

EVALUATION
OF
GAMBIAN AGRICULTURAL RESEARCH
AND DIVERSIFICATION

(AID Project No. 635-0219)

Submitted

By

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ACRONYMS

ADP II	Agricultural Development Project II (IBRD)
ANTRAC	Animal Traction Task Force
ARAB	Agricultural Research Advisory Board
ARMS	Agricultural Research Management System
CCF	Christian Children's Fund
CILSS	Permanent Inter-State Committee on Drought Control in The Sahel
CIMMYT	International Center for Maize and Wheat Improvement
CRED	Center for Research on Economic Development (Univ. of Michigan)
CRS	Catholic Relief Service
CS/RM	Cropping System/Resource Management (research program)
CUSO	Canadian University Service Overseas
D(DL)	Dalasi (\$1 = D6.5-6.75)
DAC	Divisional Agricultural Coordinator
DAHP	Department of Animal Health and Production (became DLS in 7/88)
DAR	Department of Agricultural Research
DAS	Department of Agricultural Services
DAP	District Agricultural Profiles
DES	District Extension Supervisor
DLS	Department of Livestock Services
DOA	Department of Agriculture (became DAR and DAS in 7/88)
DOP	Department of Planning (of Ministry of Agriculture)
DWR	Department of Water Resources (Ministry of Water Resources, Forestry and Fisheries)
EAU	Extension Aids Unit
EEC	European Economic Community
ERP	Economic Recovery Programme (of the GOTG)
FAO	Food and Agricultural Organization of the United Nations
FARMS	Financial Administration and Research Management System
FRG	Federal Republic of Germany
FSR/E	Farming Systems Research and Extension
FFHC	Freedom From Hunger Campaign

FSSP	Farming System Support Project
GARD	Gambia Agricultural Research and Diversification Project
GCCAP	Gambia Christian Council Agricultural Programs (Methodist Mission)
GCU	Gambia Cooperative Union
GLOS	Grain Legumes and Oilseeds (research program)
GOTG	Government of The Gambia
GTTI	Gambia Technical Training Institute
GPMB	Gambia Produce Marketing Board
IARC	International Agricultural Research Center
IBRD	International Bank for Reconstruction and Development (also WB)
ICCASP	Interministerial Coordination Committee on Agricultural Sector Planning
ICRAF	International Center for Research in Agroforestry
ICRISAT	International Crop Research Institute for Semi-Arid Tropics
IDA	International Development Agency
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development center
IITA	International Institute for Tropical Agriculture
ILCA	International Livestock Center for Africa
ILO	International Labor Organization
ISRA	Institute Senegalais du Recherche Agricole
ISNAR	International Service for National Agricultural Research
ITC	International Trypanotolerance center
IMF	International Monetary Fund
IPC	Interim Project Committee (for GARD Project)
LMB	Livestock Marketing Board
LOA	Livestock Owners Association (in The Gambia)
LRD	Lower River Division (of The Gambia)
LTTA	Long Term Technical Assistant(ance)
MEPID	Ministry of Economic Planning and Industrial Development
MD	Managing Director
MDI	Management Development Institute
MOA	Ministry of Agriculture
MOW	Ministry of Works

MFP	Mixed Farming Project
MID(N)	MacCarthy Island Division (North) (of The Gambia)
MID(S)	MacCarthy Island Division (South) (of The Gambia)
MOFT	Ministry of Finance and Trade
MWRFF	Ministry of Water Resources, Forestry and Fisheries
NARB	National Agricultural Research Board
NASS	National Agricultural Sample survey (DOP)
NBD	North Bank Division (of The Gambia)
NCB	Nigerian Composite of Maize Variety
NGO	Non-Governmental Organization
OAR/Banjul	Office of USAID Representative--Banjul
ODA	Overseas Development Administration of The United Kingdom
OMVG	Gambia River Basin Development Authority
PACD	Project Assistance Completion Date
PBS	Program Budgeting System
PID	Project Identification Document
PMC	Project Management Committee
PP	Project Paper
PCV	Peace Corps Volunteer
PPMU	Program Planning and Monitoring Unit of the Ministry of Agriculture (became DOP in July 1988)
PRC	People's Republic of China
PS	Permanent Secretary (of a GOTG Ministry)
PSO	Principal Scientific Officer (DAR)
PVO	Private Voluntary Organization
PWD	Public Works Department of the GOTG
RA	Research Assistant (DAR)
RA	Research Associate (GARD)
RDP	Rural Development Project
REDSO/WCA	Regional Economic Development Support Office/West and Central Africa-AID
RELO	Research Extension Liaison Officer
SAFGRAD	Semi-Arid Food Grains Research and Development Project
SCF (UK)	Save the Children Fund (UK)

SCF (USA)	Save the Children Fund (USA)
SM	Station Manager
SMS	Subject Matter Specialist
SRFMP	Sahel Regional Financial Management Project
SO	Scientific Officer
SSO	Senior Scientific Officer
STTA	Short Term Technical Assistant(ance)
SWMU	Soil and Water Management Unit of the Ministry of Agriculture
TA	Technical Assistance
TEAU	Teaching and Extension Aids Unit of the MOA (same as EAU)
TO	Technical Officer (DAR)
TO	Technical Officer (DAS)
TOR	Terms of Reference
TS	Technical Secretariat (of NARB)
UK	The United Kingdom
UM	University of Michigan
UN	The United Nations
UNDP	United Nations Development Program
URD	Upper River division (of The Gambia)
USAID	United States Agency for International Development
UW	University of Wisconsin
VEW	Village Extension Worker (DAS)
VSO	Voluntary Service Overseas
VSU	Virginia State University
VTC	Vocational Training Center in Banjul, The Gambia
WARDA	West African Rice Development Association
WB	World Bank
WD	Western Division (of The Gambia)
YBK	Yoro Berri Kunda

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EXECUTIVE SUMMARY

Project Background

The Gambian Agricultural Research Development (GARD) project is a 7-year project which was signed on June 29, 1985 by the Government of The Gambia (GOTG) and the Office of the AID Representative (OAR/Banjul). A 5-year contract was signed with the University of Wisconsin (Madison) in January 1986 to help implement the project. Implementation began in November 1985 with the early arrival of the Chief of Party and the Project Administrator.

The purpose of the project is to "test, generate, adapt, and promote the adoption of improved crop and livestock technologies that meet farmers' needs and expand and diversify The Gambia's agricultural economy." Project designers assumed that achievement of this purpose would contribute significantly toward the broader goal of achieving food self-reliance in The Gambia.

To produce the outputs needed to achieve the project purpose, the project was designed with five distinct but mutually supportive components:

1. Establishment of an agricultural research management system (ARMS) which would set agricultural research priorities in the light of farmers' needs, researchers' recommendations, and GOTG policy objectives; it would enforce these priorities through procedures by which programs were designed, reviewed, and funded.
2. Provision of long and short-term training for Gambians in various agricultural disciplines, and improvement of research support systems, including selected infrastructural improvements.
3. Support to on-station component research in crops, livestock, agroforestry, socio-economics, and water resources.

4. Expansion of on-farm FSR/E activities, and linking these activities to component research and the extension of programs in the context of the ARMS.
5. Design of technology promotion activities for farmers at large, including training of field workers, monitoring and feedback of results, and the financing of specific pilot promotional efforts.

Evaluation of the Project

This is a report of the first external evaluation, which was conducted October-December 1988 by a 4-person team from the consulting firm of Development Associates, Inc., supplemented by an AID expert from AID's regional support office in Abidjan (REDSO). The statement of work is presented in Annex A.

Chapter II of this report was drafted to serve as a synthesis of the other chapters, highlighting and giving a sense of priority to the team's principal recommendations.

Achievements to Date

- Since 1986, the research programs have increasingly reflected Gambian assessments of research priorities. Participation in the trials of regional networks is much more selective than previously. The quality, quantity, and relevance of research results to Gambian conditions has increased significantly.
- The internal review process for selecting and designing research projects has been strengthened.
- A substantial number of research personnel have received short-term training, either in Gambia or abroad, and a number are currently in long-term training abroad.
- Researchers now have access to computers and have been trained in their use. Thus, the timeliness and quality of analyses, and the reporting of the analyses, has been improving significantly.

- A program budgeting system (PBS) has been installed in the research service and is helping to bring about improved design of projects and improved financial management.
- The National Agricultural Research Board (NARB) has been established and has directed the Director of Agricultural Research, as Acting Technical Secretary of the NARB, to draft for the NARB's review and approval an overall research policy statement and guidelines for the design of the agricultural research program.
- Research on crops has been made the priority concern of a single department, the Department of Agricultural Research (DAR), and a research unit is now functioning in the Department of Livestock Services (DLS).
- Pilot promotional activities have been initiated for rice and cowpeas in collaboration with the extension services and NGOs. A grant has been made to Save the Children (USA) for the promotion of improved practices and varieties of rice and millet.

Matters Needing Priority Attention

- There are still perceptions within the GOTG and among those working with agricultural development that the research service's activities are largely irrelevant to current development needs--in particular, they do not respond adequately to the constraints faced by Gambia's farmers.
- In part because of the foregoing, in part because of the conditions of service, there is low researcher morale and a number of qualified personnel have quit the service to work with development activities in Gambia or with international centers.
- The implementation of research activities needs considerable improvement.

- Further improvement in the management and use of financial and other resources is needed.
- Research linkages with extension, with NGOs, and with other development projects need to be strengthened.

Recommendations

1. The Directorate of Agricultural Research (DAR) coordinate the preparation of the research policy/guidelines statement requested by the NARB and submit it to the NARB no later than March 31, 1989.
2. Funding requests for research projects for the coming year not be considered until the policy/priorities statement has been submitted to NARB; all projects proposed should be consistent with the policy/priorities statement.
3. The principal farmer constraints be identified as a part of the policy/guidelines exercise; the information collected be utilized to develop the outlines of a program for resolving (or at least alleviating) farmers' problems and for maintaining a surveillance of developments on the farm.
4. The policy/guidelines exercise be carried out in such a way as to: (a) strengthen the linkages of the research service with NGOs and other development programs and with the extension service; and (b) pave the way for more active collaboration of these organizations in the selection, design, and implementation of research activities.
5. Following the approval by NARB of a research policy and research priority guidelines, a special study of research manpower availabilities and requirements be undertaken. The study should also focus on career development and job satisfaction issues. Consistent with the findings of the study, a long-term training plan should be developed; it should cover both long and short-term training priorities.

6. The Ministry of Agriculture (MOA): (a) make funds and other resources (e.g., petrol) available on a more timely basis and in accordance with research's operational requirements; (b) delegate additional authorities to research station managers so they can ensure improved implementation of research activities; (c) prepare a management improvement plan for Sapu research station; and (d) improve the management of the soils laboratory.
7. DAR strengthen its monitoring of the use of its resources so it can assure MOA that delegated authorities will not be abused.
8. MOA fill DAR vacancies so DAR can: (a) monitor better the use of resources; (b) expand and strengthen its linkages with extension and development agencies, particularly the NGOs; and (c) through stronger management, generally improve the effectiveness and efficiency of the research service.
9. MOA should fill the vacant Technical Secretariat positions designed to serve the NARB so the NARB can become more effective.
10. MOA review the situation in the Department of Planning (DOP), particularly the administration of the National Agricultural Sample Survey (NASS), and consider transferring the National Agricultural Data Centre to the DAR and up-grading the Centre to also encompass socio-economic data collection and analysis.
11. DAR and the extension service should strengthen their technology promotion activities, in part by increasing their collaboration with NGOs and other development projects.

Amplification of most of the foregoing findings and recommendations is included in the chapters which follow. Also included in those chapters are operational recommendations and suggestions (e.g., in Chapters VI, On-Station Research, and X, Project Administration) and additional recommendations of less urgency or importance than those included here and in Chapter II.

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I. INTRODUCTION

A. PROJECT BACKGROUND

The Gambian Agricultural Research Development (GARD) project is a 7-year project which was signed on June 29, 1985 by the Government of The Gambia (GOTG) and the Office of the AID Representative (OAR/Banjul). A 5-year contract was signed with the University of Wisconsin (Madison) in January 1986 to help implement the project. However, implementation began in November 1985 with the arrival of the Chief of Party and the Project Administrator.

The purpose of the project is to "test, generate, adapt, and promote the adoption of improved crop and livestock technologies that meet farmers' needs and expand and diversify The Gambia's agricultural economy." Project designers assumed that achievement of this purpose would contribute significantly toward the broader goal of achieving food self-reliance in The Gambia.

To achieve the project purpose, it was assumed that it would be necessary to produce during the life of the project the following major outputs:

- the establishment and effective operation of an agricultural research management system (ARMS);
- the expansion and integration of FSR/E (farming systems research and extension) activities as a recognized and valued component of research and extension in The Gambia;
- component research programs which are adequately staffed and funded;
- strong effective linkages between research and extension; and
- effective promotion campaign plans and operations.

To produce the foregoing outputs, the project was designed with five distinct but mutually supportive components:

1. Establishment of an agricultural research management system (ARMS) which will set agricultural research priorities in the light of farmers' needs, researchers' recommendations, and GOTG policy objectives; it will enforce these priorities through procedures by which programs will be designed, reviewed, and funded.
2. Provision of long and short-term training for Gambians in various agricultural disciplines, and improvement of research support systems, including selected infrastructural improvements which will complement investments planned by other projects, notably the IBRD-funded ADP II project.
3. Support to on-station component research in crops, livestock, agroforestry, socio-economics, and water resources.

4. Expansion of on-farm FSR/E activities, which had already been successfully launched in the eastern portion of the country, and linking these activities to component research and the extension of programs in the context of the ARMS.
5. Design of technology promotion activities for farmers at large, including training of field workers, monitoring and feedback of results, and the financing of specific pilot promotional efforts.

B. EVALUATION OF THE PROJECT

The Project Agreement specifies that the project will have an internal evaluation after about one year's operation--this was accomplished April 13-May 1, 1987. Provision was also made for two external evaluations, one in the third year of operations and one in the sixth year.

This is a report of the first external evaluation, which was conducted October-December 1988 by a team from the consulting firm of Development Associates, Inc., supplemented by an AID expert from AID's regional support office in Abidjan (REDSO).

The Evaluation Team

a) Mr. James Roush, Project Management Specialist and Team Leader

Mr. Roush served in a number of executive positions during a 25-year career with AID (Agency for International Development), including AID Director in Chile and Cameroon. Since retiring from AID in 1978, he has evaluated several agricultural development projects in the Sahel and participated in a management assessment of the AID program in the Sahel.

b) Dr. L. V. Withee, National Agricultural Research System (NARS) Specialist

Dr. Withee has experience working with NARSs in Nigeria, Botswana, Niger, Morocco, and the Dominican Republic. Until his recent retirement, he was Professor of Agronomy at Kansas State University.

c) Dr. Ralph Nelson, Agricultural Economist

Dr. Nelson has worked extensively with research-oriented development projects as both a project manager and as an agricultural economist in Uganda, Tanzania, and Ethiopia.

d) Dr. Glenn Davis, Agronomist

Dr. Davis is Dean of the College of Applied and Natural Resources at Abilene Christian College in Texas. He has wide experience consulting on agricultural development projects and worked for a number of years in Brazil.

e) Dr. S. K. Reddy, Agronomist and Extension Specialist (REDSO Representative)

Mr. Reddy has had extensive experience in agricultural extension in India and in consulting in the Sahelian countries of West Africa. He was an AID Agricultural Development Officer in Mali, and now works as a regional trouble-shooter throughout West Africa for REDSO.

Summary of Scope of Work

The evaluators will assess ARMS in order to determine if it is carrying out the key functions of establishing research priorities, reviewing on-going and proposed research activities in light of these priorities, and allocating resources for research accordingly. This evaluation will also assess:

- the degree to which project outputs have or can likely be achieved, including the degree to which the project has been able to generate technologies which are being adopted by farmers;
- whether or not sufficient quality and quantity of information is being collected to enable measurement of the project's progress; and
- the need for making changes in GOTG and contractor staffing, level of resources, and management arrangements for the various components of the project.

The effectiveness of promotional/extension activities being conducted by the project and other projects and the improvement in Gambian research capabilities also will be given special attention.

Key questions which the evaluators were asked to address were:

1. Is the ARMS, as currently being developed, appropriate for the size and institutional capacity of The Gambia?
2. Are the support services provided by the project appropriate and adequate?
3. Are the level and type of training programs being implemented by the project adequate to meet the needs of the research service?
4. What progress has been made in improving the way research is selected, designed, budgeted, implemented, analyzed, and reported?
5. Are the types, number of trials, and level of on-station effort appropriate for the size and institutional capacity of the Gambian research system and the crops/technologies being tested?
6. What progress has been made in institutionalizing FSR/E activities in the agricultural research program?
7. Are the project's current and planned efforts to assist extension and PVOs (private voluntary organizations--also referred to as NGOs--non-governmental organizations) in promotion and training adequate, given other donors' and GOTG efforts in promoting and extending improved technologies?

8. How might administration of the project be improved?

9. Are the assumptions in the original design still valid?

The full statement of work (see Annex A) includes subsidiary questions for each of the key questions listed above.

Preparation Of The Report

The Development Associates (DA) team met in Arlington, Virginia for discussions with AID/Washington. The DA team, less Mr. Roush, arrived in The Gambia on October 27 and remained until November 23 (except Mr. Davis who left November 20). Mr. Roush was in-country from November 1-24; Mr. Reddy was with the team November 6-20.

During their visit to The Gambia, the team met with GOTG officials, representatives of other donor projects, NGOs, AID/Banjul officials, members of the contractor's team (from the Universities of Wisconsin, Michigan, and Virginia State), and a number of knowledgeable and interested individuals, e.g., members of the new National Agricultural Research Board (NARB), the Assistant Director for Agricultural Programs of the U.S. Peace Corps in The Gambia, technical advisors in certain ministries, and Peace Corps Volunteers working in the GARD project. The team presented some working papers for comment by the Directorate of Agricultural Research (DAR), the contractor's team, and AID/Banjul. Before departing The Gambia, the leader of the evaluation team submitted a draft evaluation report for review and comment by interested officials and organizations.

Upon return to the U.S., the team leader made visits to the University of Wisconsin and Virginia State University to meet with individuals who have been involved with the project and to receive those institution's comments on the draft report. He also met with the former AID project officer Tom Hobgood. Detailed comments on the draft report were submitted by the contractor and AID/Banjul.

The team leader returned to The Gambia on December 10 for a series of meetings with various officials and organizations to receive comments on the draft report and to refine and/or expand, as appropriate, on the recommendations in the report. The team leader departed The Gambia on December 20, after submitting a second draft of the evaluation report to AID/Banjul for review and comment by it, the DAR, and the contractor's team. Comments on the second draft were submitted the week of January 9, 1989.

Structure Of The Report

Chapters III through VIII were drafted concurrently by individual members of the evaluation team, and there is some overlap of coverage and recommendations. The team leader has edited these chapters for errors and omissions, and changed the form of the recommendations; otherwise, they have been left largely as drafted. A new Chapter II was drafted to serve as a synthesis of the other chapters, highlighting and giving a sense of priority to the team's principal recommendations.

II. OVERALL ASSESSMENT OF PROJECT PROGRESS

A. FINDINGS

Situation at the Beginning of the Project

1. Agricultural research was predominately crops oriented.
2. The research programs consisted largely of trials from regional and international agricultural research centers which did not necessarily reflect national priorities. In some instances Gambian researchers carried out the trials and submitted the raw data to a regional research network coordinator, but did not receive the results of any statistical analysis.
3. There was a minimal number of well-trained researchers, and they were not well-equipped.
4. There was a general perception that the Agricultural Research Service's activities were not relevant to the country's agricultural development activities.

Achievements to Date

5. Since 1986, the research programs have increasingly reflected Gambian assessments of research priorities. Participation in the trials of regional networks is much more selective than previously. The quality, quantity, and relevance of research results to Gambian conditions has increased significantly.
6. The internal review process for selecting and designing research projects has been strengthened.
7. A substantial number of research personnel have received short-term training, either in Gambia or abroad, and a number are currently in long-term training abroad.
8. Researchers now have access to computers and have been trained in their use. Thus, the timeliness and quality of analyses, and the reporting of the analyses, has improved significantly; further progress is needed.
9. A program budgeting system (PBS) has been installed in the research service and is helping to bring about improved design of projects and improved financial management.
10. The National Agricultural Research Board (NARB) has been established and has directed the Director of Agricultural Research, as Acting Technical Secretary of the NARB, to draft for the NARB's review and approval an overall research policy statement and guidelines for the design of the agricultural research program.

11. Research on crops has been made the priority concern of a single department, the Department of Agricultural Research, and a research unit is now functioning in the Department of Livestock Services.
12. Pilot promotional activities have been initiated for rice and cowpeas in collaboration with the extension services and NGOs. A grant has been made to Save the Children (USA) for the promotion of improved practices and varieties of rice and millet.

Matters Needing Priority Attention

13. There are still perceptions within the GOTG and among those working with agricultural development that the research service's activities are largely irrelevant to current development needs--in particular, they do not respond adequately to the constraints faced by Gambia's farmers.
14. In part because of the foregoing, in part because of the conditions of service, there is low researcher morale and a number of qualified personnel have quit the service to work with development activities in Gambia or with international centers.
15. The implementation of research activities needs considerable improvement.
16. Further improvement in the management and use of financial and other resources is needed.
17. The research service's linkages with the extension service, with NGOs, and with other development projects need to be strengthened.

