food.

Finally, increased food production in the semi-arid regions will have substantial effects in stimulating other sectors of the economy. It will generate business and employment in transportation, storage, input supply, credit and food processing industries. Furthermore, increased farm income will generate effective demand and open a big rural market for consumer goods, thus stimulating the industrial sector.

The Project Paper estimated that a one percent increase in the yield of the SAFGRAD crops in the original 18 member countries would generate a net incremental benefit of $20 million annually. The present value of that dividend in perpetuity discounted at 15 percent is over $130 million. Presently the SAFGRAD member countries have increased from 18 to 25. ICRISAT's experience in Asia shows that yield increases of over 15 percent can be expected. One does not have to stretch ones imagination to realize the enormous potential benefits of even modest break throughs of yield increases of one to five percent. This will amount to several hundred millions of dollars in comparison to research outlays of less than $50 million.

Possible Contract to Improve SAFGRAD Coordination

We have been asked to look at possible cooperation with the International Food Policy Research Institute (IFPRI) for improving SAFGRAD's coordination activities. We believe that it is ISNAR rather than IFPRI that has a capacity to assist in such matters. As its name implies, IFPRI concentrates its efforts on investigating and analyzing policy issues that affect food production. These include, among others, pricing policy of both inputs and outputs including subsidies, infrastructure for input supply as well as output marketing, expenditures on agricultural research and extension, agricultural taxation, food export policies and import policies, etc. It has conducted numerous studies in these fields and published the results. It held a

major conference on Accelerating Agricultural Growth in sub-Saharan Africa at Victoria Falls, Zimbabwe in 1983. IFPRI's research as well as those of other international, regional and national agricultural research, planning and development financing institutions was brought to bear on the theme of the conference. We believe IFPRI can address these research issues with its own resources. We see no capacity in IFPRI to assist SAFGRAD in improving its coordination activities.

On the other hand, ISNAR, which is also supported by the CGIAR, has been set up for servicing national agricultural research institutions in developing their capacity to conduct effective research. Among its functions, ISNAR assists in assessing the manpower needs of these institutions and in drawing up plans and projects for bridging the gap between current and future supplies and requirements. ISNAR also assists in the evaluation of current research activities and offers advice on corrective actions to make it more effective. It conducts regional and international seminars and workshops and courses on research methodologies, the planning and management of agricultural research and the training of medium level cadre of agricultural research assistants. A linkage between SAFGRAD and ISNAR can foster such assistance to SAFGRAD member countries and also increase the effectiveness of SAFGRAD in its networking and training activities. We strongly recommend that SAFGRAD takes immediate initiative to contact ISNAR on these matters.

LOOKING AHEAD TO SAFGRAD II

During the remaining year in the current project there is little need nor opportunity to alter the present course of action. We do emphasize, however, the need to maintain the momentum being achieved and to further develop the TAC, CC and SAFGRAD Coordination Office as guidance and implementation bodies.

Many involved in project implementation are looking forward to a SAFGRAD II project. The TAC and CC have discussed plans for the follow-on project. AID has included funds in its forward planning budget for such an event. The evaluation team agrees that the current project has laid the foundation for a research coordinating mechanism that has the potential for making an impact on food grain research in a major portion of Africa.

During the course of our rather intensive review, we have identified a number of issues which we think need serious consideration in any follow-on effort. Time does not permit full exploration, but we do wish to share our thoughts. First we are sharing rather general impressions to be followed by more specific suggestions that emerged during the reviews of project components.

We recognize there may be other ways of coordinating a focused regional research project (possibly through the IARCs or other sub-regional institutions). We conclude the OAU probably offers the best alternative for serving as a facilator in addressing food grain research problems across this vast ecological zone of Africa. OAU affiliation can ease movements of personnel and materials across borders. In some cases member countries are more apt to release scientists to work on an OAU/STRC/SAFGRAD project than they would be to release them to USAID or to one of the IARCs. OAU/STRC to date has kept its involvement in SAFGRAD on the professional/technical level and has avoided political considerations. Many people we talked to see SAFGRAD as an OAU/STRC project rather than a USAID project, thus gaining important African country support and hopefully attracting other donor financing.

There must be a recognition of the institutional development needs of SAFGRAD. Many of the early problems in the current project, in our opinion, were caused by not having a clear picture of what was expected at the end of the project. Thus, the administrative structure was not developed to implement a project that basically has a sound technical base. OAU/STRC appears to be the appropriate institutional mechanism for this effort with major emphasis placed on the OAU/STRC International Coordinator's office in Ouagadougou. Some areas of administrative management in the International Coordinators Office that should be explored:

- Again review and determine the role of the Coordinators Office and develop a strategy for providing the staff and resources needed to do the job. AID has imposed a staff ceiling of 14---this may or may not be realistic.
- A reasonable level of staffing should be determined after the role and function of the office have been re-defined and agreed upon by the International Coordinator, the CC and USAID/UV Mission management.
- As we see it, SAFGRAD can play a major role in facilitating research and the spread of research information among member countries through:
  - Commodity research networks including workshops and conferences;
  - Publishing the proceedings from these meetings;
  - Distributing research information;
  - Seeking funds from international donors to do specific kinds of research that are common to several countries;
  - Providing funds for training of research workers where shortages of skilled technical people exist.
- AID and other donors need to feel confident that proper accounting and management procedures are followed, but should not place excessive restrictions on management. (The US Government, in our opinion, over-reacted to the audit, resulting in SAFGRAD becoming a stagnant operation for nearly two years.) A rational organization that follows internationally accepted

accounting and management procedures, which satisfy the needs of member countries and the international donors, should be developed and maintained.

Ways should be explored to obtain a committment from the country requesting an ACPO for counterparts with whom the ACPO can work and as soon as possible identification of a candidate from the national program for futher training and as a replacement for the ACPO.

Explore the possibility of a contract to provide the hiring and servicing of ACPOs in the SAFGRAD region. This avenue could improve administrative support and could more easily facilitate transfer of ACPOs with particular skills among countries. The hiring of regional nationals to work in a different country, either in an on-the-job training position, or as an ACPO, should be considered as a means of developing professional talent in the region.

An issue that must be addressed in SAFGRAD II is a clear identification of the target audience, project purpose and research objectives. Is the project purpose to increase food grain production or is it to help increase the production of low input small farmers? The two concepts are not necessarily synonymous. If the project is to increase food grain production, the emphasis might be placed on development of varieties and farming practices that require moderate or high levels of inputs, i.e., improved seeds, fertilizer, animal or mechanical tillage. Most researchers feel that there is little possibility of making a significant break through in increasing yields without some purchased inputs. Some countries in Africa are moving in the

direction of large commercial, mechanical operations (contract farming). The project should be clear as to which segment of the farm population it is to direct its efforts. Contracts with the researchers must define these terms. The contract should be monitored during implementation to see that research efforts are moving toward project objectives.

Much more research is needed on soil and water management. The greatest gains for the small farmer may come from changes in agronomic practices such as correct planting dates, plant populations, weeding, or through low-cost labor-saving equipment that will help him to maintain soil moisture and help make more effective use of low levels of fertilizer.

The role of the USAID project officer and project manager needs clarification. USAID tends to see these roles primarily as one of monitoring project funds to see that proper AID procedures are followed. The SAFGRAD International Coordinator prefers to have a professional colleague from USAID who can assist in planning, developing the extension linkages and assisting with workshops---a more professional agriculture position than visualized by AID.

The following sections are the suggestions from the different project components.

Research

1. Soil fertility, water management and crop production specialists should be available at each location where major SAFGRAD breeding programs occur.

2. Soil fertility, water management, crop production and pest control specialists should serve all SAFGRAD funded .pa activities at one location, even though two or more IARCs may be involved.

3. Sorghum research now at Samaru, Nigeria, should be moved to a location that is more typical of the rainfall pattern and farming systems of the targeted small farmers. Nigeria is moving more in the direction of large commercial farming to produce coarse grains. Corn production is moving into some of the drier areas, decreasing the importance of sorghum. If ICRISAT establishes a sorghum research program in West Africa, SAFGRAD funded research should be done at that location.

4. SAFGRAD should promote better cooperation between IITA and ICRISAT and other research partners in carrying out joint agronomic research in areas common to all crops (e.g., striga control, animal traction, soil and water conservation and farming systems research) to avoid wasteful duplication of efforts and to easily achieve the necessary critical mass for effective research.

5. The guidelines for the research program should be clearly stated by the CC. The contract or agreements issued under SAFGRAD II should adhere to these guidelines. The implementing agencies should then be required to fulfill the terms of the contract.

6. Procure copies of the CDA survey reports to obtain a clear understanding of regional research program resources, duplications and shortfalls on commodities and disciplines of interest to SAFGRAD. If all of the needed information is not available from CDA surveys, then it should be obtained during SAFGRAD II project paper design.

7. Both AID and SAFGRAD should avoid duplication between their programs and those of other agencies. AID and other donors fund a number of regional programs that in varying degrees overlap SAFGRAD activities. Where duplication exists, efforts should be made to meet with concerned parties to work out differences. While some duplication may be unavoidable, SAFGRAD would then have enough information to make intelligent decisions for program direction.

8. Where serious gaps exist in regional research on the assigned crops, as exists for example in soil and water management and striga control research, SAFGRAD should attempt to develop regional research programs to fill this void.

9. Regional and international research should continue to be a function primarily of the IARCs, regardless of the donors involved. The CRSPs (INSORMIL for sorghum and millet and the soil management CRSP) are not structured to coordinate regional and international research programs and should not be encouraged to do so.

10. The final strength of research lies in the national programs---SAFGRAD generally and AID specifically should do all in their power to strengthen the national programs. The

greatest progress in this area can be made by AID missions (and other donors) working in concert with regional programs to support national research efforts.

11. During the design phase of SAFGRAD II, the unique role SAFGRAD can play in coordinating research in the semi-arid areas of Africa should be clearly identified. With a solid base in OAU/STRC, SAFGRAD has the political respectability among member countries that transcends all donors. The OAU/STRC Coordination Office has professional credibility among regional researchers to perform a number of useful functions in identifying research needs, seek funding and focus attention on specific problems. Important ancillary services and support now lacking in the region, include:

    - o Library services for researchers in the region.
    - o Providing funds and logistical support for workshops.
    - o Monitoring research programs.
    - o Funds for recognized authorities in selected fields of endeavor to attend regional conferences.
    - o Financing travel to national program staff members to other countries for important conferences, professional meetings and visits to successful, appropriate research programs.
    - o Providing funds for staff and operational costs for regional researchers to study production constraints on the commodity crops.

