

PROJECT EVALUATION SUMMARY (PES) - PART I

PD-AAV-915 15M-50976

1. PROJECT TITLE

Feeding Systems Research

2. PROJECT NUMBER

632-0065

3. MISSION/AID OFFICE

USAID/LESOTHO

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit or Country or AID/AV Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 632-86-4

FINAL EVALUATION

REGULAR EVALUATION SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES

A. First PRO/AG or Equivalent FY 78
 B. Final Obligation Expected FY 84
 C. Final Input Delivery FY 87

6. ESTIMATED PROJECT FUNDING

A. Total \$ 12,320
 B. U.S. \$ 11,194

7. PERIOD COVERED BY EVALUATION

From (month/yr.) 04/78
 To (month/yr.) 04/86

Date of Evaluation Review 04/86

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

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/AV or regional office action should specify type of document, e.g., telegram, SPAR, PIO, which will present detailed request.)

B. NAME OF OFFICER RESPONSIBLE FOR ACTION

C. DATE ACTION TO BE COMPLETED

1. Continue strengthening the Research Division (RD) through participant training, improving physical facilities, and providing commodities. Continue to provide production oriented expatriate technical assistance until the various RD Sections have an adequate number of Basotho staff with the necessary educational and experiential backgrounds to conduct effective programs on their own.

USAID/L Contractor

8/86 (LAPIS ProAg) & USAID/AI Contract.

- SPECIFICS: a) Renovating and equipping the horticulture seed testing and soil testing laboratories.
 b) Assessment of irrigation potential to grow certain high value cash crops and fruits.
 c) Supply short-term assistance to the Rural Sociology Sector to develop a comprehensive program to contribute to the overall RD's program.
 d) The Extension Section and its training and linkage functions should be continued as a vital and viable section of the RD.
 e) The MOA should clarify the status of the RD Library. The publication distribution service should be separated from the Library.
 f) Develop a working relationship/liaison with other MOA Divisions, South Africa and the various national agricultural research programs in Southern Africa and the International Agriculture Research Centers.

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- Project Paper Implementation Plan e.g., CPI Network Other (Specify) None
 Financial Plan PIO/T Other (Specify) Recommendations
 Logical Framework PIO/G
 Project Agreement PIO/P

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

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

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

Mr. Abdel M. Moustafa, Project Officer
 Ms. Halefele Habula, MOA, GOL

Handwritten signatures and dates

12. Mission/AID/AV Office Director Approval

Signature: *Jesse L. Snyder*
 Typed Name: Jesse L. Snyder, Director
 Date: June 12, 1987

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|---|---------------------------------|-------|
| 2. Develop a 15-year plan for the institutionalization of the RD, including research programs, the organizational structure, staff (number, disciplines and level of training), and infrastructure. | USAID/L GOL & Contractor | 3/87 |
| 3. Formulate an Annual Work Plan which meets the approval of RD Director, Contractor Sector Leader, and TA Team Leader. | GOL & Contractor | 12/86 |
| 4. Greatly reduce numbers of "on-farm" replicated field trials. Depend on farm demonstrations to provide first-hand information for farmers. Increase the quality and precision of replicated experiments to maximize production of reliable data. Continue the FST approach but make it an appropriate part of the RD program, not the program itself. | GOL & Contractor | 12/87 |
| 5. Determine the number of substations Lesotho needs to cover the major ecological areas and develop these as finances permit. Close out all other substations. Critical need is research station development, security and management. | GOL | 6/87 |
| 6. The RD Director, TA Team Leader, and USAID Project Officer to meet on a regularly scheduled basis, to solve any problems of coordination, to be kept fully apprised of progress. | USAID/L, GOL & Contractor | 11/86 |