B. CONCLUSIONS

1. To help offset Findings 13 and 14 and to ensure that the research program is relevant, the highest priority action needed is the preparation of the research policy/priorities guidelines statement requested by the NARB.
2. The preparation of the policy/priorities statement should involve researchers, personnel from other GOTG departments, and people active with development projects. The statement should integrate overall government agricultural policy, a review of on-going and planned development activities, potential technology breakthroughs, and a review of farmers' constraints and innovations.
3. The research service needs to increase its attention to farmers' constraints and to give greater publicity to those of its activities which are designed to deal with farmers' problems.
4. To stay current on farmers' problems and to ensure that its findings are transmitted to the farmer, the research service needs to strengthen its linkages with the nongovernmental organizations (NGOs) and other development agencies and with the extension service. The research service also needs:
(a) to ensure the availability of good agricultural and socio-economic data;
and (b) to have the capability to analyze the data and disseminate the findings of the analysis.

5. Improved implementation of research projects will require that:

- a) the MOA: (1) make GOTG funds available as needed to meet research needs, rather than distributing them evenly by quarter throughout the year as is presently the case; (2) de-centralize some purchasing authority; and (3) improve the management of the soils laboratory.
- b) the research service: (1) reduce the number of on-station activities that it tries to implement; (2) utilize NGOs and other development agencies more to help carry out on-farm trials and demonstrations; and (3) manage better the resources available for implementation of activities.

6. Improved management of resources will require:

- a) greater delegation of authority and responsibility to research station managers and effective use of those delegations by the station managers; and
- b) improved monitoring of field activities by headquarters staff.

7. If the issues raised in this evaluation are dealt with along the lines of the recommendations which follow, the Project purpose is attainable and the Project can make a significant contribution to the expansion and diversification of Gambian agriculture.

C. RECOMMENDATIONS

- 1. The Directorate of Agricultural Research (DAR) coordinate the preparation of the research policy/guidelines statement requested by the NARB and submit it to the NARB no later than March 31, 1989.
- 2. Funding requests for research projects for the coming year not be considered until the policy/priorities statement has been submitted to NARB; all projects proposed should be consistent with the policy/priorities statement.
- 3. The principal farmer constraints be identified as a part of the policy/guidelines exercise; the information collected be utilized to develop the outlines of a program for resolving (or at least alleviating) farmers' problems and for maintaining a surveillance of developments on the farm.
- 4. The policy/guidelines exercise be carried out in such a way as to: (a) strengthen the linkages of the research service with NGOs and other development programs and with the extension service; and (b) pave the way for more active collaboration in the selection, design, and implementation of research activities.
- 5. Following the approval by NARB of a research policy and research priority guidelines, a special study of research manpower availabilities and requirements be undertaken. The study should also focus on career development and job satisfaction issues. Consistent with the findings of the study, a long-term training plan should be developed; it should cover both long and short-term training priorities.

6. The Ministry of Agriculture (MOA): (a) make funds and other resources (e.g., petrol) available on a more timely basis and in accordance with research's operational requirements; (b) delegate additional authorities to research station managers so they can ensure improved implementation of research activities; (c) prepare a management improvement plan for Sapu research station; and (d) improve the management of the soils laboratory.
7. DAR strengthen its monitoring of the use of its resources so it can assure MOA that delegated authorities will not be abused.
8. MOA fill DAR vacancies so DAR can: (a) monitor better the use of resources; (b) expand and strengthen its linkages with extension and development agencies, particularly the NGOs; and (c) through stronger management, generally improve the effectiveness and efficiency of the research service.
9. MOA should fill the vacant Technical Secretariat positions designed to serve the NARB so that the Secretariat can begin to realize its potential.
10. MOA review the situation in the Department of Planning (DOP), particularly the administration of the National Agricultural Sample Survey (NASS), and consider transferring the National Agricultural Data Centre to the DAR and up-grading the Centre to encompass also socio-economic data collection and analysis.
11. DAR and DAs should strengthen their technology promotion activities, including through increased collaboration with NGOs and other development projects.

Amplification of most of the foregoing findings, conclusions, and recommendations is included in the chapters which follow. Also included in those chapters are operational recommendations and suggestions (e.g., in Chapters VI, On-Station Research, and X, Project Administration) and additional recommendations of less urgency or importance than those included in this chapter.

III. AGRICULTURAL RESEARCH MANAGEMENT SYSTEM (ARMS)

One of the main elements of the GARD project plans was to review and reform the agricultural research management system (ARMS) of The Gambia in order to facilitate, more effectively, the operation of the Agricultural Research System. An ARMS working group was established to act under the supervision of the Permanent Secretary of the Ministry of Agriculture. The WG consisted of nine members, including M.S. Sompo-Ceesay, Assistant Director (Research) of the Department of Agriculture, Elon Gilbert, Chief of Party of the GARD project, and Matthew Dagg of ISNAR as an advisor.

The Scope of work of the WG was to review and propose specific improvements in the following areas:

- structure of agricultural research in government service;
- guidelines and procedures for the formulation of research priorities and proposals;
- decision making on allocation of research resources;
- release of funds; provision of research facilities;
- provision of administrative/logistical/managerial support services;
- human resource development, including manpower planning, conditions of service, and incentives for performance;
- monitoring and evaluation of research programs;
- training of researchers;

The WG identified six problem areas that needed attention and improvements:

1. Manpower Development
2. Infrastructure Development
3. Policy Development and Clarification
4. Establishment of a System to Mobilize and Effectively Use Financial Resources
5. Establishment of an Effective Monitoring and Evaluation System
6. Establishment of Effective Linkages and Communication to other Agencies Involved in Agricultural Development

The first item, Manpower Development, is discussed in Chapter V. Infrastructure Development (Item 2) is discussed in part in the reports on Computer Services, Library, and Agricultural Statistics in Chapter IV, Research Support. In addition, it should be noted that vehicles were provided by the GARD project for the Sapu Research Station and that three staff houses were constructed there. The balance of this chapter focuses on the other four problem areas identified by the WG.

A. POLICY DEVELOPMENT AND CLARIFICATION

1. Progress to Date

The WG recommended a National Agricultural Research Board (NARB) advisory to the Ministers of Agriculture, Water Resources, and Economic Planning and Industrial Development.

The main duties of the Board would be to:

- advise the ministers on all matters concerning the organization and prosecution of research in agriculture, livestock production, forestry, fisheries, and agro-industry.
- Formulate national agricultural research policy and priorities to support national development objectives, and advise the Ministers on the financial, manpower, and physical resources required to carry out an approved research program efficiently and effectively.
- Recommend allocation of resources to high priority areas for research; review the research program developed in response to the priority guidelines before recommending approval for implementation.

The Board would be served by a Technical Secretariat which would supply the necessary information for informed decision making. It would be the responsibility of the research department to supply their data and plans to the Technical Secretariat.

The WG suggested six criteria that NARB should consider in making research priorities and allocating resources. They also listed three criteria that should be considered in choosing experiments at the research station level. These are:

- a. The chances of technical success in generating potential for improved productivity;
- b. The chances of realizing potential improvement in productivity (e.g. capacity of input supply services; prices and marketing set-up; farmers' capabilities and constraints; etc.).
- c. Satisfaction of the researcher, including prospects of recognition, promotion, and contribution to world knowledge, etc.

A National Agricultural Research Board, as recommended by the working Group, was established by the Cabinet in November 1987 and the initial meeting was held on March 2-3, 1988. Matthew Dagg and Ajiboloa Taylor, ISNAR Staff, were consultants at this meeting to discuss the role and function of the Board, to assist the Board in developing operational procedures for itself and the research systems, and to initiate action to develop research priorities. A second meeting was held on April 28, 1988, in which the Director of DAR, as acting Technical Secretary, was instructed to draft national agricultural research and priorities statements for Board consideration.

Concurrent with the efforts to establish the NARB the process for the establishment of research project priorities was being strengthened. This system, which is reviewed in Chapter VI, was geared to improve the selection and design of research activities within component programs. It was weak on establishing priorities between program components.

2. Conclusions and Recommendations

- a. The evaluation team feels that agricultural research policy and priorities statements should have been prepared earlier and should have been available for NARB's review when it was established. However, the team understands that the approach recommended by the ARMS consultant called for the NARB to participate in the exercise, and no one expected the approval of the NARB by the GOTG to take so long. The delay since April is due primarily to the re-organization of the Ministry.
- b. The NARB should ensure that there are no further delays in this process. It should require at least a draft policy statement by March 31, 1989 and should refuse to endorse any research program until NARB has approved at least interim priority guidelines.
- c. The NARB should ensure that the agricultural research program provides for the resolving, or at least alleviating, of farmer's problems and includes an activity for maintaining surveillance of and reporting to NARB on developments on the farm.
- d. The NARB should periodically review the effectiveness of the linkages between research and extension and between research and the development projects (including NGO activities).
- e. The NARB should review the GOTG's efforts to establish research activities in related fields such as crop protection, water use, forestry, natural resources conservation and management, aquaculture, and livestock.
- f. NARB should appoint a Technical Secretary who would not be a part of any research activity but capable of reviewing activities across a number of fields.
- g. Priority should be given to the staffing of the Technical Secretariat to serve NARB.
- h. The prioritizing of research programs and projects should be based solely on the potential contribution of that research to the development of agriculture in Gambia and not on the satisfaction of the researcher as stated in the WG paper. In the assignment of research topics within the DAR, however, consideration should be given to the individual researcher's interests. Promotions, salaries, benefits, and special awards should be used to recognize and reward researchers for their contributions to Gambian agriculture.

B. ESTABLISHMENT OF A SYSTEM TO MOBILIZE AND EFFECTIVELY USE FINANCIAL RESOURCES

1. Progress to Date

A Financial and Administrative Research Management System (FARMS) committee was established in 1986. Charles Steedman from the Center for Research on Economic Development, University of Michigan, made a 4-week STTA visit to work with the Committee. The FARMS committee submitted their final report on November 30, 1986. The report included a thorough review of all administrative, managerial, and financial policies and procedures of the ministries as they relate to the support of agricultural research.

The Committee's recommendations were:

- (a) NARB-approved research program funds should be available on a year-around basis adequate to accommodate seasonal variations in need.
- (b) Purchasing authority should be decentralized.
- (c) Imprest accounts should be established at the research stations.
- (d) Management units should be established at the departmental and station level in order to remove responsibility of logistical management from the researcher.
- (e) A system of deposit accounts should be created at the Ministry of Finance or the Central Bank to service donor funds covered by the Agriculture Research Service.
- (f) Quarterly allocations of GOTG funding should be immediately available at the beginning of each quarter, unless specifically flagged by the Permanent Secretary.
- (g) Establishment of an accounting system that aggregates GLF and donor below-the-line accounts.

According to the draft 1988/89 GARD annual work plan, the MOA has started implementing some of the above recommendations. A program budgeting system (PBS) has been installed, and a major redesign of the internal accounting, procurement, disbursement, and financial reporting systems for the DAR is in progress. The PBS still needs revisions, but it is functional and has resulted in positive changes in research planning, accountability, and financial discipline as well as facilitating the integration of the various sources of support.

An objective of the 1988/89 plan of work is to continue to improve PBS and financial management in the DAR and to continue to shift responsibilities for management of project support activities from the Contractor to the DAR. An LTTA Financial Advisor arrived in October 1988 to help the DAR improve financial management and to facilitate the transfer of activities.

2. Conclusions and Recommendations

- a. After effecting any needed changes in the PBS and filling the new financial management positions, the DAR should be given the additional flexibilities cited above -- (a) through (c) -- which are authorized under the GOTG system but currently denied to DAR by higher authority within the MOA.
- b. If not done before then, the AID Representative should consider including a provision in the next Project Agreement amendment which would provide for DAR to be given the needed flexibility in funds management to carry out operations effectively.
- c. The current system for programming and budgeting needs to be streamlined to reduce the time spent in the process. At the same time, more effective input is needed from the extension service and implementers of agricultural development projects. Some suggestions and observations that might be helpful in the streamlining process follow:
 - 1) make a distinction between general information sharing, which could precede and form the basis for the development of programs, and technical review, which could be limited to a small number of qualified researchers.
 - 2) establish priorities within each program, perhaps ranking activities as Priority I, II, and III based on either their importance to overall priorities or their timeliness (perhaps in relation to other experiments). Alternatively, each program component could be given a base planning figure and asked to also submit programs for 20 percent more and less than the base figure.
 - 3) after overall policy and priorities are established and research station manager positions are up-graded, have budgets developed by station.

C. ESTABLISHMENT OF AN EFFECTIVE MONITORING AND EVALUATION SYSTEM

According to the Contractor, no formal system of monitoring and evaluation exists at present. It is planned, however, with assistance from ISNAR, to introduce one in the future.

In preparation for establishing a monitoring and evaluation system, the DAR, Project staff and consultant will need to review project implementation in general and the management of resources assigned to the project. Some aspects for their consideration are developed below.

1. Research program management

The DAR has six research programs located and supervised as follows:

<u>Program</u>	<u>Program Location</u>	<u>Program Leader Location</u>
Agr. Mechanization (animal traction)	Yundum/Sapu	Yundum
Cropping Systems and Resource Mgmt	Yundum/Sapu	Sapu
Grain Legumes and Oil Seeds	Yundum/Sapu	Yundum
Horticulture	Yundum	Yundum
Rice	Yundum/Sapu	Sapu
Upland Cereals	Yundum/Sapu	Yundum

Under the system which existed for 1987-88, the six program leaders were responsible for:

- (a) formulating their programs;
- (b) chairing a program committee (also referred to by some as a task force) which was used to obtain peer comment on the proposed program;
- (c) defend the proposed program before the Agricultural Research Advisory Board (ARAB);
- (d) prepare the budget for the proposed program;
- (e) prepare protocols for the approved activities and have them reviewed by peers through the program committee;
- (f) supervise the implementation of the approved research activities and the budget approved for their implementation; and
- (g) supervise (or undertake) the collection, analysis, and reporting of research results.

Management of the programs is complicated because five of the six programs have activities being implemented on both research stations (four to five hours drive apart). In addition, most programs operate trials and surveys at each of the four off-station cluster sites. The five program leaders who are responsible for programs at both stations do not have adequate transport and budgetary resources to monitor adequately, let alone supervise the activities at the second station. This can be particularly serious when, because a number of researchers are on long-term training, implementation of a number of activities must be assigned to relatively untrained research assistants. In some cases, the researcher responsible for implementation of an activity has been located at the other station.

Project management has been further complicated by the system of station management. Although program leaders have had authority to manage their budgets, they have had to rely on the research station manager to provide necessary support services, e.g., use of a tractor or other equipment, transport, fuel, computers, etc. Furthermore, budget allocations have

generally been late and petrol supplies have usually been inadequate and not delivered to the research stations until late in the quarter. Until July 1, 1988, the Sapu station manager was from the extension service.

The DAR director has had no headquarters support staff that he could use to help monitor implementation. Given that a great deal of his time has been involved in the budget process, in the recent re-organization, and in participating in ARMS and FARMS working groups, it is not surprising that little attention has been given to implementation monitoring.

2. Research Station Management

The foundation of any agricultural research program is the research activities at the research station. The best designed research projects can be ruined by lack of discipline in the implementation of the schedule and details of activities.

Each research station has a station manager who is responsible for the support services to the research programs. This includes the provision and maintenance of equipment and vehicles; provision of labor and stores; typing, computer, and library services; and accounting services.

The station manager at Sapu is the head of the Seed Technology Unit and does not have any responsibilities for overseeing the research programs; this is left to the program leaders. The station manager at Yundum currently functions as a researcher, supervising his own specific research activities, as well as activities under the jurisdiction of Yundum station, e.g., all the trials and survey work at Yundum and in the two western cluster sites.

The Peat Marwick McClintock (ODA) report stated that the Sapu and Yundum Agricultural Stations were "not managed as coherent experiment stations but were a collection of more-or-less autonomous units with no formal relationship with the resident DAC of the extension services." This ODA report was written before the reorganization of the MOA and the shift of responsibility for station management to DAR. However, the conclusion is still valid.

As of July 1, 1988, DAR became responsible for the management of the research station. The DAR Director has appointed the head of the Seed Technology Unit as station manager at Sapu; Yundum has an acting station manager. The Director states that the station managers will be involved in the preparation of the program budget, will have the opportunity to review the component programs to be carried out at their stations, and will manage the station budget. Further, he expects the contractor's TA agronomist to advise the Yundum station manager and the ODA expert to advise on station management at Sapu. Thus, the Director expects management of the stations, particularly at Sapu, to improve.

3. Conclusions and Recommendations

- a. Monitoring of project implementation, especially at Sapu, is weak. It is unlikely to improve unless the DAR Assistant Director and Budget Officer slots are filled and the incumbents charged with monitoring functions.

- b. The evaluation team is skeptical that effective and efficient management of the research stations will be possible until:
- (1) the MOA fills all administrative and financial management positions in DAR;
 - (2) the MOA makes funds and petrol available on a timely basis;
 - (3) station managers have special training in station management; and
 - (4) station managers have the authority and capability to monitor and coordinate research activities, as well as manage the provision of support services.
- c. It is recommended that AID/Banjul discontinue funding for activities at Sapu unless the MOA agrees to accomplish b.(1) and (2) by June 30, 1989 and as soon as the research policy/priorities exercise is finished, establish a task force to develop a management improvement plan for Sapu. AID/Banjul should be prepared to support the plan with funds for improving the living conditions at Sapu and for financing technical assistance and training to support improved station management.
- d. For the longer term, the evaluation team is convinced that the research station manager position will need to be up-graded and the incumbents selected for their managerial and technical training and experience, not their longevity in the service. The managers should be capable of planning and supervising activities both on and off station. They should have training in leadership, personnel supervision, supervisory management, etc., as well as have senior researcher experience. The suggested terms of reference for the station manager of the future would include the following:
- Serves as chairman of the Station Management Team consisting of the Program Leaders, the Farm Manager, and the senior administrative and financial officers. The purpose of the Station Management Team would be advise the Station Director on research plans consistent with NARB's priorities; budgeting; coordination; resource allocation; implementation of research programs; and overall management of the station.
 - Submits agreed upon annual station work plan and budget to the Director of DAR.
 - Responsible to the DAR Director for monitoring the implementation of programs and budgets.
 - Prepares Station annual reports to the Director of DAR.
 - Encourages and promotes collaboration, at the department and station level, with the Department of Agricultural Services and NGOs and others active in agricultural development in The Gambia.

D. ESTABLISHMENT OF EFFECTIVE LINKAGES AND COMMUNICATIONS TO OTHER AGENCIES INVOLVED IN AGRICULTURAL DEVELOPMENT

1. Progress to Date

The GARD draft annual work plan states that "The Gambia has well-established ties with the International Agricultural Research Centers and with national systems in neighboring countries, notably Senegal. Although there has been a flow of information and exchanges of visits and training programs, manpower limitations and language barriers have greatly limited the extent to which The Gambia has been able to benefit from these contacts.....special attention will continue to be given to contacts with ISNAR in efforts to improve agricultural research management. Contacts will continue with IFPRI which is completing the second and final phase of a major study on the impacts of agricultural development in the Jahally Pacharr area. ICRISAT, IITA, WARDA and ILCA collectively have either regional or world-wide responsibility for most of the commodities produced in The Gambia. In the past, the Gambian research system has undertaken a broad range of trials emanating from these centers and associated research program (SAFGRAD, CILSS) to the point where the local research capacity was largely consumed in the effort. The number of research trials have been progressively reduced and are no longer the major component in the research program this year. Instead, much more relative use is being made of the innovations available from external sources in the development of a research program which more accurately reflects local needs and capacities."

The GARD plan of work has an objective to "update and confirm specific scientist-to-scientist linkages with IARCs by visits to IITA and ILCA in Nigeria and to seek to establish a relationship with Samaru Experiment Station in Nigeria."

2. Conclusions and Recommendations

- a. A relatively small agricultural research system such as the one in The Gambia should focus on adopting technologies developed elsewhere under broadly similar agro-climates, rather than undertaking basic research.
- b. The Director of DAR and the former Chief of Party of the contractor have written a paper in which they suggest a strategy for agricultural research in small-country systems. This strategy calls for maximizing the use of the international research centers and taking experiments from the regional centers to on-farm trials, by-passing to a considerable extent on-station research in country.
- c. The evaluation team supports the above approach and the project's interest in maintaining and strengthening linkages with the IARCs and regional centers. These centers can bring valuable resources to a national research system: improved germ plasm with a range of desired characteristics; information; training opportunities; and opportunities to visit other programs and meet with peers from within the region and outside the region. Currently three crop research networks are under operation in West Africa under the USAID-funded SAFGRAD-II Project: sorghum, maize, and cowpeas. Somewhat similar resources are available in millet and groundnuts (ICRISAT- Sahel center, Niamey) and cassava (IITA),

and these centers have policies and procedures to assist national programs in the region. The AID-supported Collaborative Research Support Programs (CRSPs) are yet another source of state-of-the-art technical assistance and technologies.

