

PD-NAF-954

10/1/88

Mauritania Agricultural Research II Project
Project No. 682-0957

MID-TERM EVALUATION

Final Report

Prepared for:

U.S.A.I.D. Mauritania

Prepared by:

Thomas Wayman, Chief of Party
Christine Elias, Document Editor
William Friebig, Team Member

October 1988

Tropical Research & Development, Inc.
519 N.W. 60th Street, Suite D, Gainesville, FL 32607
(904) 378-1886

TABLE OF CONTENTS

	Page
LIST OF ACRONYMS	4
EXECUTIVE SUMMARY	5
1. <u>INTRODUCTION</u>	11
1.1 <u>Preface</u>	11
1.2 <u>Purpose of the Evaluation</u>	12
1.3 <u>Evaluation Team Methodology and Composition</u>	13
1.4 <u>Economic and Social Context of the Project</u>	13
1.5 <u>Progress Toward End-of-Project Status</u>	16
2. <u>FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS</u>	18
2.1 <u>Clarity of Stated Project Objectives and Expected Outputs</u>	18
2.2 <u>Assumptions Explicit or Implicit in AgRes II Project Design</u>	25
2.3 <u>Research Personnel Shortage at CNRADA</u>	25
2.4 <u>Condition of CNRADA's Research Stations</u>	28
2.5 <u>AgRes II Role in CNRADA Human Resource Development</u>	29
2.5.1 <u>Degree Training</u>	29
2.5.2 <u>In-country Training</u>	32
2.5.3 <u>U.S. and Third-country Short Courses and Seminars</u>	34
2.6 <u>Defining an Agricultural Research Strategy for CNRADA</u>	35
2.7 <u>CILSS-Funded Agronomic Trial Results (1981-85)</u>	38
2.8 <u>AgRes II's Focus on Dieri and Walo Rather than Irrigated Cropping Systems</u>	39
2.9 <u>Research Activities of AgRes II</u>	40
2.10 <u>CNRADA/AgRes II FSR Program</u>	45
2.11 <u>AgRes II Budget</u>	48
2.12 <u>CNRADA's Administrative and Financial Management Capacity</u>	48
2.13 <u>CNRADA's Limited Operating Budget</u>	52
2.14 <u>Role of AgRes II Chief of Party</u>	54
2.15 <u>Role of the AgRes II Administrative Assistant</u>	56
2.16 <u>Internal Monitoring and Evaluation of AgRes II</u>	58
2.17 <u>National and International Linkages</u>	59
2.18 <u>Short-Term Consultants</u>	61
2.19 <u>"Farming Systems Research Along the Senegal River Valley" Series</u>	62

3.	<u>Continued A.I.D. Support to Agricultural Research in Mauritania</u>	63
	SELECTED BIBLIOGRAPHY	65
	APPENDIX	67

LIST OF ACRONYMS

AA	Administrative Assistant (AgRes II)
AGIR	Amelioration de la Gestion dans les Instituts de Recherche au Sahel
AgRes II	Mauritania Agricultural Research Project II
CILSS	Comité Permanent Inter-Etats de Lutte Contre la Secheresse dans le Sahel
CSA	Commissariat à la Sécurité Alimentaire
CNRADA	Centre National de la Recherche Agronomique et du Développement Agricole
COP	Chief of Party (AgRes II)
DCVO	Division des Cultures Vivrières et Oléagineuses
DSPTT	Division des Systèmes de Production et de Transfert de Technologie
ENFVA	Ecole Nationale de Formation et de Vulgarisation Agricole
FAO	Food and Agriculture Organization
FSR/E	Farming Systems Research and Extension
FSSP	Farming Systems Support Project
GIRM	Government of the Islamic Republic of Mauritania
MEF	Ministry of Economics and Finance
MDR	Ministère du Développement Rural
OMVS	Organisation pour le Mise en Valeur de Fleuve Sénégal
PCR	Programme de Consolidation et de Relance
PCV	Peace Corps Volunteer
PP	Project Paper
PREF	Programme de Redressement Economique et Financier
RFTP	Request for Technical Proposal
SONADER	Société Nationale de Développement Rural
SRV	Senegal River Valley
TA	Technical Assistant
UA	University of Arizona
UM	Mauritanian Ouguiya

EXECUTIVE SUMMARY

1. Project Purpose

The Mauritania Agricultural Research II Project (AgRes II) was designed as an institution-building effort. Specifically, it supports the National Agricultural Research Center - Centre National de la Recherche Agronomique et du Développement Agricole (CNRADA) in Kaedi (in the Senegal River Valley) through technical assistance and training of Mauritanian researchers. These efforts are to lead to the eventual transition to a farming systems research program in the latter years of the project. The project supports U.S.A.I.D./Mauritania's stated objectives to develop human resources and to improve food security.

2. Evaluation Purpose and Methodology

The statement of work for the mid-term evaluation of AgRes II states the purpose of this evaluation as follows:

"to ensure that [the project] continues to assist the Mauritanian government to fulfill its own objectives with regard to agricultural research and development, and that any changes in the project direction and objectives are in accordance with the (U.S.A.I.D./Mauritania) Mission's strategy and program rationale for agricultural development."

Since this was a mid-term evaluation, the evaluation team focused on moving beyond problem identification to problem resolution. Through numerous discussions with project implementors, the evaluation team worked towards a consensus on the problems and towards devising and initiating project "course corrections."

3. Findings, Conclusions and Recommendations

3.1 Project Achievements

Since the inception of AgRes II, important progress towards agricultural research institution-building has been achieved. Specific accomplishments include the following:

- * Thirteen studies were completed, providing basic data on farming systems, ecology, food consumption patterns, etc. in the Senegal River Valley.
- * Seven Mauritanian researchers are currently in training in the U.S., five for the B.S. degree and two for the M.S. degree.
- * Five research assistants received short-term, third-country training. Four in-country training seminars and three study tours were organized.
- * Station and on-farm trials have been conducted since the 1986 growing season.
- * A sorghum germplasm collection has been established.
- * Linkages between CNRADA and other national and international research and development agencies have been strengthened.

The evaluation covered three types of issues related to AgRes II; (i) project design and administration; (ii) technical; and (iii) institutional. Recommendations for future U.S.A.I.D. projects are also given. The key issues are summarized below.

3.2 Design and Administration Issues

Project Objectives, Expected Outputs and Assumptions

The original U.S.A.I.D. Project Paper (PP) was written as a regional effort for Senegal, Mali and Mauritania. The effort was subsequently divided into three bilateral projects. Documents for the Mauritania project (Request for Technical Proposal - RFTP, the contractor's technical proposal, and contract) all contain wording from the original project paper which applied to Senegal and Mali only. This has caused confusion during project implementation. In addition, invalid assumptions concerning the availability of qualified Mauritanian researchers and a research operating budget were made at the project design stage.

Recommendations

A statement of project objectives and expected outputs which will guide project implementation for the next two years should be prepared and agreed upon by the contractor, CNRADA, U.S.A.I.D. and the Mauritanian government. Proposed working for such a statement is contained in the evaluation document. A new logical framework should also be prepared reflecting this revised statement of objectives and outputs, as well as more realistic assumptions.

Terms of Reference of the Technical Assistance Team

There are some discrepancies as to the role of the Agricultural Research Planner/Chief of Party (COP) and the Administrative Assistant (AA), arising from changing circumstances since project inception.

Recommendations

Revised terms of reference should be drafted for both technical assistants (TAs). Suggested wording and/or guidelines for rewriting the scopes of work are contained in the evaluation document.

3.3 Technical Issues

Research Activities of AgRes II

The number and geographic extent of agronomic trials initiated under AgRes II have been somewhat over-optimistic. It is evident that the present numbers and training level of CNRADA research technicians are inadequate to support the extensive on-station and on-farm trial program attempted in 1986-87 and 1987-88. Most personnel who began receiving on-the-job training in farming systems research methodology are now studying in the U.S. Most remaining CNRADA personnel with whom the project works require training in the collection, analysis and reporting of research results, both on-station and on-farm. However, many of them lack the basic knowledge that is needed to grasp complex topics such as experimental design, error control and statistics.

Recommendations

The 1988-89 on-farm trial program should be scaled back taking into account CNRADA's available human and material resources. The objective should be to ensure quality before quantity in the on-farm trial program.

Station trials need more attention regarding data collection and reliable interpretation of the data. CNRADA staff presently responsible for conducting trials and reporting research results should be trained by AgRes II through informal contact and workshops in techniques for preparing research documents, technical reports, etc.

Village-based field personnel should receive basic training on station before working with farmers.

CNRADA/AgRes II Farming Systems Research Program

The Farming Systems Research (FSR) strategy proposed for CNRADA/AgRes II is basically sound and well-adapted to Mauritanian conditions. However, the trial results discussed in the evaluation report indicate that the methodology was not always being followed. For example, instances were noted where farmer-managed trials were implemented where they should have been researcher-managed exploratory trials (sesame). Also, although sorghum varieties were ready for farmer-managed testing, the husbandry practices introduced (spacing) in these trials could have been better introduced in exploratory trials.

Recommendations

Exploratory trials could be used to facilitate the identification process of alternative technologies. Although the value of these trials must be weighed against the existing personnel constraints, they could be a useful exercise in a small teaching program. They tend to promote farmer involvement which can add valuable information to the process.

The station trial designs should reflect the valuable feedback--both quantitative and qualitative--received from on-farm trials. Conversely, exploratory on-farm trials (researcher-managed) should be initiated on station-tested technologies to verify station results.

Since the CNRADA personnel trained as trainers are not now at the Center, training will have to begin anew. Both short-term consultants brought to Kaedi and short courses outside Mauritania should be tapped.

On-the-job training of mid-level research technicians necessary for institutionalizing the FSR process needs to be planned in detail, including a methodology for evaluation of progress.

3.4 Institutional Issues

CNRADA Human Resource Development

AgRes II has done an excellent job of mobilizing the long-term degree training program. The candidates are receiving academic training relevant to their work at CNRADA. The project timetable, however, will allow for little overlap at CNRADA between the technical assistance team and the newly-returned trainees. Concerning in-country on-the-job training, CNRADA officials expressed interest in laying more emphasis on this task during the remaining years of the project.

Recommendations

The U.S. academic programs of the present trainees can be strengthened even further by providing practical experience in agronomic trial design, implementation and analysis. Any U.S.A.I.D. follow-up project to AgRes II should be in place in time to receive the newly-graduated trainees.

AgRes II should consider funding short-term consultants to help CNRADA's plan and implement a program of in-country training workshops for CNRADA's mid-level research personnel.

CNRADA's Administrative and Financial Management Capacity

The Management Audit of CNRADA, prepared by an AgRes II short-term consultant, does an excellent job of identifying the Center's key constraints. It makes recommendations, supported by the evaluation team, which CNRADA can realistically follow.

Recommendations

CNRADA should begin with administrative reforms requiring little, if any, increased funding which can be implemented by available personnel. A priority task should be to reach a consensus on a strategy for administrative reform.

CNRADA/AgRes II have recently been granted funding from the Mauritanian Food Security Commission. The administrative procedures and bookkeeping system set up to manage these funds should be carefully developed so as to serve as potential models for similar systems within CNRADA.

CNRADA's Limited Operating Budget

An insufficient operating budget continues to be the major problem for CNRADA in its attempt to become a viable research institution. The Mauritanian government has stipulated that CNRADA must further demonstrate its ability to generate technologies acceptable to farmers if it is to receive a larger budget allocation.

Recommendations

CNRADA needs to demonstrate that it is making efficient use of its present operating budget by: pursuing research activities which are part of a coherent strategy; and by developing a program which it can competently complete with its existing resources.

3.5 U.S.A.I.D. Support to Agricultural Research After AgRes II

U.S.A.I.D. should make a long-term commitment to support agricultural research in Mauritania. A follow-on project should incorporate many of the elements of AgRes II, and should include a larger on-farm research program, provisions for agricultural research station repairs, and a component for agricultural extension.

1. INTRODUCTION

1.1 Preface

Mauritania has been confronted with extreme economic and environmental setbacks as a result of prolonged drought and changes in the world economy which have had adverse effects on the country. Purchased grain imports and external food aid account for a high proportion of Mauritania's food supply. To correct this situation, the Mauritanian government has made food self-sufficiency a long-term objective for the rural sector. The government has also allocated financial resources to reinforce the institutional capacity of the country's national agricultural research center, CNRADA.

In December 1985, U.S.A.I.D./Mauritania initiated Agricultural Research II Project (AgRes II) in support of Mauritania's institution-building objective. Through technical assistance and support for long-term B.S. and M.S. level training in the United States for Mauritanian researchers, AgRes II has made important progress towards strengthening the human resources of CNRADA and towards defining a research program relevant to farmers' needs. However, it is generally acknowledged that most of the positive impact resulting from development assistance to agricultural research will not even begin to show for at least five years, perhaps ten. AgRes II has been in operation for less than three years.

The combination of these two factors -- the difficult physical and economic environment in Mauritania and the newness of the AgRes II initiative -- makes the evaluation of AgRes II exceptionally difficult. We have strived to keep two facts in mind: that the accomplishments of CNRADA and AgRes II have been achieved against monumental odds; and that any deficiencies must be weighed against these odds. Our operating premise has been that a strong agricultural research system in Mauritania is an essential step towards food security, even if this goal is a long-term one.