FINAL EVALUATION

GOL CONTRIBUTIONS

PROJECT TITLE: FARMING SYSTEMS RESEARCH

PROJECT NO.: 632-0065

1. The GOL cash and in-kind contributions for this Project as stated in the Project Authorization (March 30, 1978) was not expected to be more than 8% or \$724,000, and a waiver of the requirement for a 25% matching contribution was approved. Under the Project Grant Agreement, the GOL agreed to contribute up to 8% of the total project costs by contributions of cash or "in-kind" resources.
2. The initial first year GOL contribution of \$112,000 as indicated in the Grant Agreement (May 15, 1978), was made on a timely basis. The subsequent 10 Amendments to the Grant Agreements do not reflect any change in the amount of GOL contribution and GOL contributions were made in a timely and effective manner. However, Amendment No. 11, dated February 6, 1984, increased the total level of U.S. funding to \$11,194,000 and that of the GOL to \$1,126,000, an increase of \$402,000 which raised the GOL contribution from 8% to 9% of total project costs.
3. As part of my Project Officer responsibilities, I have frequently visited the Research Division Headquarters, the three prototype research areas, and I have discussed project progress and problems with my GOL counterparts and the TA Team. It is clearly evident that the GOL had financially contributed, to the full extent, what had been agreed upon in the ProAg and Amendment No. 11. This includes salaries and wages for returning trainees, technical staff, maintenance personnel, temporary wages for field workers, and building site maintenance. Land was provided for the offices, laboratory, and library buildings. GOL also provided land for the staff housing, field sheds and research plots in the prototype areas. In addition, GOL contributed furnishings and utilities for senior technicians and field staff housing.

DRAFT:A/ADO/AMMoustafa: _____
(11b:11/21/86:"Memos/ADO/C")

CLEARANCES: CONT/AMGORDON: _____

PDO/ADEGRAFFENREID: _____

PROJECT EVALUATION SUMMARY (PES) PART II

13. Summary

At the time of the project evaluation in April 1986, the Farming Systems Research (FSR) Project was near its completion date, November 1986. The beginning of the Project corresponded with the formation of the Research Division in the Lesotho Ministry of Agriculture. Both essentially started in 1979 and have existed as a single program since 1980. The support received from the Project has enabled the research Division to advance toward becoming a mature research organization, but it is only a beginning. Much must be accomplished before the long-term goal of a Ministry research organization capable of meeting the country's needs is realized. Some of the basic and necessary organizational and physical structures are in place, while others are not yet established, or still are in their initial stage. Combined support and guidance will be essential for future development. Therefore, USAID's support of the Research Division is continuing under the Lesotho Agricultural Production and Institutional Support (LAPIS) Project.

14. Evaluation Methodology

This final evaluation was carried out by two eminent agriculturalists recruited by the Mission; the Dean of College of Agriculture, University of Nebraska (retired) and Assistant Dean, College of Agriculture, University of Illinois and Director of International Program (retired, presently professor of Agricultural Economics). The Lesotho Ministry of Agriculture (MOA), through the Director of Technical Services designated the Acting Deputy Director of the Research Division and a person of the MOA Planning Division to be part of the evaluation team.

The project outputs anticipated in project paper, as modified in response to two external evaluations carried out in 1981 and 1983 and project implementation experience, with the scope of work given to the evaluation team provided the general framework for the final evaluation.

15. External Factors

The designers of the project were overly optimistic in determining that a separate fully functional Farming Systems Research Unit (FSRU) could be established in a newly created Research Division. The young Research Division did not have the required trained manpower, expertise and managerial skills to create researchers who were competent in specialized matters, as agronomy, horticulture, rural sociology and basic research methodologies. Therefore, the 1981 external evaluation team recommended that adjustment of the project purpose to be made to include institutionalization of an effective agricultural research capacity in the MOA. This was subsequently adopted by a contract amendment embodying this concept. This was congruent with the direction desired by the Ministry.

16. Inputs

The inputs of technical assistance staff, long-term training programs and construction of needed infrastructure proceeded on schedule, without major problems. The only difficulties were that the time required for training exceeded original estimates, and that most of the technical assistance staff were not able to turn over work to most of their counterparts as originally planned. Therefore, the training program is continuing under the LAPIS Project.