Accelerated Crop Production Officers

1. Keep the existing flexibility in SAFGRAD to individually define the ACPO role, responsibilities, resource support and administrative lines in each country. Specify these points as part of the contractual agreement. Review these responsibilities every three years or sooner if needed to cycle with the expiration date of the ACPO contract. Such reviews should be completed at least one year prior to that date to allow time for contract negotiations and recruitment.
2. The most effective working relationships for ACPOs will likely be established by having a contractual agreement between OAU/STRC and the appropriate research and extension ministries with internal cooperative agreements among relevant units. In a new ACPO program, selection of a national counterpart to begin training should be a precondition to signing a contract.
3. The ACPO program supported by SAFGRAD should be viewed as catalytic and temporary. SAFGRAD should include definite plans for phasing out by transferring responsiblity and financial support to national organizations in each country. If continued financial assistance is needed after the full research-extension-farmer continuum is in place and institutionalized, consideration should be given to bilateral agreements with donors for support. Refer to Appendix E for recommended time frame.

4. Support the CC recommendation that expatriate ACPOs serve one three-year term, renewable once on an ad-hoc basis. It is easier for an expatriate from the donor country to deal with donor-related problems while simultaneously resisting in-country pressures to establish operative patterns contrary to SAFGRAD objectives.

5. Provide for professional development of ACPOs by funding visits to other ACPO programs, research centers in another country or meeting with senior professionals addressing a relevent problem. The ACPO should make a specific request with justification and provide local approval as part of the annual budget submitted to OAU.

6. Establish a one-year ACPO internship program for national counterparts returning from an experience as an expatriate or national counterpart in a country other than that of origin. This would allow the ACPO to gain confidence and mature in the position.

7. View existing ACPO program staff and those to be added in the future as an ACPO program staffing pool to be rotated to take advantage of partiular experise. Rotations could also be used to broaden the experience of ACPO program staff related to specific commodity problems successfully addressed in other countries.

8. The qualifications needed by the ACPO to succeed in each phase of the research-extension-farmer continium will differ. The same ACPO may not be equally well qualified to perform all. Establishing an ACPO program staffing pool could be extremely useful. Determining which phase of the

research-extension-farmer continuum is to be operationalized will be provided by the assessment performed by the OAU/STRC Coordinator.

9. Consider placing more than one ACPO position in a country's ACPO program and possibly more than one ACPO program where program needs warrent it. SAFGRAD should favor providing ACPO support needed for a country to be fully effective rather than opt for thinly supported ACPOs across many countries. A fully supported ACPO program might include new components such as:

   - o Developing a full extension model program for a limited geographical area. Include staff and resources needed to be effective.
   - o Providing SAFGRAD leverage funds to non-SAFGRAD salaried persons under a contractual agreement for providing SAFGRAD services.
   - o Developing a SAFGRAD training program for each country to support the ACPO program. Under this arrangement training could be provided in internationl or regional centers for SAFGRAD cooperators, such as extension agents and lead farmers.
   - o Developing a model in-country extension training center with a commitment for its utilization assured through contractual arrangements with organizations having extension agents.

Training Program

1. The inadequate supply of a trained cadre of African researchers will continue to militate against the rapid advancement of agricultural research in sub-Saharan Africa. Training support in expanding the pool of African scientists should be intensified under SAFGRAD II.
2. Selection criteria should be defined to assure selection of candidates who have adequate academic preparation, scholasitc ability, interest and work experience in areas of SAFGRAD identified needs.
3. Build in ways of utilizing the professional expertise developed through the long-term training program by obtaining a commitment from participants to work one year for SAFGRAD for each year of training or some such specified period of time.
4. OAU/STRC Coordination Office should keep files on both long and short-term trainees including their position placement at conclusion of training and conduct a two year follow-up.
5. Use short term training programs to screen for potential long-term training candidates. Take advantage of the larger number of junior level technical support positions in SAFGRAD to develop a pool of talent for career upgrading through short and long-term training.
6. Consider decentralizing short-term training. When numbers of trainees warrant it, conduct training in a specific country. Consider establishing regional training centers in

existing country facilities. The training program should be a collaborative effort with other regional and international institutions. This system could pool SAFGRAD and related expertise to extend availability throughout Africa.

7. Since bilingual ability is essential for effective communications across SAFGRAD countries, provide language training routinely during less active farming periods for technicians and professionals.

8. University training in the United States should include direct exposure to the Cooperative Extension system, preferably through both course work and short-term internship (i.e. summer work) for future researchers. If researchers know about extension, they will be in a better position to support working relationships in the SAFGRAD countries.

9. Long-term participant training should be available with extension as a major or minor, especially for future ACPOs---encourage internships as a part of program.

10. Both short and long-term participants should receive training in management as appropriate to the responsibilities they expect to assume. Preference for conducting this training should be given to African graduate schools of business having strong management programs.

11. Short-term participants should be recognized as trainers who will be expected to train others and should be guided in how to present information learned to others. Supportive educational materials and teaching aids as well as methodology should be routinely provided.

Farming Systems Research

1. A Farming Systems Research component is desirable in SAFGRAD II. It should emphasize regional training and networking activities and closer integration of FSR personnel with scientists of IITA and ICRISAT as well as those in national research institutes. FSR staff should operate out of the Kamboinse Station.

2. AID and the Government of Upper Volta should give serious consideration to continuting FSU research activities by locating them in the core of a national farming systems research program, with bilateral funding from AID.

   -- The timetable will be largely determined by GOUV decision-making regarding IVRAZ. We recommend, however, that preliminary steps to identify the appropriate niche in IVRAZ can be taken in the near future by the present FSU staff and AID;

   -- We defer the question as to whether the FSU should continue to be staffed and backstopped by Purdue to USAID/Upper Volta;

   -- The issue of project office location should be addressed and the criterion of maximizing opportunities for researcher interaction be applied.

3. FSU should provide internship and "associate opportunities" both short and long-term for staff associated with the IFAD/SAFGRAD effort, particularly if those hired have limited field experience in West Africa.

4. In developing any follow-on project SAFGRAD and AID should take into account the experiences of the FSU to date, particularly those regarding personnel, institutional linkages, techniques/methods, data management, and analytical time requirements.

BIBLIOGRAPHY

Asnani, Dr. V. L. "IITA, It's Role in SAFGRAD", paper presented at the consultation meeting with national, regional and international organizations operating within CILSS,IITA/SAFGRAD, Upper Volta, December, 1980.

Asnani, Dr. V. L., "Second TAC Quinquennial Review of IITA - an Overview of IITA Programs in Upper Volta", Ouagadougou, Sept. 1983.

Banque Mondiale, "La Recherche Agronomique et Zootechnique, Upper Volta, Rapport de la Mission", Organisation des Nations Unies Pour L'Alimentation et L'Agriculture, Service International de la Recherche Agronomique Nationale, Mars 1983.

Brhane, Gebrekidan, "ICRISAT/SAFGRAD Eastern and Southern Africa Sorghum and Millet Improvement Program", prepared for SAFGRAD TAC meeting, January 1984.

"The Challenge of the Tropics", International Institute of Tropical Agriculture, Ibadan, 1977.

Christensen, Paul and Mike Kaylen, "FSU Microcomputer Data Management and Analysis System User's Instructions", SAFGRAD/FSU,Ouagadougou, August 1981.

Duell, Robert W., et al., "SAFGRAD Mid-Term Project Evaluation", Project 698-0393, USDA/OICD, July 1981.

Fall, Mankeur, "Rapport D'Activite 1983 - R.P.A.A. SAFGRAD Senegal", Centre National de Recherches Agronomiques de Bambey, Janvier, 1984.

Garvey, William, "SAFGRAD Training Program Accomplishments", USAID/AFR/RA, December 1983.

Gwathmey, C. O. and M. T. Fobasso, "Bilan de Realisation du Projet SAFGRAD au Cameroun, 1979-1983"' Rapport prepare a l'intention de la 3eme reunion du Comite Consultatif Technique (TAC) a Ouagadougou, du 9 au 11 Janvier, 1984.

IITA/SAFGRAD Annual Report, 1982, (including IDRC Upper-Volta Cowpea Project), Ouagadougou, June, 1982.

IITA/SAFGRAD, "Progress Report and Future Plans, paper presented at the Third Technical Advisory Committee, J. P. 31 SAFGRAD, Ouagadougou, January 9-11, 1984.

IITA/SAFGRAD, Rapport, 1979, (comprenant le project Niebe, CRDI, Haute Volta, Ouagadougou.

IITA/SAFGRAD, Rapport, 1980 (comprenant le projet Niebe, CRDI, Haute-Volta, Ouagadougou.

IITA/SAFGRAD, Rapport, 1981, (comprenant le projet Niebe, CRDI, Haute Volta, Ouagadougou.

IITA/SAFGRAD, "SAFGRAD and IDRC - Govt. Upper Volta - IITA Cowpea Breeding Project, Research Plans, 1981", Ouagadougou.

IITA/SAFGRAD, "SAFGRAD and IDRC - Upper Volta National Cowpea Improvement Project, Summary Report, 1981", Maize and Cowpea Unit, Ouagadougou.

IITA/SAFGRAD, "SAGFRAD and IDRC - Upper Volta National Cowpea Improvement Project, Program of Research, 1983 First Season" Ouagadougou.

IITA/SAFGRAD, "Semi-Arid Regional Maize Adaption Testing, Results and Reports, 1980", IITA Maize and Cowpea Research Team, Ouagadougou, May 1981.

IITA/SAFGRAD, "Semi-Arid Regional Cowpea Adaptation Testing, SARCVT, 1980", IITA/SAFGRAD Maize and Cowpea Research Team, Ouagadougou.

Institute for Agricultural Research, ."1983-84 Research Programmes with progress report on research projects undertaken in 1982-83", Ahmadu Bello University, Zaria, Nigeria.

International Crops Research Institute for the Semi-Arid Tropics, "ICRISAT Challenge and Response, 1972 to 1982", India, 1982.

International Crops Research Institute for the Semi-Arid Tropics. "ICRISAT Research Highlights, 1980".

International Institute of Tropical Agriculture, "IITA Research Highlights, 1981" Ibadan 1981.

International Institute of Tropical Agriculture,"IITA Research Highlights, 1982", Ibadan, 1983.

International Institute of Tropical Agriculture, "Maize and Cowpea Improvement in Semi-Arid Africa", Ibadan, 1983.

Johnson, Jerry J., "SAFGRAD Project in Mali, September 1978 to September 1982, Final Report by the Accelerated Crop Production Officer", USAID COntract REDSO 77-111 of 6/9/77.