Though we take full responsibility for the views presented in this report it truly represents the collective work of many individuals. The Director, Assistant Director, and staff of CNRADA, the rural development planners at the Cellule de Planification (MDR), the AgRes II team, and the staff of U.S.A.I.D./Mauritania, all contributed long hours and valuable insights for this evaluation. We respectfully thank all concerned and hope we have produced a document which does justice to the efforts upon which it is based.

1.2 Purpose of the Evaluation

The statement of work for the mid-term evaluation of AgRes II states the purpose of this evaluation as follows:

"to ensure that [the project] continues to assist the GIRM (Government of the Islamic Republic of Mauritania) to fulfill its own objectives with regard to agricultural research and development, and that any changes in the project direction and objectives are in accordance with the [U.S.A.I.D./Mauritania] Mission's strategy and program rationale for agricultural development."

The evaluation team was to review the following issues with regard to both AgRes II and CNRADA:

- Research and development objectives;
- Project design and institutional design;
- AgRes II linkage to CNRADA;
- AgRes II/CNRADA linkages to other institutions and organizations both national and international;
- AgRes II constraints and limitations;
- CNRADA constraints and limitations;
- AgRes II workplans;
- Training plans;
- Project time frame;
- Project budget and financial situations;
- CNRADA budget and financial situations;
- Available human, material and financial resources of both AgRes II and CNRADA;
- Alternative sources for human, material and financial resources.

The statement of work called for recommendations regarding:

- (i) changes or adjustments in the project's design and objectives;
- (ii) the direction the project should take in the future; and
- (iii) the possible redesign or amendment of the project if it were extended beyond its current PACD.

1.3 Evaluation Team Methodology and Composition

Clarification of evaluation issues

The evaluation team gave considerable attention to establishing the information needs of the major project implementors -- U.S.A.I.D., the University of Arizona (UA), CNRADA, GIRM. As the first task of the evaluation process, the team prepared an expanded statement of issues and questions, using the evaluation statement of work as a starting point and incorporating contributions from the project implementors. This statement became the basis for the evaluation team's work.

interactive approach to evaluation

Since this was a mid-term evaluation, the evaluation team focused on plans for the future; on moving beyond problem identification to problem resolution. The approach was to work towards a consensus on the problems and towards devising and initiating project "course corrections". To achieve these goals, numerous discussions were held between the evaluation team and project implementors, both in Nouakchott and in and around Kaedi.

The final report is in itself a product of these interactions. Although the evaluation team takes full responsibility for its contents, the report has benefited greatly from the comments of the project collaborators. A discussion draft summarizing the evaluation's conclusions and recommendations was translated into French so as to obtain comments from CNRADA and GIRM. This final report incorporates those perspectives.

Evaluation Team Composition and Dates

The evaluation team consisted of: Son Nguyen, Assistant Agricultural Development Officer (ADO), U.S.A.I.D./Mauritania; Wane Hamdou Rabby, MDR Planning Unit; and Christine Elias, William Fiebig, and Thomas Wayman of Tropical Research and Development, Inc. (TRD). The evaluation took place in Mauritania from June 5 to July 9, 1988. This final report was completed in the U.S.

1.4 Economic and Social Context of the Project

In 1985, an estimated two-thirds of the population of Mauritania -- 1.2 million people -- depended on income from the rural sector. From 1977 to 1985, the population of

villages, towns, and cities increased by 100 percent. Nomadic peoples who supported themselves from livestock were leaving the countryside to settle in populated areas. This has placed more population pressure on potentially arable lands in the Senegal River Valley.

Crops and livestock represented 24.9 percent of the Gross Domestic Product in 1981; this fell to 20.4 percent in 1984. (Programme de Redressement Economique et Financier - PREF, 1985)

Arable lands found in the southern zone of the country fall into four categories:

- rainfed fields, that provided 60 percent of the grain production prior to the droughts. 200,000 ha were cultivated prior to the drought; approximately 50,000 ha are still arable under the average rainfall conditions of recent years (PREF, 1985);
- small, wadi dams have allowed for 10,000 ha of crop lands in average rainfall years;
- floodplain fields that account for 60,000 to 70,000 ha if rainfall permits full flooding; average or low rainfall supports approximately 25,000 ha.;
- approximately 30,000 ha of irrigated fields developed by the government and the private sector.

In pre-drought Mauritania, livestock were a major source of income and economic growth. During the 1971-81 decade, herds were decimated. The PREF estimates that over one-third of the nation's cattle was lost between 1980 and 1985 while sheep and goat flocks decreased by 50 percent. A large portion of livestock were moved to neighboring countries where pasture was available.

The prolonged drought has brought about major social adjustments, primarily a mass exodus from the countryside to cities, towns, and villages. Urbanization has often meant unemployment or under-employment for household members, changing values, and a changed lifestyle. Settlement in the Senegal River Valley has been heavy and increasing pressure on available arable lands.

The drought further precipitated out-migration to other West African cities and to France. The AgRes II FSR Reconnaissance Survey reports cite that almost all families mention remittances from family members who have migrated as a regular source of income. The 1988 sociological survey undertaken by the Dirol Plain Project in villages in the Dirol Plain adjacent to the Senegal River Valley, found that 40 to 50 percent of

economically active men had left their villages to find a livelihood elsewhere. A portion of these men would be expected to return, if recessional or irrigated agriculture could be practiced.

The Rural Assessment Manpower Studies (RAMS) 1982 Rural Assessment cites surveys in the Senegal River Valley which show that due in part to the out-migration of men, women of all ethnic backgrounds are taking a primary role in irrigated, recessional, and rainfed agriculture. For women of some ethnic groups, this has meant a major change in their former role.

Economic and Financial Recovery Programs

Public investment in the rural sector has been, and will continue, to be significant. The National Recovery Program of 1981-84 allotted 13 billion Mauritanian Ouguiya (UM) to the rural sector. This was increased by the 1984-88 National Recovery Plan (PREF) to 17 billion UM. The National Investment Program that is being finalized for 1989-91 (Programme de Consolidation et de Relance -- PCR) is proposing investments of 27 billion UM in the rural sector.

The PCR states the government's long term objectives for the rural sector as follows: self-sufficiency in food, the regeneration of the natural environment, and restraining the rural-urban drift. Medium-term goals are:

- to raise production so that, in 1991, 60 percent of the nation's consumption of cereals, and 30 percent of the nations consumption of vegetables will be produced nationally;
- to preserve and develop pasture lands, and watering areas;
- to create conditions in which both irrigated and rainfed agriculture are economically viable;
- to encourage private investment in agriculture.

Among the objectives related to agricultural research and development are the following:

- to elaborate a national coordinating plan for agricultural research and training;
- to reinforce the institutional capacity of the agricultural research and training centers;

- to undertake agricultural research in irrigation and soil and water management techniques.

The creation of a National Institute for Training and Agricultural and Veterinary Research through the fusion of CNRADA and the national rural development and veterinary schools was proposed in the PREF and again in the PCR. Another proposal would reactivate the National Commission for Agronomic and Veterinary Research which has the mandate to evaluate and orient research and training programs.

CNRADA

CNRADA, the organization within which AgRes II works, has a mandate to conduct and coordinate agricultural research in Mauritania. It is located on the Senegal River at Kaedi, 500 km southeast of Nouakchott. The Center has three research stations, six sub-centers, and a date plantation. One administrative and three technical divisions are presently operating at CNRADA: Farming Systems-Technological Transfer Division - Division des Systèmes de Production et de Transfert de Technologie (DSPTT); Food and Oil Crops Division - Division des Cultures Vivrières et Oléagineuses (DCVO); and the Horticultural Division. Proposals to create seven new divisions at CNRADA have been accepted by CNRADA's Conseil d'Administration. These divisions have not yet been created because of insufficient personnel and funding.

1.5 Progress Toward End-of-Project Status

AgRes II is an agricultural research institution-building project. A number of important achievements of AgRes II leading towards this goal were noted by the evaluation team.

- * Thirteen studies were completed, providing basic data on farming systems, ecology, technology, food consumption, nutrition status, and women in development in the Senegal River Valley.
- * The active participation of expatriate and Mauritanian researchers in many national and international conferences, seminars and workshops has enhanced CNRADA's national and international recognition. Technical papers prepared by the TA team and CNRADA researchers were presented at some of those meetings.

- * The master plan for agricultural research is being finalized with inputs from various national and international research and development organizations.
- * A plan for the improvement of CNRADA administration was completed in collaboration with the Comité Permanent Inter-Etats de Lutte Contre la Secheresse dans le Sahel (CILSS) Amelioration de la Gestion dans les Instituts de Recherche au Sahel (AGIR) Project and approved in principle by the former Minister of Rural Development.
- * Station and on-farm trials have been conducted since the 1986 growing season.
- * A germplasm collection has been established. Sixty-five sorghum varieties have been given to the Food and Agriculture Organization (FAO) Seed Project for multiplication.
- * Seven Mauritanian researchers are currently in training in the U.S., five for the B.S. degree and two for the M.S. degree.
- * Five research assistants received short-term, third-country training. Four in-country training seminars and three study tours were organized.
- * Linkages between CNRADA and other national and international research and development agencies have been strengthened through frequent communications, consultations and research collaboration.

These highlighted achievements are discussed in more detail in the following sections.

2. FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

2.1 Clarity of Stated Project Objectives and Expected Outputs.

Findings

Producing one statement of the Mauritania AgRes II project objectives and expected outputs as a basis for evaluation is problematic. This is due to inconsistencies in the original project paper and to changes noted in other documents written over the life of the project to date. The following discussion presents the objectives as stated at each stage of project development: PP, RFTP, UA proposal, UA/U.S.A.I.D. contract, and project implementation reports.

Project Goal and Objectives/Purpose¹

The AgRes II project was originally designed as a regional effort to be managed under the auspices of the OMVS (Organisation pour le Mise en Valeur du Fleuve Senegal). Its goal, as stated in the PP (p. 33) is:

To improve the capacity of Senegal, Mali, and Mauritania to more effectively plan and implement agricultural development activities in the Senegal River Basin.

The confusion begins in the PP which states differing objectives for the overall regional effort and for the Mauritanian component. The objectives for the regional project were defined as follows (PP, p. 33):

1. To develop Senegalese, Mauritanian and Malian agricultural research capacities in the Senegal River Basin through training, facilities development, and participation in the design and implementation of adaptive research and farming systems research programs; and
2. To improve the combined effectiveness of national agricultural research programs in the Senegal River Basin through regional coordination and prioritizing within the OMVS.

¹ In this discussion, the terms "objective" and "purpose" are considered to be synonymous. These are distinct from "goal" which is the broader end to which the project contributes.

Concerning the Mauritania component, the PP stated that:

"the project will support ... research planning/management and farming systems research" (PP, p. 33).

The PP qualifies this statement, however, in the following excerpt:

"It was originally envisioned that the Mauritanian component of this agricultural research program would begin with an on-the-ground adaptive crop research effort. A joint GIRM/U.S.A.I.D. review and further design work indicated that development of an adaptive crops research program at CNRADA was premature at the present time, and consequently, that [sic] a good foundation of human resources development, the development of a research strategy as well as the development of financial, commodity and research systems was the appropriate first step to take during the initial phases of the project. A transition to FSR will be made in the latter stages of the project, after the basic research systems are in place." (PP, p. 73).

Due to a policy directive from A.I.D./Washington withdrawing from regional efforts, the decision was made to create separate bilateral projects in Mauritania, Mali and Senegal, linked by a regional project to be managed from Senegal by OMVS. U.S.A.I.D./Mauritania issued a request for technical proposals for the Mauritania component only. The objectives of this "sub-project" as stated in the RFTP were identical to those of the original AgRes II regional project. The difference was that the objectives were to have been achieved through the combined efforts of the three bilateral projects.

It is important to note that no new logical framework was prepared for the Mauritania AgRes II bilateral project. Therefore, although the text of the PP defines Mauritania as a special case, the objectives are stated globally for all three countries.

The project objectives as stated in the UA/U.S.A.I.D. contract still include all the PP wording about the regional project and the qualifier about the Mauritanian component (i.e. institution building now, adaptive crop research and a transition to FSR in the later years of the project).

In May 1986, an interim paper by CNRADA's Directeur Technique and the AgRes II COP entitled "Research Strategy for the Crop Year 1986-1987," presented the goals and objectives of the project differently than the previous documents. The

project's 1986 Annual Report (p. 10) stated that these modifications were made and "informally accepted" after having completed the first reconnaissance survey and the Agricultural Research Alternatives. The newly-stated goal and objectives read as follows:

Goal

To improve the standard of living of farm households by:

- (1) Increasing agricultural production, especially of staple foods, and
- (2) Arresting, or at least slowing, the rapid deterioration of the environment in the river valley and the adjacent Sahelian region.

Objectives

- (1) Institution Building -- to establish the research center (CNRADA) in Kaedi as a credible and regionally recognized research institution;
- (2) Institutional Linkages -- to establish collaborative links between the various rural development, agricultural, educational and research institutions and organizations; and
- (3) Farming Systems Research and Extension (FSR/E) Capability -- to apply the FSR/E methodology and approach to research and extension by establishing on-farm trials and by extending the new appropriate technologies developed by CNRADA and on other research stations in the Sahel and West Africa.

According to the AgRes II Draft 1987 Annual Report, a fourth objective was added during the management audit (Nov 1987):

- (4) Training -- to assist in training a number of CNRADA researchers and administrative personnel in order to raise the level of competency in the field of research, in the administration, and in the management of the research center.