17. Outputs

The technical assistance inputs were used reasonably effectively in orienting the program of the young Research Division to a farmers-oriented approach that reflects relevant research needs. The construction of a new Research Division Headquarters, three Agricultural Experimental Stations (prototype research areas representing the lowlands, foothills and mountains) and an agricultural research library were essential to establish a basic research arm to serve the Ministry. The project design target of reaching at least 5 percent of the farmers in the prototype research areas were achieved. The project targets for training Basotho personnel by a combination of degree, non-degree and in-country training have been achieved. Training 20 nationals to B.S. or M.S. levels has been a major accomplishment that will have major impact. These returned trainees, along with the facilities constructed, have provided a nucleus for developing a research unit.

18. Purpose

The Project Paper listed a multi-component purpose which was to create more productive agricultural enterprise mixes which are acceptable to farmers, sensitive to farmers' management ability, appropriate to the resources available, and protective of the land base. The technical assistance provided by the project developed the capacity of the Research Division to provide applied and practical technical information to the target group. The objectively verifiable indicators that appropriate farming systems and related rural enterprises are in use by 5 percent of farm households in the prototype research areas of project implementation was achieved. Means of verification were project records, survey and this evaluation.

19. Goal/Subgoal

The national and sector goals of the project was to improve the quality of rural life and to increase rural income from agriculture, respectively. A project survey concluded that the Village Agricultural Committee (VAC) members have proved to be effective disseminators of agricultural information and diffusers of innovations and that each VAC members has influenced an average of 8.8 persons through combination of telling, showing and facilitating the observation of agricultural innovations. The evaluators visit to the Prototype Research Areas confirmed the project's written report and attested to the significance

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of the FSR developed strategy for reaching farmers. Records from combination farmers showed that major changes in practices and enterprises were made resulting in increased incomes from field crops. A survey conducted in 1986 to study the impact of FSR extension education programs on members of former contact groups indicated that 39 percent of the participating farmers experienced more income from farming.

20. Beneficiaries

The beneficiaries of this project are the farmers of Lesotho. The initial target group were those individuals or groups of individuals who indicate a desire and willingness to try improved farming techniques with the associated risks. The ultimate target group were those farmers or farmer groups who indicate a reluctance to improve traditional agriculture due to a lack of resources, financial or physical, or who possess a perception that change is possible. These farmers represent the mass of Lesotho's rural poor. Establishment of a farming systems unit in the Research Division was a means (output) to give leadership in attaining the approved project purpose. This was modified from establishment of a FSR unit per se to strengthen the overall capacity and program of the RD. The technical assistance team with their Basotho counterparts have effectively focused on the farmers' problems and socio-economic milieu. A 1985 survey of a sample of 196 of the 224 Village Agriculture Committees members who had participated in the FSR program during 1979-84 had received benefits. This included higher crop yields, acquisition of better animals, better condition of animals, ability to purchase improved inputs, more income from farming, acquisition of more property, more trading with neighbors, and better meals for family. These data and evidence of VAC influence on other farmers lead the evaluation team to the conclusion that the five percent target was attained.

21. Unplanned Effects

The presence of a substantial technical assistance team encouraged the Basotho counterparts to put some of their work responsibilities on expatriate shoulders.

22. Lessons Learned

- A. Institution-building is a long-term proposition and requires substantially more than the usual 5-year development assistance project.
- B. Researchers should receive in addition to technical subject matters, some training in research policy, planning and personnel management.
- C. LT Training should not be centered at one institution, to ensure that MOA participants be exposed to a diverse range of disciplines and approaches.

23. Special Comments

USAID/Lesotho is continuing its assistance to the RD of the MOA under the Lesotho Agricultural Production and Institutional Support (LAPIS) Project (No. 632-0221). The RD Director, TA Team Leader and USAID Project Officer meet on a weekly basis to solve any problems, ensure coordination and keep fully apprised of progress.