Korteweg, C. I., Final Report, ACPO SAFGRAD Project (Upper Volta), 1978-1982", SAFRAD, Ouagadougou.

Korteweg, C. I. and Moussa Kamore, " SAFGRAD, ACPO Upper Volta, Report 1981", Ouagadougou.

Muleba, Nyanguila, "Cowpea-Agronomist, Annual Report, 1982"' SAFGRAD/IITA, Ouagadougou.

Ohm, H. W. and M. Lang, "Report for SAFGRAD TAC Meeting 9-11 January, 1984", FSU/SAFGRAD, Ouagadougou.

OUA/CSTR/SAFGRAD, "Activites du RPAA-SAGRAD/MALI", presente au Troisieme Reunion du Comite Consultatif Technique du PC 31 Ouagadougou 9-11 Janvier 1984.

Perrier, Dr. Eugene R., "The Soil-Water Management Problem of Upper Volta, ICRISAT/SAFGRAD, Ouagadougou (Technical Paper for TAC).

"Questionnaires Utilises Pour les Etudes les Systemes de Production Agricoles Dans des villages Echantillons de Haute Volta", Unite de Recherches des Systemes de Production (SAFGRAD), Universite du Purdue, Ouadagougou, January 1980.

Rao, N. G. P., "Soughum Breeding Research Report, 1982-83", ICRISAT/SAFGRAD, Samaru, Nigeria.

Ramaiah, K. V., "Striga Program in Africa", ICRISAT/Upper Volta Cooperative Program, Kamboinse, paper presented at the Second SAFGRAD Sorghum and Millet Workshop, Gaberone, March 16-19, 1981.

"Rapport D'Activites du Responsable de la Production Agricole Acceleree de Haute-Volta", presente au Comite Consultatif Technique (CCT) du 9 au 11 Janvier 1984, Ouagadougou.

"Rapport de la Campagne, 1981", Projet SAFGRAD Au Mali, Bamako.

"Rapport de la Campagne, 1982", Projet SAFGRAD Au Mali, Bamako.

"Report of the OAU/STRC JP 31 SAFGRAD Panel Discussion on Maize and Cowpea", SAFGRAD, Ouagadougou, March 1-2, 1982.

Rodriquez, Dr. Mario, "Maize Agronomy Annual Report, 1982", IITA/SAFGRAD Ouagadougou.

Rodriquez, Dr. Mario, "Regional Maize Agronomy Trials", IITA/SAFGRAD, 1982 Preliminary Report, Ouagadougou.

SAFGRAD, "SAFGRAD, Farming Systems Unit, 1982 Annual Report", May 1983.

SAFGRAD, "SAFGRAD First OAU/STRC Workshop on Sorghum and Millet, Report and Recommendations", Mombasa, Kenya, Februrary 26 - March 1, 1980.

SAFGRAD, "Scientific Documents Presented at the Second Workshop on Sorghum and Millet", Gaberone, Botswana, March 16-20, 1981, SAFGRAD, Ouagadougou.

SAFGRAD, "The Second Consultative Committee Meeting on Semi-Arid Food Grain Research and Development Project, JP 31 SAFGRAD, November 7-8, 1983", (Proceedings), Ouagadougou.

SAFGRAD Coordination Office," Background, Discussion Papers and Agenda for Second Consultative Committee Meeting on November 7-8, 1983," Ouagadougou.

SAFGRAD/OUA/CSTR, "Synthese du Rapport D'Activites, Campagne (Togo), 1983", Janvier 1984.

Shetty, S.V. R., "ICRISAT/SAFGRAD JP 31 Programme at Nigeria, 1980-83 (draft)", Samaru, undated.

Singh, Ram D., "Major Cropping Patterns - SAFGRAD Countries, Upper Volta Facts and Observations Relevant to Farming Systems Research", SAFGRAD/FSU Document No. 7, undated.

Singh, S. R. and D. J. Allen, "Cowpea Insects and Diseases", Manual Series No. 2, IITA, Ibadan, 1979.

Singh, S. R., Singh, B. B., et. al., "Cowpea Research at IITA", Information Series, No. 14, Ibadan, 1983.

Swanson, Richard A., "Household Consumption, Rainfall, and Household Labor Time Allocation for Planting and Weeding: Some Observations and Recommendations", Farming Systmes Unit/SAFGRAD, Ouagadougou, January 1981.

Systhesis Report, 1981, OAU/STRC JP 31 SAFGRAD, Ouagadougou.

Universite du Purdue,"Programme des Essais au Champ du FSU/SAFGRAD, Campagne 1983", Ouagadougou.

Universite du Purdue, "Recherche Sur Les Systemes de Production Agricole, Rapport du Programme, 1982 (Provisoire)", SAFGRAD.

Ziet, Nazreth and Debre Ziet, "Sorghum Improvement in Eastern Africa", Proceedings of the Regional Workshop on Sorghum Improvement in Eastern Africa, Ethiopia, October 17-21, 1982.

Appendix A

Information Appendix for

AFR/W Executive Level Personnel

Prepared by: Donald R. Mitchell, Agricultural Consultant

Date: June 8, 1984

Project: Semi-Arid Food Grains Research and Development (SAFGRAD)

Country: Regional - 25 countries in semi-arid Africa

Cost: $19,160,000 grant over 8 years

I. What constraints did this project attempt to relieve?

This project was designed to help the farmers in the semi-arid areas of Africa to increase the production of their major food grain crops---sorghum, millet, maize, cowpeas and groundnuts. Low yields in these crops are caused by a number of factors, including weather extremes, soils incapable of retaining moisture, insufficient labor, inability of farmers to pay for substantial production inputs.

II. What technology did this project promote to relieve these constraints?

The major thrust of this project is to develop the technology needed to over come many of these constraints. While it is too soon for much specific technology to have

been developed from project activities, the project attempted to reduce these production constraints on several levels. Research was conducted by IITA for maize and cowpeas and by ICRISAT for sorghum and millet, primarily to identify superior varieties that are resistant to predominant pests and diseases and will provide increase in production over that of local varieties under variable low rainfall conditions experienced by farmers. In addition, various agronomic practices were tested to develop practices that would help retain soil moisture and modify the effects of pests and diseases. Farming systems research was undertaken with farmers to identify and better understand the constraints the farmers face. Accelerated Crop Production Officers (ACPOs) were stationed in five countries to develop the institutional linkages between research, extension and farmers.

III. What technology did this project attempt to replace?

Through this project, attempts are being made to replace traditional varieties with higher yielding varieties under low input conditions of farmers. It is very difficult for the farmer to achieve higher production without additional inputs, principally, labor or fertilizer. For example, tied ridges is an old practice used to provide micro-catchment basin to collect rain. It has been shown in research that tied ridges when used with high yielding

varieties and fertilizer will profitably increase yields. The addition of mulch will provide an additional increase. Farmers generally do not use these practices because it requires more labor to build the tied ridges, they do not have the capital to buy fertilizer that is unavailable or eraditically available and the mulching materials available are usually fed to the livestock. Researchers are attempting to solve these problems.

IV. Why did project planners believe that intended beneficiaries would adopt the proposed technology?

The semi-arid countries of Africa face a chronic food shortage. It was believed that the research conducted through this project would result in yield increasing technology to alleviate this problem. It was also assumed that the governments of the 25 member countries would pursue food grain price policies that encourage increased production. This has not been the case. Many of the governments are politically unstable with frequent changes in policy direction. Most are faced with chronic foreign exchange shortages making the purchase of fertilizer and other agricultural supplies difficult. Further, the US and other countries are providing food aid to relieve the starvation prevelant in many of these countries. While this is a humanatarian thing to do, it enables the governments to pursue a cheap food grain policy that is counterproductive in terms of encouraging farmers to increase local production.

V. What characteristics did the intended beneficiaries exhibit that had relevance to their adopting the proposed technology?

In general farmers in the member countries are eager for low cost technology that will increase production, particularly if this increase results from the same or less labor input. Food shortages common in the area should assure a market for the increased production.

VI. What adoption rate has this project achieved in transferring the proposed technology?

It is much too early to tell. To date the development of technology is still at the research stage, including the on-farm trials. The development of packages of technology is yet to be done, although pieces of the package are beginning to emerge.

VII. Has the project set forces into motion that will induce further exploration of the constraints and improvements to the technical package proposed to overcome it?

Yes. The establishment of the OAU/STRC Coordination Office is now operational and can be an important factor in coordinating the research of many international research groups and national research programs working on problems common to member countries. Through this mechanism, professional exchanges dealing with specific commodities or research problems are taking place. The

active participation of IITA and ICRISAT assure some of the best researchers are working on the problems of the semi-arid African farmers.

VIII. Do private input supplier have an incentive to examine the constraints addressed by the project and to come up with solutions?

This varies from country to country, but in general most governments in member countries import and distribute fertilizer and other agricultural chemicals. The amounts are small and the governments attempt to control the prices. As demand for the inputs increase it is very likely that channels for private suppliers will open.

IX. What delivery system did the project employ to transfer technology to intended beneficiaries?

The position of an ACPO was established in five member countries employing different modes of operation. Some of the ACPOs have been expatriates while others are host country nationals. Their major role is to provide a bridge between the researchers, extension workers and the farmers. The role of the ACPO was seen as a temporary position to help the host government see the need and work out administrative arrangements for establishing this linkage. The project did not plan to fund ACPO positions in all member countries, but rather that the OAU/STRC Coordination Office would influence other donors or member countries to provide funds. French aid, for example is

funding the ACPO in Togo. Additional governments are asking for ACPOs in their countries.

X. What training techniques did the project use to develop the delivery system?

The ACPO largely provides on the job training for the agricultural workers in the country where he is stationed. On-farm trials to date have been mostly for research purposes rather than as result demonstrations to teach farmers. Farmers, of course, learn from these trials, but it is not true extension. A ACPO network is seen as an effective way of exchanging ideas between ACPOs in member countries, but this has not been implemented. Extension can only happen after proven technology has been developed and it is too early for this to have happened in this project.

APPENDIX B

SCOPES OF WORK
SAFGRAD EVALUATION

Team Leader

The SAFGRAD Project is a regional agricultural research project comprised of several activities being implemented in several locations. The evaluation must address administrative arrangements in terms of the coordination function as performed by OAU/STRC and the technical/scientific aspects as carried out by the various research entities. The final evaluation report must be a comprehensive document which will assist USAID, OAU/STRC and other project cooperators in addressing policy issues and in designing more appropriate interventions for a SAFGRAD Phase II. The Team Leader's primary function will be to insure that the evaluation is completed in a timely manner while providing effective management and program guidance to all project entities. To this end, the Team Leader will carry out the following scope of work:

1. Provide guidance and direction to evaluation team members in accordance with AID evaluation methodology and procedures as outlined in AID Handbook 3, Chapter 12.