- d. The evaluation team recommends further strengthening of ties with the NGOs and other donor-supported agricultural development projects in The Gambia. These ties may involve doing research for the NGOs and the development projects, asking the NGOs and the projects to carry out field trials under the DAR's guidance and monitoring, and providing training to NGO and project personnel to facilitate their technology promotion activities.
- e. To make the linkages more effective, there needs to be special line items in the project budget for Networking and Collaborative Research. This would facilitate the travel of Gambian researchers to regional and neighboring research centers and permit DAR to contract special services from such centers or others. This is discussed further in Chapter X, Section D.

IV. RESEARCH SUPPORT

A. COMPUTER SERVICES

1. Progress to Date

a. Hardware

Thanks to the GARD project and the predecessor Mixed Farming Project, there are computer facilities at the Livestock Research Center at Abuko, Department of Planning (DOP) of the Ministry of Agriculture (MOA), Department of Agricultural Research (DAR), the Agricultural Research Stations at Sapu and Yundum, and the GARD project office. There were none in DAR at the outset of the project.

The computer inventory at each location as of November 1988 was as follows:

<u>Location</u>	<u>Computer</u>	<u>Printer</u>	<u>UPS</u>	<u>Stabilizer</u>	<u>Generator</u>	<u>Two-Way Radio</u>
Abuko	1	1	1	1	-	-
DOP	2	2	2	2	1	-
DAR-HQ	2	2	1	2	-	-
Sapu	2	2	1	2	1	1
Yundum	2	2	1	2	-	1
GARD Office	4	3	3	3	-	1
Under Repair or Backup	1	3	1	7	1	1
Totals	14	15	10	19	3	4

b. Software

The software inventory at each location as of November 1988 is as follows:

<u>Location</u>	<u>Office Writer</u>	<u>Lotus 123</u>	<u>Para- dox</u>	<u>SAS</u>	<u>MSTAT</u>	<u>Harvard GR</u>	<u>Mini Tab</u>
Abuko	X	X	X	X	X		
DOP	X	X	X		X	X	X
DAR-HQ	X	X	X				
Sapu	X	X	X	X	X	X	
Yundum	X	X	X	X	X		
GARD Of.	X	X	X	X	X	X	X

c. Personnel

The trained personnel at each location is as follows:

<u>Location</u>	<u>Personnel</u>	<u>Employer</u>
Abuko	Omar N'Jai Matarr N'Jie	MOA/DLS
DOP	Malik Jallow	MOA/DOP
DAR-HQ	Lamin Gassama Nuha Kujabi Bintu Nying Penda Carrol	MOA/DAR GARD GARD GARD
Sapu	Basirou	MOA/DAR
Yundum	Momodou Conteh	GARD

d. Training

All of the above Gambian personnel have received training by Patty O'Neill (PCV), Manocher Timajchy (GARD), Brad Mills (PCV), Jim Sumberg (GARD), Momodou Conteh (GARD), and Limin Jabang (PPMU). Momodou Conteh has been sufficiently trained so that he is now a trainer. Formal courses lasting from 2-10 days were given in word processing, spreadsheet/accounting, data system, national agricultural sample survey, BASICA programming language, SAS and MSTAT statistical analysis packages, and the PARADOX database software package. These initial courses were followed up by hands-on informal training. Gambian research personnel have been trained in appropriate software utilization.

e. Continuing Support

The project will continue to provide technical repair service to the equipment, purchase appropriate hardware and software, and give training.

f. Utilization

Virtually all research analyses are now computerized. Consequently, trials are now fully analyzed and most results are available for the following year's program. This is in contrast to the pre-project situation in which many experiments were not analyzed or were analyzed in a rudimentary fashion.

2. Conclusions and Recommendations

- a. The project is commended for its planning and developing of a computer services unit to support the agricultural research program. Sufficient personnel have been trained to assist the researchers in the entry and analysis of research data.

- b. The responsibility for the highly technical functions of equipment maintenance and the purchase of additional equipment, software, and supplies should not be transferred to the MOA until toward the end of the project.
- c. GARD project personnel should continue their training activities for the duration of the project.

B. LIBRARY SUPPORT

1. Progress to Date

STTA report No. 19 "Toward a National Program for Agricultural Library Information Service in The Gambia" by Mary W. Bailey gives a good account of library facilities, personnel, holdings, and equipment as of 1986. Her findings were: (a) library facilities and holdings range from nil to inadequate; (b) the infrastructure for information acquisition, processing, retrieval, and information dissemination is inadequate; and (c) the lack of trained personnel is one of the principal impediments to the development of an agricultural information system.

Since her report, the only significant improvements have been at the Sapu Research Station. A room in the office block constructed with support from ADP II was designated for the library and equipped with shelving, a reading table, a desk, and a chair. The faculty of the University of Wisconsin donated a large number of textbooks. The University of Wisconsin library donated bound copies of twenty professional journals and abstracts covering time periods of one to sixty years and the USDA Yearbook of Agriculture from 1894-1975. The library also has all GARD reports and scattered copies of MOA Annual Research Reports, FAO publications, and International Agricultural Research Centers' publications.

Sherilyn Paris, PCV, commenced her assignment as the Sapu librarian on September 15, 1988. She was also given responsibilities for overseeing the organization of collection of documents at Yundum and to coordinate these efforts with those of other departments such as PPMU and Abuko. She has contacted individual researchers to obtain contributions from their personnel collections for the library. A library committee was formed at Sapu and regulations governing the operations of the library were established. Nonrelevant materials were eliminated and the shelving of the documents was completed. Ms. Paris has written to a number of organizations, notably the IARCs, to obtain copies of publications for the library. All orders for documents, books, and journals are channeled through the library to avoid duplication and help ensure that items purchased with GOTG/GARD funds find their way to the library. She has also traveled to Senegal to arrange for exchanges of documents with the Senegalese research system on a regular basis.

It does not seem realistic for Ms. Paris to cover such a broad range of responsibilities as well as overseeing the day-to-day operations of the Sapu library. It is envisaged that she will have a counterpart in the near future who will be able to perform this latter function, but to date no one has been appointed to the position. There is also a position for a librarian based at the DAR headquarters at Yundum which has not been filled.

In recognition of the need to improve the library system, the project provided the services of Mary Bailey, a librarian from VSU as a short-term training advisor in November, 1986. In addition to detailing the current status of the document collections, Ms. Bailey's report included proposals for improving the library system. The 1987/88 workplan stated "a short-term mission last year assessed library needs and a one-year mission will be started in 1987/88 to establish a library/information system to serve agricultural research." The plan was to employ Mary Bailey, the STTA, for this position but circumstances aborted this plan. Aside from the efforts of Ms. Paris discussed above, little progress has been made since then.

The 1988 ARAB meetings approved the creation of an agricultural data library to provide better access to data sets generated by various projects, including the Mixed Farming Project, Gambia River Basin Studies, and the IFPRI/PPMU research project in addition to GARD support survey results. This data library, which would consist of data files and guides to their use, would complement the collections of documents currently being organized for the library system.

2. Conclusions and Recommendations

- a. One National Agricultural Information Center should be established, possibly located in the Gambia College library and run in collaboration with that institution. The Permanent Secretary of Agriculture should establish a task force to recommend the configuration of a National Agricultural Information System and a plan for achieving this goal--to include a schedule of actions to be taken by MOA and the GARD project.
- b. The Director of Research should canvass all agricultural researchers and find out which professional journals they would like to access. The list of desired journals should be forwarded to the University of Wisconsin where the table of contents of the incoming journals would be photocopied and sent to the National Agricultural Information Center. The center would make additional copies of the table of contents and distribute them to the unit libraries and to the researchers who have indicated an interest in that journal. Requested copies of journal articles would be sent to the University of Wisconsin, photocopied, and then sent to the Center for distribution to the requestor. This system would identify the journals utilized by the research staff. The GARD project should then subscribe to the commonly used journals. The Center would be the depository of all professional journals purchased by GARD and MOA. The Center would utilize the same process as outlined above for the journals received. The Center would need a small budget for this service.
- c. The Center should develop a computer list of all agricultural holdings and exchange this list for the list of similar holdings of The Gambia National Library, Gambia College and the research units of MOA. The list of all holdings should be distributed to all researchers after an Inter-Library Loan Service has been established.
- d. The Center should develop on-line literature search capability with the National Agricultural Library of the U.S. Department of Agriculture. This can be done through FAX.

- e. After the task force has completed its study, the GARD project should consider providing technical assistance to work with counterpart staff. If needed, the project should fund a 3-6 month U.S.-based on-the-job training program for the Gambian designated to become the head librarian.
- f. The satellite libraries should be depositories of all internal reports, FAO and International Agricultural Research Centers' relevant reports, and other publications which are less costly than journals. The satellite libraries should also contain non-professional literature for leisure reading.
- g. A professionally trained librarian should be employed at the National Center. The satellite librarians can be locally trained.
- h. All services established by the MOA and the GARD project should be within the projected capabilities of the MOA to sustain after the termination of the GARD project. The provision of professional journals by USAID can continue, however, for five years after the project is closed out.
- i. The MOA should employ a Gambian to be an understudy to Sherilyn Paris at Sapu and to become the librarian at Sapu after the departure of Ms. Paris.

C. AGRICULTURAL DATA COLLECTION AND ANALYSIS

1. Progress to Date

The Ministry of Agriculture, prior to GARD, had a Program Planning and Monitoring Unit (became Department of Planning on July 1, 1988). PPMU was established with FAO assistance. The statistical unit of the Farm Economics and Statistics section had a Director of Statistics and three senior field staff and equipment furnished by CILSS (English translation would be Inter-State Commission for Drought Control in the Sahel) and the Mixed Farming project. The unit was utilizing FAO procedures for field measurement and crop cutting. The primary shortcomings of the data system was that the coefficients of variation were too high and the estimates were released too late for policy use.

Support to DOP has focused almost exclusively upon improving the National Agricultural Sample Survey (NASS) as discussed below. In addition, the Grant Agreement envisaged DOP participation in FSR/E activities and the provision of short-term technical assistance to help PPMU undertake agricultural policy studies that would be of interest of the GARD project. The project attempted, with little success, to have PPMU become involved in the FSR/E work, and the horticulture marketing studies, participate in the task forces reviewing the component research programs, and assist in developing a monitoring and evaluation system. GARD support facilitated the participation of a DOP staff member (K. Johm) in the analysis and write up of the IFPRI/PPMU study of the impact of the Jahally Patchar project in 1987."

GARD decided to concentrate its efforts on the National Agricultural Sample Survey (NASS) and the analysis of the NASS data. Their contribution was four short-term visits by John Rowe and two short-term visits by Aaron Johnson, both from the University of Wisconsin. These two consultants

recommended that their efforts should be directed to sample design, the use of more efficient estimators, and improving the quality and quantity of resources for data collection, analysis, and summary. The immediate training needs were identified as: (1) develop a training agenda for different staff levels; (2) prepare training manuals; and (3) prepare an enumerators' manual.

During their visits the consultants:

- a. Conducted management seminars for six supervisors;
- b. Conducted a two-week training course on data analysis for 16 participants;
- c. Assisted in the preparation of the sample design, questionnaire design, and its enumeration training manual;
- d. Conducted enumerator training;
- e. Reviewed NASS procedures and made recommendations;
- f. Developed and documented the computerized NASS Summary System, which systematized the survey's data entry, editing, and estimation procedures;
- g. Evaluated the 1987/88 survey design; and
- h. Assisted with the review and preparation of NASS publications.

GARD also provided the following short-term training the U.S.:

- 4 persons in statistical analysis
- 2 persons in computer software for statistics
- 1 person in data processing
- 1 person in agricultural statistics
- 1 person in market survey study
- 1 person in program, planning, and statistical forecasting

Concurrent to this activity, the NASS hired 6 field supervisors and 36 enumerators in permanent staff positions, CILSS contributed mopeds for the enumerators, and GARD contributed one printer, two UPSs, two stabilizers, and one generator to NASS.

The result of these activities was that the 1986/87 National Agricultural Sample Survey was a success. The data were fairly accurate, the report was timely and useful. This evaluation was shared by the many people we talked to concerning NASS.

The success of the 1986/87 survey was not sustained in 1987/88. Factors contributing to the deteriorated quality of the 1987/88 data included the following factors: (1) fewer staff--one was in the US studying for a BS degree under GARD sponsorship and others were on leave; (2) new personnel

were unfamiliar with the system; (3) the mopeds were inoperative due to misuse and poor maintenance; and (4) without transportation, the enumerators could not cover the territory to collect the data.

To provide on site training of statistical and computer personnel, and to aid in the implementation of STTA recommendations, Phillip DeCosse was recruited by GARD as a Research Associate to assist and advise the Senior Planner for two years.

2. Conclusions and Recommendations

- a. DOP participation in project activities could be very useful. Given DOP's new role and its level of staffing, it is doubtful that the GARD project can expect any significant contributions from DOP beyond the management of the NASS. Even that will be in jeopardy unless:
 - The enumerator transportation problem is resolved, or at least substantially alleviated.
 - DOP management becomes more participatory, thereby promoting more informed decisions, more coordination, a comprehensive understanding of the functioning of the center by all professional staff, and higher morale.
 - DOP provides adequate and timely support services to the field staff and monitors field staff activities. Additional GOTG funding may also be needed.
 - In-country training for the new staff continues for the duration of the project.
 - The enumerator transportation problem is resolved -- or at least substantially alleviated. (In the meantime enumerator workload should be reduced. This need not entail a reduction in sample size, but could result from reduction in a particular component of the enumerators' tasks such as yield measurements. This would ensure the reliability of the yield data, while increasing the sampling error. The latter is amenable to statistical measurement; the former is not.)
- b. Unless there is a rapid turnaround in the situation at DOP, consideration should be given to requesting the transfer of the National Agricultural Data Centre to DAR (or to an expanded NARB Technical Secretariat if DAR were unwilling to take it). The evaluation team believes that DAR, with its deputy and staff positions filled, backed up by the contractor's staff, could do a much better job of supervising the survey. After all, DAR has research and survey design and implementation experience and capability, while DOP management is more oriented to the analysis and use of statistical data rather than its generation.
- c. The evaluation team remains unconvinced that the present structure of DAR provides for adequate socio-economic input into the research program. The plans to have socio-economists within some program components does not appear to be the most efficient use of limited personnel. The team

recommends that consideration be given to establishing a socio-economic unit that would:

- (1) supervise the NASS;
- (2) design and carry out other economic and social studies and surveys in support of the component research program;
- (3) provide socio-economic input into the periodic review of overall research policy and priorities;
- (4) provide socio-economic input into the design of component research activities; and
- (5) be responsible for drafting and coordinating the preparation of the annual review of farmer innovations and constraints (as recommended in Chapters II and VII).

(NOTE: The evaluation team is mindful of the concern of the Director of DAR that FSR/E-type activities can be people-expensive and have in some cases resulted, in essence, two research services. In response to the team's recommendation in the draft report for an identifiable research program for resolving farmers' problems, the Director expressed concern that a separate program might lead to unnecessary tension between commodity component researchers and researchers in the farmer constraint area. The Director stated: "I would prefer that the whole system is farmer constraint driven rather than having a separate programme on farmer constraints."

The evaluation team shares the Director's concerns, but has a more over-riding concern: that the research program will continue to be perceived as irrelevant to farmers' concerns until there is a systematic effort, and reporting on the results of the effort, to catalog farmer constraints and identify programs to alleviate or eliminate the constraints. This does not necessarily require separate on-farm research activities, but it does call for systematized data gathering and analysis. Only when that is done will it be clear whether some additional research or data-gathering is needed. The team is not proposing a separate FSR/E effort; it is calling for data gathering and analysis that is integrated into and supportive of the component research program. It takes specially trained personnel to do the kind of studies and surveys needed.)

- d. If DAR should be given responsibility for the NASS, it would be advisable to have a NASS advisory committee with representation from different parts of the MOA and other interested ministries to review periodically survey content and data collection experience and methods.

D. SOIL FERTILITY LABORATORY

1. Progress to Date

The soils laboratory at the Yundum research station has the capacity to serve all research projects in which soil fertility or salinity are factors. Well-trained laboratory assistants can perform routine analyses,

if a clear procedure has been established by the laboratory manager. The soil chemist (lab manager) can train the assistants if a functional laboratory protocol has been established.

STTA Report # 4 includes a full set of guidelines for setting up a soils laboratory. The report points out that the laboratory at Yundum lacks only a few items in order to be well equipped for its intended purposes. Conductivity bridges, pH meters, sieves, an atomic absorption spectrophotometer, and other equipment are in place. A flame photometer, some hollow cathode tubes, a grinder, and some glassware and reagents are all the basic physical inputs that are lacking.

The soils chemist has been exposed to training in two outstanding soils laboratories. The researchers need the services of the laboratory but the laboratory does not appear to be serving its intended role in DAR. The equipment is adequate. The management is not.

A consultant, Dr. Neal Wolfe, visited The Gambia in November, 1987, and made several suggestions for laboratory operations. He recommended that a task force be set up to consider: (a) the needs of several labs in The Gambia; and (b) whether consolidation into one or two central labs might be more efficient. No action appears to have been taken on these recommendations.

2. Conclusions and Recommendations

- a. Action on consolidation of the several agricultural laboratories in The Gambia needs to be taken as soon as possible. A competent analytical chemist should be appointed as director. He should be answerable to an oversight committee representing potential users of laboratory services.
- b. A competent soil fertility specialist should be identified to work with the laboratory director to set up the soil testing section of the laboratory. He should be familiar with soil testing procedures as well as soil fertility field research methodology. If no specialist is available, a promising Gambian should be sent for BS/MS training as soon as possible. In the meantime, a short-term (or long-term) consultant may be required.
- c. It is recommended that the MOA take the necessary action to ensure that the soils laboratory begins to provide needed support to the research effort.

V. TRAINING

The contract states that the contractor will:

1. provide short term trainers/advisors and training to improve the national agricultural sample survey;
2. provide short term trainers/advisors and training in statistics, experimental design, and quantitative analysis;
3. manage and coordinate the short-term and long-term training programs under the project;
4. plan and implement technical training for field workers to ensure dissemination of research results;
5. provide short term training/advisors within the context of the long range plan. This will involve the pairing of a Gambian researcher with an appropriate expatriate researcher. The expatriate researcher will schedule a series of short-term visits to help plan research, monitor progress, advise on problem resolution, and assist with analysis. The Gambian researchers will make one or more short-term training visits to the expatriate researchers' home institution to work with their expatriate counterparts.

The training programs will be reviewed first, followed by a section on training administration and planning. The final section deals briefly with relations with Gambia College.

A. TRAINING PROGRAMS — PROGRESS TO DATE

1. Short-term trainers/advisors and training to improve the NASS

This has been covered in the section on Agricultural Data Collection and Analysis (IV. C. above).

2. Short-term trainers/advisors and training in statistics, experimental design, and quantitative analysis

Some of the training reported under 1. above would also fit under this category. U.S. short-term training was provided in statistical analysis (4 people), statistics (1), and research methods (1).

3. Management and coordination of the short and long-term training programs under the project

One hundred and seventy-one Gambians have been trained in 30 short-term training programs under the contract. Of these, 136 participants were trained in Gambia, 23 in the U.S., and 12 in other countries. (See Annex B for details).

The Training Committee identified horticulture, social science, agronomy, biometrics, animal production, and farm mechanization as priority areas for training.

The number of short-term training programs and participants according to subject matter was as follows:

<u>Subject Matter</u>	<u>Number of Programs</u>	<u>Number of Participants</u>
<u>Identified Priority Areas</u>		
Horticulture	2	3
Social Science	2	3
Agronomy	2	3
Biometrics	0*	0*
Animal production	2	3
Farm Mechanization	3	68
<u>Total</u>	11	80
<u>Other areas</u>		
Statistics, Research, Data Analysis	12	31
Farming Systems	1	20
Water and Soils	4	4
Rice Policy	1	1
Laboratory Instrumentation	1	12
Networking	1	5
Program Budget System	1	21
<u>Total</u>	21	94

* Biometrics was part of the Statistics, Research Data Analysis training listed in Unidentified Areas. Biometrics was also included in the on-the-job training provided by the TA agronomist.

The names and status of participants in degree training is provided in Annex B.

The summary of degree training is as follows:

Number Enrolled by Year

<u>Year</u>	<u>Number</u>
1986	5
1987	2
1988	7

Number Enrolled by Area of Study

<u>Area of Study</u>	<u>Number</u>	
	<u>B.S.</u>	<u>M.S.</u>
Poultry Science	1	1
Agricultural Extension		1
Agricultural Economics	1	1
Agronomy	2	2
Business Information Systems	1	
Horticulture	2	
Soil Science	1	
Agricultural Education	1	
Total	9	5

The areas of study of degree candidates is quite consistent with the vacancies at Yundum and Sapu Research Stations with the exception of entomology.

4. Plan and implement technical training for field workers to ensure dissemination of research results

None has been provided under the project.