Project Outputs

As with project objectives, the expected project outputs are not consistently stated through the stages of project evolution.

The expected outputs of the regional OMVS AgRes II project, as stated in the PP (p. 33) and also in the RFTP are:

1. Production systems studies, on-farm trials of improved technology, and improved technical packages for "recommendation domains" in major ecological areas of the Senegal River Basin;
2. Upgraded technical and professional skills for agricultural researchers, research assistants and research technicians;
3. Upgraded agricultural facilities for the three research stations located at Fanaye, Senegal; Kaedi, Mauritania; and Same, Mali; and
4. Strengthened regional research coordination among national research agencies and involving national development agencies;

Although not stated as "outputs", the PP (p. 34) and RFTP continues as follows:

"This project will be undertaken to:

5. Identify and refine improved farm production practices which can be utilized in the OMVS Integrated Rural Development project;
6. Provide inputs for establishing extensive field trial programs and research management activities in the three existing research centers."

Then, as was the case for project objectives, a different set of expected outputs was presented for the Mauritania component of AgRes II (PP, p. 75):

1. A medium to long-term strategy (and implementation plan) for agricultural research activities in the Mauritanian portion of the Senegal River Basin and it will also be necessary to make an inventory of research resources and farmer needs (p. 74);
2. Six academically trained personnel...;
3. Short-term training at international training centers;
4. U.S. observation tours for two participants;
5. Third country tours;
6. In-country training and seminars; and
7. Infrastructure development.

Note that there is no mention of on-farm trials in the Mauritania component, yet the expected outputs of the regional project specify trial results.

The RFTP presents yet another revision of the expected outputs for the Mauritania AgRes II project as follows:

1. An established research system, including the development of a research strategy which will serve as a basis for the eventual transition to a farming systems research program in the latter years of the project;
2. Six Mauritanian researchers trained to the BS and MS levels, Mauritanian research assistants given special third country and U.S. training and other GIRM field staff benefiting from in-country seminars;
3. Provision of four houses for researchers at the Kaedi research station; and
4. A strengthened regional research system integrating national research agencies (e.g. CNRADA) appropriately coordinated with national development agencies (e.g. Société Nationale de Développement Rural - SONADER).

The UA proposal re-worked the wording of the PP and RFTP, but essentially quoted both the expected outputs of the regional project and the Mauritanian component as expected outputs of the Mauritania project.

In the UA/U.S.A.I.D. contract, the outputs of both the regional and Mauritanian projects are again given. By that time, however, the wording was modified to state that these outputs will be the product of the combined efforts of the "bilateral sub-components in Mauritania, Mali and Senegal, linked by a regional project to be managed from Senegal by OMVS". The outputs of the Mauritania project are stated with the identical wording used in the RFTP.

Conclusions

The project's goal as stated in the AgRes II implementation documents (i.e. interim research strategy and annual reports), is "to improve the standard of living of farm households by ... increasing agricultural production, especially of staple foods ..." While this may be the ultimate goal of agricultural research, it leaves room for confusion as to whether the project should be focusing on agricultural production or on research institution building. It could be argued, for example, that achieving increased agricultural production in Mauritania could be done without strengthening CNRADA (e.g. by changing agricultural prices).

All the cited variations of project objectives/purpose give priority to institution building. The differences arise in the means to achieve the objective and, consequently, the expected results or outputs of the project. Two key differences are apparent in the stated objectives and outputs cited above:

1. Phasing of FSR: The U.S.A.I.D. documents discuss the "eventual transition to farming systems research in the later years of the project" while the AgRes II implementation documents describe the initiation of FSR in Year 1.
2. FSR vs FSR/E: The U.S.A.I.D. documents do not include extension for the Mauritania project while the AgRes II implementation documents describe "apply[ing] the FSR/E methodology ... by establishing on-farm trials and experiments and by diffusing and extending the new appropriate technologies developed on research stations."

The PP did state differences between expectations for the Mauritanian component of the project and the other countries concerned. However, the objectives for Mali and Senegal were repeatedly stated in the Mauritanian AgRes II documentation. This has caused confusion.

Recommendations

A statement of project objectives and expected outputs specific to Mauritania which will guide project implementation for the next two years should be prepared and agreed upon by all parties involved in AgRes II. This mutually acceptable statement should be signed by CNRADA, U.S.A.I.D., and AgRes II. Given our numerous conversations with U.S.A.I.D., the contractor, CNRADA, and GIRM, the following wording might be considered.

Project Goal

To assist CNRADA to become a regionally recognized agricultural research institution capable of producing results relevant to farmers' needs in rainfed, flood-recession, and irrigated production systems.

Project Objectives

- To strengthen CNRADA's capacity to develop and implement adaptive agronomic research, based on the FSR methodology, through an interactive program of on-farm and on-station research trials leading to new production technologies relevant to farmers' needs;

- To upgrade technical and professional skills for agricultural researchers, research assistants and research technicians in both on-station and on-farm research techniques through degree training, in-country on-the-job training, and special U.S./Third Country short courses;
- To strengthen and/or establish collaborative links between the various research, rural development, agricultural educational, and extension organizations in Mauritania and in other countries;
- To assist CNRADA to develop an efficient administrative support system compatible with its existing personnel, financial and material resources.

Expected Project Outputs

- A short and medium-term agricultural research strategy document and implementation plan for CNRADA which prioritizes research alternatives based on farmers' needs with consideration given to available research resources;
- Seven Mauritanian researchers trained to the BS and MS levels;
- CNRADA research technicians trained in on-station and on-farm research techniques through a concerted effort on in-country on-the-job training;
- Strengthened collaborative linkages between CNRADA and Ecole Nationale de Formation et de Vulgarisation Agricole (ENFVA), as evidenced by a mutually planned and implemented training program for CNRADA research technicians and ENFVA students; between CNRADA and SONADER through collaborative researcher managed on-farm and/or on-station trials; and between CNRADA and the regional extension service as evidenced by extension personnel participation in on-farm trial design and implementation;
- One or two new technologies (crop variety, husbandry practice, etc.) which have passed through the stages of farming systems research and are ready for transfer to the agricultural extension service and/or farmers;
- A plan for enhancing the administrative support system of CNRADA and progress made in implementing the plan.

The UA/U.S.A.I.D. contract should be revised to reflect these changes, deleting all references to the OMVS regional project, its objectives, and expected outputs.

A new logical framework with indicators of progress also needs to be prepared to reflect these new objectives, expected outputs, and realistic assumptions about the

project's environment. These assumptions are discussed in the subsequent section.

2.2 Assumptions Explicit or Implicit in AgRes II Project Design

Conclusions

Three key assumptions made implicitly or explicitly in the project design have proved to be invalid. They are that:

1. There would be sufficient numbers of qualified Mauritanian personnel with which the TA team could work;
2. CNRADA's budget would fund maintenance of the research stations so they could support the envisaged on-station trial program; and
3. Funding would be available to conduct the envisaged research (whether on-station or on-farm),

The implications of these assumptions for project implementation are detailed in Sections 2.3, 2.4, and 2.13, and respectively.

Recommendations

More realistic assumptions should be incorporated into the new logical framework as proposed in Section 2.1.

2.3 Research Personnel Shortage at CNRADA

Findings

In February 1988, CNRADA's Conseil d'Administration adopted a new organogram defining one administrative and ten technical divisions. To date, only the administrative division and three of the technical divisions: Horticulture; Food and Oil Crops; and FSR and Technology Transfer are operational. At present, there are only four Category A staff members (i.e. senior researchers) at CNRADA: the director, the assistant director, the head of the Horticulture Division, and the assistant head of the FSR Division. The remaining personnel are of the Conducteur level or below.

One key factor which has temporarily contributed to the shortage of qualified personnel at CNRADA is the AgRes II long-term degree training program. Six of CNRADA's best professionals are now abroad. While there is no question of the vital importance of this training, few professionals remain at the Center to carry on its research program.

CNRADA and AgRes II have attempted several options to rectify the situation. First, CNRADA requested and received seven-eight personnel seconded from MDR. Among them is the present Assistant Director of CNRADA who has proved very effective. However, some of the other appointees have not adequately contributed to CNRADA's research program.

Other more temporary solutions have also been attempted. For example, Peace Corps Volunteers (PCVs) have been recruited to conduct on-farm trials. AgRes II sponsored pre- and in-service training for these volunteers on the principles of FSR. But the PCVs have not had the agronomic skills appropriate for their task. This has been recognized and new volunteers to be based on the research stations will have more advanced agronomic training.

The Center is now completing plans to use Commissariat à la Sécurité Alimentaire (CSA) funds to hire six-eight field supervisors and observers (Conducteur and/or Moniteur level of training) to implement on-farm and some station trials. Some of the recruits have had experience with field trials, but most of them lack this experience. Furthermore, no provisions have been made to absorb them back into the MDR personnel structure.

Recommendations

CNRADA should assess the feasibility of reallocating some of its horticultural and/or DCVO personnel to DSPTT for on-farm work.

CNRADA should also initiate a new request to MDR for qualified personnel to be transferred to CNRADA. Such a request should state the rationale for requesting such personnel, clear scopes of work for the personnel requested, and a precise statement of where they would fit into the CNRADA organizational structure. The request should also contain proposals for eventually absorbing into the MDR personnel structure the contractors hired with CSA funds.

The Conseil d'Administration should use its influence to ensure that CNRADA has a voice in the selection of personnel transferred to the Center.

The informal links which have been created between CNRADA/AgRes II and ENFVA can contribute to the long-range personnel needs of the Center. Specifically, the initiative taken by the project to have short-term consultants teach at ENFVA should

be developed into a long-range, formalized training plan. This would not tax the project's limited resources since the short-term consultants would essentially be accomplishing two compatible tasks (See Section 2.5).

In the meantime, the AgRes II team should scale back its activities to a level which is realistic given the present personnel situation, and strengthen its in-service training program for existing personnel.

2.4 Condition of CNRADA's Research Stations

Findings

On-station research is a vital component of FSR. Having identified the constraints which limit the productivity of traditional farming systems, on-station research must then be conducted to search for alternatives to relieve the farmers' constraints without posing any risk to them.

Some factors that affect the quality of research results were observed during visits to CNRADA's Belinabe and Sylla research stations:

1. Many of the derivation and drainage canals are either infested with weeds or filled with soil which affects the efficiency of water control.
2. The plots are not levelled resulting in variable soil moisture content which confounds the research results.
3. The lack of a suitable enclosure around the station results in trials being destroyed by animals.

The AgRes II budget does not allow for the amelioration of CNRADA's research facilities as the PP assumed that the stations were adequate.

CNRADA lacks an adequately trained station manager who should be responsible for allocating the available manpower to perform the necessary day-to-day tasks to assure a successful on-station research program.

Interviews with CNRADA's research Division Chiefs indicate that the majority of the salaried labor force lies within the Division of Horticulture, many of which are contracted with funds provided by collaborating donors. The DCVO which is responsible for research linked to the FSR on-farm component of AgRes II has a shortage of manpower. Unfortunately, the AgRes II team can do little about this situation.

Conclusions

The quality and reliability of CNRADA's agronomic data has undoubtedly been affected by the physical condition of the research stations. Furthermore, the continuity of on-station research is uncertain because the personnel presently managing the Belinabe and Sylla research stations are either contracted (i.e. not permanent GIRM employees) or are inadequately trained.

Recommendations

Some station improvements can be made with minimal capital investments. The irrigation canals can be cleared with the existing labor force. Experimental plots can be levelled as needed for individual trials. Fencing must be put up around experimental areas. Also, the trial program should be adjusted to contain experiments which are compatible with the available facilities.

Anticipating the more expensive station improvements, U.S.A.I.D. should initiate contact with donors operating within Mauritania to secure multi-lateral funding for: (1) a study to determine the equipment, material, and capital inputs necessary to rehabilitate CNRADA's Belinabe and Sylla research stations (this study is proposed in the PCR but not yet funded); (2) the implementation of this rehabilitation plan.

CNRADA should name a research station farm manager to coordinate the day-to-day research activities for the Belinabe and Sylla stations. A special training program for the appointee, including short courses abroad and in-country on-the-job training, should be organized and funded under AgRes II. The training would include techniques for maintaining the station's infrastructure as well as management of the facilities to provide the controlled agronomic environment necessary for reliable research results.

In anticipation of fully operational research stations, AgRes II should assist CNRADA with an assessment of labor requirements for the research stations. Suggestions should be made as to the allocation of existing salaried personnel and requirements for additional personnel.

2.5 AgRes II Role in CNRADA Human Resource Development

Three types of human resource development have been addressed by the project: long-term degree training in the U.S.; in-country training and seminars; and short courses/seminars outside Mauritania.

2.5.1 Degree Training

Findings

The UA/U.S.A.I.D. contract budgeted for six degree programs for Mauritanian researchers: four B.S. degrees and two M.S. degrees. In January 1986, the AgRes II team accommodated a request from the Director of CNRADA to train a fifth bachelor's degree student. This was accomplished (with the Director's agreement) within the

current budget by eliminating the summer short courses planned for the four original students, but still preserving the planned mid-winter seminars (AgRes II 1986 Annual Report, p. 7).