2. Assist the Management/Organization Specialist in an evaluation of the overall concept and the coordination function as implememted by OAU/STRC.

3. Related to 2 above, determine the degree that participating SAFGRAD countries' national research programs are integrated with the regional research supported by the project.

4. Manage the compilation of the evaluation final report. He/she will be the principal editor and will insure the evaluation report is a cohesive document and is submitted in a timely manner.

5. Related to 4 above, provide for all logistical support to the evaluation team. This will include hiring secretaries and administrative assistants, renting vehicles, etc. USAID/UV will provide support in this effort.

Agricultural Economist

Seventy to eighty per cent of the population of the SAFGRAD countries are engaged in rainfed agriculture. The majority of these farmers depend almost entirely on cereal production for their livelihood. Millet, sorghum and maize production account for approximately eighty per cent of all cereals produced in the semi-arid regions of the participating SAFGRAD countries. In terms of economic returns to USAID's investment in SAFGRAD, and to this end the Agricultural Economist participating on the SAFGRAD evaluation will carry out the following scope of work:

1. Review the research activities implemented by the SAFGRAD supported entities and identify technologies (varieties and cultural practices) being promoted by the project which have potential for widespread adoption amongst farmers of the participating countries.

2. Based on one above, estimate the economic impact, both direct and indirect of the improved technologies on semi-arid small farm agricultural production, and determine the most cost-effective resource allocation amongst different research activities (breeding, agronomy, entomology, farming systems research) supported by the project.

3. Evaluate the cost-effectiveness of SAFGRAD as a research coordinating mechanism relative to the establishment of other regional research institutions such as Institute du Sahel and the SADCC effort and to the improvements in national research programs since the inception of the SAFGRAD project.

4. Given that prices and other economic policy relatives affect the rate of adoption and appropriateness of new technologies, identify ways by which other International Research Organizations such as the International Food Policy Research Institute can contribute to the development of the SAFGRAD research agenda and improve its effectiveness as a research coordinating body.

5. Based on 1 and 4 above, make recommendations which should receive emphasis and be considered in any phase II SAFGRAD efforts.

Farming Systems Research Specialist

The SAFGRAD Project has supported the Farming Systems Unit (FSU) with the purpose of obtaining more aoro-ecological specific information regarding small farm conditions in participating SAFGRAD countries. Introducing Farming Systems Research (FSR) provides a vital feedback link in terms of constraint identification and farm level resource allocation decision from the small farmer to the research scientists conducting basic varietal and agronomic research. This process is considered vital to a more accurate appraisal of research needs and more effective dissemination of promising technologies. The Farming Systems Research Specialist on the SAFGRAD evalaution team will carry out the fololowing scope of work to assess the FSU component of the SAFGRAD Project:

1. Assess the Farming Systems Research (FSR) methodology which has been developed by the Purdue University technical assistance team in terms of:

   a. Its appropriateness relative to other models developed for use in the Sahel and other parts of Africa, i.e. the ICRISAT Economic Program, ORSTROM, and IRAT; included should be a cost-effectiveness analysis of the socio-economic data collection activities in relation to other methodologies.

   b. Its contribution to increased knowledge of small farm conditions, production constraints, and farm management strategies; and

   c. Its potential as a means of facilitating the transfer of information concerning small farm conditions and farmer atitudes toward improved technologies to appropriate research institutions.

2. Determine the feasibility of using the FSU model to implement a FSR project on a bilateral basis with the GOUV.

3. Determine the degree of integration and collaboration the FSU activities have with other SAFGRAD research cooperators (IITA, ICRISAT) in terms of selecting technologies to be tested/evaluated and form formulating the SAFGRAD research agenda.

4. Recommend appropriate FSR interventions for the remainder of ther SAFGRAD Project and for any phase II efforts. To this end, provide an assessment of the proposed IFAD support to the development of additional FSUs in other SAFGRAD countries.

Organization/Management Specialist

The SAFGRAD organization provides for the semi-arid zones of Africa an institutional structure which promotes the coordination of cereals and grain legumes research and training of participating countries' research scientists. The actual SAFGRAD research and training is conducted by numerous research entities which can be grouped into three categories: participating African states' national research institutes, International Agricultural Research Centers (IARCs) and other agricultural research organizations with programs in semi-arid zones. The SAFGRAD organization is comprised of three coordinating bodies; the Consultative Comnmittee (CC) which provides policy guidance and program monitoring, the Technical Advisory Committee (TAC) which recommends the research and training agenda, and the Coordination Office which implements the SAFGARD research program as directed by the CC and TAC. The administrative systems and inter-institutional agreements employed in the SAFGRAD organization are provided by the Organization of African Unity Scientific, Technical and Research Commission (OAU/STRC). Membership on the CC and TAC is made up of respresentatives of all the participating entities; OAU/STRC, is complex with a myriad of activities being implemented to achieve different sub-objectives of the project. Given this organizational complexity the Organization/Management Specialist will provide an analysis of the coordination function and carry out the following scope of work:

1, Provide an analysis of the SAFGRAD organization in terms of:

   a. The administrative structure and management systems of the OAU/STRC coordination offices in Lagos, Nigeria and Ouagadougou, Upper Volta and its capacities to perform the research coordination function required by the project;

   b. Related to a. above, the relationships between the OAU/STRC Coordination Office and other project cooperators, including USAID, in terms of efficiency and effectiveness in coordinating research and project implementation and management;

   c. The OAU/STRC financial accounting system.

2. Based on 1.a, .b and .c make recommendations for improvements as required.

3. In collaboration with the Senior Research Scientist and Team Lerader, and based on 1.a, .b and .c above, assess

the continued appropriateness of the SAFGRAD organization as an institutional coordinating mechanism for research, training and technology transfer.

4. In collaboration with the Senior Research Scientist, review the functions of the CC and TAC in terms of developing and implementing the SAFGRAD research agenda.

Research Agronomist

The SAFGRAD Project purpose is to develop improved cereal varieties (millet, sorghum and maize) and grain legumes (cowpeas, groundnuts) and improved cultural practices which address production constraints of small farmer semi-arid agriculture. The development of improved technologies is crucial to any efforts at increasing agricultural prodction and small farmer productivity. The research undertaken by the project is supported at the regional and national levels. The regional research is conducted at the Kamboinse Research Station in Upper Volta, Samaru Station in Nigeria and Nairobi, Kenya. SAFGRAD regional research is supported at the national level through programs of field/on-farm trials and other types of outreach extension programs aimed at further testing, developing and extending improved technologies. The International Institute for Tropical Agriculture (IITA) has primary responsiblity for conducting research on maize and grain legumes and the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) concentrates on millet, sorghum and production agronomy research. As the SAFGRAD Project's major emphasis has been to support basic varietal and agronomic research, the reseaarch agronomist will address the technical issues of the research conducted by the SAFGRAD Project by carrying out the following scope of work:

1. Review the research activities implemented by the SAFGRAD supported entities and evaluate the varietal and agronomioc improvement programs of IITA and ICRISAT in terms of their scientific quality and appropriateness given the production constraints (low rainfall, low and deteriorating soil fertility) of semi-arid conditions.

2. Based on 1 above, recommend priority areas and most effective resource allocations in terms of research (varietal vs agronomic; on station vs off-station, expanded FSR, more emphasis on local varieties vs development of new varieties) which should be addressed during the remaining life of the current project and a phase II effort.

3. Assess the SAFGRAD concept of regionally supported research from a technical point of view in terms of efficiency and effectiveness in coordinating research to determine its relevance to national programs and agro-ecological specific needs and make recommendations for more effective structure and linkages.

4. Review the various scientific conferences supported by SAFGRAD to determine their effectiveness at information dessimination among research scientists and to what extent they promote increased collaboration in addressing research needs and make recommendations for future support of these activities.

Training/Extension Specialist

The SAFGRAD Project supports training at several levels: farmer, non-degree and degree training. Each contractor under SAFGRAD (IITA, ICRISAT and Purdue) has training programs which attempt to develop the host countries' capacities for implementing research programs. Additionally, the project has sent 26 candidates for long term training in various agricultural sciences. Overall, the SAFGRAD Project has devoted much effort and resources to training programs. The Training/Extension Specialist participating on the evaluation team will carry out the following scope of work to address issues of the training activities:

1. Review the SAFGRAD supported long-term training in terms of:

   a. The geographic distribution of participants;

   b. Academic performance of participants;

   c. Areas of emphasis, i.e. disciplines studied;

   d. The selection process and criteria for selection; and make recommendations which will improve the long-term training program.

2. Review the short-term training programs as implemented by the individual contract teams in terms of the relevance and effectiveness of the programs in developing intermediate level technicians to carry out the various research programs and make recommendations for improving the programs.

The principal mechanism of linking research to the farmer and extension service under the SAFGRAD program involves the use of an Accelerated Crop Production Officer (ACPO). Presently the SAFGRAD Project has 5 ACPOs working in Senegal, Upper Volta,

Mali, Cameroon and Togo. ACPOs are assigned to national research programs to carry out a program of field/on-farm testing and demonstration of research results. The Training/Extension Specialist participating on the evalaution team will carry out the following scope of work to determine the effectiveness of the ACPO program:

1. Review the ACPO programs in Cameroon, Senegal, Mali and Upper Volta to determine the effectiveness by which SAFGRAD regionally supported research is being further tested at the farm level. To this end, assess the linkages between ACPOs and SAFGRAD research entities and the OAU/STRC coordinating office.

2. Based on 1 above, assess the degree of extension service and farmer collaboration in implementing the off-station research trials, i.e., to what degree is a FSR perspective incorporated in their programs.

3. Evaluate the degree of integration of the ACPO programs with national research programs (this will include to a certain degree an assessment of the relevance of SAFGRAD supported research to national programs) and recommend alternative mechanisms for ACPO support, i.e. if ACPOs provide a vital link in the research process, is it not in the interest of national programs to assume their support to expand their capacities to perform this research-extension-farmer liaison function?