5. Short-term trainers/advisors (STTAs) within the context of the long range plans

GARD has an STTA Report Series (see Annex C) which consists of the final reports of short-term advisors plus a few reports written by long term

technical advisors. The distribution of these reports by area of training is as follows:

<u>Area of Training</u>	<u>Number</u>
Crop Agronomy	6
Soil, water/plant relationships	5
Agr. Engineering and animal traction	1
Horticulture	6
Crop protection	0
Small Ruminants	1
Poultry	2
Forage	0
Agricultural Statistics	6
Policy Analysis	0
Biometrics	0
Library	1
Research Management	3
Training	1
Administration/Finance	3
Farming Systems	2
Grazing Schemes	1
Laboratory Management	1
Agricultural Profiles	2
Livestock Research	1
Research Extension Liaison	1
Total	43

The modus operandi of the STTA program was to pair the expatriate researcher with a Gambian researcher. The STTA would then schedule a series of short-term visits to help plan research, monitor progress, advise on problem resolution, and assist with analysis. The Gambian researchers would make one or more short-term training visits to the expatriate researchers' home institution to work with their expatriate counterparts.

Of the 34 STTA reports reviewed, 16 of the STTAs had counterparts and 18 did not. In addition, three STTAs provided formal short-term training even though they had no counterpart. Thus, 19 STTAs provided training to Gambians. Seventeen of the STTAs made a one-time visit. A listing of the STTA visits and their purpose is provided in Annex C.

As implemented, the large number of STTAs overloaded the system. The Gambians complained that too much of their time was spent "educating" the STTAs; there were only 7-10 Gambian researchers to work with during the period of the visits. The number of visits also overloaded the Chief of Party and the other technical training advisors and kept them from their primary responsibilities. The 17 different areas of study and training overloaded the ability of both GARD and DAR staff to respond to the recommendations. At the request of the DAR Director, the STTA program was reviewed at the 1988 annual planning meeting (DAR, AID, and the Contractor) and it was agreed to reduce the program and tie it more closely to the requests of Gambian researchers.

B. TRAINING PROGRAMS — CONCLUSIONS AND RECOMMENDATIONS

1. A substantial amount of short and long-term training has been carried out (or at least initiated in the case of long-term training). The areas of training seem appropriate. A priority task is to ensure that the conditions of service in the research service are made sufficiently attractive to hold its trained personnel.
2. The evaluation team believes that the STTA program as set forth in the Project Paper was overly ambitious. Furthermore, a series of STTA visits to Gambia, followed by Gambian researcher visits to the U.S., to plan, monitor, and analyze research program results is a very expensive way to train researchers. This approach, which was devised in part to reduce the long-term technical assistance component of the project, would seem more appropriate at a later stage of the project when there would be a number of returned participants in the service who would have already established a relationship with potential STTAs while they were at the university.
3. The evaluation team sees value in having the resources to bring in short-term TA experts, particularly since they may be used as consultants as well as trainers. There may be more need for consultants as a more comprehensive research program evolves - reflecting the broader DAR mandate. When the STTA is coming for a training mission, the following are some questions that should be asked. What research or research support activities lend themselves to STTA training? Does the DAR have the resources to follow up on the training and recommendations? Does the objective require a single or multiple visits? Does the objective include a Gambian follow-up visit to an American institution?

C. TRAINING ADMINISTRATION AND PLANNING

1. Progress to Date

The GARD project has a Training Coordinator and a Training Committee composed of the Contractor's Chief of Party, the chief Gambian counterpart, AID's project manager, and the Director of DOP. The Committee, at its first meeting, established criteria for the selection of candidates. Later, it developed the processes for evaluation and selection of participants, and the development of the terms of reference for their training. The Committee also established a processing schedule and forms for necessary clearances and a pre-departure checklist. The Training Committee meets regularly and has done a good job of selecting qualified candidates and processing them so they could start their programs on schedule. Now that AID/Banjul has a Training Officer, the Training Committee should consider in visiting her to attend committee meetings.

2. Conclusions and Recommendations

- a. The contract universities, and especially the University of Wisconsin, have done a fine job in managing the training activities in the United States.

b. As recommended in Chapter III, the adoption by NARB of a research policy and general priority guidelines should be followed by a study of the manpower implications of the general research policy. This study would look at the long term needs of the research service for researchers in different fields, guidelines for career development, and ways of strengthening and maintaining pride in the service and a high level of job satisfaction. As part of this effort, a long-term training plan should be developed. Particular issues or components that should be dealt with or included in the training plan include the following:

- Ph.D training should be considered for at least three or four researchers who could eventually provide a leadership and training role.
- Gambians training in the U.S. should take 2-3 courses in management and leadership. Most of these Gambians will be given management responsibilities soon after their return to The Gambia. The University of Wisconsin should explore short-term seminars in management offered by USDA or other agencies for the present U.S. students.
- Candidates for long-term training should not be restricted to employees of the DAR.
- Training plans should include both long-term and short-term training.
- Consideration should be given to including the following in the training program: (1) orientation in the importance and methods of performing socio-economic research; (2) training in the design and monitoring of on-farm research; (3) training for research assistants; and (4) training in statistical analysis, management and leadership, and report writing.
- Consideration should be given to increased use of IARC's and neighboring country researchers for short-term and long-term training. For short-term training, the physical and cultural environment is more similar, travelling expenses are less, and the probability of a sustaining linkage is greater. Regarding long-term training, IITA and ICRISAT have B.S. and M.S. programs whereby the students take their course work at a nearby university and do their training and/or dissertation at the IARC under the supervision of a senior scientist.

c. The evaluation team suggests that the Committee: (1) have the candidate submit his credentials with the GARD application rather than follow up with a request for that data; (2) keep the department informed of all action taken - not just the approval of the candidate; and (3) invite the AID/Banjul Training Officer to participate in Training Committee meetings.

D. GAMBIA COLLEGE

The internal evaluation of the GARD project in 1987 stated that "consideration should be given to the possibility of developing a cooperative program with the

Gambia College. The College could provide training and could assign a number of its higher level students to work in the MOA research programs in internships".

The team concurs with this proposal, but suggests that the program should initially be for agricultural assistants who would be upgraded from a certificate to a diploma. The program's primary objective should be to train them to perform more effectively within the MOA rather than prepare them for B.S.-training in the U.S. as the curriculum in the proposal suggests.

For the longer term, consideration should be given to moving the research activities at Yundum to the Gambia College site. Strengthening the links between agricultural research and the academic activities in agriculture and livestock at Gambia College should be in the best interests of both parties.

VI. ON-STATION RESEARCH

For myriad reasons, there has not been a significant increase in the Gambian domestic food supply or agricultural exports for many years. Weather, market structures and policies, weak extension services, pricing policies, etc., have all contributed to poor agricultural performance; nevertheless, agricultural research has been singled out for considerable blame. The type and quality of on-station research has been criticized, and this contributed to the creation of the GARD project.

This chapter focuses more on proposing further improvements than on accomplishments to date. To provide a better perspective on achievements of the research service, there is appended as Annex D two tables on agricultural research achievements: D-1 -- Varieties Released to Farmers; and D-2 -- New or Improved Techniques Adopted by Farmers. The tables include data relating to the pre-GARD period as well as later developments.

Emphasis in this chapter will be placed on the following topics:

- Selection and Design of Research Projects
- Project Planning and Budgeting
- Data Analysis and Interpretation
- Reporting

Project implementation is discussed in Chapter III.C.

A. SELECTION OF RESEARCH ACTIVITIES

1. Progress to Date

The activities planned for on-station (component) research pass through a long review process in the DAR. Research proposals are developed within one of six program units within the DAR: Agricultural Mechanization (animal traction); Cropping Systems and Resource Management; Grain Legumes and Oil Seeds; Horticulture; Rice; and Upland Cereals. A Program Committee for each program is maintained to review and advise on program priorities and on the suitability of individual projects. The program leader submits the product of the Program Committee to the Agricultural Research Advisory Board (ARAB) for review. The latter recommends either approval or rejection on a project-by-project basis to the Director of DAR.

Program leaders submitted the proposals in writing and presented them to the convened ARAB in 1987 and 1988. Each proposal was open for discussion by all persons present. The process was long and tedious.

The process of selecting projects for on-station research in DAR has been improved through GARD influence:

a. Peer level technical review in Program Committees

A Program Committee was organized for each research unit in DAR. Each Committee includes representatives of other units in DAR, the extension service, and NGOs. The Committee provides a mechanism for peer review of

proposed research and of research conducted in the previous year. The concept of peer review is very important to a research system. The Program Committee system may need to give way to a less time consuming process of peer review, but the Committees represent distinct progress in the process of selecting research activities in DAR.

b. Review at ARAB level

The Gard project fostered the improvement of the research review process in ARAB. This advisory board receives the output of the Program Committees. This arrangement provides continuity in the peer review and combination of peer-management-clientele review.

2. Conclusions and Recommendations

a. On-station research should give greater priority to resolving high impact problems. A few notable successes in component problem solving would elevate the status of on-station work. On-station work should be focused more to solve component problems for researchers who are on-farm and for extensionists who are demonstrating packages of technology. On-station research is integral to the success of farming system research and extension efforts.

b. Two examples of on-station research projects that could have profound effects on crop yields in The Gambia are:

- Sorghum Selection. Sorghum grain yields have been static in The Gambia for many years. It appears to be "common knowledge" that high yields in adapted sorghum cultivars is not associated with acceptable agronomic qualities such as open panicle, long glumes, and drought tolerance. Field observations reveal highly variable plants in the same row. Because of the self-pollinated nature of Sorghum bicolor, head-to-row trials of morphologically different plants would scientifically test the "common knowledge" assumption. The diverse sources of sorghum germplasm in The Gambia could yield some rich rewards through on-station research.
- Groundnut Plant Population. Low groundnut plant population with irregular plant spacings is widely recognized as a critical problem to growers. The issue is apparently centered around seedling vigor as related to seed viability. This problem offers an excellent opportunity for on-station field and laboratory research. This work has been initiated by the PCV plant pathologist in plots in farmers' fields. Expanded activity seems justified.

c. Projects in research need to reflect more the restraints to production identified by extension workers and farmers. Three examples where this seems possible follows:

- (1) Weed Research. Visits to farmers' fields, discussions with FAO project workers, and conversations with extension personnel all indicated that weed competition is an overwhelming constraint to production of groundnuts, sorghum, millet, and rice. In an Economic

Analysis reported in February, 1988, A. Jones, et al proposed that row seeding instead of broadcasting rice would have a substantial yield effect. The gain would be realized by mechanized weed control. Experiments have been under way in researcher-directed plots on farms during the past year.

A proposal for integrated weed control was made for 1988/89 by the researchers in the Rice program. By contrast, the Upland Cereals program continues with only one weed research project. This is a Striga control project conducted in cooperation with ICRISAT. Weed competition studies are not included in the Grain Legume/Oilseed Crops program for 1988.

Recommendation: On-station research projects should be designed by plant protection researchers to determine yield losses when weeding is delayed for two or more weeks after crop emergence.

Recommendation: Advances in technology should be included in extension program microplots or on-farm demonstrations as soon as the component problem is solved by research.

- (2) Intercropping. In reference to field trials on groundnut/cereals intercropping, an STTA agronomist (GARD Report #27) recommended that each row of groundnuts be harvested and weighed separately in order to measure the influence of the intercropped cereal on groundnut yield. The STTA also recommended that crop row orientation relative to the sun be noted in intercropping experiments. Analysis of field data by row orientations would produce useful information to farmers who use intercropping.

This type of input from STTA can be helpful to the researcher. The recommendations were not included in the protocol for the project in the following year, although some of the suggested field measurements were made.

Recommendation: Ample opportunity for counterparts to learn from highly experienced STTAs should be specified in the terms of reference of the STTA.

Recommendation: Applicable STTA reports should be introduced in the peer level technical reviews.

- (3) Intercropping. The field plot plans for groundnut/cereal intercropping in 1987 included three patterns (ratio of rows) of groundnut rows to cereal row. The ratios included in the project were 3:1, 5:1 and 7:1. Extension workers report that farmers prefer to plant a 10:1 pattern of groundnut rows to cereal row; yet the project protocol for this project in 1988/89 does not include the 10:1 pattern in the plot plans.

Recommendation: Extension workers' (DAS) input in project design should be sought by the researchers.

Recommendation: DAS should have a stronger voice in the reviews of project proposals.

- d. The design of projects has improved in terms of determining the statistical analysis methods prior to planting the plots. Projects in CS/RM for on-farm testing were sometimes too complex for successful analysis or interpretation of results. Field plot designs involving nested variables probably should be reserved for testing on the two main stations. Field plot techniques that are appropriate to on-station field trials are often too complex for on-farm plots.
- e. Based on the number of field trials that have been abandoned or ruined by weeds or insects, it seems that the number of projects approved exceeds the capacity of the research system. Support services for field plot work is inadequate. In general, there were fewer projects installed on the stations in 1987 than in 1986 and fewer in 1988 than in 1987. On-farm researcher-directed projects in rice increased over these same years. Animal traction research increased sharply each year since 1986.
- f. The GARD project has brought about a better balance in numbers of projects among research units. Definite success has been achieved in increasing the emphasis on animal traction and livestock research. There seems to be considerable agreement that the total number of projects in DAR will be reduced to a manageable level.

B. PROJECT PLANNING AND BUDGETING

The scheme now in place for project plan development is very clear and exact. The forms provided to DAR program leaders guide the researchers in an orderly process. Budgeting of expenditures, vehicles, personnel at all levels, travel, training, and land use are all included in the planning guide forms. The formal guide for budget planning has been in place only a short time, but the general principles of the scheme were used by researchers last year. The new format for project budgeting demands clear, detailed planning by the researchers. It is undoubtedly a valuable tool. The monetary budget is directly related to the project protocol.

The PBS budget management program will have its first full cycle of operation during the next fiscal year. Periodic budget status reports will be released to project budget managers. Researchers will have access to current statements of their budgets. Inadvertent overruns can be avoided with the new system.

Project budget managers in agricultural research have legitimate concerns about the government's practice of releasing funds on a steady rate quarter by quarter. Field research expenditures for fuel and labor are much greater in the planting season than at any other time. In order to get the plot work done in a timely manner, the researcher is obliged to use non-standard schemes for meeting expenditure demands in the first quarter. Otherwise, the land

preparation, seeding, and the first weeding operation are delayed. The human error imposed on the research in these plots decreases the value of the data collected.

Recommendation: Budgeted funds should be made available on the schedule required to accomplish the desired results, not on a schedule designed for the general operation of government.

Station managers and researchers are not given an estimated or target budget amount before the annual budget development process is begun. Consequently, available funds are often overestimated and too many projects are approved for the available funds.

In an attempt to bring the total budgeted amount in line with available funds, the Director reduces line items within a project. This will disrupt the whole process of budget management unless the project purpose and protocol are changed before the project budget is reduced. If projects are ranked in order of priority, then a project should be dropped when the funds available to a program are reduced.

Recommendation: When it becomes necessary to reduce the budget of a DAR program, the project of lowest priority ranking should be deleted from the approved list.

Recommendation: Line item amounts should not be reduced without first allowing the project plan to be modified by the program leader.

C. DATA ANALYSIS AND INTERPRETATION

1. Progress to Date

Interpretation of data from biological experimentation through the methods of inferential statistics is dependent on proper experimental design. The design of DOA on-station research projects has improved since the initiation of the GARD project.

Data analysis capabilities in DAR has increased many fold with the introduction of the MSTAT package and the access to the SAS computer package. Access to these two analytical packages on micro computers has no less than revolutionized data analysis in the DAR. Orientation of researchers has been initiated rapidly. Training capabilities among the GARD and DAR personnel is certainly adequate.

The combination of proper design of experiments for statistical analysis with excellent computing facilities is a very positive factor in research improvement. An STTA reported in 1987 that more research projects in 1987 than 1986 included the analysis plan. The calculation of degrees of freedom and the derivation of errors terms previous to installation of a biological experiment is an indication that adequate thought has been put into field plot design.

The capabilities for calculation of complex analyses are resident in the statistical programs in use by GARD. The powerful regression analysis program in SAS opens very useful analysis procedures to the research organization.

2. Conclusions and Recommendations

- a. Continual vigil is required in the review of research proposals and of project reports to avoid misuse of statistical analyses. Examples of misuse of the Least Significant Difference (LSD) are in the new project reports submitted to ARAB. The reference (check, control) variety or treatment is often not specified in the report tables. This implies that LSD is an adequate statistic for separation among means instead of only between the reference variety and each other variety. Tables were presented that included separation of means notations (a, ab, b, c) followed by an LSD value.
- b. Statistical significance can be measured at various levels of probability depending on the stated objectives of the research. It is very economical and often instructive in agronomic research to run probabilities at the .10 .05 and .01 level.
- c. Senior researchers and technical advisors should conduct in-service seminars on data analysis and interpretation.

D. REPORTING

1. Progress to Date

The program review date of ARAB provides a convenient absolute deadline for reporting results from the previous year. The reports in 1988 varied widely in quality but indicated an awareness on the part of some researchers that reporting is necessary in a research system. Many project reports have not been submitted on research from last year. Tolerance of tardiness in report submission indicates lack of discipline in the system.

GARD has provided a reports editor for the project and DAR. This is a positive step and will bring more uniformity to report writing. The plans to produce an advanced research report series (GARP) is a timely effort initiated by GARD.

GARD has helped re-instituted the Annual Research Report after a hiatus of about 10 years.

Clear report writing is widely recognized as an indication of clarity of thinking. The philosophy that good research includes good writing is beginning to be accepted in the DAR. Progress reports could be effective to record the status of a project.

2. Conclusions and Recommendations

- a. Reports are the only picture that many of research's clientele will see. It is of great importance that emphasis be placed on writing reports of high quality.

- b. The GARD project has brought about a change in direction in the area of research reporting in DAR. Under its urging, research information from the five years prior to the project was gathered and written. The peer level technical review system in the Task Forces and ARAB served to stimulate research reporting. Some annual progress reports are not as complete or as timely as desired, but the GARD plan for improvement in reporting is bringing a positive change.
- c. Proposals for a subsequent year's funding should not be entertained by ARAB until an adequate report is submitted on the previous year's work.
- d. Senior researchers and TA experts should form seminars and review panels on report quality.

VII. FARMING SYSTEMS RESEARCH AND EXTENSION PROGRAM (FSR/E)

A. PROJECT STRATEGY

The GARD Project Strategy of improving the effectiveness of agricultural research was based on three major considerations. "First, the system must produce results which are relevant to the needs of its clients: farmers, extension workers, policy-makers. Second, these must be extended and utilized by clients. Third, the entire system must be institutionalized within the GOTG such that it can be sustained after the conclusion of the Project." (Project Paper, page 7).

To implement the project strategy a two-pronged effort was proposed: "(1) the long-term institutionalization of an effective, applied agricultural research system; and (2) the development, promotion, and adoption by farmers of improved agricultural technologies as early as possible" (PP, page 10). To achieve the latter, Farming Systems Research and Extension (FSR/E) was chosen as the means. In choosing FSR/E as the means, it was sought to produce research results relevant to the needs of clients, test and extend technologies in collaboration with the Extension Service and the NGOs, link the research system to its clients and thus accelerate the process of technology transfer and adoption. This was reflected in the following statement:

"....., assigning priority to institutionalization does not mean that substantial attention will not be given either to producing research results or to ensuring that research results are extended to farmers. Within the research system, major emphasis will be given to the expansion and strengthening of Farming Systems Research and Extension (FSR/E) activities aimed at identifying, testing and extending improved technologies to farmers in collaboration with the Extension Service and private voluntary Organizations (PVOs). FSR/E is an approach designed to link the research system to its clients and to accelerate the process by which relevant technologies are identified and eventually utilized by agricultural producers. FSR/E in collaboration with the enhanced component research programs must produce results to gain the necessary recognition and acceptance, and ensure the longer run effectiveness and survival of the agricultural research system. The Project will retain the production of research results as a major objective and allocate resources accordingly." (PP, page 9).

FSR/E is basically a process of making the research relevant to the needs of the clients (rural producers, extension organization, and policy makers). This involves the following processes:

- understanding rural production systems, such as current practices, resources, constraints, problems, and opportunities;
- translating the understanding into a research agenda (on-station and on-farm). When implemented, the research results will relieve constraints, and lead to increased production and/or productivity;

- testing research results (technologies) under farmers' circumstances to ensure their suitability;
- obtaining client feedback on the technologies tested; and
- based on the feedback, either proceed with large scale promotion (positive feedback), or revise the research agenda, or continue the test-retest-adjustment process over a reasonable period of time.

At least two models are prevalent for institutionalizing FSR/E:

1. a separate organizational unit within a national agricultural research system complementing commodity and discipline-oriented research; and
2. a participatory model in which commodity and discipline-oriented researchers systematically interact with the client system in a coherent way to ensure the process of collaboration and linkages.

The two models are distinguished in a number of ways. First and most important, Model 1 is organizationally separated from the component/commodity research programs. It is a unit set apart with its own full time staff and budget. It may have operational linkages with other research programs, but is not part of them. The critical division of labor with the component/commodity research programs is between on-farm and on-station research -- the FSR/E unit has responsibility for most or all on-farm research whereas the other programs focus upon on-station research and external linkages with IARCs, etc.

Under Model 2, individual research programs are responsible for both on-station and on-farm research activities for the specific commodities/components under their jurisdiction.

Model 1 units may have broad mandates covering both crops and livestock with a full complement of staff representing a full range of disciplines, especially in larger research systems. In theory at least, research is undertaken by multidisciplinary teams working on a range of issues facing one or more specific farming systems. As a result, the research may be more holistic in character -- with assessments of the secondary and tertiary impacts of proposed interventions in addition to the primary impacts.