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Final Evaluation

Farming Systems Research Project

No. 632-0065

A Report of
An Assessment of Progress

by

Elvin F. Frolik

and

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Submitted to the U.S. Agency for
International Development Mission
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April 26, 1986

1. Elvin F. Frolik, Agricultural Consultant and formerly Professor of Agronomy and Dean, College of Agriculture, University of Nebraska, Lincoln, Nebraska 68512. U.S.A.

2. William N. Thompson, Agricultural Consultant and formerly Professor of Farm Management and Policy, Associate Dean and Director of International Agriculture, and Assistant Vice-Chancellor for Research, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801, U.S.A.

EXECUTIVE SUMMARY

This is a concise summary of the final evaluation of Farming Systems Research Project No. 632-0005, a cooperative project between the Government of Lesotho (GOL), the U.S. Agency for International Development (USAID) and Washington State University, the project Contractor. The project started in early 1979 and will end in mid-1986.

1. The technical assistance inputs have been used reasonably effectively in orienting the program of the young Research Division (RD) of the Ministry of Agriculture (MOA) to a farmer-problem solving approach that reflects relevant research needs. The combination of expatriate personnel, training, and physical facilities and commodities has led to a major stride in strengthening the program and resources of the RD.

2. The farming systems program of the RD, initially oriented to establishing a FSR unit within the RD but later broadened to strengthening the entire Division, has not become clearly established. A good base is present, the strong elements being the orientation to farmers' problems, excellent linkages to farmer and community groups, and adaptive research in farm management, marketing, rural sociology and extension. Essential, but less effective, elements are a research station base of adaptive research in the production disciplines and a clear understanding of the need for a balanced program of research stations and sub-stations and/or prototype area headquarters experimentation, and on-farm trials, tests, and demonstrations.

3. The establishment of the program in prototype areas has been an effective strategy for reaching farmers. The Village Agricultural Committee (VAC) approach, growing out of early-initiated project research, is an excellent way of getting farmer and community involvement in technology testing, transfer, and adoption. The project design target of reaching at least five percent of the farmers in the prototype areas has been attained.

4. The project targets for training Basotho personnel by a combination of degree, non-degree, and in-country training have been achieved.

5. Facilities and commodities support have been essential to strengthening the program of the RD at the Maseru Station and the prototype areas. Establishment of the RD library collection which now serves as the MOA library and base for research data and information is particularly noteworthy.

6. The technical assistance Contractor (WSU) demonstrated flexibility in providing personnel as the focus of the project changed from the FSR unit to the entire RD. In general, WSU complied satisfactorily in terms of personnel qualifications. WSU graduate students have made significant contributions. The concluding team is leaving an outstanding series of reports, bulletins, and circulars documenting project and RD staff accomplishments during the life of the project.

7. Problems of coalescence of MOA, WSU, and USAID project management developed early in the project and were only partially resolved. Lack of a mechanism for joint, collaborative and co-operative management to resolve major policy, program and leadership issues detracted from returns from human, physical, and monetary resources being maximized.

8. With respect to institutionalization of the RD, good progress has been made in Extension and in the social sciences (both fit naturally into the FSR approach). Much less success has been attained in building production sections because resources have been utilized mostly on "on-farm" tests, whereas replicated experiments must be conducted under researcher-controlled conditions, in most cases best and most economically carried out at experiment stations.

9. Progress has been made in many areas in strengthening the Research Division and its linkages to other MOA divisions and farmers. Nevertheless, the RD does not yet have the institutional capacity to carry out an effective adaptive research program without continuing technical assistance. The critical mass of personnel is lacking in all sections and collectively. Some disciplines received little, if any, support from the FSR project. Capacity to plan, lead, and implement an effective, well-balanced, adaptive research program is a critical need.

Principal recommendations follow. Other more specific recommendations are in the several scope of work sections.