Senior Research Scientist

The SAFGRAD Project provides for the semi-arid zones of Africa an institutional structure which promotes the coordination of cereals and grain legume research and training of participating countries' research scientists. The actual SAFGRAD research and training is conducted by various research entities which can be grouped into three categories: participating African states' national research institutes, International Agricultural Research Centers (IARCs), and other agricultural research organizations with programs in the semi-arid zones. The SAFGRAD organization is comprised of three coordinating bodies; the Consultative Committee (CC) which provides policy guidance and program monitoring, the Technical Advisory Committee (TAC) which recommends the research and training agenda, and the Coordination Office which implements the SAFGRAD research program as directed by the CC and TAC. The administrative arrangements and inter-institutional agreements employed in the SAFGRAD organization are provided by the Organization of African Unity Scientific, Technical and Research Commission (OAU/STRC). Membership in the CC and TAC is made up of representatives of all participating

entities; OAU/STRC, member states, IARCs and the donor community. Since the inception of the project, IARCs have expanded their programs in Africa, national research programs have grown and other regional research institutes have been created. As a result, scope of the SAFGRAD network will need to be redefined relative to the institutional development of these other research entities. To this end, the Senior Research Scientist participating on the evaluation team will aid in clarifying the role of the SAFGRAD organization and will carry out the following scope of work:

1. In collaboration with the Organization/Management Specialist and Team Leader, assess the continued appropriateness of the SAFGRAD organization as an institutional coordinating mechanism for research, training and technology transfer for cereals and grain legumes in the semi-arid zone of Africa.

2. Based on 1 above, if the coordination fuction is required, recommend a more efficient or effective alternative.

3. Assess the degree of integration of the research supported by SAFGRAD at the national, regional and international levels and make recommendations as to how this could be enhanced and facilitated.

4. Recommend how IARCs can play a larger role not only in carrying out research, but also in coordinating research with national and regional programs.

5. Related to 4 above, delineate the most appropriate type of relationship between the IARCs and USAID i.e. grant or contractual; in terms of accommodating the research required by the project.

6. Assess the potential for other regional research institutions and programs such as INSORMIL and INSAH to assume more responsibilities for SAFGRAD supported activities.

7. In collaboration with the Management/Organization Specialist, review the functions of the CC and TAC in terms of developing and implementing the SAFGRAD research agenda, and recommend how these committees can be more effective.

APPENDIX C

UNCLASSIFIED
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) – PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Semi-Arid Food Grain Research and Development (SAFGRAD)	698-0393	USAID/Upper Volta

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 686-83-01

☐ REGULAR EVALUATION ☒ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent	B. Final Obligation Expected	C. Final Input Delivery	A. Total	$ 21,300,000	From (month/yr.)	5/77
FY 77	FY 83	FY 84	B. U.S.	$ 16,475,000	To (month/yr.)	6/81
					Date of Evaluation Review	3/83

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

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
(Note: This PES has been prepared based on a July 1981 external evaluation and on AID IG audit (report 7-698-83-1 of November 1982). The actions identified below represent a melange of outstanding items from the evaluation, the audit, and other observations of the USAID/Upper Volta staff. It is also important to note that, while the evaluation reviewed all aspects of the SAFGRAD activity, the IG audit limited itself to the management and financial operations of the SAFGRAD coordination office in Ouagadougou.)		
A.	B	C
1. The Evaluation, the audit and recent meetings between the OAU principals (OAU/USAID/ICARS) all called for an expanded role of the OAU/STRC in implementing SAFGRAD. Such an expanded role requires:		
A. approval of an expanded FY83 budget for both the Ouagadougou and Lagos operations;	Becker/Hughes	4/15/83
B. approval of an expanded FY 84 budget for both the OAU Ouagadougou and Lagos operations; and	Becker/Hughes	7/1/83
C. transmittal of USAID guidance on host country procurement of goods and services.	Becker/Hughes	4/15/83
2. The Audit highlighted the importance for USAID to clarify implementation monitoring responsibilities between the field and Washington and transmit such clarification to OAU/STRC.	Naylor (AFR/RA)	5/1/83

(continued on next page)

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- ☐ Project Paper
- ☐ Financial Plan
- ☐ Logical Framework
- ☒ Project Agreement
- ☒ Implementation Plan e.g., CPI Network
- ☒ PIO/T
- ☐ PIO/C
- ☐ PIO/P
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. ☐ Continue Project Without Change
- B. ☐ Change Project Design and/or
- ☒ Change Implementation Plan
- C. ☐ Discontinue Project

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

July 1981 evaluation team:
Herbert S. Hughes Leopold Fakambi
John D. Hyslop Robert W. Duell, Team Leader
Elon Gilbert
USAID/UV evaluation Officer: Michael Rugh

12. Mission/AID/W Office Director Approval

Signature: Laurence C Wilson

Typed Name: Emerson J. Melaven

Date: April 21, 1983

AID 1330-15 (3-78)

Project emphasis has been on regional-level research with little effort given to the oversight of that work in terms of relevance to SAFGRAD's target group: the small farmers of sub-saharan Africa.

The July 1981 evaluation made 14 recommendations to improve project implementation. As of March 1983, the status of these recommendations is as follows:

Recommendation 1: SAFGRAD policy and guidance functions should be strengthened by revitalizing the Consultative Committee (CC) and Technical Advisory Committee (TAC) and institutionalizing their roles within the project.

Status: This has not happened, and was subject of recent audit recommendation. AID-OAU meetings of February-March 1983 have resulted in a first cut at revised management protocols for SAFGRAD. However, simply "revitalizing" the CC and TAC may not be the best route to strengthened management. The roles of both will become clearer when they convene in May 1983.

Recommendation 2: Greater relative emphasis should be placed on coordination of national with regional-level research efforts and relatively less emphasis placed on direct research at the regional level.

Status: There has been a small improvement. The present project manager, who was part of the evaluation team, believes it was a weakness of the evaluation in attempting to make policy-shift decisions in mid-stream. Such a shift is difficult to carry out quickly. Purdue has made an effort to refocus and expand from national to regional emphasis in its activities. It is unrealistic to expect a major shift within the present project; Phase II design should address this point.

Recommendation 3: Attention should be given to the permanence of SAFGRAD, i.e. institution-building.

Status: Until the evaluation, the permanence of SAFGRAD was of secondary concern. The USAID emphasis was, rather, on mobilizing research and transferring the information expeditously to the member states. The evaluation pointed out that this would necessarily be a long-term process involving greater participation of African institutions. As a result, OAU/STRC initiated two major actions. First, they reviewed their own support of the coordinator office and subsequently have expanded their Lagos backstop for the project. Second, the OAU/STRC has taken a leadership role in SAFGRAD and is bringing the office into line with other OAU/STRC institutions throughout Africa by introducing full OAU management procedures.

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Recommendation 4: OAU should be more active in pursuing donor support for SAFGRAD.

Status: As a result of the evaluation, AID/Washington advised OAU/STRC that the long-term viability of SAFGRAD was contingent on other donor participation. As a result, the new Executive Director of OAU/STRC, Prof. A.O. Williams, launched a campaign for SAFGRAD support from several international donor agencies including: the European Development Fund, the International Fund for Agricultural Development (IFAD), and the French FAC. In addition, he also pursued greater participation by the Institut de Recherches Agronomiques Tropicales.

Recommendation 5: Consideration should be given to empowering OAU/STRC as the contracting body for technical assistance activities.

Status: The USDA project manager believes this recommendation was ill-advised. Recent audit findings would superficially tend to support this position and no doubt an expanded role for OAU/STRC should await the arrival of a new management team in the coordinator's office. Nevertheless, if efficient SAFGRAD operations and management are to be based on several different donors, then it is appropriate that a uniform system of contracting be introduced (an OAU/STRC system).

Recommendation 6: The autonomy of the OAU/STRC Coordinator in Ouagadougou with respect to OAU/STRC headquarters in Lagos should be maintained in the making and implementation of operational decisions.

Status: This runs contrary to 1982 audit dindings. Recent events support a view that OAU should set up a system whereby headquarters has more input and operational control and it is in this direction that the project will head.

Recommendation 7: The operations of the Ouagadougou office should be strengthened by adding: (1) a Coordinator of Research responsible for the management of all technical research matters; and (2) one or two persons to the staff of the OAU/STRC Coordinator so that fiscal matters can be professionally handled.

Status: The OAU/STRC simultaneously began the search for a Director of Research as well as support for such a position soon after the evaluation was completed. Based on the expression of interest of IFAD in this area, the OAU/STRC, with the help of other participating SAFGRAD supporters, selected a Director of Research in March, 1983. To improve the management of fiscal matters, an accountant was hired with AID funds in March, 1982. Since then, the OAU/STRC as a result of audit findings have begun to introduce their own accounting systems as well as financial management and control procedures.

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Recommendation 8: OAU/STRC, with AID support, should negotiate with the other donors and implementing agencies they fund to bring them more closely into the SAFGRAD fold and achieve greater SAFGRAD influence over their research activities.

Status: The OAU/STRC began discussions with the ICARs on this matter upon the arrival of Prof. A.O. Williams. However, the greatest progess to date took place in Brussels (March, 1983) where the role of the CC and TAC were discussed. All participants agreed more coordination of SAFGRAD research activities was required and the OAU/STRC through its expanded Coordinator office would take the lead.

Recommendation 9: AID and OAU/STRC should consider placing the regional research centers under full SAFGRAD management to avoid questions of national sensitivity.

Status:No action taken and none envisioned. It is believed the evaluation team was not in agreement over the inclusion of this recommendation. We believe placing regional research centers under full SAFGRAD management would be counter-productive to those research efforts and would certainly offend the governments of the countries in which they are located.

Recommendation 10: Greater regional-level emphasis should be placed on soil and water research. Breeding work should be aimed at varieties adapted to farmers' current management and levels of output.

Status: Some progress has been made. ACPOs are placing more emphasis on agronomy. To the extent the opportunity has arisen to change personnel and policy, the movement has been towards emphasizing soil and water research. Lack of a TAC hindered making progress towards meeting both points in this recommendation.

Recommendation 11: The FSU team should concentrate on the adaptive farm trials component of its program for the remaining life of the current SAFGRAD project.

Status: The FSU team has fully complied with this recommendation and intensified its efforts on adaptive farm trials. Their current research directions will greatly enhance their final product.

Recommendation 12: (Concerns follow-on Phase II project and relates to design team and FSU when Phase II is implemented).

Recommendation 13: The ACPO role as liaison between national research and national extension should be his only mission. The permanent research staff of the national centers should take over responsibility for regional trials.

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Status: Recommendation has been partially fulfilled. ACPO contracts now emphasize their role as liaison and suggests they facilitate national research trials to be done by the nationals of the country in which ACPO is located.

Recommendation 14: ACPOs should be assigned to national farming systems programs in order to provide "leverage" to the farming systems' extension activities beyond the immediate areas in which they are working.

Status: Partially implemented. The Upper Volta ACPO has been urged to work with the FSU as there is not a national system's extension group. Also, the new Benin ACPO position is fully integrated with the national farming systems research effort.