Under the second model, individual researchers characteristically participate in both on-farm and on-station research in specific subject areas/commodities. Mandates often cover the entire country rather than specific regions within the country. Fewer disciplines are often represented in a specific research task than may be the case with Model 1. The focus is upon the primary impacts of specific interventions and the constraints to increased production/productivity of the specific commodities.

B. FSR/E UNDER THE GARD PROJECT

Institutionalization of FSR/E in The Gambia began in 1985 prior to the inception of the GARD project. Following a workshop on FSR/E methodology presented by FSSP, a series of field visits were made by teams representing different disciplines, including agronomy, economics, and extension to assess farming systems and to monitor the progress of on-farm demonstration trails in the eastern part of the country.

In early 1986, two STTA missions by John Caldwell resulted in the formation of a Horticultural Research Group which carried out reconnaissance surveys of horticultural producers in the western part of the country to assess constraints and areas of possible improvement. The group also designed trials for possible implementation during the following dry season.

In May 1986, immediately following an FSSP workshop on on-farm trials, two consultants associated with FSSP (Poey and Caldwell), in collaboration with Gambian researchers and GARD TA staff, designed an FSR/E approach which generally conformed to the description in the Project paper. FSR/E steering committees were created and based at Yundum and Sapu to cover the western and eastern parts of the country respectively. Steering committees were composed of senior representatives from the research and extension services of the Department of Agriculture (DOA), Department of Animal Health and Production (DAHP), Crop Protection Service (CPS), and the Program Planning and Monitoring Unit (PPMU). Four Pilot Area Teams (PATs) were created, two in each region. Pilot area teams were supervised by their respective regional FSR/E steering committees.

Each pilot area team consisted of a Research Assistant from the DOA, a District Extension Supervisor (DES) in the pilot area, a Livestock Assistant from the Department of Livestock Services (DLS), and the Divisional Supervisor of PPMU (DS-PPMU). Personnel were assigned to serve on the PATs, and were expected to move and reside in the assigned pilot area. In only one instance was a move actually made. Special efforts were made to motivate those assigned to PATs to move to the pilot areas by providing motorcycles and gasoline to assist with survey work and attend bi-weekly meetings. However, these special incentives were insufficient.

The activities of FSR/E steering committees and PATs during the 1986 season consisted of the following:

- review of existing data on soils, climate, and farming systems;
- reconnaissance visits, surveys, etc;
- trials at Mixed Farming Centers and on farms; and
- participation of researchers in the FAO-sponsored Fertilizer Demonstration Trials Program.

The outputs of the 1986 FSR/E activities were:

1. District Agricultural Profiles (DAPs) for three out of four pilot areas.
2. Identification of research themes designed to overcome the constraints to improve productivity for the farming systems in the areas, e.g., water infiltration to reduce run-off, soil fertility strategies for efficient use of limited fertilizer, mechanization strategies for lowland rice production, diversification of farming systems in the North Bank, etc.
3. Trial and survey results from specific activities carried out on-farm and on-station, e.g., the Elias report on Water Control Projects.

The effort was not carried out as had been planned and the results were considered inadequate in relation to the resources devoted to the effort. Some of the reasons for the less than satisfactory performance are:

- The farming systems and on-farm research activities were ambitious and not planned well. They were super-imposed on an already approved ambitious component research program.
- Four PAT members were drawn from four departments; none were specifically charged with control and responsibility. The team did not seem to have a common set of objectives.
- There was limited participation by extension personnel.
- Steering committees were inexperienced in the FSR/E approach and methodology. It was not clear who among the steering committee had specific supervisory authority. No one seemed accountable.
- The disincentives to field activity by Gambians in the research service and other departments outweighed any conceivable benefits of participation in the activity.

The experience in 1986 led to a serious rethinking about the organization of agricultural research under the DOA. A special meeting of the Agricultural Research Advisory Board (ARAB) in 1986 made the decision to reorganize research programs and "fold" FSR/E into the commodity programs.

The reorganization, which was implemented in the 1987 crop season took the following form:

- Integrate the FSR/E process into the component program, rather than create a complementary structure of FSR/E teams.
- Organize the research program into six commodity programs.
 - Upland cereals (Sorghum, Millet, Maize, Minor cereals)
 - Grain legumes, oil seeds (peanuts, cowpeas, sesame, etc)
 - Cropping systems - Resource Management
 - Rice
 - Agricultural Mechanization
 - Horticulture (Fruits, Vegetables).

The following mechanisms were designed to integrate FSR/E processes into the on-station research"

1. Establishment of six task forces to provide multi-disciplinary input into the commodity-component research.
2. Clustering the multi-locational sites and on-farm testing sites around four "typical sites" representing different ecologies. The office was located at the Mixed Farming Center which also was the headquarters of DES. These centers are essentially sub-stations or satellite experimental stations to conduct multi-locational testing or other on-station type of experiments. The villages around the four cluster centers were to serve as on-farm research sites.

3. Bi-monthly research-extension workshops to exchange information.
4. Participation in demonstration trials with the FAO-Fertilizer Project.
5. Participation in ADP-II micro-plot activities.

The consequences of the reorganization were:

- Multi-locational and on-station trials were located at or near the cluster centers.
- Research themes from 1986 on-farm research were incorporated into 1987 research programs: groundnut density, fertilizer rotations, alley cropping, etc.
- Animal traction was used for lowland rice production.
- A cowpea promotion program was organized with CRS.
- Farmer surveys were conducted, e.g., fertility maintenance, groundnut stand survey, feed management, etc.
- Researcher-managed trials on farmers' fields within cluster areas, e.g. sorghum varieties, fertilizer application, etc.

C. OBSERVATIONS ABOUT THE RE-ORGANIZED FSR/E EFFORT

While the 1987 effort attempted to capture some of the elements of FSR/E approach, primarily multi-disciplinary input into the on-station trials, and focused interaction with farmers at the cluster areas, there were a number of shortcomings.

- A serious lack of interdisciplinary interaction at the field level.
- The quality of the on-farm research was poor; many on-farm trials were lost due to poor supervision. Farmer surveys, however, were generally well conducted and documented.
- A breakdown of relationships between research and extension since researchers retreated to cluster centers.
- A continued perception of cluster staff as on-station researchers.
- Lack of a cohesive research effort within cluster areas themselves.
- Inability of task forces to prioritize and to focus on specific research themes suitable to the environments represented by cluster areas.
- Farmers and district extension staff played no direct role in the programming of research activities within the cluster areas.

The FSR/E approach during the 1988 season pretty much continued that of 1987, except that two cluster site coordinators were appointed for the two sites in the western region. Research took the form of multi-locational on-farm tests managed by researchers and based on themes derived from the 1986 and 1987

surveys. On-farm research during the 1988 season consisted of about six thematic studies across 21 locations with farmer-managed on-farm tests mostly in the rice production system.^{1/}

D. SUMMARY OBSERVATIONS ON FSR/E AND ON-FARM TRIALS

1. The attempt to introduce the Farming Systems Research and Extension (FSR/E) approach as an integral part of the agricultural technology design and development process has faced a number of constraints, including a small and weak NARS, weak leadership from the NARS, faulty structuring of field teams, and insufficient time of Gambian researchers.
2. Although several Gambians were trained in FSR/E concepts in short courses, none seem to have had practical experience in the methods of FSR/E. It was also not clear whether those trained in FSSP-conducted courses were assigned to the effort.
3. FSR/E activities to date have produced a rapid reconnaissance survey, three district profiles, about six thematic surveys and reports on issues related to production. These are likely to improve the relevance of the on-station research projects.
4. On-farm tests under farmer management have not been given priority by most of the component programs. Results of the 1986 tests were largely unreliable, while several of the 1987 tests are yet to be analysed and reported. The rice program has been a notable exception.
5. On-farm research on inland valley rice production conducted during the 1987 and 1988 cropping seasons, both researcher-managed and farmer-managed, was impressive. The trials proceeded with a thorough review of available experiences and data (on rice research, animal traction, in-land valley rice practices, socio-economic conditions, interplay between women and men's cropping systems, etc.) in determining the design and approach. In 1987 researcher-managed on-farm tests were conducted with 15 farmers in 3 valleys. A reconnaissance survey conducted in early January 1987 formed the basis of the 1987 research proposal. Results of the 1987 on-farm research were used to design and implement 1988 on-farm tests managed by 57 women farmers in 3 villages. The critical constraint of weed control was addressed in these tests by mechanization of one rice planting, by ploughing and transplanting, or by direct seeding using super-eco rice seeders. One of the four improved varieties, depending on the environment, was tested with the local variety and traditional planting methods in a simple two-plot design.
6. The present system relies almost totally on the component program leaders to determine the needs for FSR/E research and to carry out any on-farm trials that may be deemed necessary. Aside from being vulnerable to the variations of interest that the different research

^{1/}Some of the trials on the farmers' fields under researcher management, with 2-3 treatments and 4 replications, are appropriately called multilocational trials rather than on-farm trials under farmer management.

leaders have in FSR/E and on-farm work (which currently has built in disincentives), the system is not systematically reviewing farmers' constraints to determine whether new research programs should be established or different types of trials are needed in existing programs.

7. Multi-disciplinary task forces, including the participation of extension and other promotional agencies, have no doubt contributed in some measure to the increased relevance of on-station work. There is a feeling among the client system that task force procedures are cumbersome and time consuming and that interactions within the task forces need to be improved in quality.

E. CONCLUSIONS AND RECOMMENDATIONS

1. The project attempted to implement FSR/E as required in the Project Paper, but it was not well structured and the general approach was unsatisfactory. A different approach of incorporating FSR/E procedures into the technology development process is now being used.
2. While acknowledging the need for improvement, the Director of Agricultural Research maintains that FSR/E is incorporated, as needed, into each component research program.
3. Because of the firm position of the DAR Director, the relative scarcity of trained personnel, and the dis-incentives in the system for field work, the evaluation team does not feel that it would be helpful at this time to try to insist that the original Project Paper proposal be implemented.
4. The evaluation team does believe, however, that a more comprehensive and integrated research effort in production systems and farmers' constraints is needed to ensure that farm level constraints are addressed in the research program. This is particularly true now that the scope of research activity for which DAR is responsible has been expanded.
5. Priority should be given, as a part of the exercise to establish priorities, to reviewing existing surveys and reports and interviewing personnel in extension, NGOs and other development projects to catalog farmers' constraints and innovations. This is needed as input for the priorities exercise; it should also serve as the basis for a farmers' constraints element in the research program and more appropriate design of some of the other components' activities. It will also demonstrate to extension and the development agencies that research recognizes that the farmer is its most important client. The inland valley rice research provides an example of how other programs might operate in this regard.
6. A comprehensive report should be submitted each year to NARB on developments in the relationship between the production systems and their constraints (social, economic, technical, policy), the research that is being undertaken and planned to develop technologies to mitigate those constraints, and actions needed from other parts of the GOTG to ensure that new technologies can be profitably adopted by the farmer. This activity could be undertaken by a new DAR unit charged with administration of agricultural surveys and socio-economic studies (see IV.C.2.c.).

VIII. TECHNOLOGY PROMOTION

Technology transfer and promotional activities supported by the project are discussed at two levels:

- Research-Extension linkages which contribute to the transfer of technologies (communicating with extension and development agencies, sharing research findings, training of extension personnel, and incorporating farmer feed back into the research program).
- Support to discrete promotional programs: cowpeas; rice and millet.

A. RESEARCH-EXTENSION LINKAGES

1. Progress to Date

Since the inception of the project, a number of mechanisms have been evolving to bring about greater interaction and collaboration between the research and extension systems to facilitate the development of relevant technologies and their transfer. The following mechanisms have become operational:

- Research Program Committees, in which Divisional Agricultural Coordinators (DACs) participate in the review of results and contribute to the research proposals to be submitted to ARAB.
- Participation of senior extension managers (Director and Assistant Director of Extension) in the ARAB meetings which review results and approve research programs.
- Field days conducted at the research stations and cluster centers which are attended by extension personnel and farmers.
- On-Farm trials: Multilocational trials, cluster-site trials, demonstration trials, and micro-plots (which are funded by the ADP-II project).
- Bi-Monthly Research-Extension workshops (T&V workshops under ADP II). These workshops provide a forum for passing out research recommendations, trouble shooting specific field problems, and imparting problem-oriented training.

Unfortunately, most of these mechanisms are still rather weak and need nurturing to make them effective and productive. For example, there has been less than full participation of extension representatives in some of the Program Committees. Not many researchers attended the T&V bimonthly workshops regularly. Researchers feel the workshops are too structured for them to make an effective input - they would need to become involved earlier.

Similarly, participation of researchers in micro-plots has been very limited. Each village extension worker is supposed to put out some 50 microplots and researchers do not have enough time to backstop this effort.

The recent separation of extension and research organizationally, while demonstrating GOTG recognition of the importance of these services, has exacerbated the problem of ensuring collaboration of the two services.

Research-extension linkages have no doubt been adversely affected by the two GOTG-wide personnel reductions and the July 1, 1988 re-organization. Further, the extension service has not been receiving much training, and it is trying to implement what appears to be a rather rigid approach in a changing society. The research-extension liaison officer (RELO) position in the research service is also a new approach in Gambia to foster linkages.

Although both the Director of Agricultural Services (which includes extension) and the Director of Agricultural Research are committed to closer ties between their services, their deputy positions have not been filled and they cannot devote the time needed to review the linkage problems and develop solutions.

2. Conclusions and Recommendations

- a. In the first draft of its report, the evaluation team proposed that the Directors of DAS and DAR assign responsibility for research-extension collaboration to their deputies, bring in a short-term consultant¹ and, if supported by the short-term consultant, upgrade the RELO position to advise and assist the two deputies.

The following reactions were received to this proposal:

- The Director of DAR accepted the first two suggestions, but did not favor the third.
 - The NARB agreed on the importance of the research-extension linkage and intends to devote a session to the issue. However, it felt that the RELO, if needed, should be located at the working level.
 - Virginia State University representatives pointed out that some of the action ideas mentioned in the first draft (Annex E) were recommended in STTA Report No. 42 of March-April 1988, and that an additional consultancy from Virginia State University was scheduled in the current work plan. They were also concerned about the proposed up-grading of the RELO TA position, fearing it would place excessive demands on the managerial capacity of the system.
- b. Given all the foregoing, the team concludes that the research service, pending positive outcomes from the actions proposed in c. below, and/or other actions to strengthen the effectiveness of the extension service, should give priority to utilizing and expanding its linkages with the NGOs and development projects -- for information gathering on farmers' constraints and for help in carrying out on-farm trials.

¹/ Dr. Curtis Trent, who is now retired from the University of Arkansas and is serving as a consultant, and who previously filled a high-level RELO position in Nigeria and Botswana. In Botswana, he was also a member of an FSR/E team.

- c. As soon as its research priority setting exercise is completed, and assuming the concurrence of the Director of Agricultural Services, DAR should request the proposed STTA visit by Virginia State University. Given Dr. Trent's successful work in Africa, it is proposed that he be invited to participate. The result of the visit should be an in-depth report on why existing mechanisms are not functioning optimally, how they can be improved, and what other steps or mechanisms are needed. This could provide the basis for a meaningful NARB review of the problem. Another result could be a joint DAS-DAR memorandum of understanding, as suggested by Virginia State University, which would clearly set forth the importance each Director gives to strengthening the collaboration between the two services and set forth programs to implement the agreement.
- d. In the meantime, there are some additional supportive activities that the RELO could be promoting:
- (1) It has not been possible to locate up-to-date written research recommendations. Everyone said they exist. But none was able to produce copies. Separate bulletins for each crop should be produced with whatever recommendations are available. The RELO should take the lead with counterparts in documenting available recommendations and, after appropriate review, pass them to the extension service, for reproduction and distribution to extension agents.
 - (2) Opportunities for researchers to use the existing radio program (30 minutes per day) should be exploited. A message or advocacy by a researcher can reinforce the work of village level workers. Special topics (e.g. the problem of low groundnut stands) should be identified, detailed scripts written, edited, translated into local languages, and presented/read over the radio. RELO and his counterpart should take the lead in organizing radio programs. The script should be written by the concerned researcher who should be given credit on the airwaves.

B. PROMOTIONAL PROGRAMS

Promotional programs have a distinct advantage of focussing on a specific activity, targeted to a specific group within a limited geographic area, and deploying appropriate resources to achieve an impact.

1. Progress to Date

Two promotional efforts have been undertaken under the Project and are discussed below. In addition, a write-up on the sesame program promoted by the Catholic Relief Service is presented for reference as Annex E; some DAR/GARD research support to this activity may be appropriate. The two GARD-supported activities are:

- Cowpeas program promoted by the extension services and Catholic Relief Service; and
- Rice and Millet program promoted by Save The Children Fund.

a. Cowpea Promotion

The Cowpea Promotion Program was started in 1987 as a collaborative effort between the DAR, extension agencies, and Catholic Relief Service (CRS). A number of varieties had been tested on-station during the previous seven years. These varieties were received from SAFGRAD and IITA. CRS had also been investing efforts in promoting cowpeas with the aim of improving nutritional status and income of rural households. The objectives of the promotion program were (1) to revive the cultivation of cowpeas and (2) to test under farmer conditions four varieties of cowpeas.

The program was introduced in four divisions of The Gambia; CRS was responsible for the program in two Divisions (NB, WB) while the DOA was responsible for the program in the other two Divisions (MIDS, URD). Technical support was provided by the grain legumes and oil seeds program of the Agricultural Research Service. Four varieties were tested -- TVX-3236, TN-8863, CB-5, and Mounge (local) -- in 12 on-farm tests (plot size 1/8 ha; 42 X 30 divided into four unreplicated blocks of 9x30 M).

The promotion program was comprehensive. The recommended package of practices were fertilizer 15:15:15, seeding in rows, 3 sprays, etc; field days and cooking demonstrations.

The results were generally welcomed by farmers. Yields ranged from 750-1000 kgs. Farmers' preference varied from white-grain (true Blackeye pea-CB-5), though low yielding, to those resistant to insects (TVX-3236 and TN-8963), to the one with a high yield.

Post harvest follow-up indicated that CB-5 and Mounge were susceptible to stored grain pests in spite of seed treatment. Several farmers expressed willingness to join the promotion program the following year and were willing to bear the cost of inputs. Two research themes emerged, viz: testing two vs three sprayings; and on-farm testing of varieties with desirable characteristics. Economic analysis showed that profitability of cowpeas is sensitive to a yield reduction of 25%.

The Program is being continued during the 1988 season in six divisions with 15 farmers in each division. In each division five farmers are monitored by DAR's grain legumes unit.

b. Rice and Millet Promotion Program

A rice and millet program (RAMP) is implemented by the Save the Children Fund -- SCF(USA) -- organization. The program is supported by OAR/Banjul funding (\$227,624 over two years using GARD project funds). SCF-USA emphasizes Infant-Maternal health to reduce mortality, improve school enrollments, and rural income-generation activities. SCF-USA operates in the North Bank Division (NBD) which represents an upland-rainfed production system. The program is multi-sectoral, divided into high and low impact areas, working in 10 villages with about 5000 population. A staff of 50 (including 3 expatriates) are involved in this pilot program reaching to the village level. RAMP presents an opportunity for the GARD project to assist SCF and the research service to transfer technologies to farmers.

Major program activities are:

- Rice production
- Millet Production
- Seed multiplication
- Seed storage
- Vegetable gardens
- Blacksmiths
- Bakery and fishing groups

SCF four years ago obtained a variety from the South Bank (Peking^{1/}) and introduced it to farmers. It has received wide acceptance in the area. A second variety was obtained through the GARD project.

Millet is another crop RAMP is working with. Millet is a staple of the North Bank. STC/USA obtained the seed of the variety SOUNA BADO LAEBI from the FAO/Banjul program. It is an early maturing variety with acceptable food quality and, due to its long bristles, is resistant to head borer, diseases, smut, and birds.

The variety was first identified under the CILSS (AID funded) Integrated Pest Management Project in The Gambia and the results were reported in 1986. It was reported to be more resistant to pests (weaver birds, head lover, blister beetles) than the local white souna variety. Due to the keen interest from DAR, DAS and the FAO fertilizer project, a second round of demonstrations were conducted: 3 with fertilizers under the FAO fertilizer project and 11 under farmer conditions with no fertilizer. In the two sets of demonstrations (1986-1987) the demonstrated variety yielded 16% more grain than local varieties under similar conditions (range 450-730 kg)/ha. Differences were statistically significant.

2. Conclusions and Recommendations

- a. NGOs seem to be active seekers of technologies and innovations from within and outside the national system, e.g. cowpea variety CB-5^{2/} obtained from Senegal, sesame varieties from 3 countries, animal drawn technology for processing millet from Gossas, Senegal. Research needs to work more with NGOs in testing and adapting innovations.
- b. The RELO should consider increasing his interaction with NGOs to identify their training and information needs.

^{1/}The Peking variety was released by the research service as an upland rice variety some four years ago. Some researchers say it is not a high yielder, susceptible to blast, and too short to be convenient to harvest because women harvest rice by picking individual panicles.

^{2/}CB-5, although susceptible to insects, seems to have the preferred grain color and taste. Tests under the cowpea pilot program should provide opportunities for introducing other varieties.

c. OAR/Banjul's approach to funding specific promotional programs (e.g. CRS and RAMP/STC-USA) is a step in the right direction and should be continued whenever specific opportunities are presented. Transfer of technology via private non-governmental efforts is likely to be cost-effective and likely to lead to impact areas from which further diffusion and adoption would occur.