The bachelor's degree candidates were selected by competitive examination arranged by MDR and U.S.A.I.D./Mauritania, and by June 1986 all five were studying English at UA's Center for English as a Second Language. Four students passed their TOEFL exams in December 1986 and began regular course work in January 1987. The programs being followed by these students at UA are listed below:

<u>Former Position within CNRADA</u>	<u>Major</u>	<u>Minor</u>
1. Food Crops Division	Plant Sciences Agronomy	Extension
2. Cereal	Agronomy	Horticulture
3. Horticulture	Agricultural Engineering	FSR/E
4. Cereals Division	Agricultural Economics	FSR/E
5. Horticulture	Soil Science	Horticulture

The fifth student had still not passed his TOEFL exam by August 1987. At the suggestion of the Minister of Rural Development during his visit to Tucson, it was decided to transfer the student to New Mexico State University. This action was taken because the student had already devoted one year to his studies and it would take a new candidate at least nine months to pass the TOEFL and begin his academic courses (AgRes II 1986 Annual Report, p. 54).

Finding candidates for the graduate degree scholarships, intended for CNRADA staff, proved problematic. When UA requested A.I.D. to send a letter to MDR formally offering the two scholarships, A.I.D. declined to do so. A.I.D. wanted MDR to find replacements for the potential trainees to work with CNRADA until the trainees returned from UA. For their part, MDR would not propose candidates until they were officially informed of the scholarships. With the continued delays, the recipients of the two scholarships were not selected until May 1988. These delays will make it difficult to complete the training component of the project under the PIO/P by August 1990, the

established project completion date. The graduate degree candidates' fields of study are given as follows:

<u>Former Position</u>	<u>Major</u>	<u>Minor</u>
1. Division Head	Plant Physiology	Plant Breeding Food Crops
2. Crop Protection	Agricultural Economics	Farming Systems Research

The timing of the degree programs will not allow for overlap in Kaedi between the returned degree trainees and the TA team. This will hinder the trainees' effective re-entry into CNRADA. Given the nature of undergraduate degrees, the newly-trained bachelor's degree holders will return with little, if any, new experience in agronomic trial design.

Cognizant of these facts, UA has initiated an innovative proposal for an independent study program for the one of the candidates. Through this program, the student would return to Kaedi for the summer and collect basic data for crop water requirements. The proposal is being considered by U.S.A.I.D.

Conclusions

AgRes II has done an excellent job of mobilizing the long-term degree training, despite a bureaucratic snag between U.S.A.I.D. and MDR which delayed the M.S. candidates. Flexibility on the part of the UA administration has allowed the funding of one more B.S. student than was originally envisaged. Once in the States, UA gave prompt attention to the student having TOEFL difficulties and executed a solution which seems to satisfy all concerned.

The candidates are receiving relevant academic training which will contribute to their work at CNRADA.

The undergraduate degree program is on schedule, but the present timetable will actually hinder project continuity because there will be no overlap in Kaedi between the newly-returned trainees and the AgRes II TA team. UA designed a pilot independent summer study program at CNRADA for one of the bachelor's degree trainees. This is a positive step towards mitigating this problem.

Recommendations

Two options should be considered to facilitate CNRADA team building and to make the academic programs of the degree candidates even more relevant to their post-degree work at CNRADA:

- (1) Building upon UA's initiative of promoting summer internships at CNRADA. Such internships, to be mutually agreed upon by Ag Res II, CNRADA and U.S.A.I.D., if well planned and supervised, could contribute to CNRADA's research programs while earning academic credit for the trainees;
- (2) Developing academic programs for the degree students whereby they can gain practical experience in the U.S. on agronomic trial design, implementation, and analysis.

In retrospect, the AgRes II project's time frame is not long enough to afford degree training. Either provisions should have been made to have returned trainees in place before the arrival of the TA team, or AgRes II should have worked with CNRADA's staff at their present professional level. For the future, any U.S.A.I.D. project after AgRes II should be in place in time for the newly-trained degree holders' return from the U.S.

2.5.2 In-country Training

Findings

The AgRes II 1986 and 1987 Annual Reports (specifically Appendix D and Appendix F, respectively) list the workshops and seminars which were either conducted by the project or to which the project sponsored participants. These efforts can be summarized as follows:

Lecture series for ENFVA -- The project initiated efforts to have short-term consultants give lectures at ENFVA in addition to their other responsibilities. One consultant gave an introduction to FSR/E (half-day) in both 1986 and 1987 (as well as a one-day session on the same topic for Peace Corps trainees). Another gave a series of three lectures plus field work on soils and soil management in 1986. Finally, a third consultant lectured for a half-day on irrigation and water management in 1987.

FSR Methodology -- In June 1986, CNRADA/AgRes II conducted a two-day seminar (in French) on "Design Aspects of On-Farm Experiments" based on the Farming Systems Support Project (FSSP) workshop format. It was conducted by the project COP and the then Division Head of DCVO. The Technical Director of CNRADA/Project

Coordinator, the acting head of DSPTT, the former head of the pre-extension division (now with Projet Semencier), and a staff member of the Integrated Pest Management project attended the workshop. This same workshop was also given in English for the four PCVs who managed the on-farm trials during the 1986 farming season.

A one-week "Introduction to FSR/E" taught in Aug/Sept 1986 by some of the participants from the "Design Aspects ..." workshop, was held for 12-16 participants (some participated part-time): three CNRADA conducteur-level staff members (doing on-station work); six-seven ENFVA professors; one-two senior staff members of the Regional Agricultural Office (IRA); staff of the Partners for Productivity project; and one SONADER division head.

PCVs were the primary source of manpower for conducting on-farm trials. Yet they lacked the practical skills necessary to be effective in this role. Therefore, the in-country training program in FSR Methodology conducted in 1987 was targeted at these PCVs. In March/April, a two-week workshop on "Methods of Diagnosis and Design: On-Farm Experimentation in FSR/E" was held in Kaedi. A five-day "Introduction to FSR/E" was also conducted for new Peace Corp trainees.

Through evaluation team interviews with CNRADA personnel, we learned that CNRADA considers in-country training to be of primary urgency for its staff and an area to which they hope the AgRes project II can contribute in the future. The staff stated that AgRes II should consider bringing in consultants to plan and conduct a series of in-country training workshops on practical aspects of on-station and on-farm trial design, implementation, data analysis, and report writing.

Conclusions

The introduction of FSR concepts to CNRADA and other agricultural development organizations in Kaedi is important. It must be linked, however, with practical on-the-job training in the design, implementation, and analysis of both on-station and on-farm trials. This was initiated with the DCVO division head and the acting DSPTT division head. The former is now studying in the U.S. The latter needs continued follow up training and should be a priority for AgRes II during the next two years.

Recommendations

The AgRes II team should consider funding short-term consultants to help CNRADA plan and implement a program of in-country training workshops for CNRADA's mid-level research personnel. The training program should cover design, implementation, data analysis, and report writing for both on-station and on-farm trial programs. All such training should be presented in the context of FSR methodology.

The project's initiative to have consultants teach at the ENFVA should be reinforced and expanded. The same short-term consultants implementing the in-country training plan for CNRADA should also work with ENFVA to establish a training program on FSR for students at the school. This will be a useful step to preparing future graduates for work within CNRADA. Part of the training could consist of practical field work whereby students could learn while assisting CNRADA with its on-going research programs.

2.5.3 U.S. and Third-country Short Courses and Seminars

Findings

The project sponsored a number of participants to attend workshops and/or seminars outside Mauritania.

At various times in 1986, four CNRADA staff members plus the AgRes II COP each attended one of the three-week FSSP workshops on "Methods of Diagnosis and Design and On-Farm Experimentation in FSR/E" (in either The Gambia, Mali, or Gainesville, FL).

In 1987, the following sponsorships were awarded:

DATES	WORKSHOP/ SEMINAR	PLACE	PERSON SPONSORED	CONDUCTED BY
Jul 19- Aug 8 (3 weeks)	Development Project Management Workshop	Pomona, CA	Ba Bocar Sule	CA Poly
Sept 2- Oct 9 (3 weeks)	Statistical and Econ. Analysis of Experimental Data	Muscle Shoals, AL	Sidi Fall	
Sept 17-28	Irrigation and Water Management	Rabat, Morocco	Ba Mamadou Lamine	Hassan II & Utah State U.
Oct 14-17	Microcomputer Applications-FSR/E	Fayette- ville, AK	Mark Lynham	Univ. of AK/FSSP
Oct 18	FSR/E Training: Some Practical Considerations for Delivery	*	M. Lynham, H. N'Gaide, S. Fall	FSSP
Oct 19-21	FSR/E Annual Conference	*	M. Lynham, H. N'Gaide, S. Fall	

In addition, the COP accompanied several CNRADA staff members to the Annual FSR/E Symposia in the U.S., to present papers related to the project activities.

Conclusions

AgRes II has invested considerable time and effort to tap quality in-service professional development opportunities abroad for CNRADA's staff. This is a justifiable use of project funds and should continue.

2.6 Defining an Agricultural Research Strategy for CNRADA

Findings

One of the expected outputs of AgRes II is a "research strategy and implementation plan² which will serve as a basis for the eventual transition to a farming systems research program in the latter years of the project" (UA/U.S.A.I.D contract, p. 8). The plan is to "match resource availability with the research priorities of Mauritania [and will] focus on the River Basin"³ (UA/U.S.A.I.D. contract, p. 8). The contract also states that in preparing the strategy, "it will also be necessary to make an inventory of research resources and farmer needs" (p. 8).

Within two months of project start-up (i.e. in February 1986), a dry season farming systems reconnaissance survey was conducted in Mauritania's Guidimaka, Gorgol, Brakna, and Trarza regions (Frankenberger et al., April 1986). Thirty-four villages were surveyed by a multi-disciplinary team of 11 to 16 members. Over 400 farmers were contacted in their fields, and interviews guided by a topical outline were conducted with approximately 180 farm families. General inquiries were also directed to several hundred women in 27 villages regarding consumption patterns. The report on this survey contains a detailed description of general production constraints and constraints related to each farming sub-systems. This had never before been accomplished in

² The phrase "...implementation plan..." is not actually found in this particular quote, but is quoted elsewhere twice on the same page in relation to the research strategy. It is inserted here for clarity.

³ The PP stated that while focusing on the River Basin, the plan "must, of necessity, incorporate CNRADA's national, non-River Basin responsibilities." This requirement was not included in the contract.

Mauritania. A similar reconnaissance survey was carried out during the 1986 rainy season (Lynham et al., Nov. 1986).

Following each survey, the AgRes II team published reports (FSR series, Reports 2 and 11) containing research alternatives which CNRADA might consider implementing. These alternatives were based on the constraints identified in the reconnaissance surveys. Having defined a number of research alternatives and the constraints faced by farmers, the stage was set to develop the research strategy.

Numerous reasons were given to or observed by the evaluation team as to why the research strategy (known as the Plan Directeur) was not yet completed:

1. U.S.A.I.D., the COP, and CNRADA have differing perspectives on who should draft the Plan. Should it be the COP with CNRADA's assistance or vice versa?
2. Debate over the scope of the Plan took time. Initially, GIRM wanted the Plan to take a broad interpretation of agricultural research (i.e. to include livestock and all production systems). The Plan will instead restrict proposals to agronomic research focusing on the river basin.
3. There are political pressures to conduct research for all ecosystems irrigated, (dieri, walo) and for all crops, making it difficult to set priorities.
4. Personnel shortages within CNRADA and conflicting demands placed on the COP have restricted the time available to work on the draft.
5. A consultant was hired by the AgRes II project to draft components of the research strategy. His contribution fell short of expectations and he did not deliver his sections as expected.
6. The World Bank Agriculture Sector Assessment Mission requested data on CNRADA's priority research activities so they could be reflected in the proposed national budget allocations. This took considerable time. Furthermore, by virtue of the Mission's timing, detailed proposals for future research activities were prepared before CNRADA had decided upon its strategy.
7. Three new CNRADA organograms (for the actual, short-term, and long-term scenarios) were drafted and presented to the Conseil d'Administration. Since the requisite personnel are not yet available to staff all of the envisioned Divisions, priorities must be reflected in the research strategy. These priorities are as yet unclear.

8. There has been resistance to selecting research activities on the basis of available resources. Many of the research alternatives in Reports 2 and 11 would require human and financial resources not presently available at CNRADA. Moreover, an inventory of resources, upon which a realistic research program should be based, has not been taken. Since the Plan is meant to cover only the 1989-91 period, prioritization is particularly important. The resistance may stem in part from CNRADA's concern that the definition of their main research topics will alienate some sources of external funding. (The conflicting view is that donors can always be found to fund a well-organized, focused program).
9. The Plan is developing into long document which may have much more detail than necessary.

Conclusions

AgRes II made major contributions towards developing a research strategy by completing the dry season and rainy season reconnaissance surveys and the research alternatives reports. Yet despite these efforts, completing of the Plan Directeur has proven to be an elusive goal. Undoubtedly, all of the reasons cited above have hindered progress to varying degrees. What does seem clear is that CNRADA, the AgRes II TA team, and U.S.A.I.D. have not, in fact, given priority to drafting the Plan. Instead, the de facto strategy has been to run agronomic experiments on a year-to-year basis rather than within the context of a well-conceived research master plan.

The time frame of the Plan Directeur is short-term, covering only the period from 1989-91. Therefore, the chances of obtaining and mobilizing major increases in human and financial resources during that time are small.

Recommendations

CNRADA and the AgRes II team should give priority to drafting the Plan Directeur. Although the difficulty of making choices is acknowledged, the researchers should choose a very limited number of topics from the lists of possible research alternatives presented in Reports 2 and 11. The choices should be made in light of farmers' constraints and the human and financial resources available to carry out the program. Simplicity, expediency, and attainability of objectives should be the governing principles in drafting the Plan.