14. Evaluation Methodology

The purpose of the evaluation was to determine: (a) the effectiveness of the funded research coordination, extension and training efforts; (b) the degree of adherence to the project plan and objectives; (c) to recommend revision of the project documents, if necessary; and (d) project and recommend a U.S.-supported follow-on project. Field work for the evaluation began in Ouagadougou in May 1981 by the five-member team, and encompassed visits to the primary sites of SAFGRAD regional activities in Senegal, Mali, Nigeria and Upper Volta.

Discussions were held with representatives of international and national research and extension organizations, expatriate researchers, and farmers in villages at points throughout selected participating SAFGRAD countries. The evaluation concentrated more on process than on products and outputs due to the fact that, at the time of the evaluation, the project was only half way through its projected five-year life.

15. External Factors

Not pertinent at this time.

16. Inputs

AID-funded staffing for the project, with exception of the ICRISAT team at Samaru,Nigeria, was realized in a relatively timely manner. Construction at Kamboinse, Upper Volta, and procurement of project vehicles also was realized without a detrimental delay to project implementation. Long-term training start-up experienced selection/placement delay due to varying selection procedures in participating countries, and coordination through the OAU/STRC mechanisms. The evaluation did not find any major problems directly related to input delivery.

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17. Outputs

The SAFGRAD project log frame cites seven major outputs:

Output 1: Regional Crop Research (varietal improvement/soils management).

The evaluation found SAFGRAD's major emphasis has been on varietal development research at the regional level, with most progress being on maize development by IITA at Kamboinse. AID-funded work on sorghum by ICRISAT at Samaru, Nigeria, was delayed due to initial contractor staffing problems and the lack of an agreement with Nigeria. The evaluation recommended greater regional emphasis be placed on soil and water research, and breeding work be aimed at varieties adapted to farmers' current management and levels of input.

Output 2: Regional farming systems research.

The Farming Systems Unit (FSU), implemented through a contract with Purdue University, was intended to give SAFGRAD a capability for basing its research and development activities on an understanding of the farmers' decision-making environment.

The FSU team concentrated its efforts on village-level studies in Upper Volta, almost exclusively. Its work plan called for detailed socio-economic surveys in the villages to provide data for models of production-consumption behavior. Management problems in data gathering and a lack of computer for tabulating and analyzing the data resulted in a failure to complete the planned formal analysis.

Partial analysis of the data and experience in working with villagers permitted the team to begin an on-farm agronomic trials program. The evaluation recommended the FSU team concentrate on the adaptive farm trials component of its program for the remainder of the SAFGRAD project, and that it should have a regional, rather than national, orientation (see 13 for further clarification).

Output 3: National field trials/demonstration activities.

This element of the project is the responsibility of the ACPOs (Accelerated Crop Production Officers) serving as a link between the crop researchers and the FSU team on one hand, and farmers and national extension units on the other. The role of each of the four ACPOs in place at the time of the evaluation has been based on an accomodation between that delineated in the PP and the constraints and opportunities presented by the institutions and resources in each SAFGRAD country.

Two ACPO issues cited in the evaluation are: (1) SAFGRAD regional versus national responsibilities; and (2) integration of the ACPOs' national work into a farming systems research program. The evaluation recommended the ACPOs' SAFGRAD regional field trial responsibilities be given to the national research program. At the ACPO level of the SAFGRAD project, the role in strengthening linkages is paramount in furthering the objectives of increased production of farmers. His time and material resources which

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are allocated to SAFGRAD regional trials are not available to build up necessary bonds between research and extension.

The ACPO has been working primarily with results produced by crop researchers and not integrating his operations into national farming systems research.

Output 4: African scientists and technicians trained on the job.

The evaluation found African officials asserting the view that the training element was an indisputable and unequivocal positive project contribution. Thirteen degree-level participants were enrolled and three additional were being processed for training. The PP had envisioned a long-term training total of 160 student-years. Thus, while a positive element, the level is lower than planned and has started much too late to make a contribution to this phase of the SAFGRAD project. Short-term training is being managed by the international research institutes. Because AID funds were "pooled" with other training money, it was difficult to fiscally isolate training done with SAFGRAD funds. An estimate of 40 is believed reasonable. (The PP log frame indicator anticipates 40 person-years). SAFGRAD headquarters is attempting to gather together more definitive information to ensure more complete documentation.

Output 5: Systematic exchange of crop research information among scientists

Workshops were held in each of the crop research sectors and had participants from a wide selection of SAFGRAD countries. The workshop reports were well produced and distributed but appeared to lack significant technical input. The evaluation team noted that it was unclear how or to what degree workshop recommendations are distributed or acted upon outside the circle of workshop participants. The evaluation also noted information exchange gets a very perfunctory treatment both in the PP and in reality. Conference proceedings are published and distributed, as are IITA and ICRISAT reports, on the basis of fixed distribution lists on a one-time basis. The evaluation recommends a more formal system of information acquisition, storage, and retrieval as a logical element of SAFGRAD's coordinating function. The SAFGRAD Newsletter was viewed by the evaluation as excellent and beneficial in disseminating research information.

Output 6: System for regional research planning and coordinating

Policy and program guidance functions were vested in the Consultative Committee (CC) composed of African research and development officials and representatives of donor nations. The CC was to be assisted by a Technical Advisory Committee (TAC) of senior scientists from SAFGRAD member countries and international research agencies. Up to the time of the evaluation these two committees have been less effective than envisioned by the PP. The primary responsibility for convening the two committees rests with OAU/STRC.

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Meetings of the CC and TAC have been infrequent (and a liberal interpretation of "meeting" is necessary to state they have met annually as is required by the Agreement). The evaluation team believed the inactivity of these two committees is a primary cause for the project's failure to evolve beyond the research priorities set in the PP, or to truly integrate the activities of the researchers, and concluded there is a clear need to implement and accelerate the functioning of the two committees.

At this date, USAID does not totally adhere or support to this recommendation. The urgent need to restructure the management of the project is acknowledged, but the CC and TAC as originally designed are probably too unwieldy and impotent to have a major impact on the project. Leaner, more functional mechanisms have to be found to manage SAFGRAD and to direct and disseminate research. OAU-AID-contractor negotiations on this important point have recently taken place, and new, more functional, CC and TAC mechanisms have been established.

Output 7:

Research station infrastructure, construction of offices and laboratories at Kamboinse has been completed as planned.

18. Project Purpose

"To: (1) develop improved cereals (millet, sorghum, maize) and legumes (cowpeas, groundnuts) and cultural practices which are compatible with small farm semi-arid farming systems and to promote their adaptations in participating countries; and (2) strengthen the coordination and capability of African Research within a regional framework". In July 1981, at the time of the evaluation, research efforts were in progress to improve cereals and legumes through manipulation of genetic materials enhancing both yield potential and diseases and pest resistance. Most of the effort was taking place at research stations as opposed to on-farm trials. Since the evaluation, ACPOs have been stimulating increased on-farm trials utilizing improved seed varieties. These are still in the guided demonstration stage of utilization by farmers. It is still too early to assess the direct impact of improved seed variety adoption on the potential beneficiaries.

The OAU/STRC provides a broad regional framework within which research under the project is carried out. However, the CC and TAC have not played as active roles in strengthening regional coordination of African research as had been envisioned by the SAFGRAD project.

19. Goal/sub-goal

The project goal is "to increase the quantity and quality of staple food crops effectively available to the increasing populations in the semi-arid zone of Africa". Research efforts to improve food grain quality and production potential were in progress at the time of the evaluation. However, since improved food grain seed was being tested under controlled conditions and not being made available to farmers on a commercial scale, virtually no

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measurable progress was noted in achievement of the project goal. Research results, however, point to substantive future improvement of food crop production which, assuming farmer field trials convince the local farmer of their superiority, should improve quality and quantity of staple food crops. Further, the Purdue Farm Systems Research Unit has considerably expanded its on-farm program since the evaluation.

20. Beneficiaries

Of an estimated 165 million inhabitants in the SAFGRAD countries, an estimated 70-80% are engaged in small farm agriculture. Additionally, others cultivate cereals and grain legumes as their principal staples.

As noted earlier in this PES, the research now being conducted appears promising, but to date, few tangible benefits have accrued to the small-scale farmer as a direct result of project activities.

21. Unplanned Effects

None noted.

22. Lessons Learned

Relationship between donors and OAU were very poorly defined. The agreements made between USAID and participating contractors were also ambiguous and left many loopholes, creating pitfalls for effective project implementation at the program level.

The major implementation weakness has been the failure to fully utilize the project's policy and guidance structures. Inactivity on the part of the Consultative Committee and the Technical Advisory Committee has created a policy vacuum which was filled, in part, by the OAU/STRC Coordinator and the AID Project Officer. They neither can nor should take over the functions which should be carried out by these committees or suitable alternates. This failure has impacted on the regional-level research, and more effort should be given to the oversight of that work in terms of its relevance to SAFGRAD's target group of beneficiaries - the small farmers of sub-saharan Africa.

13. Summary

Background and Summary Project Description:

SAFGRAD represents a major initiative for addressing fundamental constraints to increased food production in the vast semi-arid zones of sub-saharan Africa. The project purpose is to develop improved cereal varieties (millet, sorghum, maize) and grain legumes (cowpeas, groundnuts) and cultural practices which are compatible with small farm semi-arid farming systems; and to promote their adaptation and use in farmers' fields. Project activities fall into two broad areas: first, regionally coordinated research on staple cereals and grain legumes at three selected African research centers; second, support to national research, field trials and outreach programs to further develop, test, and extend improved technologies to farmers.

Policy and program guidance was to be provided by a Consultative Committee (CC) comprised largely of African national crop research and development authorities. A technical Advisory Committee (TAC) was to provide technical oversight and planning. The Scientific and Technical Research Commission of the Organization of African Unity (OAU/STRC) was to perform the vital role of regional coordination and administrative support for the project. As such the OAU/STRC is the grantee. AID's original contribution to SAFGRAD was earmarked in the Project Paper as follows:

a. ICRISAT (Samaru, Nigeria)	$1,800,000
b. IITA (Kamboinse, Upper Volta)	3,307,500
c. ACPO's (five)	2,562,500
d. Participant training	2,000,000
e. OAU/STRC Administration	236,500
f. Conferences	313,500
g. Commodities and Construction	443,000
h. Consultants	234,000
i. AID Project Officer	570,000
j. Contingencies and Inflation	2,411,000
	$13,878,000

In FY 1982, the project authorization was amended to extend the project from May 1983 to a new PACD of March 1985. In addition, the authorized life of project cost was increased to $16,475,000.