IX. LIVESTOCK ACTIVITIES

The Project Paper has a long discussion regarding the livestock situation in The Gambia, based primarily upon a review and explanation of the Mixed Farming Project (MFP).

The Project Paper included a number of possible areas of attention for livestock research, including forages, crop residues, small ruminants, poultry, fallow improvement, and living fences. Aside from continuing the forage work of MFP, the only livestock related research during the first three years of the project was supposed to be exploratory in nature, to better define the focus of work during years 4-7 of the project. Special attention would be devoted to external networking with ILCA and research and development institutions in neighboring countries with a view to identifying innovations which had been successfully introduced elsewhere in the Sahel. In short, no major effort in livestock research was envisaged during the first three years of the project.

A. PROGRESS TO DATE

Between the time of the design of the project in early 1985 and the initiation of project activities in 1986 additional questions were raised about the priority that should be given to forage research in the light of the very limited progress that had been made by MFP in getting farmers to devote resources to the production of animal feed. Accordingly, it was decided to suspend efforts to fill a one year TA position in forage agronomy pending a more complete review of livestock research priorities.

Following the STTA mission of Drs. Yuill and Homan of the University of Wisconsin (UW) in September/October 1986, a livestock research planning workshop was held in Banjul in December including representation from DLS, DOA, and PPMU. Both research and extension staff were present. The report of the workshop, which was issued in 1987, detailed a research program in small ruminants, feed management, poultry, and animal traction. At that time it was decided to begin the process of locating a senior TA to assist with the implementation of this effort in view of the limited experienced manpower available for implementing the proposed research program.

During the first half of 1987, DLS commenced programs in small ruminants, feed management, and animal traction, the latter in collaboration with staff from DOA. The initiation of long-term training programs for two poultry research staff resulted in the decision to postpone village level poultry work. Aside from a review of MFP deferred grazing activities in June 1987 (one year after the end of MFP) with the assistance of Steve Lawry, an STTA from UW (STTA Report 23), progress in implementing the research programs was very limited. A shortage of experienced staff was the major factor.

The GARD project agreed to provide support for two Gambian researchers to work as consultants to DLS pending decisions on their applications for regular positions in the Department. One of these was subsequently hired and is now in the research unit (Mahtar Njie). The project also agreed to move up the provision of senior technical assistance by one year. Jim Sumberg spent

approximately 2 months working with the Research Unit in the fall of 1987 and returned for a one-year assignment in January 1988. He departed in December 1988 and will be replaced by Jess Reed as a GARD LTTA beginning in February 1989. The research unit has also been provided with the part-time services of the GARD TA in agricultural economics, Elon Gilbert, since March 1988.

Sumberg argues in the report at the end of his 1987 mission (STTA No. 38) that it is appropriate to understand the success or failure of past livestock research activities, not only those of the DLS/GARD project but all such projects in West Africa. He states that the key responsibility of the long-term technical assistance position should be to assist DLS to examine critically the many assumptions about livestock production in The Gambia. One approach he suggested was to initially focus attention on the assumptions previously made through field work and analysis of existing information in livestock production, feed management, and socio-economics work. The objective of the work would be to build a better understanding of the context and the constraints to the various livestock production activities in the country. The information gathered would be useful in determining the type and level of research and technical support required.

During 1987 and 1988, the research unit in DLS has followed this approach, particularly in the feed management area. Following the assessment of deferred grazing sites in June 1987, the unit developed and implemented a research program to assess the production, marketing, and utilization of groundnut hay. Another study reviewed the feed resource balances by division and concluded that the feed situation was much better than earlier estimates by MFP had indicated. Perhaps the most important single variable is the timing and extent of bush burning in various parts of the country. If burning can be reduced or eliminated, feed resources should be at least adequate in most years given the current livestock population levels. Accordingly, a survey of burning was initiated in late 1988 designed to determine the extent and causes of burning.

DLS initiated investigations on the health and management of equines, the most important source of animal traction in the country. A national survey in late 1987 revealed major imbalances between mortality and foaling rates for both donkeys and horses, resulting in heavy dependence on imports from Senegal to sustain herds. The research unit hopes to explore ways of reducing mortality and increasing foaling rates which could save farmers a major portion of what they now spend purchasing replacement animals. A review of the evolution of animal traction in The Gambia was also completed in 1988.

Poultry Development

Data summarized at the time of the STTA visit of Drs. Yuill and Homan to The Gambia in September 1986 suggested that major poultry populations were found roaming free in the villages (estimated to be about 280,000 birds). The total numbers were less near urban areas than in the housed and more intensive production facilities which consisted of about 20 farms containing 1,000 birds or less (with a total of about 16,000 to 24,000 birds). Interviews in several villages in late November 1986 provided assurance that the village people wanted to produce more poultry and that they ate eggs and poultry meat when they were available.

In December 1986, the Livestock Planning Workshop identified the following objectives for improving poultry production in The Gambia: 1) determine the performance of two egg-laying strains under commercial conditions; 2) determine performance of chickens fed rations formulated with locally available ingredients; and 3) determine the effectiveness of live virus vs. killed virus vaccine during brooding and rearing periods.

Lisa Grobar concluded in her early 1988 STTA visit that the commercial poultry industry in The Gambia was producing about 124,000 broilers and spent hens as well as about 4 million eggs annually. In his June 1988 STTA visit, Dr. Bernard Wentworth found that broilers were being produced in excess of 200,000 annually with unusual profitability. He concluded that production efficiency among The Gambian producers surveyed matched that of Western Europe, the United States, and Japan with 2 kg broilers being produced with 4 kg of feed in 6 weeks and 5 days (using imported feed at D114/50 kg).

Also in 1988, DLS researcher Mahtar Njie successfully completed a feeding trial at Abuko comparing different poultry breeds. Additional work in poultry awaits the return of the two researchers now in training in the U.S. Patricia Andrews is expected to return in August 1989, Ellen Secka in December 1990.

Status of DLS Research Unit

Within the DLS is a Research and Investigations Section with a Senior Veterinary Investigation Officer in charge. Additionally there are seven other Veterinary Officers. There is a Senior Animal Husbandry Officer assisted by other animal husbandry officers; three animal husbandry officers have been involved in GARD-supported activities.

The Director of DLS has returned to his native Ghana, and a replacement will be designated. Additionally, there have been large cuts in personnel as part of the general retrenchment. A Cabinet decision has been taken recommending the privatization of some veterinary activities. All of the foregoing has resulted in a situation within the Department of inadequate direction and sense of mission among the limited number of people qualified to do research.

The privatization recommendation of the Peat Marwick study also proposed that animal husbandry researchers be transferred to DAR. This proposal was also accepted by the Cabinet, but it was decided that the transfer would wait until the veterinary privatization took place. The individual livestock researchers are discouraged, because they see no career future in the veterinary-dominated DLS.

This matter was discussed with the Deputy Director of DLS who acknowledged that there are only two researchers available now to work full time with the Livestock TA, and one of them has been nominated for training. He felt it was important to continue training activities, and suggested that the TA work with some of the veterinary officers and other interested people in the DLS Extension Division, some of whom could be made available on a part-time basis.

B. CONCLUSIONS AND RECOMMENDATIONS

- a. Although few in number, the DLS researchers have been very productive and significant progress has been made since 1987. The unit, with GARD

assistance, had identified important constraints and defined research priorities to deal with the constraints. There are at least three areas needing further work in the coming year: small ruminants (fattening rams), poultry, and a livestock feed survey on upland range.

- b. In addition to working in the foregoing areas, the TA livestock expert can backstop the animal traction program, help with the identification of farmers' constraints, and possibly work with some NGOs. Therefore, there appears to be justification for continuing the Livestock TA position.
- c. The Team does not see the rationale for keeping the few potentially productive animal husbandry researchers in DLS isolated from the other aspects of agricultural research and located where there is no chance for advancement. The team urges the Minister of Agriculture to consider seconding the DLS researchers to DAR so they can begin to be integrated into the broader program and participate in its development.
- d. If the DLS researchers have not been transferred or seconded to DAR by the time the manpower development study is undertaken (recommended in Chapter II), they should be involved in the study, and livestock personnel should be included in the long-term training plan to be developed.
- e. Later in the year, perhaps as a follow-on to the priorities setting exercise, the NARB may wish to review the progress in integrating livestock research with other elements of agricultural research as well as determine whether the number of livestock researchers is commensurate with the importance of livestock and the research needs and possibilities in livestock area.
- f. In poultry, there seem to be two areas worthy of particular attention:
 - (1) resolution of any technical problems that may arise in the present expansion in poultry commercialization by private entrepreneurs. This may require visits of STTA specialists.
 - (2) overcoming the constraints to widespread poultry production by the general farm population. This may involve a multi-disciplinary effort in fact-finding and project development.

X. PROJECT ADMINISTRATION

A. GOTG-CONTRACTOR-AID COLLABORATION

At the outset, there was close collaboration among the triumvirate necessary for a successful project. The Director of Agricultural Research, the University of Wisconsin's home office backstop officer, the University's chief of party in Banjul, and AID/Banjul's project officer were all members of the project design team that prepared the Project Paper. Thus, all were familiar with the thinking that went into the project design and had helped establish the work plan.

With the evolution of the project, some differences in perspectives began to develop as some of the assumptions in the project design appeared to some of the parties not to be feasible, either in the way or in the time frame in which planned. For example, the large number of short-term technical assistance (STTA) visits and the quality of some of the work of the STTAs led to a reduction in the number of missions from mid-1987 onward. Requests for STTAs must originate from the research programs or relevant unit in addition to being approved by the senior Gambian counterpart and AID Banjul. Similarly, implementation of farming systems research and extension (FSR/E) recommendations in the Project Paper did not achieve expected results and the approach was abandoned. Some friction with AID/Banjul has resulted. Differences have also risen about the priority that should be given to promotion programs for extending research results to farmers.

It is normal to make adjustments in project operations during implementation as project assumptions face the world of reality. It is essential that communications channels remain open and active and, if appropriate, that outside experts be brought in to help resolve issues that arise. Some serious communications problems developed in 1988 between the contract team leadership and the new team at AID—Director, Agricultural Officer, and GARD Project Officer—over the role of the contract team, the rate of project progress, and the weight to be given to, and the interpretation of, "institutionalization."

The evaluation has served to clear the air and a consensus seems to be re-emerging among AID, the DAR Director, and the Contractor's Chief of Party on immediate priorities, on new project emphases, and on the need to demonstrate the relevance and importance of the research service to current efforts to increase agricultural production. The latter is one of the surest ways of ensuring support for the research service, a basic requirement for institutionalization.

In discussions with Gambian researchers and the Contractor's team, the evaluation team used as a point of reference the institution building model developed for AID by Milton Esman, et. al. In the hope that Esman's work would be useful for reference as the project progresses, an article discussing the model and other institution-building literature is appended as Annex G.

The lack of a research strategy and a set of approved research priorities or guidelines has probably also contributed to the recent friction over project implementation. The Evaluation Team has urged that this be given highest

priority so that a document can be ready for NARB review and approval in time to be the basis for the preparation of the 1989-90 research program.

AID/Banjul is required to submit semi-annual reports to AID/Washington on the progress of its projects, and it is suggested that tripartite project implementation reviews be held at least semi-annually to review progress indicators which could be incorporated into the AID report. The fall review could focus on physical implementation and financial management issues and the spring review on forward planning and budgeting --tying them into the up-coming GOTG budget cycle and the preparation of the contractor's annual work plan.

B. CONTRACTOR PERFORMANCE

In general, the Contractor has performed well. Qualified TAs were fielded quickly, and have worked hard to help the Gambians up-grade the quality of research in the service. The field team has been back-stopped well (after some difficulties in arranging finance and procurement procedures at the outset). Training backstopping in the U.S. has been particularly noteworthy.

There have been concerns expressed about the large number of STTAs and consultants that were fielded during the first year and a half of the project. The contribution of some to project progress was not immediately evident or was considered marginal. The project design called for a large number of STTAs in the first two years. Even so, the numbers fielded seem to exceed even the overly ambitious schedule in the Project Paper.

Some GOTG officials are critical of the size of the Contractor's local staff and the fact that the Contractor's offices and motor pool are not co-located with the DAR. The Contractor is aware of the criticisms, but feels, understandably, that they are somewhat unjust. The Project was specifically requested to hire personnel for positions that would later be filled by GOTG employees once the reorganization was complete. The GARD staff will be reduced as the functions are assumed by the GOTG personnel. The staff at Mile 7 has been prepared to move to MOA/DAR office space since September 1988; however, the MOA has yet to make the space available.

It will be especially important that the University (Home Office and Field Team), AID, and the GOTG have an agreed definition of institutionalization and what it means operationally. Some long-term TAs may need to accept more responsibility for operational activities than some have felt appropriate in the past. This does not imply any less priority for institutionalization, but a recognition that the performance of the research service must be maintained and improved now, not after all trainees have returned.

C. CONTRACT RENEWAL

The contract with the University of Wisconsin is for five years; the project is for seven years. This makes for uncertainties by the Contractor and the GOTG as to how they should be planning. As soon as the research policy/priorities is approved by the NARB, some re-planning is quite likely. At that time, the Contractor should be asked to prepare a 7-year budget as the first step in the process of getting the contract extended.

Recommendation: AID/Banjul, with concurrence from the DAR Director, request the Contractor to prepare a 7-year budget after the ramifications of the NARB-approved policy and guidelines have been analyzed.

D. CONTRACT BUDGET

Some of the line items in the budget in the contract have been exceeded, while others are less than planned. USAID has agreed to budget adjustments where the overspending against budget exceeded the 15 percent allowed in the contract.

The line items in the contract are not consistent in all cases with the budget in the Project Agreement. The DAR Director wishes to be able to identify support costs of the Contractor's office vs. direct support to the research program. He also wishes to be able to send his personnel to visit IARCs or other research services without the visit being treated as training and involving the preparation of PIO/Ps and related AID Documentation.

Recommendation: The contract budget be amended to include a special line item for Networking and that the accounting system be modified, if necessary, to provide expenditure data to meet the DAR Director's needs.

A special item for collaborative research is needed to increase the linkages with the International Agricultural Research Centers (IARCs) and with NGOs active in agricultural development in the Gambia. With its own funding, the Project could obtain IARC cooperation according to GOTG priorities, not those of the IARCs. A small agricultural research service, such as Gambia's, needs to obtain research results from the IARCs and get them tested on farmers' fields without going through a long in-country, on-station research program. In some cases, it may be possible to take results from the IARCs directly to NGOs for trials within their projects under general supervision/coordination of the Gambian research service, with the back-up of the IARC. The proposed line item is to support this type of activity as well as others which can help accelerate the adaptation and dissemination of agricultural technology.

Recommendation: The Grant Agreement be amended to provide a line item for Collaborative Research and that the budget in the Grant Agreement be made compatible with the contract budget.

E. CONTRACTING MODE

This is a Title XII collaborative mode project. As such it places a premium on long-term, institutional linkages between the Contractor and the host country. This, in turn, makes it important for the Contractor to use its own personnel rather than hiring 'off the street.' Seven of the eight long-term, senior TAs provided have been from the three Contractor universities. The eighth was brought in for one year when the GOTG asked to begin the livestock TA position one year ahead of schedule. That individual is now being replaced by a member of the Contractor universities. All five of the long-term junior TAs have been from the Contractor universities, as have most of the short-term TAs.

The Contractor team is led by the University of Wisconsin (UW) with Virginia State University (VSU) and the University of Michigan as subcontractors. The three schools seem to work well together.

Of special interest is the UW-VSU connection. The two universities are linked by a Joint Memorandum of Understanding (JMOU) with AID. UW and VSU cooperate very closely in the GARD Project. VSU has responsibility for the RELO position and for STTA missions regarding extension. The two schools provided senior personnel for the first internal evaluation and also for developing plans for the Gambia College. They hope to work together with the Gambia College. In the early phase of the project the administrative backstopping staff of UW worked with the VSU staff to familiarize them with the administrative needs of this type of project. The UW-VSU relationship in the GARD project seems to be fulfilling the objectives of the JMOU program, but it perhaps could be strengthened by fostering greater participation by the Virginia State University backstop team in the informal forward planning for the project.

It is indeed very unusual and commendable that the Contractor universities have supplied so many of the technical assistance personnel from the member institutions, and it was good to see so much interest in the project on the two campuses visited. It should be noted, however, that none of the Contractor universities are located in an area that is geographically and ecologically comparable to The Gambia. At times, therefore, it will be in the best interest of the project to use experts (particularly STTA) from other U.S. institutions or organizations or from regional centers. Long-term relationships with regional centers and IARCs are also very important for The Gambia. The Contractor should also keep abreast of, and be prepared to recommend use of specialized technical services available through centrally or regionally funded AID projects.

XI. PROJECT DESIGN ASSUMPTIONS

A. INSTITUTIONALIZATION

Institutionalization has become an issue of contention in the implementation of the project. For some, the Mixed Farming Project had made some important contributions and the GARD project was seen as a follow-on project that would institutionalize the Mixed Farming Project results. The difference between the structures of the projects seems to have been minimized. The Mixed Farming Project was working directly with farmers and not with any GOTG departments. Thus, the Mixed Farming Project could be institutionalized only insofar as farmers accepted the practices recommended. Some people told the Evaluation Team that most of the presumed successes of the Mixed Farming Project are no longer in practice.

Some people have felt that the GARD project should have picked up the activities that showed promise and moved them further. The evaluation team shares this view with regard to one or two activities from the Mixed Farming Project. However, it would be unusual to have a government department pick up activities in which they had no part in the design or implementation.

Institutionalization vs. production of research results is another issue that has arisen which seems to stem from the basic design exercise. The Project Paper says that research production and dissemination should not suffer as a price of institutionalization, but it might have been helpful to have been more specific about the need for production to maintain credibility of the service—an essential ingredient of institutionalization.

This issue arises not only in terms of research results, but also in establishing research priorities. Great effort was expended to obtain the creation of an institution (NARB) to review and endorse research priorities, but no exercise to establish priorities has yet been undertaken three years into the project. The evaluation team finds this a serious shortcoming which may well be an underlying factor in the recent controversy over project direction.

B. FSR/E

One of the five project components was an initiation of FSR/E activities. One of the major outputs forecast for the project was: "the expansion and integration of FSR/E activities as a recognized and valued component of research and extension in the Gambia." This has not happened and it is unlikely to happen in the way that it was planned in the Project Paper.

The Internal Evaluation report (May 1987) reports: "As yet there is no unified concept of FSR/E among team members and the leadership of the project." The current evaluation team concluded that such is still the case. However, the team concluded that a recommendation to attempt to implement FSR/E as envisaged in the Project Paper would be counterproductive. The team has insisted, however, that the concerns which gave rise to the FSR/E recommendations in the Project Paper are valid. That is, more attention needs to be given to farmers' constraints and practices in the selection, design, and implementation of

research. The team believes the latter is essential to achieving project success, but that it is possible to do this without implementation of an FSR/E activity in the form and magnitude set forth in the Project Paper. The approach in the Project Paper seems not to account for the size of the research service and the newness of the FSR/E concept.

C. GOTG FINANCIAL MANAGEMENT AND BUDGET CONTRIBUTIONS

The Project Paper assumes that a project administrator would be required for only two years. This seems clearly to underestimate the project administration needs of the Contractor and overestimate the capability of the GOTG to improve its administration. The experience of AID with project financial management throughout the Sahel should have introduced a little more realism into the planning in this area.

The Project Paper and the Project Agreement provide for the GOTG to cover all operating costs of the project by the end of the first phase of the project, i.e., after seven years. If the project is really seen as a 15-year (or more) effort, why would one expect the GOTG to have picked up all costs after seven years?

Regardless of what was reasonable to anticipate in 1985 when the project was approved, the GOTG is in extremely tight financial straits. The largest item in the budget is debt service. The GOTG has had to go through two retrenching (personnel reduction) exercises. Even so, some new positions for research support and project administration have been established.

The appropriate time to request increased contributions to the research budget (other than personnel costs) will be after the project has achieved some successes in the dissemination and promotion of research results and/or improved farming practices that are resulting in increased production. For the present, it would be preferable to encourage the GOTG to facilitate a more efficient use of its resources in support of the project rather than trying to get it to increase its financial contributions to operating costs. For example, there are flexibilities available under the GOTG system which are not being provided to the Project. This is discussed further in Chapter III.B.

D. SHORT-TERM TECHNICAL ASSISTANCE (STTA)

The overloading of STTAs during the first two years of the project has been cited previously. This was, in part, built into the design. It was also structured in the Contractor's budget to appear that STTA activity would always have a training element (it was included under Training). There was also an assumption that STTA would be used, through frequent follow-up visits of the same person, to substitute for long-term advisors. This seems more likely to work in the later stages of the project after there are more well-qualified Gambian researchers in the system, many of whom will have had their training at the contract universities and studied under the STTA.