Once these important choices are made for the immediate future, plans can be projected to subsequent years using different assumptions about available resources; for example, plans to be implemented upon the return of the degree trainees, or strategies requiring additional financing.

2.7 CILSS-Funded Agronomic Trial Results (1981-85)

Findings

Mauritania has been a member of CILSS since its creation as a sub-regional organization in September, 1973. Other member countries included in CILSS are Burkina Faso, Cape Verde, The Gambia, Mali, Niger, Senegal, and Chad. The main goal of CILSS is to help the Sub-Saharan countries to achieve self-sufficiency in food production and ecological stabilization of their environments. In June, 1981, a four-year regional project for the member countries of CILSS was financed to conduct research on millet, sorghum, maize, and cowpeas.

The small grains division within CNRADA received financing in 1981 from CILSS as part of the four-year research project to test more than 70 varieties of millet, sorghum, maize, and cowpeas at stations in Kaedi, Barkeol, and Selibaby (Dobos, 1986). Experimental designs were provided for each crop using a randomized complete block design with six replications, consistent with the other countries which were testing the same varieties. Each crop tested included early, medium, and late maturity varieties.

A number of varieties performed well and were identified for further testing: millet varieties which proved stable over environments and years in Mauritania were Souna III and HPK; sorghum varieties were CE 151, CE 145, and CE 90 (under irrigation only); maize varieties were Maka and Jeka; and cowpea varieties were 58-57 and TN 88-63. These varieties were recommended for testing by the pre-extension division in 1986.

The pre-extension division conducted trials at the other stations and substations in the Brakna, Gorgol, and Assaba regions to further test the varieties before releasing them for distribution to the farmers.

Conclusions

Results achieved from the varietal trials were well documented and presented in the project summary from CILSS for the first four-year phase of their research program and verified by the Annual Reports of CNRADA from 1985 and 1986. The evaluation team agronomist was concerned about the reports of the CILSS-related trials conducted by the small grains division. The format followed in the 1985 and 1986 annual reports gives little if any introduction as to why the experiments were carried out or how they were conducted, i.e. design, number of replications, level of fertilization, etc. There is little if any discussion of the results from the trials being reported, and no trial-specific conclusions are made. Another point of concern was the erratic performance of many

of the varieties tested over years, which makes it difficult to make conclusions based on the research.

Recommendations

Not applicable for this section.

2.8 AgRes II's Focus on Dieri and Walo Rather than Irrigated Cropping Systems

Findings

Irrigated perimeters are relatively new to the traditional farming systems in the Senegal River Valley. The majority of the farming has been in rainfed cropping systems (dieri) and flood recessional cropping systems (walo). These two systems account for the majority of the food crops for local consumption of millet, sorghum, cowpeas, and maize. The shift from the dieri and walo cropping systems by farmers with access to irrigated perimeters has been related to the extended drought in Mauritania over the last 15 years or so. It has become increasingly risky for farmers to rely on either the dieri or the walo for their subsistence needs and for this reason, many farmers are looking for access to irrigated perimeters and shifting to the cultivation of rice. Farmers involved in the irrigated perimeters still farm in the dieri or walo if they feel sufficient rainfall has occurred, often at the expense of not properly caring for the irrigated parcels in the perimeter (i.e. weeding, bird control, etc.).

The original project paper, prepared for the OMVS project in the Senegal River Valley, cited GIRM's policy to promote a transition from traditional farming systems in the dieri and walo systems to irrigated perimeters. After the reconnaissance surveys in 1986, it became obvious to the TA team that this transition not only would require cultural change, but that there would be a number of added difficulties imposed on these traditional farming systems, such as costs required for the transition and the increased labor necessary for the management of irrigated crops.

Conclusions

The evaluation team believes that the AgRes II project was justified in its decision to place emphasis on the dieri (dryland) and walo (flood-recession) cropping systems due to the following findings:

- farmers have demonstrated a risk-spreading strategy of practicing irrigated farming while still maintaining the traditional farming systems;

- the cost to farmers of making the transition from traditional to irrigated farming systems near Kaedi has not been determined;
- risks to obtaining profitable yields by farmers still exist and depend on those controlling pumping operations;
- many of the managerial problems which exist on the irrigated perimeters (pump failure, fuel shortages, etc.) are beyond the capacity of research to address;
- irrigation management technologies, i.e., transplanting techniques, planting densities, best varieties, recommended fertilizer rates, etc, have not been sufficiently developed; thus, AgRes II would have difficulty making progress with irrigated crops within its time frame.

AgRes II also assumed that research on irrigated crops would be conducted by other organizations outside CNRADA; SONADER in particular. This has not proved to be entirely accurate. In fact, SONADER has stressed the need for more collaboration between CNRADA and SONADER on irrigated crop research. AgRes II and CNRADA have recognized this and will be conducting a limited number of irrigated trials in Bogue and Fumegleita in collaboration with SONADER.

Recommendations

AgRes II should continue its emphasis on dieri and walo cropping systems not only due to the findings as stated in the conclusion, but also because of the severe shortage of personnel and resources. Collaboration on irrigated trials should be determined based on available human and financial resources.

2.9 Research Activities of AgRes II

Findings

To date, AgRes II has concentrated its agronomic research efforts on the DCVO and the DSPTT. As such this section deals for the most part with the activities of these two divisions.

CNRADA/AgRes II conducted both on-station and on-farm research activities during the 1986-87 and 1987-88 cropping seasons. Eight on-station and 55 on-farm trials were implemented during the 1986-87 campaign (Annual Report, 1986, p. 5; Annual Report, 1987, p. 3). During the 1987-88 campaign, 14 on-station and 51 on-farm trials were implemented (Annual Report, 1987, p. 9). The activities from both cropping seasons are summarized in Appendix B in the 1987 Annual Report (Annual Report,

1987, pp. 97-98). In the 1986-87 cropping season, 8 on-station and 30 on-farm trials are listed. Seventeen on-station and 51 on-farm trials are reported for the 1987-88 cropping season.

1986-87 Campaign

On-station trials

The DCVO's 1986-87 annual report for on-station research provides data on two trials of the eight planned related to the AgRes II project (Fall, 1987). The first was an economic study of rice, sorghum and maize conducted at the Belinabe and Sylla research stations representing two soil types, clay at Belinabe and sandy at Sylla. Data was obtained at the Belinabe station which was reported by the DCVO; trials at the Sylla station were reported lost due to insect problems. The objective of these studies was to determine the costs incurred in irrigated cropping systems with the three cultures involved. Data obtained indicated that there was a net loss of 6000 UM when sorghum was grown under irrigated conditions and net profits of more than 20,000 UM were achieved with irrigated maize and rice.

The other trial reported was conducted in the walo near Kaedi and was a sorghum and sunflower intercropping trial. This association is not traditionally used in the Senegal River Valley and each crop produced yields of less than 0.4 t/ha whether grown in monocrop or in association.

On-farm trials

Of the 55 on-farm trials reported as implemented in the 1986-87 campaign, 17 were reported completed in the AgRes II 1986 annual report (Annual Report, 1986, pp. 25-26). No data from the trials conducted by PCVs were presented in the technical report prepared by DSPTT on the on-farm trials and experiments conducted in 1986-87 (R'Chid, 1988). Some of the most useful information obtained from these trials was qualitative in nature and resulted from observations and experiences of CNRADA researchers and PCVs. This information was either not reported at all in the technical report or was reported inappropriately as quantitative data.

Results from two sites, Kinikoumou and Guemou, are presented in a report on sesame in which data presented in the table conflicts with the discussion of the data (R'Chid, Undated, pp. 4-7).

1987-88 Campaign

On-station trials

According to the 1987 annual report by AgRes II, 14 on-station trials were implemented during the 1987-88 campaign (Annual Report, 1987, p. 9). Data were found for nine of the station trials in the 1987 annual report by the DCVO (Fall, 1988).

The results from several of the trials should be discussed. An experiment was conducted to measure the yield response of sorghum under three planting densities using the variety CE 151. The highest planting density had a reported yield of 5.5 t/ha and the medium and lowest planting density each yielded 6.6 t/ha without irrigation (Fall, 1988, pp. 22-23). The highest yields that had ever been achieved in the past using CE 151 without irrigation had been 2.0-2.3 t/ha (Dobos, 1886, pp. 14-16). A trial measuring the yield response of 14 maize varieties showed 7 varieties yielding exactly 4.0 t/ha and 6 varieties yielding 2.0 t/ha. Another varietal trial of 10 maize varieties had 3 varieties yielding 4.0 t/ha and the 7 others giving yields of 2.0 t/ha (Fall, 1988, pp. 16-17).

An on-station trial was conducted of 14 sesame introductions in 1987 to observe their characteristics and how they respond to the environment. Yield data was reported as grams per pod, then converted to tons per hectare.

On-farm trials

The 1987 annual report states that 51 on-farm trials were implemented during the 1987-88 campaign. It reports that these were harvested with varying degrees of success. The technical report prepared by the DSPTT presents data on sorghum yield trials comparing two new varieties, CE 145 and CE 151, with local varieties in four villages (R'Chid, 1988, pp. 12-14). Most of the trial results were not reported. It was unclear to the evaluation team whether the problem was a delay in reporting results or whether the results could not be analyzed. In any case, much of the data was not available for review one year after the cropping season in question.

An experiment was conducted in three villages to test six different levels of intercropping sesame with cowpeas and millet (Annual Report, 1987, p. 53). Some of the failures might have been due to unfamiliarity of the farmers with the association, coupled with inability of the PCV to motivate the farmers under the present strains of training, personnel and resources.

Another set of tests was conducted in a number of villages comparing new sorghum varieties, CE 145 and CE 151, with the local varieties of sorghum. Trials conducted in Ganki, Feralla, and Ouloumbouni were managed by PCVs who provided some observations from their experiences (Doebler, 1987; Schlesinger, 1987; PCV personal communication). Results were obtained from trials conducted by observers from the DSPTT of CNRADA in the villages of M'Bout and Djadjibine (R'Chid, 1988).

Some of the evaluation team went to M'Bout to visit with several of the farmers involved and discussed the trials with them. It was only possible to visit a small group of farmers. It was evident that these farmers did like the taste and texture of the CE 151 sorghum variety. They believed the CE 151 allowed better bird control as it is only half the height of their local varieties. However, these farmers did not like the higher plant density the observers required because it took too long for them to plant one field. This conflicted with their risk aversion strategy of planting as many scattered fields as possible. Also, the farmers thought that with the higher density, the crop would be more likely to suffer from moisture stress if the rain was insufficient or poorly dispersed. Therefore, it appears that the CE 151 variety meets the requirements necessary for further testing, but testing should include the farmer's own practices with CE 151 and the local varieties.

The technical report prepared by the DSPTT averaged all the farmers yields within each village together for each new variety and averaged at least three different local varieties to compare yields (R'Chid, 1988, pp. 12-14). The reports could be improved by the presentation of specific data and characterization to help explain the yield differences. Observations concerning weeding frequency and effect of planting density (not research trials per se) were presented in the report as conducted research trials (Ibid, pp. 8,10).

The evaluation team also visited another farm site near the village of Roufi Audi with the AgRes II team and were informed of a number of trials which had been conducted by a progressive farmer with the help of the resident PCV and the AgRes II TA. None of the data were reported in the DSPTT's technical report.

Garden trials with improved vegetable varieties and cultural practices were implemented in the 1986-87 campaign and were introduced into the DSPTT on-farm program in the second half of the 1987-88 campaign (Dia, 1988). Trials were conducted on sandy soils in the villages of Bagodine, Debaye Doubel, and Woloum Hatar and on clay soils in the villages of Dawalel and Roufi-Audi. Varieties which were included in the trials and demonstrations were lettuce, cabbage, eggplant, peppers, onions, sweet potatoes, and potatoes.

Sorghum Germplasm Collection

The initiation through AgRes II of the sorghum germplasm collection, an on-going activity for 1.5 years, is a major accomplishment of the project. The local sorghum and millet varieties collected were planted in collaboration with the Projet Semencier for observation and multiplication purposes. Projet Semencier plans to conduct future comparative trials with ten of the varieties. Since sorghum is a major staple food in the Senegal River Valley, this collection is an important step towards the genetic improvement of the crop, both in Mauritania and in neighboring countries.

Problems have been encountered with the handling of the initial seed stocks. A system for numbering the varieties collected for identification purposes needs to be established.

Conclusions

The number and geographic extent of agronomic trials initiated under AgRes II have been somewhat over-optimistic. It is evident that the present numbers and training level of CNRADA research technicians are inadequate to support the extensive on-station and on-farm trial program attempted in 1986-87 and 1987-88. Most personnel who began receiving FSR on-the-job training are now studying in the U.S. Most remaining staff of DCVO and DSPTT require training in the collection, analysis, and reporting of research results, both on-station and on-farm. However, many of them lack the basic knowledge that is needed to grasp complex topics such as experimental design, error control, and statistics.

Recommendations

The 1988-89 on-farm trials program should be scaled back taking into account CNRADA's available human and material resources. This can be achieved by either limiting the geographic spread of the trials or by reducing the number of trials conducted in each geographic area. The objective should be to ensure quality before quantity in the on-farm trial program.