Principal Recommendations

1. Emphasize strengthening the RD through participant training, improving physical facilities, providing commodities, and generally having expatriates give more production-discipline assistance to on-Station research programs.
2. Develop a 15-year plan for the institutionalization of the RD, including research programs, the organizational structure, staff (number, disciplines and level of training), and physical plant.
3. Strengthen technical and leadership capabilities to plan and implement an effective and balanced adaptive research program for the Division. Support personnel in technical and administrative areas need to be upgraded. A critical need is research station development, security, and management.
4. Continue the FSR approach but make it an appropriate part of the RD program -- not the program. Spell out the FSR interpretation (there are many) for Lesotho, in writing, and make copies available to all concerned.
5. The RD Director, TA Team Leader, and USAID Project Officer to meet on a regularly scheduled basis, to solve any problems of co-ordination, to be kept fully apprised of progress, to inspect ongoing research and Extension programs, and to adjust programs as is deemed desirable.
6. Greatly reduce numbers of "on-farm" replicated field trials. Depend on farm demonstrations to provide first-hand information for farmers. Increase the quality and precision of replicated experiments to maximize production of reliable data.
7. Have production researchers help plan on-farm demonstrations, participate in farmer meetings, help prepare educational publications and other materials, and work closely with Extension in order to maintain a close farm orientation.
8. Maintain the momentum which is underway in the Social Sciences and Extension. Social science staff should conduct much of their research with farmers.
9. Determine the number of substations Lesotho needs to cover the major ecological areas and develop those as finances permit. Close out all other substations.
10. Formalize a plan for staff members (especially expatriates at this time) to assemble on an on-going basis

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technology and materials from the many excellent sources outside of Lesotho. Summarize in writing pertinent information and make available to all in a numbered series in the Library.

11. Provide each potential expatriate with a plan of work, same to be made a condition of employment. This will avoid possible misunderstandings of what is expected. There should also be annual plans of work to be approved by Team Leader, Section Leaders, and the RD Director.

12. Have short-term consultants with strong technical backgrounds come to Lesotho to monitor programs, to provide counsel to the researchers, and to be available for assisting with reviews and evaluations. Consultants should not be presently or formerly employed by the RD, Contractors and sub-contractors, or USAID except in unusual circumstances. Consultants should be retained over as long a period of time as possible.

13. Continue to provide expatriate technical assistance until the various RD Sections have an adequate number of Basotho staff with the necessary educational and experience backgrounds to conduct effective programs on their own.

ACKNOWLEDGEMENT

Evaluation assignments are useful, professionally rewarding and personally pleasant only if there is full cooperation and mutual trust among all involved. Without exception, this has been the case. To all we are grateful -

- to Miss Museebata Ntoanyane and Miss Halefele Mbulu, Ministry of Agriculture evaluation team associates, who provided useful information and helped us understand what we read, heard and observed.
- to Mr. Trower Namane, Acting Director, Research Division and his staff and to Dr. Donald Lee, Team Leader, and all members of the Washington State University Team who provided access to all reports and patiently participated in interviews and field visits.
- to the Acting Principal Secretary and Director of Special Services, MOA, who provided background and insights on the FSR Project and relationships with other MOA units.
- to the many Research Division and Extension representatives who accompanied us on field visits and to the farmers and members of Village Agriculture Committees, the intended beneficiaries of the coordinated efforts of FSR and the Research Division, we are especially grateful for their hospitality and articulate explanations of their problems, progress, and aspirations.
- to the many in USAID who helped us, particularly L. Dean Bernius, Program Officer; Barry H. Hill, Agricultural Development Officer; A. DeGraffenreid, Project Implementation Officer; and Abdel M. Moustafa, Assistant Agricultural Development Officer. Dr. Moustafa deserves special mention for his constant attention and assistance to making our work effective and time efficiently used.
- and to Ken Dewire who diligently processed our scrambled words into a report under inhumane time pressure.