1981 Evaluation and Recommendations

The Semi-Arid Food Grain Research and Development Project (SAFGRAD) was formally evaluated in July 1981. That evaluation found project implementation to be basically on schedule with timely staffing, and personnel of the various implementing organizations working in a vigorous and professional manner. The major implementation weakness had been the failure to fully utilize SAFGRAD's policy and guidance structures. This had impacted on project orientation.

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APPENDIX D

SAFGRAD TRAINING PROGRAM ACCOMPLISHMENTS

Long Term Training

According to the Garvey Report, the SAFGRAD Project Agreement was signed in May 1977 but has completed only five operational years.[1] During that time, and up to September 30, 1983 twenty-six candidates have been selected for long term training (including four who are contract funded by Purdue University). Of these, one was at the BS level, one non-degree, sixteen MS and seven PhD. The degree program of one candidate cannot be identified in the files. To date ten have completed their studies, one refused to accept the program, one resigned during training and at least two were dropped for poor academic performance. Three approved candidates are awaiting acceptance by an American university.

Geographically, the candidates have for the most part been selected from Sahelian countries---five Voltaics, six Malian, two Senegalese and one Chadian. Other West African students make up the remainder of the group with five students coming from Guinea, two from Togo and one from Ghana. The remainder of the SAFGRAD countries are represented by two students from Botswana and one from Cameroon.

Plant breeding with emphasis on the major crops of the project---sorghum, maize and millet---is the most frequent major, with ten participants enrolled in this field. Agronomy is represented by four candidates as well as three in soil science. There is also one candidate each in plant nutrition, plant pathology and agricultural hydraulics. The Purdue contract financed long-term participants majoring in agricultural economics.

Academic performance of SAFGRAD participants is very hard to estimate due to the skimpiness of information available in either USAID or SAFGRAD offices. However most students who completed their studies appear to have been reasonably competent and some were considered outstanding by their institutions.

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[1] Garvey Report, a document prepared by a USAID consultant, provides training information through July 1983. Material presented throughout this Appendix draws almost entirely on data in the Garvey Report. There is some paraphrasing and organizational shifts to condense information presented here.

Recommendations for participants come to SAFGRAD from a number of sources---from SAFGRAD country Ministries of Agriculture, from ACPOs and from the major institutions associated with the project. In most cases selected participants have been working in their country's agricultural research program, often directly in SAFGRAD associated efforts. There would appear to be substantial correlation between academic success and a contractor or ACPO's recommendation.

There appears to be a lack of knowledge by SAFGRAD or other interested parties concerning assignments long-term participant trainees receive on their return home. Although the investment in a participant's education is not lost regardless of his assignment, the objective was to produce trained researchers and ACPOs actively engaged in sorghum, millet, maize and cowpea research. Yet neither the SAFGRAD nor the USAID offices in Ouagadougou receive any notification of student progress, academic program, completion of studies, or date of return, except for Voltaic participants.

The Project Paper and Project Agreement allocated $1,600,000 to long-term training. A recent Project Paper Revision approved August 17, 1983 added $150,000 to the life of project allocations for both long and short term participant training. The specific allocation of this amount between the two presumably will be worked out by OAU/STRC and AID.

PIO/Ps to date have obligated $845,189 for long term training. Assuming a cost of $18,500 per year training costs and an average training time of 2.5 years for a MS and 3.5 years for a PhD degree, an additional $200,000 in accrued expenditures can be anticipated to complete the training of current students and those identified in the pipline.2

Therefore some $555,000 remains in the long term training pipeline even if long term training receives none of the additional $150,000 in the recent project paper revision.3 This

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2 Those students identified in the pipeline for whom funds or additional funds must be obligated are Saidou $42,000; Goukaila $27,400; Fobasso $15,250; N. Coulibaly $46,250 and; Gokally $64,750.

3 The amount may be somewhat larger, since PIO/Ps for individuals who have been counted here, but who withdrew or refused the program (e.g. Hema Idrissa) can be deobligated. Note also that funds for Purdue MS and PhD candidates are not counted here since they are funded under the Purdue PIO/T.

would allow OAU/STRC/SAFGRAD to train an additional twelve students to the MS level or eight to the PhD level, substantially reaching project objectives in long term training.4

Short Term Training

A more correct term for short term training might be "contract funded" training. All contract training in the project appears to be funded under PIO/Ts and while most of it is short term training, one contractor (Purdue) has implemented mostly long term degree training. The Project Paper set an output of 65 technicians for an average of six months training each. The Project Paper and subsequent project agreements allocated 480,000 for short term training.

IITA: The goal for short term training to be conducted by IITA as specified in their contract was ten trainees annually for an average of four to six months each. IITA's training effort includes a varied number of components. An important one is in-service training of six months duration at Kamboinse in which 16 students from nine SAFGRAD countries have been enrolled since 1980. Technicians were trained in maize and cowpea breeeding, maize and cowpea agronomy and entomology. An additional three Voltaic university students received graduate thesis guidance in maize breeding and cowpea agronomy and two Voltaic students received three months training in entomology at the Institute Practique in Kolo, Niger. Twenty students participated in a six-week course in maize and cowpea production at Kamboinse. In addition to short course training carried on by the IITA/SAFGRAD team at Kamboinse one can include annual four month training programs in maize and cowpea production give at IITA headquarters in Ibadan.5 An average of twenty-five technicians representing a wide cross-sector of SAFGRAD countries have been trained annually since 1980. SAFGRAD funds have supported approximately ten of these trainees. Many of the IITA trainees were extension agents receiving production oriented training.

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4 Word of caution. Although $550,000 remains in this long term budget, overall SAFGRAD expenditures may be overruning their budgets and training funds might have to be reallocated to such project components to keep within total project authorizations. It appears that the total project pipeline as of September 30, 1983 and from the Purdue, IITA and ICRISAT contracts is only about $170,000. A pipeline analysis of each project component should be made at an early date.

5 Rapport 1980, IITA/SAFGRAD. Undated IITA, Ouagadougou. p. 17.

In addition, IITA has also organized maize and cowpea monitoring tours in which national scientists from SAFGRAD member countries have participated. These tours are for approximately three to four weeks. This activity is considered a valuable training experience for different national scientist who visit five or six national programs as a group along with IITA/SAFGRAD researchers during the crop season to compare the strengths and weaknesses of each program for mutual benefit. Maize and cowpea scientists from Senegal, Upper Volta, Mali, Nigeria, Ethiopia, Zimbabwe, Gambia, Benin, Botswana, Ghana, Somalia, Tanzania, Togo, Central African Republic, Kenya and Cameroon have participated in one or more of these training tours.

IITA was allocated $76,000 per year for all training for the first two years of its original contract. Subsequent amendment dropped this figure to $42,000 per year for training at IITA and $24,000 per year for local training. The mosdt recent contract amendment (No. 3, dated October 23, 1982) allocates $40,000 to IITA headquarters training and $70,000 to local training from January 1982 through May 1983. A contract amendment proposed by the USAID/Ouagadougou ADO to carry IITA through December 31, 1983 would not add funds to IITA headquarters training but would put another $21,900 into local training a Kamboinse.6 IITA expenditures on SAFGRAD training at their headquarters from the beginning of the project through March 1983 (the last period for which invoices are available) come to $103,628.

It would appear that IITA has accomplished most of its contracted assignment for short term training and that budget restraints have not been a limiting factor. Although IITA short term training has used more than half of the funds allotted, this is to be expected since IITA was assigned by their contract a large share of the short term training load.

ICRISAT: All ICRISAT training is currently done at their training facility in India. Since the inception of the SAFGRAD program, nine ICRISAT/SAFGRAD affiliated technicians have completed a six month technician level course, eight of them in crop production and one in crop improvement. Eight of the nine attended the course in 1982, the ninth in 1983. Countries represented were Guinea (4), Cameroon (3), Mali (1) and Botswana (1).

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6 The same proposal would give IITA $32,800 for post doctoral training.

ICRISAT is in the process of establishing its African headquarters just outside Niamey, Niger and apparently upon its completion (1985) plans to offer technician level training at that facility. This should greatly increase the opportunity for technical training in the sorghum/millet phase of SAFGRAD.

ICRISAT in its contract received an allocation of $40,000 for short term training for the first year and $60,000 for the second year. Total training allocation was reduced to $63,406 by contract amendments and increased to $103,406 by Amendment No. 4 dated August 5, 1982. The ADO proposed budget for extending the contract through December 31, 1983 would give them an additional $43,800 for training.

ICRISAT's total expenditure for short term training from the beginning of the project through March 1983 comes to $63,406 for the nine students trained. It has sufficient funds to increase its level of short term training assuming qualified candidates can be found and there is room at their training facility in India.

Purdue: Training at Purdue under its SAFGRAD contract has been almost exclusively at the graduate degree level. One of its SAFGRAD associates received two months training in computer programming and one attended a two week farming system course in Zimbabwe. Four of its participants are currently enrolled in MS or PhD programs on the Purdue campus.

It appears that the Purdue team recognizes the need to place greater emphasis on technician training, a recent internal study recommending "a training program of 1 to 3 months be organized in Uppper Volta in early '84 for the FSU project personnel and personnel from national organizations" and further suggesting that "principal emphasis in 1984....be upon training and scientific interaction with the Voltaic national agencies in both the extension and the agricultural research divisions."

Purdue's training allocation under its contract was $55,000 for participant training. This amount was retained in the budget attached to Contract Amendment No. 10 dated January 8, 1982 and no line item changes are noted through Ammendment No. 15 dated June 7, 1983.

Purdue indicated a cumulative training (tuition) expenditure through March 1983 of only $9,789. Since they have entered four participants into long term training, two of the MS and two at the PhD level, it is clear that their training budget is insufficient. The problem will be accentuated if they are to follow through on their decision to increase short term training in Upper Volta.

APPENDIX E

PERSPECTIVES ON STRENGTHENING EXTENSION-RESEARCH LINKAGES

The following analysis is presented to clarify the steps involved in transmitting researcher findings to actual practices in farmers' fields. Technology transfer is a process consisting of overlapping phases and repetitive teaching, interestingly packaged. The process is often slow as it must take farmer attitudes, traditions and beliefs into account. Simply presenting factual information rarely generates practice change in risk resistant populations. Ideally, the research-to-extension-to-farmer chain includes the following phases.

Phase I - Adaptive Research

- o International and regional research centers develop improved varieties in the five SAFGRAD crops and identify agronomic practices for more efficient production. These are sent to national research centers for testing for local adaptability. Their feedback results in further refinement.
- o National research centers send successfully tested varieties and protocols to international and regional research centers for further developmental work to improve selected characteristics or agronomic practices. International and regional centers exchange

information on refinements with national centers until an acceptable product results. Information at each stage of experimentation is provided to the national research centers of SAFGRAD member countries. Ultimately, recommendations are provided to all member states on potential benefits of the new technology.