E. TECHNICAL ASSISTANCE ADVISORS VS. RESEARCH ASSOCIATES

The original design assumes a clear distinction between the long-term advisors and the research associates who come to do an operational job, e.g., for a Gambian who is in training. In practice, some of the Research Associates have

been given adequate support and some not; also, some of the TAs have become operational. The Director of Agricultural Research questions whether the distinction between RAs and TAs is useful. On the other hand, the Minister of Agriculture and the Chairman of the NARB have complained about the youth and inexperience of some of the technical assistance personnel. Presumably, they were referring to RAs.

The Evaluation Team questions whether doing away with the distinction between RA and TA is worth the hassle that would be involved in negotiating a change in the contract. What seems more crucial is that there be established for every contract position a clearly defined scope of work and a statement of the type of support to be provided. Further, the candidate must be qualified to fill the position.

It may well be that the Minister and NARB need to be briefed better on the role of the Contractor, the Peace Corps, and other donors in maintaining the productivity of the research service while half or better of its staff are in training. Some of the people recruited should be younger workers and it should be recognized that this will permit the contract budget to go farther than if more senior personnel were hired for a job that a more junior person could do.

It is important that "advisors" be prepared to take on operational tasks at times, especially in first-of-a-kind exercises. On the other hand, it is important that advisors not get so loaded down operationally that they cannot help with longer term planning and are unable to conduct seminars and give on-the-job training.

In short, good will, good planning, good communications, and good implementation are all inter-related and essential. With those, titles and designations become much less important.

ANNEX A

EVALUATION SCOPE OF WORK

Gambia Agricultural Research Diversification Project

(No. 635-0219)

Delivery Order No. 10, PDC-1406-I-10-7006-00

I. OBJECTIVE

- 1) To evaluate the progress of the Gambia Agricultural Research and Diversification (GARD) project (535-0219) toward meeting the end of project objectives;
- 2) To evaluate the success of the GARD Project in achieving the project purposes and meeting project goals; and
- 3) To assess the degree to which the project is being executed in a manner consistent with the Project Grant Agreement.

II. STATEMENT OF WORK

The evaluators will assess ARMS in order to determine if it is carrying out the key functions of establishing research priorities, reviewing on-going and proposed research activities in light of these priorities, and allocating resources for research accordingly.

This evaluation will also assess (A) the degree to which project outputs have or can likely be achieved, including the degree to which the project has been able to generate technologies which are being adopted by farmers, (B) whether or not sufficient quality and quantity of information is being collected to enable measurement of the project's progress, and (C) the need for making changes in GOTG and contractor staffing, level of resources, and management arrangements for the various components of the project. The effectiveness of promotional/extension activities being conducted by the project and other projects, and the improvement in Gambian research capabilities also will be given special attention.

Key questions which the evaluation team will address are indicated below for each component of the project.

1) Agricultural Research Management System (ARMS)

Key Questions No. 1:

Is the Agricultural Research Management Systems (ARMS), as currently being developed, appropriate for the size and institutional capacity of the Gambia?

- A) What progress has been made in developing a detailed plan for the ARMS?
- B) What aspects of the plan have already been implemented and what difference has this made in terms of how research programs are planned, prioritized and funded?
- C) Are the technical assistance and training resources appropriate and adequate for the implementation of the ARMS?
- D) How has the project staff attempted to coordinate its activities with research inputs from other donors?
- E) What implications does the recent re-organization of the Ministry of Agriculture (MOA) have for ARMS as currently being implemented?
- F) How can the support service being provided to the researchers by the project be more fully integrated into the Department's research system?

Key Question No. 2:

Are the other support services provided by the project appropriate and adequate?

- A) Has the collection, analysis, and publication of agricultural statistics been improved by the project? What further assistance should be provided by the project to the program policy and monitoring unit (PPMU) in this area?
- B) Has the provision of computer hardware and training improved the ability of researchers to analyze their data? What are the plans for integrating the computer facility within the Gambian Research Service?
- C) Has a plan been developed under the project to improve library services for researchers? If so, what are the next steps for project assistance to improve these services?

2) Training

Key Question No. 1:

Are the level and type of training programs being implemented by the project adequate to meet the needs of the research service?

- A) Have long-term training priorities been established?
- B) Is the process by which long and short-term training opportunities are identified and participants selected operating fairly and efficiently?
- C) Will the amount of B.S. and M.S. training planned under the project meet the needs of the research system?

- D) Has the short-term training/advisor system worked as planned in the project design? How might it be improved?
- E) What role should Gambia College play in conducting in-country training programs? Should the project assist the Gambia College or another Gambian institution develop the capability to conduct this type of training?

3) On-Station Research

Key Question No. 1:

What progress has been made in improving the way research is selected, design, budgeted, implemented, analyzed and reported?

- A) Have the prioritization and selection of research activities changed? How has the size of the research program changed?
- B) How has the design and budgeting of research changed?
- C) How has the implementation and management of research changed?
- D) How has the analysis and reporting of research changed?

Key Question No. 2:

Are the types, number of trials, and level of on-station effort appropriate for the size and institutional capacity of the Gambian Research System and the crops/technologies being tested?

- A) Given the present organization and implementation of FSR/E activities, is it likely that the on-station research program will be affected by the experiences and lessons learned from FSR/E activities?
- B) Has the project begun to improve the linkages and communication between the Gambia Research System and sources of innovation at International Agricultural Research Centers and research programs in neighboring countries and elsewhere? Have efforts to date been adequate?
- C) Are the level and type of technical assistance and training adequate for the on-station, component research activities being supported by the project?

4) Farming Systems and Extension Program (FSR/E)

Key Question:

What progress has been made in institutionalizing FSR/E activities in the agricultural program?

- A) How are the current FSR/E core and field teams organized? Does this seem to be a viable/efficient way to conduct FSR/E activities in the Gambia?

- B) What FSR/E activities have been conducted by the project to date? What have these activities accomplished so far in identifying and alleviating constraints to agricultural production? What should be the priority focus of these activities in the future?
- C) How involved are farmers, extension agents, and PVOs in planning and conducting on-farm research?
- D) Are the technical assistance and training resources adequate for the FSR/E activities?
- E) Have the technologies identified in the Project Paper as ready for on-farm testing been tested? What have been the results? What improved technologies have been tested on-farm?
- F) What should be the appropriate mix between on-station and on-farm research?

5) Promotion Activities

Key Question:

Are the project's current and planned efforts to assist extension and PVOs in promotion and training adequate given other donor's and GOTG efforts in promoting and extending improved technologies?

- A) What improved technologies, if any, have been developed, disseminated, and adopted by farmers as a result of the project. In this regard, what can be expected of the project in the near future?
- B) What role has the FSR/E activities played in terms of promotion of technologies?
- C) What promotion activities have taken place since project design?
- D) What has been the role of the Research Extension Liaison Officer (RELO) in promotion activities?

6) Project Administration

Key Question:

How might administration of the project be improved?

- A) Are project activities likely to exceed the amount of funds budgeted for them? Are new line items or adjustments in existing line items of the budget required?
- B) Has the process for identifying and approving short-term technical assistance (STTA) worked efficiently? Are adjustments in procedures needed?

- C) How effective has USAID been in providing administrative guidance, support, and required approvals? How well has the three-way partnership (GOTG, AID, CONTRACTOR) as envisioned in the collaborative mode, worked?
 - D) Has a counterpart for the project administrator been identified and trained? Will there be a continued need for long-term expatriate, in-country, project administrative support beyond that currently planned for in the project?
 - E) What has been the effect of personnel changes: i.e., chief of party, agronomist, livestock advisor, and administrator?
- 7) Project Design Assumptions

Key Question:

Are the assumptions in the original log frame still valid?

- A) Can actions be taken to increase the probability that the critical assumptions will be realized?
- B) Are the explicit or implicit assumptions about the diversification objectives of the project clear? What does diversification mean in terms of the GARD Project and the type of research being done?

THIRD COUNTRY TRAINING SUMMARY - GARD PROJECT

Beginning of Project to 11/30/88

<u>Name of Participant</u>	<u>Dates in Training</u>	<u>Field of Training</u>
JARJU, S. & MARONG, A.	09/19/86-09/25/86	FSSP Networkshop on Animal Power
JARJU, S. & MARONG, A. & SARR, D.	09/26/86-10/02/86	Work Oxen Project: Animal traction techniques & implements
NJAI, Omar & MBAKEH, M.	07/18/87-07/26/87	International Workshop on Goat Production
SOWE, Jabel M.	06/13/87-06/23/87	ILCA Workshop on Animal Traction
JAITEH, Lamin	09/17/87-09/27/87	SAFGRAD On-Farm Testing Workshop

Total Number of Participants: 7

IN-COUNTRY TRAINING SUMMARY - GARD PROJECT

Beginning of Project to 11/30/88

<u>Description of Training</u>	<u>Dates of Training</u>	<u>Number of Participants Enrolled</u>
FSSP On-Farm Trials	04/07/86-04/25/86	6
FSSP On-Farm Trials	04/18/86-04/25/86	8
Instruction on GADS Data Collection	05/26/86-05/30/86	7
	06/16/86, 06/17/86, 06/18/86, 06/19/86, 06/28/86, 06/30/86	68
Instruction on GADS Data Collection	07/01/86-07/04/86 & 07/07/86	43
Agricultural Statistics for Developing Countries	02/23/87-03/06/87	16
Program Budgeting Workshop	04/22/87-05/01/87	16
Networking	10/20/87-10/21/87	5
Laboratory Instrumentation Workshop	12/17/87	12
Animal Traction	01/11/88-01/13/88	31
	01/18/88-01/20/88	34
Animal Traction	07/06/88-07/12/88	<u>4</u>
Total		250

U.S. TECHNICAL TRAINING SUMMARY - GARD PROJECT

Beginning of Project to 11/30/88

<u>Name of Participant</u>	<u>Dates in Training</u>	<u>Field of Training</u>
ANN, Musa	08/19/86-12/22/86	Soil Testing & Management
CANTEH, Momodou	09/16/87-09/18/87	Crop Protection
COX, Albert	01/15/87-02/19/87	Training in using personal computer and selected statistical soft ware packages; assistance in analyzing past research trials data, assistance in the formulation of proposals for research to be conducted in 87; interaction with UW Agronomy faculty, collaboration with M. Mbenga, GARD Participant at Cornell.
FYE, John	08/08/87-10/29/87	Soils Classification
GAYE, G.O.	08/10/86-08/28/86	Attend International Horticultural Congress, Post-Congress Tour, and interact with Horticulture Faculty at UW-M.
GAYE, G.O.	01/12/88-12/15/88	Horticulture
JABANG, Lamin	09/06/87-10/08/87	Computer Statistical Software
JALLOW, Malick	01/17/87-04/23/87	Computer training
JALLOW, Momodou	08/23/87-12/13/87	Agricultural Statistics
JALLOW, Yaya	01/03/88-12/18/88	Statistical Analysis
JASSEH, F.	07/10/86-08/10/86	Water Management-USDA Short Course
JOHM, Ken	05/10/87-07/05/87	Review Gambian Rice Policy
KINTEH, Sambou	12/06/87-12/14/87	Socioeconomic research in the Gambia; review/discuss PPMU's Market Price Survey, Horticulture Market Study, and GADS survey and microeconomic concepts; tour Wisconsin Dept. of Agriculture to view economic analysis and statistical sections of the State of Wisconsin; discuss collaborative research programs on marketing improvement of the groundnut trade with staff from Harvard and their informal credit study.

<u>Name of Participant</u>	<u>Dates in Training</u>	<u>Field of Training</u>
NJIE, Mustafa	09/16/87-09/18/87	Crop Protection
OWENS, Solomon	01/22/87-02/02/87	Analyze data from research trials collected in the Gambia; training in use of personal computers for data analysis and report writing; prepare summaries of research results and develop proposals for 1987 research trials; interact with Wisconsin staff.
OWENS, Solomon	08/08/88-08/26/88	Conference on Dryland Farming and GARD Update
SENGHORE, Thomas	01/17/87-02/23/87	Obtain training on computer and selected computer software packages; enter data from 1986 field trials on computer; analyze the 1986 field research trials; summarize results and formulate proposals for research for 1987; interact with UW Agronomy faculty; intercropping.
SEY, M.	06/30/86-08/25/86	Horticulture/Vegetable Crops - USDA Short Course.
TOURAY, K.	12/20/86-12/23/86	Soils
Total:	19	

ANNEX B-4

CURRENT PARTICIPANT TRAINING IN THE U.S.

<u>Name of Participant</u>	<u>Employer in Gambia</u>	<u>Field of Training</u>	<u>Starting Date of Training</u>	<u>Est. Date of Completion</u>	<u>Location of Training</u>	<u>Degree Goal</u>
ANDREWS, Patricia	D.L.S.	Poultry Sci.	8/87	8/89	Univ. of Wisconsin	M.S.
BALDEH, Nyada	D.A.B.	Agricultural Extension	8/88	6/94	VSU & U-Wisc.	M.S.
COLE, Mohammed	D.A.R.	Agronomy	1/86	12/88	Univ. of Wisconsin	M.S.
JARJU, Osman	D.A.R.	Horticulture	9/88	6/92	Tuskegee University	M.S.
KABAY, Mohammed	D.A.R.	Ag. Econ.	9/88	6/92	Univ. of Wisconsin	M.S.
MBENGA, Musa	D.A.R.	Agronomy	1/86	5/89	Cornell University	M.S.
CANARA, Ebrima	D.O.P.	Ag. Econ.	8/86	6/90	Univ. of Wisconsin	B.S.
JABANG, Modou	D.A.P.	Horticulture	8/88	6/92	Univ. of Wisconsin	B.S.
JABANG, Lamin	D.O.P.	Information	8/88	6/92	Virginia State Univ.	B.S.
JOBE, Babou	D.A.R.	Soils Science	9/88	6/92	Univ. of Wisconsin	B.S.
MBALLO, Asidou	D.A.R.	Agronomy	8/86	12/90	Univ. of Wisconsin	B.S.
SINA, Sheriff	D.A.S.	Agricultural Extension	9/88	6/92	Virginia State Univ.	B.S.
SECKA, Ellen	D.L.S.	Poultry Sci.	8/87	12/90	Univ. of Maryland	B.S.
TRAWALLEY, K.	D.A.R.	Agronomy	12/86	6/90	Univ. of Wisconsin	B.S.

ANNEX C

LIST OF REPORTS BY
SHORT-TERM TECHNICAL ASSISTANTS (STTAs)

1. Training Consultancy by Sharon Baumgartner.
2. A Review of the Agricultural Data System at PPMU with Suggestions for Improvement by A.C. Johnson and John Rowe (February 1986).
3. Soil and Water Conservation Programs by Fred Madison, (March 1986).
4. Evaluation of Soil Fertility Programs and the Soil Testing Lab, Yundum, by E.E. Schulte (March 1986).
5. Report on GARD Consultancy in The Gambia (Agronomy) by E. Gritton (March 1986).
6. Agronomy - Joshua Posner.
7. Trip Report - Agriculture Statistics, by John S. Rowe (April 1986).
8. Strategy to Strengthen The Farming Systems Approach to Research and Extension for The Gambia, by Frederico Poey (May 1986).
9. Neil Patrick - June/July, 1986.
10. Accomplishments, Follow-Up and Needs for Farming Systems Research/Extension with a Focus on Horticulture Crops, by John Caldwell (March 1986).
11. Current Research on Agronomy and Soils: Report on GARD Consultancy In The Gambia, by Earl Gritton (August 6 - August 23, 1986).
- 12a. Strengthening Animal Traction Research and Developments in The Gambia Through Networking, by P. Starkey (March 1986).
- 12b. Strengthening Animal Traction Research and Developments in The Gambia Through Networking: Annotated Bibliography of Animal Traction, by P. Starkey (May 1986).
13. Livestock Research Planning Mission, Jane Homan and Tom Yuill (October 1986).
14. Agricultural Statistics Short-Term Technical Assistance, by John Rowe (September 15 - October 10, 1986).
15. Report on Animal Research Planning Workshop, by A. Pope, B. Wentworth, G. Dentine, W. Bosu, M. Ezekwe, T. Remington, J. Homan (November 30 - December 22, 1986).
16. Technical Report - Horticultural Marketing Mission, by Gerald Campbell and Lisa Daniels (December 25, 1986 - January 18, 1987).

17. Horticulture: Technical Assistance Report, by John S. Caldwell in collaboration with G.O. Gaye and Isatou Jack (15 February to 14 March, 1987).
18. Agricultural Statistics Short-term Technical Assistance, by Aaron C. Johnson and John S. Rowe (12 February - 28 March 1987).
19. Toward A National Program for Agricultural Library Information Service in The Gambia, by Mary Bailey (November 18 - December 9, 1986).
20. Use of Farming Systems Research/Extension (FSR/E) Methods to Identify Horticultural Research Priorities in The Gambia, West Africa, by John Caldwell, G. O. Gaye, and Isatou Jack (April/May 1986).
21. John Caldwell (combines information from # 10 and # 20).
22. Evaluation of Soils Inventories, by Fred Madison (May 1987).
23. Report of an Assessment of Deferred Grazing Schemes in The Gambia, by Steven Lawry, (June/July 1987).
24. Pump and Tidal Irrigation on the River Gambia - D. Karmeli (not final).
25. Horticultural Exports from The Gambia to the EEC; An Overview of Issues and Concerns, by Gerald Campbell and Lisa Daniels (July/August 1987).
26. Horticultural Marketing Mission to The Gambia, by Gerald Campbell and Lisa Daniels (July/August 1987).
27. A Review of the Cropping Systems/Resource Management Research Program in The Gambia, by Earl Gritton (August 11-26, 1987).
28. A Review of Cropping Systems Research in The Gambia, by Professor R.W. Willey (June 2-13, 1987).
29. Agricultural Data Collection and Management, by R. Klemme.
30. Computerized Program Budgeting System by R. Devred and J. Sands (April 22 - May 1, 1987).
31. Supply and Demand for Poultry in The Gambia (preliminary report), by Lisa Grobar (from visit of July/September 1987).
32. Study of Water-Controlled Rice Production in The Gambia, by Christine Elias, July 1987.
33. Laboratory Management, Equipment, and Maintenance, by Neal E. Wolfe, (November - December 1987).
34. District Agricultural Profile of Central Baddubym NBD, by Joshua Posner and Elon Gilbert (January 1987).
35. District Agricultural Profile of Foni Brefet and Foni Bintanq-Karenai, WD, by Joshua Posner and Elon Gilbert (January 1987).

36. Soil Physics and Soil & Water Management Research, by Birl Lowery (October - November 1987).
37. Agricultural Statistics Short-Term Technical Assistance by John S. Rowe (November to December 1987).
38. The Department of Animal Health and Production and Livestock Research in The Gambia, by James Sumberg (October-December 1987).
39. Short-Term Technical Assistance Mission in Agricultural Statistics, by Aaron C. Johnson (January-February 1988).
40. The Horticultural Unit and Research Station Management by Gavin Weis (January-February 1988).
41. Financial System for The Gambian Agricultural Research Service by Frank Kooistra (February-March 1988).
42. A Proposed Strategy for Implementation and Institutionalization of a Research and Extension Linkage Process for The Gambia, by Winfrey Clarke, Omar Sonko, et al (March-April 1988).
43. Organization of the National Agricultural Research Board (NARB) by Matthew Dagg and Ajibola Taylor - NARB report (February-March 1988).
44. Administrative Management for the Department of Agricultural Research, by James Nti (March-May 1988).
45. Poultry and Livestock Research Activities in the Department of Animal Health and Production by Bernie Wentworth (May-June 1988).
46. Technical Report: Horticultural Marketing Mission to The Gambia, by Gerry Campbell and Lisa Daniels (June-July 1988).
47. Preliminary Report on Horticultural Marketing Research by Lisa Daniels (July 1988). (Final Report to be submitted in December 1988.)

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ANNEX D-1

VARIETIES OF EACH MAJOR CROP RELEASED TO GAMBIAN FARMERS BY THE RESEARCH SYSTEM

CROP	VARIETIES	ATTRACTIVE FEATURES TO FARMERS
GROUNDNUTS	S-28-206	Relatively high stable yields, good oil content, medium duration, high percent of hay.
	73-33	Heavy kernel, tolerant to cercospora, high yield, high percent of hay.
	55-437	Confectionery nuts, commands a high price, matures early (@90 days), drought tolerant, high percent of hay.
MAIZE	NCB	Tall, robust, relatively high yield, yellow endosperm, medium maturity.
	JEKA	Early maturity, high yield, yellow endosperm, drought tolerant.
	ACROSS 7434	High yield, white endosperm, medium maturity.
	MAKA	Very high yield, 2 ears per plant, drought tolerant, high palatability, yellow endosperm.
MILLET	DARU	High yield, long ear head, early maturity, stable yield.
	HASUM NYANG	Early maturity, palatability is good, high productivity.
	NAGA WHITE	Very high yield, insect pests and disease tolerant, bold grain, bird resistant.
SORGHUM	E-35-1	Early maturity, high yielding, easy harvesting, palatability is good.