Station trials need more attention regarding data collection and reliable interpretation of the data. CNRADA staff presently responsible for conducting trials and reporting research results should be trained by AgRes II through informal contact and workshops in techniques for preparing research documents, technical reports, etc. The senior researchers should agree on a methodology for on-the-job training that allows them to measure the progress of those training activities.

The station trial designs should reflect the valuable feedback -- both quantitative and qualitative -- received from on-farm trials. For example, the program could include a

simple yield trial of short-stature sorghum varieties using seed selected from the germplasm collection. As expressed by some of the participating farmers in M'Bout, the short stature is an asset for bird control. Exploratory on-farm trials (researcher-managed) should then be initiated on these and other station-tested technologies to verify station results.

The short-term work plan concerning the recording and storage of the germplasm collection of subsistence crops should be completed. Also, a long-term plan should be prepared to select improved sorghum lines from the collection based on visual observations and yield performance for station-level testing.

Training exercises for CNRADA technicians could be designed which would further sorghum germplasm work while teaching research techniques. For example, establish trials with promising sorghum lines, thereby multiplying the seed of better varieties while providing technicians with on-station trial experience. Later on, the technicians would also learn more about FSR methodology as the varieties are moved into site-specific and on-farm testing.

Village-based field personnel should receive basic training on station before working with farmers. This training would cover some methodologies for on-farm trials, including procedures for choosing and laying out trial sites and for recording trial observations. Since some trials will have training as a main objective, supervision of the personnel should be stressed.

Although sesame is an extremely interesting crop for Mauritania, its introduction at the farm level in some regions is still exploratory. Before implementing any more on-farm trials in these regions, a small series of station trials and multilocation tests could be conducted to obtain answers to questions such as planting distance and intercropping scheme. It would be useful to design those experiments so that data can be expressed as yield per unit land area. Particularly in regions where sesame is a new crop, it is important to maintain farmer credibility and interest in FSR/E.

If there is sufficient information and interest in other regions, on-going farm trials could be complemented with research on by-product-use techniques, such as cake and oil (Frankenberger, personal communication).

2.10 CNRADA/AgRes II FSR Program

Findings

A strategy for the transition to a FSR program at CNRADA has been developed for inclusion in the Plan Directeur. Entitled "La Recherche Agronomique Adaptative: Un

Modele a Cinq Etapes pour le Transfert de Technologies", it basically describes the five stages of FSR, recognizing that FSR must be adapted to the region where it is being practiced.

This methodological frame presupposes a reconnaissance survey which defines the local farming systems and identifies the constraints confronted by farmers. The first step, adaptive on-station research, entails the identification and design of trials based on these results. Realistically, research alternatives should be given priority based on the technical and human resources available to CNRADA while taking into account farmers' priority constraints. The AgRes II/CNRADA reconnaissance surveys defined numerous production constraints faced by farmers. However, many of the research alternatives proposed by the AgRes II project were neither prioritized based on farmers' constraints nor are they within the capabilities of CNRADA to address.

Concerning sorghum, it was not necessary for AgRes II to start at the beginning of the FSR process because two varieties, CE 151 and CE 145, which were the result of CNRADA's collaboration with CILSS, were ready for researcher-managed, site-specific trials. However, taking varieties directly to the farmers with personnel untrained in the approach resulted in some failures because the personnel could not always generate farmer interest. In addition, some farmers were exposed to undue risk by the untrained personnel.

Varietal trials were conducted by the DCVO (Fall, 1988) in 1986 and 1987 with sorghum, millet, maize and cowpeas at the research stations at CNRADA. The best performing ones are probably ready for site-specific trials to identify those varieties which would be used in researcher-managed trials.

The new Assistant Director is gaining more expertise in FSR. He participated in preparing the Plan Directeur, and as Acting Head of DCVO, he can now begin to substitute for the Head, who had received training in FSR but is now studying in the U.S.

Training in FSR methodology for CNRADA personnel is one of the important objectives for the institutionalization component. Three of the four CNRADA personnel who had begun training in implementing the FSR methodology have either permanently left or are temporarily away from CNRADA. It was intended that these people serve as trainers for CNRADA's lower-level technicians.

Conclusions

The FSR strategy proposed for CNRADA/AgRes II is basically sound and well-adapted to Mauritanian conditions.

However, the trial results discussed in this Section and Section 2.9 indicate that the methodology was not always being followed. For example, instances were noted where farmer-managed trials were implemented where they should have been researcher-managed exploratory trials (sesame). Also, although sorghum varieties were ready for farmer-managed testing, the husbandry practices introduced (spacing) in these trials could have been better introduced in exploratory trials.

Recommendations

Although the methodology described in the CNRADA Plan is sound as proposed, exploratory trials could be used to facilitate the identification process of alternative technologies, such as new varieties of sorghum (other than CE 151), millet, cowpeas, effects of weeding frequency on yield, etc. Although the value of these trials must be weighed against the existing personnel constraints, they could be a useful exercise in a small teaching program. They tend to promote farmer involvement which can add valuable information to the process.

Site-specific trials could be conducted for best-bet alternatives already identified, resulting in technologies ready to be tested with researcher-managed multi-location trials when the trainees return from the U.S.

Coordination of research station and on-farm trials should be established using information gathered from the past two years of on-farm trials. Those responsible for the trial design should collaborate with the field personnel who conducted on-farm trials in the past to identify alternatives to constraints faced by farmers.

Since the CNRADA personnel trained as trainers are not now at the Center, training will have to begin anew. Both short-term consultants brought to Kaedi and short courses outside Mauritania should be tapped.

On-the-job training of mid-level research technicians necessary for institutionalizing the FSR process needs to be planned in detail, including a methodology for evaluation of progress. The sequential implementation of the five steps of CNRADA's FSR methodology to evaluate and ultimately disseminate production technologies to farmers should be an important component of this training program.

2.11 AgRes II Budget

Findings

The project's operating budget has been strained since its onset. This is largely the result of expenditures AgRes II was obliged to make which had not been foreseen in the 1985 budget. These unforeseen expenditures fall into four categories:

- Housing and offices: although the Project Agreement stipulated that GIRM would provide houses and office space for the project, these facilities had to be rented with AgRes II funds;
- Residence and office security: the project was obliged to hire day and night watchmen because of the security situation;
- Support to CNRADA: fuel, electricity, repair of vehicles, indemnities to CNRADA staff, per diem payments, trials, seed, station repairs, office supplies, were funded by AgRes II;
- Station and on-farm research: these AgRes II funded activities were to have been funded by CNRADA's own budget or through OMVS;

Conclusions

The budget restrictions resulting from these expenditures have limited the amount of field work which could be funded through the project.

Recommendations

Budget increases through amendments to the U.S.A.I.D. contract have alleviated financial constraints somewhat. In addition, AgRes II has worked with CNRADA to tap alternative funding sources. (The successful acquisition of CSA funds is discussed in Section 2.12). These efforts should continue.

2.12 CNRADA's Administrative and Financial Management Capacity

Findings

AgRes II has placed considerable importance on working with CNRADA to improve its administrative and financial management capacity. The project has focused on two main efforts in this area:

- (1) a Management Audit for CNRADA; and
- (2) facilitating dialogue between CNRADA, the Conseil d'Administration, AGIR, and MDR to begin implementing recommended changes in CNRADA's management system.

The Management Audit, published in November 1987, describes the larger institutional framework within which CNRADA must function. In addition, it provides brief narratives about CNRADA's overall structure and organization, gives an up-to-date status report on its internal administration, highlights numerous constraints to bringing about administrative improvements to CNRADA, and makes recommendations for dealing with these constraints. Among the most important recommendations -- selected because they require little, if any, increased funding -- are the following:

1. The GIRM Decree 74-208/PR creating CNRADA should be revised to reflect its role as a technical research institution. As it stands, the Decree defines CNRADA as an administrative body with mandates far beyond the financial resources allocated to fulfill them.
2. Despite the authority the Ministry of Economics and Finance (MEF) exerts over the budgetary process for State funds, CNRADA should set up certain internal record-keeping systems in order to improve its own understanding of the use of these funds.
3. CNRADA, with assistance from the AgRes II team, should implement selected administrative control systems, monitor their usage, and refine them through regularly scheduled meetings. An administrative handbook for CNRADA should be prepared based on these refined procedures.
4. UA, supported by U.S.A.I.D./Mauritania, should enter into discussions with responsible parties in Nouakchott to determine the degree of commitment and, consequently, the level of support the AgRes II team might expect when proceeding with active assistance to CNRADA's institutional development.

There are also a number of serious constraints identified in the Management Audit which would require financial investments to rectify. For example, CNRADA does not presently have the funds nor expertise to implement any financial or accounting systems of its own. (An MEF public accountant has full control of all financial and accounting responsibilities at CNRADA). Furthermore, CNRADA does not have a personnel officer to manage its staff of over one hundred people.

Several steps have been taken to begin to address these recommendations and find solutions for the constraints. First, the AgRes II team initiated collective action between the project and AGIR⁴. Together, they worked with CNRADA's Director to present to the Minister of Rural Development the key recommendations; i.e. to modify the Decree and to augment CNRADA's budget. Also, a request has been made for a senior administrative officer for the Center.

Second, the AgRes II team has worked with AGIR to conduct and follow up on two training workshops for CNRADA personnel. The workshops were designed to help CNRADA develop job descriptions for its personnel and begin to set up internal record-keeping procedures.

Third, to help ease monetary deficiencies, the AgRes II team and CNRADA collaborated to submit a proposal for funding from the CSA (Food Security Commission). The proposal was accepted by CSA, resulting in the allocation of funds for research personnel, supervisory trips for on-farm research, and limited research station improvements. According to the CSA agreement, an imprest fund will be established and managed by the AgRes II AA. He will justify expenditures to the Director of CNRADA and the AgRes II COP.

These are all positive developments, but the process has proved arduous. Concerning the AgRes II team's role in helping CNRADA improve its administrative capabilities, one problem appears to have been the working relationship between the COP and the CNRADA Director. They have not always kept each other informed of their activities and planning has, at times, not been a joint effort. However, the evaluation team saw evidence that this situation is to be improving.

CNRADA recently moved into its new office center, and the project's technical offices have now been shifted to this center. For the first time in the life of the project, the COP and CNRADA's Director and Assistant Director work in the same physical location. Due to lack of space at the new office center, however, the AgRes II AA still occupies a separate office.

Poor communication links between CNRADA and Nouakchott have contributed to administrative difficulties. Telephone links are unreliable at best, and CNRADA's personnel must regularly travel to Nouakchott to transact business. AgRes II has a short-wave radio system linking its Kaedi office and U.S.A.I.D./Mauritania. This was purchased by the project for emergency contact, but it is regularly used for project business as well. It is seldom used by CNRADA.

⁴ In a 1984 study of CNRADA's administrative structure, AGIR reached similar conclusions to those confirmed by the AgRes II Management Audit.

(The role of the AgRes II AA in working towards administrative reforms at CNRADA are discussed in Section 2.15).

Conclusions

The AgRes II Management Audit of CNRADA does an excellent job of identifying the Center's key constraints and succeeds in making recommendations which CNRADA can realistically follow. Our investigations confirmed the findings in this report and we support the recommendations.

Some progress has been made in laying the groundwork for a new research management system for CNRADA. Through two seminars in Kaedi convened by AGIR, CNRADA has begun to develop job descriptions for its personnel and to initiate plans for an internal system of budgetary control. However, the Director, Assistant Director, and the Controller of CNRADA were not present at these seminars. This calls into question the priority which CNRADA gives to administrative reforms.

Recommendations

As concluded in the Management Audit, the underlying principle for administrative reform at CNRADA should be to begin with the changes which require little, if any, increased funding and which can be implemented by the available personnel. A program of in-service training will clearly be required.

A priority task should be to reach a consensus on a strategy for administrative reform. Are the recommendations in the Management Audit acceptable to and realistic for CNRADA? What timetable should be followed? Who within CNRADA will spearhead the effort? What will be the role of AgRes II and AGIR in this effort? What support is required from the Conseil d'Administration?

The Management Audit's recommendation to seek modification of the GIRM Decree creating CNRADA should be pursued.

The receipt of CSA funds provides an excellent opportunity to develop a new system of financial management within CNRADA. The administrative procedures and bookkeeping system set up to manage these funds should be carefully developed so they can be implemented by CNRADA's personnel and can serve as potential models for similar systems within CNRADA. CNRADA's staff, including the director, assistant director, division heads and personnel from the administrative and logistics division, should be fully involved in the development of procedures to manage the CSA funds.

When the usual communication channels fail, the project's short-wave radio in Kaedi could be used to facilitate communication between CNRADA and Nouakchott as well as between the AgRes II team and U.S.A.I.D./Mauritania.

2.13 CNRADA's Limited Operating Budget

Findings

CNRADA's limited operating budget has been a chronic problem that has severely restricted the Center's capacity to conduct on-station trials, on-farm trials, and to maintain the station.

A discussion of CNRADA's funding sources is found in the Management Audit for CNRADA (Atkinson, pp. 14-15). The key points can be summarized as follows:

1. Although CNRADA's Director submits annual proposals for CNRADA's National Budget allocation, the MEF dictates what the Center's operating expenses will be. CNRADA's intermediary, the Conseil d'Administration, does not seem to serve as an advocate and has tended to provide pro forma approval for MEF decisions.
2. Fully eighty percent of CNRADA's State allocation is earmarked for salaries and benefits. Mauritania's protective labor laws make the cost of laying off redundant employees prohibitive.
3. A budget for an autonomous, self-directed program of agricultural research is virtually non-existent.
4. CNRADA receives external assistance from a variety of donors. But, understandably, the Mauritians do not consider these funds as a reliable source which can be depended upon, and thus integrated into the regular operating budget.