- o National research centers participate in international and regional variety and cultural practice trials on an on-going basis. Results of experimental work are disseminated on a regular basis to international, regional and national centers working on SAFGRAD crops, as well as to African universities, agricultural colleges and technical schools, ACPOs, FSUs national extension agencies and private sector enterprises related to the commodity/practice tested.
- o Conduct in-region/in-country sub-station research trials to further screen materials and methods and disseminate findings to entities described above.

Phase II - Applied Research

Engage in farming systems research to determine socio-economic parameters for local farmers. If national efforts are not feasible due to constraints (funds available, number of agro-climatic zones, tribal customs and traditions) representative sub-regions should be identified for this effort.

Phase III - Pre-Extension Testing

Based on recommendations from national research centers and using information generated by farming systems units, conduct on-farm trials to test adaptability and acceptability of varieties and cultural practices. Identify the most promising and best adapted for use under typical farmer constraints. Focus on making consistant, even if small, gains through feasible improvements or modifications in the farmers traditional methods. Concurrently, conduct end-user product/practice acceptance tests (quantity, quality including local preferences and tastes).

Phase IV - Extension Liaison

Disseminate appropriate information on proven "promotable" findings:

- Brief local government officials, influential leaders, donors and others able to further disseminate efforts and support farmer adoption programs.
- Conduct tours of local on-farm trials.
- Plan seminars, meetings or workshops for potential extension collaborators.
- Provide news releases for local, mass media outlets.
- Participate in local harvest festivals or similar opportunities for sharing information.

Phase V - Extension Program Development

In collaboration with extension, develop and pre-test educational programs directed toward farm family adoption.

- o Identify other agencies that can conduct and/or assist in technology transfer through education/demonstration to gain farm family involvement and support.
- o Provide training for other trainers.
- o Provide models for use in training farm families including:
  - * protocols
  - * schedules
  - * demonstration packages
  - * support materials (posters, flannel boards, pamphlets)
  - * in-process support needed (equipment, inputs, operations funding)
  - * plan for farmer assistance, monitoring and evaluation
  - * plans for feedback and recommendations to researchers and appropriate others on strengths and weaknesses of their technology used in farm operations.

Phase VI - Extension Implementation

As the outline presented above suggests, technology transfer is complex, potentially expensive and time consuming. Yet without comprehensive linkage-transfer efforts, needed research results (even more expensive) are not widely used. The research linkage to the extension transfer process must be recognized as sequential and developmental---with very high long term cost-benefit potential.

ACPO responsibilities should emphasize Phase IV efforts. In cases where Phase III or Phase V work is deemed essential initially this work should be viewed as evolutionary with the intention of moving these responsibilities entirely to appropriate national organizations as soon as possible.

The amount of time needed to progress through initial phases of the research linkage to extension transfer to farmers can be roughly calculated. Assuming that Phase I is fully operational and the country is ready to test national varieties or cultural practices at the applied level:

First year - Phase II

Second year - Phase II (2/3), Phase III (1/3)

Third year - Phase II (1/3), Phase III (2/3)

Fourth year - Phase III

Fifth year - Phase III (2/3), Phase IV (1/3)

Sixth year - Phase III (1/3), Phase IV (2/3)

Seventh year - Phase IV

Comparable time must be added if the ACPO is expected to assist in Phase V. Furthermore, if a country does not have the capacity to fully implement Phase VI, developing a companion SAFGRAD extension model should be considered. This would be staffed by an additional ACPO Team on definite terms. As extension activities are on-going, it must eventually become the host country's responsibility to provide them on a permanent basis. The ACPO should serve to stimulate the incorporation of research findings, adapted to local conditions, into extension

programs, as well as recommendations made by extension agents to get the researchers attention. The research-extension connection must be truly collaborative and two directional to be effective.

The ACPO program should be perceived as developmental, one that evolves through all phases in the research extension continuum. Maximum total time needed, if a country has none of the phases or supportive structures in place at the start of the program is approximately 18 years---calculated at three years for each of the six phases.

APPENDIX F

LIST OF CONTACTS

Mr. Nazirou Sacko, Pedologist, Project Inventaire des Ressources Terrestres, Bamako, Mali

Prof. A. O. Williams, Executive Secretary, OAU/STRC, Lagos, Nigeria

Dr. Mario Rodriquez, Maize Agronomist, IITA, Ouagadougou, Upper Volta

Dr. Joseph B. Suh, Entomologist, IITA, Ouagadougou, Upper Volta

Dr. John Scheuring, Sorghum Breeder, ICRISAT, Bamako, Mali

Dr. Rattan Lal, Soil Physicist, IITA, Ibadan, Nigeria

Dr. Ermond H. Hartmans, Director General, IITA, Ibadan, Nigeria

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Dr. Shiv. Raj. Singh, Program Leader, Grain Legumes Improvement Program, IITA, Ibadan, Nigeria

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Mr. John H. Davies, Director (Acting) of the Institute for Agricultural Research, Samaru, Nigeria

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Dr. Brhane Gebrekidan, ICRISAT/SAFGRAD, Nairobi

Mr. John A. Becker, Agriculture Development Officer, USAID/UV

Mr. Roger Bloom, Project Manager, SAFGRAD, USAID/UV

Mr. Larry Heilman, Deputy Mission Director, USAID/UV

Mr. Emerson J. Melaven, Mission Director, USAID/UV

Mr. Julius Walker, US Ambassador, Upper Volta

Mr. Mike Rugh, Program Officer, USAID/UV

Mr. Robert Zigler, Training Officer, USAID/UV

Mr. Abdel Moustafa, Project Manager, USAID/Cameroon

Mr. Bill Litwiller, Agriculture Development Officer, USAID/Cameroon

Mr. Bernard Wilder, Deputy Mission Director, USAID/Cameroon

Mr. Jacques-Paul Eckebil, Director General, Institut Recherche Agricole, Cameroon

Mr. Bill Slocum, Logistics, USAID/Cameroon

Mr. Owen Gwathmey, ACPO, Cameroon

Mr. Martin Fobasso, Cameroon National Counterpart ACPO

Mr. Mossa Kabore, ACPO, Upper Volta

Mr. Ouro-Gnaou Talley B'fah, SAFGRAD/ACPO Program Technician, Upper Volta

Mr. T. Aithnard, Directeur de Recherches Agronomique, Togo

Mr. Nguyen-vu, Conseiller Technique, Direction Recherches Agronomique, Togo

Mr. Batussi Mpo, Togo National ACPO Counterpart

Dr. Robert Nicou, IRAT, Upper Volta

Mr. Sidney Bliss, USAID/Togo

Mr. Sosti Sauri, Training Officer, USAID/Togo

Mr. P.I. Thiongane, Director General, ISRA, Senegal

Mr. Mankeur Fall, ACPO, Senegal

Mr. John Balis, Agriculture Development Officer, USAID/Senegal

Mr. John McMahon, Project Officer, SAFGRAD, USAID/Senegal

Dr. Ratiba Saad, Agronomist, SODEVA, Senegal

Mr. Sanogo, Directeur General de Researchees Agronomique, Bamako, Mali

Mr. Dolo, Chef du service ORA, Bamako, Mali

Mr. Lamine Traore, ACPO, Mali

Mr. Jerry Johnson, Former expatriate ACPO Mali

Dr. S.K. Reddy, Project Officer, USAID/Mali

Dr. Herbert Ohm, Purdue Team Leader and Agronomist, FSU, Ouagadougou, Upper Volta

Dr. Mahlon G. Lang, Agricltural Economist, Purdue University, Ouagadougou, Upper Volta

Mr. Cris Pardee, Agricultural Economist, Purdue University, Ouagadougou, Upper Volta

Dr. Peter Matlan, Agriculture Economist, ICRISAT, Ouagadougou, Upper Volta.

APPENDIX G

Qualifications and Functions of Additional Postions for OAU/STRC Coordination Office

Planning and Organization Officer

Functions

- To develop "marketable" projects for SAFGRAD presentation to new and present donors;
- To assist in the organization of SAFGRAD coordination activities such as workshops, conferences, seminars, etc.;
- To activate a SAFGRAD publications clearing house operation for all member countries and interested institutions;
- To follow-up on the treatment and publication of SAFGRAD data, newsletters, etc.

Qualifications

- Some agricultural training;
- Some management training and experience;
- Proven writing and editing skills;
- Computer use skills;
- Fluency in French and English;
- African national (preferred)

Director of Training and Extension

Functions

Training

- o Conduct and update a training needs assessment;
- o Define the relevant long and short term training program;
- o Coordinate regional training activities;
- o Develop selection criteria for SAFGRAD funded training participants;
- o Solicit member countries for training participants;
- o Help training candidates on procedural matters;
- o Define active training participants' follow-up procedures.

Extension

- o Conduct needs assessment;
- o Define the role of ACPOs and the necessary preparation;
- o Coordinate ACPO training, work orientation and network participation;
- o Facilitate liaison of ACPOs with regional and international centers;
- o Seek ACPO program donors;
- o Help develop a research-extension linkage in

member countries.

- o Help determine and activate the appropriate national setting for ACPOs;
- o Assist in contractual management in ACPO program and serve as ombudsman for ACPOs.

Qualifications

- o Some agricultural training and extension experience;
- o Some management training and experience;
- o Proven writing and editing skills;
- o Computer use skills;
- o Fluency in French and English;
- o African national (preferred).

Appendix H

Evaluation Team Travel Itinerary
January 28 to March 1, 1984

January 28	McKenna, Mitchell arrive Ouagadougou
January 31	Taylor arrives Ouagadougou
February 1	Simmons arrives Ouagadougou
February 3-12	McKenna to Cameroon return Ouagadougou
February 6-12	Simmons, Taylor, Mitchell to Nigeria return Ouagadougou
February 10	Poiroir arrives Ouagadougou
February 11	Albert arrives Ouagadougou
February 15	Frolik and Gray arrive Ouagadougou
February 16	McKenna to Togo, Senegal and Mali
February 17	Albert to Senegal, Mali
February 18	Simmons returns to Mali (home base)
February 20	Taylor to Mali
February 21	Bekure arrives Ouagadougou
Feburary 25	McKenna, Albert, Taylor return Ouagadougou
March 1	Team departs

1984-09

SEMI-ARID FOOD GRAINS RESEARCH AND DEVELOPMENT, PROJECT EVALUATION

AU-SAFGRAD

USDA/OICD Team