Annex D-1 continued

CROP	VARIETIES	ATTRACTIVE FEATURES TO FARMERS
RICE	IR 442-258	Medium duration maturity, good cooking quality.
	SE 302 G	Early maturity, drought tolerant, good cooking quality.
	BG 90-2	Early maturity, high yielding, good palatability.
	PEKING	Early maturity, easy milling, resistant to disease, good cooking quality.
	ROK 5	Mangrove variety with good salt tolerance, high yielding.
	IR 934-450	Early maturity, stable yields.
	PHARCOMEN	Mangrove variety, salt tolerant.
	IR 22	Good grain quality, good palatability, short stature.
AIMU	Early variety, stable in submarginal conditions.	
COWPEAS	TVX 3236	Resistant to insects, medium maturity.
	TN 8863	Resistant to insects, white colored grain.
	MOUNGE	Yields are high, medium maturity.
	CB-5	Extra earliness, white seeded color.
TOTAL	24	

Sources:

1. Grain Legumes Annual Papers and personal communication, 1982-86.
2. Upland Cereals Program Papers and personal communication, 1982-86.
3. Rice Research Program Reports and personal communication, 1982-85.
4. Training of Extension Aids Unit, personal communication, 1987.
5. K.F. Demba, IRPA Sapu, personal communication, 1987.

Source: Department of Agriculture draft report entitled: Agricultural Research Achievements in The Gambia and Impacts of Research on Selected Farm Economies, by Ibrahima Diallo, Patricia O'Neil, and Baboucar Manneli, March 2, 1988.

ANNEX D-2

NEW OR IMPROVED TECHNIQUES ADOPTED BY FARMERS OVER THE PAST FEW YEARS

TECHNIQUES	ATTRACTIVE FEATURES	CROPS OF APPLICATION
Use of inorg. ferti- lizers (incorp.)	Adequate plant nutrition, growth and yield fertility maintenance	Groundnuts, Maize, Irr. Rice, Cotton
Seed dressing	Control of soil born diseases (damping off) facilitate germination and emergence	Groundnuts, Cotton
Seed drilling	Allows good weed control, reduces labor costs, helps control erosion and runoff, maintenance of fertility	Rice
Use of farm implements (eco-seeder, sine hoe, lifters)	Timely planting & weeding saving of time, energy and labor	Groundnuts, Rice, Millet, Sorghum, Maize
Use of herbicides	Efficient weed control	Groundnuts
Stocking harvest or raised platforms	To control aflatoxin contamination	Groundnuts
Thinning	Helps promote plant growth, development and yield increases	Maize, Millet, Sorghum, Cowpeas, Cotton
Gap filling	Helps maintain adequate plant population per unit area of land	All crops
Top dressing with Urea	Helps boost plant growth for subsequent higher yields	Maize, Irr. Rice
Use of crop residues for livestock	Livestock maintenance	Maize, Groundnuts, Millet, Sorghum, Rice
Insecticide Appl.	Helps control insect attacks	Cotton, Cowpeas, Millet Maize

ANNEX D-2 continued

NEW OR IMPROVED TECHNIQUES ADOPTED BY FARMERS OVER THE PAST FEW YEARS

TECHNIQUES	ATTRACTIVE FEATURES	CROPS OF APPLICATION
Construction of anti-salt and water retention devices	Helps control salt intrusion, increases area cultivable	Rice and horticulture.

Sources:

1. Annual Research Papers: Grain Legumes, Upland Cereals, Rice, and Cropping Systems Resource Management Programs.
2. Training and Extension Aids Unit, personal communication, 1987.

Source: Department of Agriculture draft report entitled: Agricultural Research Achievements in The Gambia and Impacts of Research on Selected Farm Economies, by Ibrahima Diallo, Patricia O'Neil, and Baboucar Manneli, March 2, 1988.

ANNEX E

IDEAS FOR STRENGTHENING RESEARCH-EXTENSION COLLABORATION

The evaluation team suggested in the first draft of its report that a Research-Extension Collaboration Advisor position be established to advise and assist the Assistant Directors of Agricultural Services and Research.

Although there is no support for the proposed position, there may be interest in using as a checklist the illustrative list of issues the proposed TA was expected to address or activities he/she might have undertaken:

1. Participate in Task Force and ARAB meetings to identify areas of misunderstanding and to facilitate exchanges of information.
2. Identify barriers to the transfer of information between extension and research and between extension and farmers and devise means to improve the transfer.
3. Clarify the respective responsibilities of researchers and extension personnel with regard to on-farm research.
4. The design, production, and distribution of educational aids, particularly relating to new technology to be diffused.
5. Survey the personnel of DAS and prepare training programs to increase their competency in subject matter areas and extension methods.
6. The delivery of extension information to women farmers.
7. Advise on the production of an MOA newsletter to improve the knowledge of the operations and objectives of the Ministry by all employees and the Ministry's clients.
8. Survey the NGOs to determine their role in extension, promotion, and research, how they and their programs interact with MOA personnel, and how this interaction could be made more productive.
9. Ascertain and promote ways to create a consciousness by all extension workers of the value of their efforts and a pride in the way they carry out their tasks.
10. Advise on the coordination and collaboration of the NARB and the Extension Advisory Board.
11. Review and advise on the relationships between donor-funded programs (such as ADP-II) and the extension and research services and the impact of such programs on research and extension.
12. Work with, and advise, the Gambian RELOs at Yundum and Sapu Stations.

ANNEX F

CRS SESAME PROMOTION PROGRAM

The Sesame Program's beginnings could be traced back to 1979 when the Catholic Relief Service (CRS) started looking for alternatives to increase caloric intake and improve family nutrition in rural areas.

Initially sunflower and sesame were thought of as possibilities. Four Sesame varieties were obtained by CRS from Sudan (2), Nicaragua (1), and the US (1). Trials were simultaneously conducted by the research service at Sapu and Yundum for two years. The sunflower crop competed with traditional crops and had many other problems. Sesame fitted the system fairly well: could be sown last on poor soils, and did not compete with other crops. However, there was no indigenous capacity to extract oil efficiently. The local method of oil extracting recovered only about 50% of the oil content. (Sesame oil content 35-40% of the seed weight.) Traditional beliefs also favored sesame crop.

In 1983 in CRS villages, 30 ha of sesame were promoted yielding an average of 400 kg/ha. By 1986, area under sesame had grown to 4000 ha. Seventy-five percent of those involved in production were female farmers. The male farmers involved saw that cash returns were possible. At this point, oil extraction capacity (including organization) and marketing became a primary concern.

Between 1985 and 1986, 16 oil expellers were installed (2 types: 800-100 kgs/hr; 40-50 kg/hr). Yields of 400-800 kgs/ha have been recorded depending on whether or not manures and fertilizer were used. Up to 1200 ha have been reported to be fertilized.

Other improvements in sesame cultivation are being thought of (or proposed), e.g., as a second crop after early maize or millet or late intercrop in cereals. It is here the research system could help by designing and testing experiments or tests.

With the promotion and large scale adoption of sesame cultivation, processing and marketing begin to emerge as constraints. Processing seems to be not so much a question of oil expelling capacity but of adjusting the product flow to machine sites evenly over a period of time avoiding extreme peaks.

There is a good demand for sesame oil. Prices at 7D/l are competitive with imported vegetable oil. To create an even flow to expelling centers, plans are under consideration to develop private/cooperative means of purchasing during the market season and storing the sesame. Attempts are also underway to develop export opportunities. This would help keep domestic prices at attractive levels and contribute to the foreign exchange earnings of The Gambia. The following questions are being addressed:

- (a) Policy: By law sesame is not an oil seed crop in The Gambia. Hence GPMB and NTC are reluctant to take up processing and marketing. National policies, combined with Economic Policy Reforms, contributed further to the reluctance of GPMB and NTC, which have been under performance contract with the World Bank. There is no minimum price set for sesame. It is not clear whether a minimum price would have any meaning unless GPMB has the capacity to step in and purchase at minimum prices.

- (b) Marketing: A marketing study by an ODA consultant indicated good export potential if the right contacts could be established and quality produce assured. For example, samples sent to Europe had 9% foreign matter while the acceptable range seems to be about 4-5%.
- (c) Investment: A local Lebanese merchant has expressed interest in marketing, including an investment of \$150,000 in cleaning equipment. However there seems to be a stalemate regarding the purchase price.

The sesame program seems to possess sustainability. Sesame could be produced under low fertility conditions without competing with major crop enterprises. There seems to be enough local demand for cooking oil (as seen by imports). To the extent sesame oil could replace imported vegetable oil, it is likely to find a place as a cash generating enterprise contributing to rural incomes and saving foreign exchange. Perhaps the GARD project could assist in assessing economic benefits to farmers and the potential for further expansion leading to import substitution.

ANNEX G

1. THE ESSENTIAL CORE OF THE LITERATURE^{1/}

Outstanding contributions to the literature on institution building are summarized below in one of two categories: manuscripts with an institutional-organizational focus or works dealing with phenomena beyond this micro orientation.

The literature with an institutional-organizational orientation resulted largely, but not exclusively, from the Inter-University Research Program in Institution Building (IRPIB). This multidisciplinary program was undertaken by scholars from Michigan State University, Syracuse University, Indiana University, and the University of Pittsburgh, where the project's headquarters are located. This consortium program, financed largely by the Agency for International Development (AID) and the Ford Foundation, was the largest single source of the manuscripts reviewed in the preparation of this book.

Eight of the manuscripts nominated by professionals actively working in the field of institution building resulted directly from the IRPIB. In three others, the methodology developed in the program is used. Because these IRPIB contributions are consolidated in a recently published book of readings, that book is the source of most of the summaries of IRPIB contributions in this chapter. The one exception, however, is Milton Esman's manuscript, "The Institution Building Concepts-An Interim Appraisal." This manuscript is summarized in detail, rather than his shorter chapter in the book edited by Joseph Eaton, because it contains the important conceptual framework developed by him and others.

Although no one group of manuscripts dominates the macro oriented literature, a number of significant contributions have been made. Again, a recently published book -- this one entitled A Theory of Institutions by John Powelson -- is reviewed in detail. Likewise, the book of readings entitled Modernization by Design by Chandler Morse et al. is given considerable attention. An article by T. W. Schultz is reviewed in sufficient detail to indicate clearly its substantive contribution. Finally, attention is called to a bibliography that contains some references to macro oriented literature in the fields of technical assistance and institution building.

INSTITUTIONAL ORGANIZATIONAL LITERATURE

[1] ESMAN, Milton J. "The Institution Building Concepts -- An Interim Appraisal." Graduate School of Public and International Affairs, University of Pittsburgh, Pittsburgh, Pa., 1967. 66 pages. (Mimeographed. Part of Inter-University Research Program in Institution Building.)

Since much of the institution building literature refers to the framework conceptualized by Esman et al. it will be summarized first. Esman's manuscript contains not only basic concepts but also a partial evaluation of them on the basis

^{1/} Melvin G. Blase, Institution Building: A Source Book, Midwest Universities Consortium for International Activities, Inc. for A.I.D., Contr. No. AID/esd-3392, 1973.

of data obtained from the initial IRPIB case studies. These case studies were: the College of Education of the University of Nigeria, by John Hanson [12]; the Central University of Ecuador, by Hans C. Blaise and Luis A. Rodriguez [47]; the Institute of Public Administration of Thammasat, University of Thailand, by William Siffin [72]; and the Institute of Public Administration for Turkey and the Middle East, by Guthrie Birkhead [73].

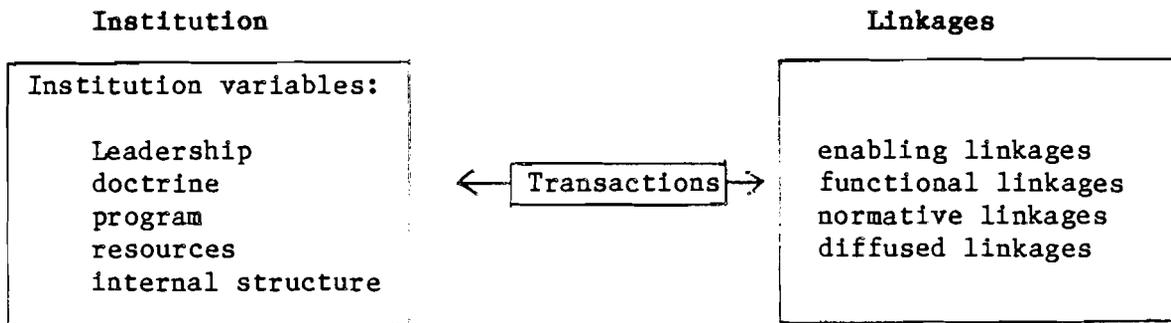
Basic Concepts

In the restatement of the basic concepts, Esman emphasizes that his approach has a pronounced bias toward social engineering that is based on the proposition that most significant, contemporary changes -- especially in developing countries -- are deliberately planned and guided. Further, the approach presupposes that the introduction of change takes place primarily in and through formal organizations. When these organizations are change-inducing, change-protecting, and formal, they are considered to be institutions. These organizations and the new patterns they foster become institutionalized, e.g., meaningful and valued in the societies in which they function. This involves a complex set of interactions between the institutions and the environment. The latter varies in its readiness or resistance to change both over time and from place to place.

Basic to Esman's approach is the assumption that the efficient assimilation of new physical and social technologies requires that the environment provide supporting values, norms, processes, and structures which usually are not present when the new technologies are introduced. Changing the environment to complement or accommodate the new technologies is an integral part of development. Since these new technologies are primarily introduced in and through organizations, the supportive values, norms, processes, and structures must be institutionalized in and through these organizations; that is, normative relationship and action patterns must be established in and through organizations which incorporate, foster, and protect normative relationship and action patterns and perform functions and services that are valued in the environment. The results of analyses of these institutionalized changes can serve as guides to social action. Hence, the assumption has been made that institution building is a generic social process, i.e., a set of elements and actions can be identified which is relevant to institution building in general.

The three analytical categories upon which Esman's analysis is built are depicted in the accompanying figure from citation [2]. Institution variables are those elements thought to be necessary and sufficient to explain the systemic behavior in an institution.

The Institution Building Universe



Leadership applies not only to people formally charged with the direction of an institution, but also to others who participate in the planning, structuring, and the guidance of it. Within leadership, viewed as a unit, important factors include political viability, professional status, technical competence, organizational competence, role distribution, and continuity.

Doctrine, as the stable reference point of an institution to which all other variables relate, contains such characteristics as specificity, meaning the extent to which elements of doctrine supply the necessary foundation for action in a given situation; the extent to which the institutional doctrine conforms to the expected and sanctioned behavior of the society; and the degree to which the institution's doctrine conforms to the preferences, priorities, intermediate goals, and targets of the society.

Those actions related to the performance of functions and services constituting the output of the institution represent its program. Hence, important aspects of the program variable include its consistency with the institution's doctrine, stability of output, feasibility regarding resources, as well as complementary production of other organizations in the absorptive capacity of the society, and the contribution of the institution toward satisfying the specified needs of the society.

The inputs of an institution, here defined as resources, are important not only in quantitative terms, but also because of their sources. These sources and the ability to obtain resources through them affect decisions with regard to program, doctrine, and leadership. Hence, the two categories within this variable are availability and sources.

As both structure and process, the category of internal structure includes such things as the distribution of functions and authority, the processes of communication and decision making, and other relationship-action patterns. Consequently, it determines the efficiency and effectiveness of program performance. Components of this category include identification of participants within the institution, consistency of the structure with the institution's doctrine and program, and the structure's adaptability to shifts in program emphasis and other changes.

Every institution is dependent upon other organizations for its authority and resource; hence, its linkages with other entities are vitally important. These linkages also include an institution's dependency on complementary production of other institutions and on the ability of the environment to use its resources. Finally, linkages are also concerned with and subject to the norms of the society. Through these linkages the institution maintains exchange relationships with its environment, an interdependent complex of functionally related organizations. The four subcategories of linkages are discussed briefly below.

In the initial stages of an institution's life, its prime target is developing its relationship with other entities that control the allocation of authority and resources it needs; this category is called enabling linkages. Developing relationships with such entities is important not only for obtaining authority and resources, but also because these are the same entities through which the institution's opposition seeks to withhold needed inputs from it.

Functional linkages relate the institution to (1) organizations which are complementary in a productive sense, that is, which supply inputs and use the outputs of the institution; and (2) those organizations which constitute real or potential competition. Through functional linkages an institution attempts to spread its innovations as it embodies and promotes new patterns and technologies.

Both sociocultural norms and operating rules and regulations have important implications for institutions via normative linkages, through which the society places certain constraints on and establishes guidelines for institutions. The norms, rules, and regulations can either act as obstacles to or facilitate the process of institution building.

While these three categories of linkages refer to relationships of an institution with other specific institutions and organizations, diffused linkages refer to the relationship between the institution and public opinion and with the public in general. Thus, this category includes relationships established through news media and other channels for the crystallization and expression of individual and small-group opinion.

Through these four linkages, then, an institution carries on transactions with other segments of the society. These transactions involve not only physical inputs and outputs but also such social interactions as communication, support acquisition, and the transfer of norms and values. More specifically, the purposes of transactions have been identified as (1) gaining support and overcoming resistance, (2) exchanging resources, (3) structuring the environment, and (4) transferring norms and values.

Institution building is a time-consuming process. During its initial phase certain values or goals are conceived by the change agents, and a strategy is determined for their attainment. Also during this period, support is sought for achieving goals and values, an effort is made to overcome resistances, and an attempt is made to acquire the necessary authority and resources for the establishment of the institution. Subsequently in the life cycle of the institution, different strategies and actions are required for executing the program, maintaining the institution, and facilitating the transfer of norms and values to other elements of the society.

Case Studies

In reflecting on the four case studies, Esman attempts to (1) analyze and compare some of the researchers' most salient findings, (2) suggest implications for the program's general approach to the institution building process and to the basic concepts which were their common point of departure, and (3) indicate the future development of theory, methodology, and practical application toward which these studies point. Since these studies are summarized in [12], [47], [72], and [73], attention is now called to generalizations drawn from them rather than their individual findings.

Technical Assistance in Institution Building

In all four of the cases studied, technical assistance staffs made up of foreigners to the country in question provided the main models for change and, in three cases, most of the impulse for action. However, even in these three cases, the staff

members were unable to carry their local counterparts with them on significant issues. Although frequently disagreeing among themselves, their counterparts were committed to only a few of the specific changes that they endorsed. Local staff members frequently attached higher priority to protecting existing relationships than to the changes proposed by technical assistance personnel, although they frequently agreed with the technical personnel about proposed goals.

In the instances studied, the technical assistance personnel were welcomed as suppliers of physical resources, as teachers, and, to some extent, as sources of technical ideas which would help the existing system do its old job better. But when viewed as a means of inducing new norms or action patterns within the institution itself or in transactions with linked cliental groups, they were threatening. These experiences suggest that congruence between the technical assistance personnel and indigenous institutional leaders over goals and tactics, as well as over the doctrine and the program of the subject institution, directly influences the effectiveness of foreign assistance. Without such congruence frustration is inevitable and even conflict may result.

On the basis of this admittedly small sample of four cases, several tendencies appeared to exist. One of these is that the doctrinal compatibility between the technical advisers and the institution's leadership cadre seemed to be more important than the formal positions of power that the technical assistance personnel occupied within the institution. Another is that technical assistance teams need to maintain a position that will enable them to capitalize upon changes in the external environment. A third is that technical assistance personnel tend to use mild and accommodating tactics rather than tension or crisis producing ones. Fourth, at the outset of a technical assistance project, leaders at the host institution are often uncertain of their goals, are more concerned with maintaining existing patterns and protecting their own interests within the present system than in fomenting changes, are unwilling to incur risks, and tend to be passive or inept in using the resources or the opportunities available. Fifth, in these situations institution builders must deploy a battery of survival and service tactics as well as change tactics. Sixth, the institution builder must be a manager par excellence, who can adjust to unplanned consequences of actions taken as well as to unanticipated contingencies, and who can attempt to create opportunities to facilitate his program. Finally, Esman concludes:

The most generalized proposition that seems to emerge at this stage of institution building research on the question of change tactics is that the institution building leadership should attempt in its transactions with each linked public to distribute or appear to be distributing a far greater volume of benefits than of costs. The margin of benefits over costs must be substantial because costs (dissatisfactions or threats) in status, respect, security, finance, or scope for action are usually perceived to be far more critical, triggering defensive action, than are anticipated benefits triggering supportive action. Where a wide margin of benefits over costs cannot be distributed, or where the organization appears to be under attack from a major linked institution, it must not hesitate to defer some of its activities which might be threatening to an external group. In such cases it must attempt to deal with a few negative situations at a time, must focus enough bargaining energy and resources on the

potential conflict, and must be able to deploy enough power in that situation to be reasonably certain of a satisfactory outcome. This is simply the strategy of keeping one's opponents divided and dealing with them separately rather than allowing an effective coalition to mobilize. (p. 46).

Several strategies for institution building are suggested. One is that rather than creating an entirely new institution, an existing one should be strengthened, unless (1) important groups within the society perceive that the existing institution is discharging its functions inadequately or is neglecting activities which it should be performing, or (2) the original institution is not catering to emergent needs or demands within its field of jurisdiction. When the existing institution has a widely diffused internal power structure, the appropriate strategy would appear to be an attempt to create a new unit within the existing institution. In situations where both the leadership and environmental factors are favorable, a rational approach to timing is to give initial emphasis to building a solid and viable organization and then to construct reliable linkages within the environment. Only when these linkages have been established should the riskier and more difficult task of restructuring the environment and transferring norms to linked institutions be attempted. When the environment is especially receptive to change, a more apropos and certainly bolder strategy may be to foster changes within the environment before linkages have been firmly established and the basic organization built on a solid foundation.

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