Maintenance for the new office buildings, homes, and laboratories, and the increased transport costs arising from the Center's new location, will increase CNRADA's operating costs. This says nothing of the funds required for a research program. The Center's operating budget is insufficient to carry on the present program, a situation which will become ever more acute when the seven newly-graduated degree holders return from the States.

In preparing its submission to MEF, the MDR Cellule de Planification proposed allocating approximately 5-6 percent of the total MDR budget to agricultural research.

The Cellule recognizes the need to increase this allocation to 10-12 percent, but stipulates that CNRADA must first demonstrate its ability to generate technologies acceptable to farmers. The AgRes II team's efforts with FSR are an important step in this direction.

Irrespective of the unreliability of external funding sources, CNRADA has had few options but to pursue them. The original UA contract did not have a line item for trials or station maintenance. In 1986, the contract was amended to include limited funding for trials. In addition, CNRADA and AgRes II collaborated to solicit and receive CSA funds for implementing field trials.

Conclusions

An insufficient operating budget continues to be the major problem for CNRADA in its attempt to become a viable research institution. The factors contributing to this problem have been clearly stated in the AgRes II Management Audit. Our investigations confirm the validity of these statements.

While external financial assistance such as CSA funds will contribute to the research program, this is a temporary solution only.

Recommendations

CNRADA should demonstrate that it is making efficient use of its present operating budget if it is to expect additional funds from GIRM. CNRADA can accomplish this by:

- (1) completing its Plan Directeur in which research activities are prioritized considering the present financial and personnel constraints;
- (2) pursuing a strategy of quality before quantity, in its on-station and on-farm trial programs;
- (3) carrying out activities of the Plan Directeur and presenting the results in reports of scientific quality.

Increased budgetary support for CNRADA from GIRM should continue to be sought as a sustainable solution for CNRADA's financial problems. At the same time, other sources of financing, such as CSA, should also be tapped as temporary sources of operating funds. CNRADA must seek a healthy balance between GIRM and other funding sources.

CNRADA should develop a realistic long-range plan outlining its financial needs. This plan should clearly state what research activities can be accomplished at low, medium, and ideal levels of funding given expected personnel availability. The AgRes II technical assistance team should help in the preparation of this plan to be presented to GIRM and to external donors.

2.14 Role of AgRes II Chief of Party

Findings

The major tasks and responsibilities for this position are stated in the UA/U.S.A.I.D. contract (p. 8) as follows:

Under the policy supervision of the Director of CNRADA and the technical guidance of the Chief of the Plant Improvement Service [sic] of CNRADA the agricultural planner/agricultural economist will:

- participate with other researchers in developing and implementing a long term-research strategy for the CNRADA program including assistance in project design, research resources management (including the development of methodology to predict cost effectiveness of research activities), and project reporting and evaluation;
- develop and implement a farming systems research program on irrigated river basin agriculture;
- work closely with the regional development agencies in setting up and implementing the on-farm trials and assist in the provision of information and interpretation of results for extensive farm dissemination by regional development agencies;
- assist in training Mauritanian counterparts.

The contract also states (p. 7) that he "will be the counterpart of the Director of CNRADA and as the COP will be responsible for the implementation of the project. Together with the staff of CNRADA, the Planner will design the long range research strategy for CNRADA."

The approach to be taken in fulfilling each of these responsibilities is not explicitly stated in the contract. The following discussion contains our observations as to the strategy adopted by the COP for each task since project implementation began.

The COP's first task concerns the development of CNRADA's research strategy. Section 2.6 presents the status of the preparation of the Plan Directeur. The contractual scope of work presented above is ambiguous concerning the COP's role in preparing the Plan. In one statement, the contract says the COP's role is to "participate with other researchers in developing and implementing a long term-research strategy". In a contradictory statement the COP is to design the long-range strategy together with the staff of CNRADA.

As stated by the COP, he has perceived his role as one of advisor and facilitator in the process of outlining and gathering information needed to draft the Plan. He has considered the actual writing of the Plan to be the responsibility of CNRADA personnel. It is his stated view that if he were to do the writing of the Plan, CNRADA would consider it to be AgRes II's Plan and not its own.

The COP's second task is to "develop and implement a farming systems research program on irrigated river basin agriculture." After the first reconnaissance survey, the decision was taken to shift the project's emphasis from irrigated to rainfed and flood-recession agriculture (the rationale for making this decision is presented in Section 2.8).

The task of developing and implementing a farming systems research program is closely linked to the COP's third task: setting up and implementing on-farm trials and assisting in disseminating results to regional development agencies. Activities related to these tasks have occupied much of the COP's time to date.

Finally, the COP is to "assist in training Mauritanian counterparts." As stated in Section 2.5, CNRADA views this as a major responsibility of the COP and stressed the need for more progress in this area.

Conclusions

The terms of reference for the Agricultural Research Planner (COP) as stated in the UA/U.S.A.I.D. contract are too vague, outdated and inappropriate concerning his role in preparing the Plan Directeur and in developing and implementing a farming systems research program within CNRADA.

The COP's role as trainer, however, is crucial to achieving expected project outputs. CNRADA would like more emphasis placed on this task in the future.

Recommendations

A revised Terms of Reference for the COP should be prepared and agreed upon by the parties involved with AgRes II. Having taken into account numerous discussions

with the UA team, CNRADA personnel, and U.S.A.I.D., the evaluation team proposes the adoption of the following scope of work for the Agricultural Research Planner (COP):

Under the policy supervision of the Director of CNRADA, the agricultural research planner will:

- work with CNRADA researchers to prepare a short and medium-term agricultural research strategy and implementation plan for CNRADA which prioritizes research alternatives based on farmers' needs and with consideration given to available research resources;
- develop and institutionalize a research program into CNRADA, using the farming systems research methodology, at a pace compatible with CNRADA's human and material resources;
- design and assure the implementation of an ongoing in-country training program for CNRADA's permanent and temporary research technicians in trial design and implementation; data collection and analysis; techniques of working with farmers; and report writing;
- facilitate, through the Director, improved cooperation with ENFVA, SONADER, the agricultural extension service, and other related institutions to develop collaborative training programs, research trials, and research-extension linkages;
- assist the Director to promote the reinforcement and/or establishment of linkages with regional and international agricultural research and donor institutions to:
 - (1) acquire adaptable technologies and reduce duplication of research efforts; and
 - (2) explore options for obtaining financial assistance;
- supervise the AgRes II technical assistance team and monitor the day-to-day running of the project.

2.15 Role of the AgRes II Administrative Assistant

Findings

The scope of work for the AgRes II AA as stated in the UA/U.S.A.I.D. contract, gives the AA administrative responsibilities in both CNRADA and AgRes II. That is, it specifies

that the AA will be the AgRes II administrative officer while also being active in CNRADA's administration. Specifically, the contract gives the following tasks for the AA:

1. Assisting CNRADA in the routine functions of administrative and logistical support, material procurement, and the evaluation and improvement of budget and managerial systems;
2. Training CNRADA staff in administration and management, and assisting CNRADA in the development of administrative, financial and research systems; and
3. Functioning as the Administrative Manager of the UA research team, focusing on procurement, financial management, and logistical support.

CNRADA's Director was not in his present post at the time the PP and Project Agreement were written; therefore, he did not contribute to the definition of these terms of reference. This has led to conflicting views as to what role, if any, the AA should play in CNRADA's management.

After the evaluation mission and before the completion of this final evaluation report, the AA finished his contract and was replaced.

Conclusions

At project start-up, duties related to establishing systems to handle the project's administrative, logistics, and procurement activities required the full attention of the AgRes II AA. The incumbent succeeded in accomplishing these tasks. It was unrealistic to expect that he would also have a role in improving CNRADA's administrative systems.

Recommendations

The project has already recognized the need to clarify and redefine the role of the AA. Efforts are being made to develop, with CNRADA's Director, an acceptable scope of work. Towards this end, the Management Audit provides options for the role of technical assistance in administrative institution-building. These options (Atkinson, p. 37) should be considered anew and are listed as follows:

"[The] technical assistance might take the form of one or more of the following alternatives:

- identify and recruit a qualified Mauritanian to handle much of the local AgRes II project logistics so that the AA is freed to play a day-to-day role within CNRADA itself;
- continue to use both AgRes II staff members as advisors and monitors, and bring in occasional short-term technical assistance to respond to specific administrative issues, to do further implementation, to put on seminars and workshops, and so forth;
- hire an additional full-time staff member of the AgRes II team to work exclusively on CNRADA administrative and financial issues (this person might initially work out of the MDR in Nouakchott); or
- provide no more technical assistance with respect to this aspect of the project and concentrate purely on agricultural research outputs."

The Management Audit continues with the following important point:

"A given embedded in the above options is that members of the AgRes II team must, in some fashion, be involved regularly with this institution-building process. Failing that, no further effort should be made in this direction. It is not reasonable to expect to create long-term institutional improvements, or even cosmetic ones, through the use of specialized short-term technical assistance unsupported by rigorous monitoring, guidance, and follow-up."

2.16 Internal Monitoring and Evaluation of AgRes II

Findings

The UA's Technical Proposal states that during the first year of the program, a set of evaluation criteria would be established. These "measures of effectiveness" were to:

- notify project management of procedural and technical matters that need attention or modification;
- help identify objectives and activities that are falling behind.

In short, they were to provide an early warning system should an activity not proceed according to plan or not function as predicted (UA Technical Proposal, p. 91). These measures of effectiveness have not been established.

Both the AgRes II COP and U.S.A.I.D./Mauritania have considered the development of internal monitoring systems to be important. At a meeting in Dakar in the summer of 1987, discussions were held on the feasibility of having annual reviews of FSR projects in neighboring countries by colleagues involved with these projects. Participants from Mauritania, Senegal, The Gambia, and Mali attended. After the meeting, FSR specialists and agronomists from Mali, Côte d'Ivoire and A.I.D./Washington were invited to come to Mauritania in August 1987 for the annual review of AgRes II. However, due to workload and scheduling conflicts, two of the three invited specialists could not come. As a result, the planned review was cancelled. Action on internal evaluation was deferred until the mid-term project evaluation.

Recommendations

A system of internal monitoring and evaluation for AgRes II is essential. The following strategy is proposed for the remainder of the project:

- Criteria for assessing progress on recommendations defined in the mid-term evaluation report should be developed as soon as possible. Criteria for the final project evaluation should also be defined. The assistance of a short-term consultant may be useful for these tasks;
- AgRes II and CNRADA should keep progressive records on each evaluation criterion defined above;
- One year from now, AgRes II should conduct an internal review of its progress based on the established criteria. Again, a short-term consultant could assist with the task;
- Based on the recommendations of the review, AgRes II and CNRADA would make the necessary modifications in project implementation and continue internal monitoring until the final project evaluation.

2.17 National and International Linkages

Findings

Since its inception, CNRADA has developed linkages with national research and extension organizations and international research organizations. Through the efforts of AgRes II/CNRADA, these linkages have been strengthened. In particular, AgRes II has worked to establish or strengthen linkages with FAO, CILSS, SAFGRAD, WARDA, IBPGR, CIRAD and ISNAR as well as research institutions in Mali and Niger.

CNRADA researchers have participated in several international seminars, workshops and conferences through AgRes II funding (see Section 2.5). Technical papers prepared by CNRADA staff in collaboration with the TA team were presented at the 1987 Arkansas FSR/E Symposium, increasing the recognition of CNRADA at the international level. CNRADA researchers and the TA team also presented papers at the 1988 Arkansas FSR/E Symposium.

AgRes II has also spear-headed the negotiation of a Memorandum of Understanding between the UA and MDR (representing CNRADA and ENFVA). The Memorandum agrees, in principle, that, among other things:

1. The parties will promote exchanges of personnel (study tours);
2. Any publications resulting from the agreement must be mutually agreed upon by both parties.

AgRes II has worked to strengthen collaborative links with the national agricultural extension service. For example, representatives of the extension service participated in the reconnaissance surveys. Also, the project cooperated with Projet Vulgarisation on a meeting between research and extension. The first meeting of its kind, it was to develop concrete proposals for cooperation between the two sectors.

Both the PREF and the PCR propose merging CNRADA and ENFVA. The arguments in favor of this merger are:

1. Better coordination and execution of research, extension, and training efforts;
2. More efficient use of scarce personnel resources; and
3. Better use of agricultural research results. The proposal is still being debated and no timetable for the merger has been set.

It became evident in Kaedi that much of the agricultural research being conducted in Mauritania is carried out in isolation by a number of national and international organizations and donors. The work is not directed by a coherent strategy, nor is it being coordinated by one institution such as CNRADA.

Conclusions

The AgRes II team has expended considerable effort assisting CNRADA in strengthening its ties with both national and international agricultural research and development institutions. These efforts have had positive results.

Recommendations

Since the PREF and PCR both state the objective of merging CNRADA and ENFVA, the AgRes II team might begin now to facilitate the negotiation of a formal memorandum of understanding between these two institutions. The AgRes II team has already taken steps in this direction by providing the services of its consultants to teach at the school (see Section 2.5). The memorandum could include, for example, agreements to set up practical training for ENFVA students at CNRADA or to have CNRADA researchers teach at the school.

2.18 Short-Term Consultants

AgRes II has made very efficient use of funding available for short-term consultancies. The contract between U.S.A.I.D. and UA stipulated that over the life of the project, fifteen person-months of technical assistance consultancies would be provided. Instead, AgRes II facilitated thirty TA person-months during the first 30 months of the project. Of these, only twelve months were paid for by the project. The remaining eighteen person-months were contributed by UA, USDA and other donors.

The consultancies funded by AgRes II were less costly than expected. Their cost to the project averaged approximately 20 percent less per person-month than had been budgeted. At 30 months into the project, 37 percent of the TA consultancy budget still remained to be spent.

The Director of CNRADA would have liked to have a greater role in defining consultants' terms of reference, selecting candidates, and determining the timing of their missions.

Recommendations

Maximum involvement of CNRADA's Director in each short-term consultancy is needed. This could be ensured if the AgRes II team would prepare a file for CNRADA's own records on each consultancy proposed and/or implemented under the project. Each file should contain the terms of reference signed by representatives of CNRADA, AgRes II, and U.S.A.I.D.; all correspondence related to candidate selection and scheduling; copies of candidate CVs; and copies of the consultant's interim and final reports.

2.19 "Farming Systems Research Along the Senegal River Valley" Series

Findings

The results of eleven studies have been published in this series since the project's inception. They contain high-quality basic data on the farming systems, ecology, technology, food consumption patterns, etc. The documents are reproduced in both English and French, and are attractively bound. They have been widely circulated outside Mauritania and some, in particular, the reconnaissance surveys are considered to be models for conducting similar studies in other countries.

There have been two important difficulties with the reports. First, the turn-around time required to translate the reports into French has been long. All but one of the reports were written in English and required translation.

Second, all reports were produced and duplicated in Tucson and shipped back to Mauritania. This process often took several months and was an expensive undertaking. The project is, however, exploring the feasibility of establishing a production facility in the new Documentation Center.

Conclusions

The baseline farming systems data, of the type published in this series, has never before been available to Mauritanian researchers. The reports will be of particular use to the new B.S. and M.S. degree holders when they return from the States.

However, the reports have been very expensive to produce, and, given the resource base of CNRADA, are not an activity which can be sustained after the project.

Recommendations

A concerted effort should be made to shift responsibility for publishing reports to CNRADA. The following actions should be considered:

- Where possible, solicit greater involvement of Mauritanian researchers in drafting the reports.
- If Mauritians are involved as authors, perhaps the reports could be initially drafted in French and later translated to English.
- Plans to create a production facility in the new Documentation Center should be pursued so as to build CNRADA's internal capacity to produce reports.

3. Continued A.I.D. Support to Agricultural Research in Mauritania

Findings and Conclusions

The preceding discussion highlights many of the constraints faced by CNRADA and AgRes II. Of critical importance is the shortage of qualified personnel at CNRADA. Researchers are being trained in the U.S. under AgRes II, but the completion of their studies will correspond with the end of the project. There will be limited overlap between the Technical Assistance team and the returned trainees.

Another key constraint is CNRADA's limited operating budget. For CNRADA to strengthen its research program, it needs more operating funds. GIRM's stated policy is that increased funding for agricultural research will be dependent upon visible results from research efforts, that is, increases in farmers' production. This policy puts CNRADA in a difficult situation. For the results of research to reach farmers, an efficient agricultural extension service must be in place. Agricultural extension is in its nascent stages in Mauritania and cannot be expected to evolve to the desired stage during the life of the project. Also, securing alternative sources of funding for CNRADA is a gradual endeavor.

In short, building CNRADA into a stronger research institution is a long-term goal, not one to be achieved by a four-five year project.

Recommendations

The following recommendations concern U.S.A.I.D./Mauritania's support for agricultural research through the present AgRes II Project and for future project interventions.

AgRes II

AgRes II needs to consolidate its efforts, taking into consideration all the constraints in human, financial and material resources under which AgRes II and CNRADA are and will be operating. This will ensure that maximum benefits can be obtained from the project for the next two years.

The project should focus more on in-country training for CNRADA personnel. Agronomic, administrative and financial management training needs should be assessed as soon as possible. A relevant training plan should be developed which will be implemented by the TA team and short-term consultants where needed. This training plan will be coordinated with the OAR's Human Resource Development Office.

The on-farm trial program should be consolidated and scaled down to correspond to the existing resources. The program's quality should be ensured before the quantity of trials is increased. Station and on-farm trials will serve as hands-on learning experiences for Mauritanian researchers, while experienced researchers ensure that farmers are not exposed to additional risk through these trials. The TA team should work closely with their counterparts in analyzing the research data. The lessons learned and recommendations found throughout this report should be incorporated into the project's on-the-job training plan.

The project should strive to achieve a good foundation of human resources and develop a realistic long-term research plan for CNRADA by the PACD so that CNRADA will be able to conduct by itself an acceptable adaptive research program within the limits of its available resources.

A productive working relationship between the COP and the Director of CNRADA is indispensable for achieving project objectives. In particular, the role of the COP -- and the other technical assistants -- should be explicitly defined in terms of a mutually agreed upon balance between advisory versus project implementation functions.

Post AgRes II

U.S.A.I.D. should make a long-term commitment to support agricultural research in Mauritania. Specifically, plans should be initiated for a follow-on project to be implemented immediately after the completion of AgRes II. This new effort would incorporate many of the elements of AgRes II, but would have new elements permitting: (i) a larger on-farm research program; (ii) agricultural research station rehabilitation; and (iii) extension of research results.

At the very least, U.S.A.I.D. should consider an extension of AgRes II to ensure the necessary overlap between the Technical Assistance team and the newly-returned degree holders.

SELECTED BIBLIOGRAPHY

- Ackerman, R.W. July 1986. Special Report on CNRADA Administration and Financial Viability (to Director, CNRADA and Director A.I.D.) [precursor to Management Audit]
- Dobos, A. 1986. Rapport Annuel de 1985. Division Vivriere. CNRADA.
- Dobos, A. 1987. Rapport Annuel de 1986. Division Vivriere. CNRADA.
- Doebler, S. 1987. Final report on sorghum and sesame trials in Ouloumbounie. PCV personal communication.
- Fall, S. 1987. Resultats des quelques travaux realise en 1986-1987. Division de Culture Vivriere et Oliagineuse. CNRADA.
- Fall, S. 1988. Resultats des travaux realises par la division en 1987-1988. Division Culture Vivriere et Oliagineuse. CNRADA.
- Frankenberger, T. R., M. B. Lynham, H. N'Gaide, S. Fall, M. P. N'Daiye, and B. Perquin. April 1986. FSR Along the Senegal River Valley. A Dry Season Reconnaissance Survey in Guidimaka, Gorgol, Brakna, and Trarza Regions. U.S.A.I.D./UA. Tucson, AZ.
- Frankenberger, T. R., and M. B. Lynham. January, 1987. Farming Systems Along the Senegal River Valley. Agricultural Research Alternatives Addendum. U.S.A.I.D./UA. Tucson, AZ.
- Hamady, D. 1988. Campagne Maraichere, 1987-1988, en Milieux Paysan. CNRADA.
- Hildebrand, P. E., and F. Poey. 1985. On-Farm Agronomic Trials in FSR/E. Lynne Reinner Publ. Inc. Boulder, Colo.
- Lamine, B. M. 1987. Resultats de la Campagne, 1986-1987. Division Horticulture. CNRADA.
- Lichte, John. Strategy for Evaluation of Farming Systems Research Projects (Draft). FSSP. April, 1986.

- Lynham, M. B., T. R. Frankenberger, W. Phelan, H. N'Gaide, P. Stone, J. A. Tabor, and N. Harouna. Nov., 1987. FSR Along the Senegal River Valley. A Rainy Season Reconnaissance Survey in Guidimaka, Gorgol, and Brakna Regions. U.S.A.I.D./UA. Tucson, AZ.
- N'Gaide, H., M. B. Lynham, T. R. Frankenberger. July, 1986. FSR Along the Senegal River Valley. Agricultural Research Alternatives. U.S.A.I.D./UA. Tucson, AZ.
- R'Chid, S. 1987. Rapport sur la Collecte Germplasm Sorgho-Mil. Division Pre vulgarisation. CNRADA.
- R'Chid, S. Undated. Experimentation du Sesame en Milieu Paysan. CNRADA.
- R'Chid, S. 1988. Synthèse des Tests en Milieu Paysan. Division des Systemes de Production et de Transfer de Technologie. CNRADA.
- Schlesinger, P. 1987. Final Report on sorghum and sesame trials in Feralla and Debai Doubbel. PCV personal communication.
- Slack, D.C.. Trip Report for August 1987. Draft 3, September 13, 1987. Mauritania AgRes II
- Annual Report, 1986. FSR Along the Senegal River Valley. U.S.A.I.D./UA. May, 1987.
- Annual Report, 1987. FSR Along the Senegal River Valley. U.S.A.I.D./UA. May, 1988.
- C.I.L.S.S. 1985. Bilans des Activities de Research.
- U of A Technical Proposal in Response to U.S.A.I.D. RFTP No. 84-682-0957 Mauritania Agricultural Research Project II; Submitted by The Office of International Programs, University of Arizona in Cooperation with The CID and Member Universities. May 1985
- U.S.A.I.D. PP; OMVS Agricultural Research II Project (625-0957), Mali Agricultural Research (688-0957), Senegal Agricultural Research (685-0957), Mauritania Agricultural Research (682-0957); Authorized August 11, 1983, Amended June 28, 1984.

APPENDIX

ITINERARY FOR AGRES II EVALUATION MISSION

(* Denotes numerous meetings with this individual, all not specified on itinerary)

June 5		Arrive Nouakchott late night
June 6	9:00 1:30	Son Nguyen*, AADO/A.I.D. Walter Boehm*., Asst. Dir/A.I.D.
June 7		reviewed documents
June 8	10:00 1:00 2:30	Jeff Coupe, FEWS/A.I.D. Mr. Tahara, Chef, Crop Protection, MDR Glen Slocum*, Mission Director, U.S.A.I.D./Mauritania
June 9	9:00 12:30	Presentation of PCR to A.I.D. by Wane Hamdou Rabby, Cellule de Planification, MDR Andy Gilboy, HRD/A.I.D.
June 11	9:00 1:00	Meeting cancelled with Director/Department of Agriculture Barro Amadou Basirou, Director, Celule de Planification
June 12	11:00	Team presentation of evaluation issues to U.S.A.I.D. and Univ. of Arizona Team
June 13	1:00 2:30 2:45	Wane Hamadou Rabby Hamath N'Gaide, former AgRes II project coordinator Walter Boehm
June 14		travel to Kaedi
June 15	10:00 12:30 5:20	Diarra Mamadou, CNRADA Director and N'Gam A.O.*, CNRADA Assistant Director Scheduling and briefing meeting w/evaluation team, Mark Lynham*, AgRes II COP and Michael Norvelle*, Project Director CNRADA briefings by N'Gam, Sidi R'Chid*, Acting Head, DSPTT

June 16	8:00 9:00 10:00 11:00 12:00	Ba Mamadou Lamine, CNRADA/Horticulture Division Moussa Pere N'Diaye, Inspecteur Agricole, Gorgol/Kaedi Isselmou o/Mohamed Vall, Governor of Gorgol Youssouf Diagana, Mayor of Kaedi Visit to Belinabe and Rinjao research stations (see names of observer and trial manager in notes)
June 17		Day trip to Sylla research station, Dirol plain, AGRES trial sites at Roufi Audi, Diawolel(? -- garden)
June 18	am 12:45 2:00	Sand storm; interview with Mark Carson, AgRes II TA Luciano Arch. Gastaldi, Coordonnateur, Africa'70 Project Mike Norvelle
June 19	10:00	N'Gam/Mark Carson
June 20	10:00 4:00	N'Gam/Sidi R'Chid Mark Lynham
June 21		Visit to Mbout SONADER/Foum Gleita Ba Mamadou Omar, Chef de Service Intendance et Logistique M. Habibullah, Chef de Service Mise en Valeur
June 22	12:00 18:00	Varady, Norvelle, Lynham Visit to Boghe Jean-Luc Francois, Forage Research, Sylla
June 23	9:00 2:45	Diop Alieu, SONADER/Gorgol Norvelle, Varady, Lynham, Carson
June 24		Travel to Nouakchott
June 25	am/pm 20:00	Norvelle, Varady, Lynham, Wane at AGRES guest house Reception by Ba Bocar Sulay, President, CNRADA Conseil d'Administration
June 26		Prepared for U.S.A.I.D. briefing Wane
June 27		Lynham, Varady U.S.A.I.D. Briefing -- Boehm, Slocum

June 28	9:00 1:00	Varady, Lynham Briefing for Varady/team
June 29	9:00 10:00	Ba Bocar Sulay Hamath N'Gaide
June 30		Report drafting
July 1		" "
July 2		" "
July 3	2:00	Lam Hamady, ENFVA Fiebig depart
July 4		Report drafting
July 5	10:00 1:00	Carson Presentation of preliminary findings, conclusions, and recommendations to A.I.D. and AgRes II team
July 6		Kaedi, Diarra Mamadou, CNRADA Director
July 7		Return to Nouakchott Meeting with Lynham, Carson
July 8		Report drafting, organization of publications, xeroxing
July 9		" " "
July 10		Elias, Wayman depart