Elvin F. Frolik
William N. Thompson
April 26, 1986

TABLE OF CONTENTS

| | |
|---|-----|
| Title Page..... | i |
| Executive Summary..... | ii |
| Principal Recommendations..... | iv |
| Acknowledgement..... | vi |
| Table of Contents..... | vii |
| I. Introduction..... | 1 |
| A. General..... | 1 |
| B. Evaluation Methodology..... | 1 |
| 1. Expected Project Outputs..... | 2 |
| 2. Evaluation Scope of Work..... | 2 |
| 3. Prior External Evaluations..... | 3 |
| 4. Evaluation Procedures..... | 4 |
| II. Response to Scope of Work..... | 6 |
| A. Input Effectiveness..... | 6 |
| B. Project Impact on Research Capability..... | 6 |
| 1. General..... | 6 |
| 2. Technical Assistance Programs..... | 7 |
| a. Agronomy..... | 7 |
| b. Horticulture..... | 11 |
| c. Plant Protection..... | 13 |
| d. Seed Program..... | 13 |
| e. Soils..... | 14 |
| f. Range Management..... | 15 |
| g. Animal Science..... | 17 |
| h. Agricultural Engineering..... | 18 |
| i. Farm Management..... | 18 |
| j. Rural Sociology..... | 20 |
| k. Marketing..... | 21 |
| l. Extension..... | 23 |
| 3. Trained Basotho Personnel..... | 25 |
| 4. Facilities and Commodities..... | 30 |
| 5. Agriculture Research Library..... | 31 |
| C. Research Division Viability..... | 33 |
| D. Visits to Prototype Areas..... | 36 |
| E. Farmer and Community Involvement..... | 36 |
| F. Project Outputs and Purposes..... | 39 |
| G. TA Team Composition and Skills..... | 42 |
| H. Entity Commitment and Support..... | 44 |
| I. Problems and Constraints..... | 47 |
| J. Progress Following WSU Review..... | 49 |
| III. Literature Cited (a partial list)..... | 51 |
| IV. List of Persons Contacted..... | 52 |
| V. Acronyms and Abbreviations..... | 54 |

I. INTRODUCTION

A. General

This is a report on the final evaluation of Farming Systems Research Project No. 632-0065, a co-operative project between the Government of Lesotho (COL), the U.S. Agency for International Development Mission to Lesotho (USAID), and Washington State University (WSU), the project contractor. The agreement between the GOL and USAID to carry out this project was signed in April 1978. The Project technical assistance team provided under a contract with WSU signed in March 1979 began arriving in Lesotho in July 1979 and was fully on board by August 1980. The original five-year project time period was extended for two years to March 31, 1986 with subsequent agreement to extend to July 31, 1986.

This "final evaluation" was provided for in the Project Paper (PP) to "be carried out after the project ends to determine its efficiency, effectiveness, and impact." However, it was scheduled for April 7-26, 1986, some three to four months before the completion of technical assistance activities. This provided the opportunity to observe and discuss the project while all parties were actively involved in the closing weeks of implementation.

B. Evaluation Methodology

This final external evaluation was carried out by Elvin F. Frolik, team leader, and William N. Thompson, team member. The Ministry of Agriculture and Marketing (MOA), through the Director of Technical Services, designated Miss 'Maseabata Ntoanyane, Acting Deputy Director, Research Division (RD), and Miss Halefele Mabula of MOA Planning to be part of the evaluation team.

The project outputs anticipated in project design, as modified in response to two external evaluations carried out in 1981 and 1983 and project implementation experience, with the scope of work given to the evaluation team and shared with MOA and WSU personnel, provided the general framework for the evaluation. The scope of work, blended with the anticipated outputs, provide the general outline for this report.

1. Expected Project Outputs.

The following is a summary of the outputs that were to be produced to achieve the project purpose and principal focus "to create more productive agricultural enterprise mixes which are acceptable to farmers, sensitive to farmers' management ability, appropriate to the resources available, and protective of the land base."

- a. Institutionalization of a farming systems research section within the Ministry of Agriculture and Marketing (MOA) Research Division.
- b. Development of a farming systems program.
- c. Development of strategies for reaching farmers.
- d. Trained Basotho Personnel.
- e. Establishment of a research and information data base.
- f. Establishment of an agriculture research library.

2. Evaluation Scope of Work

The scope of work provided that the team should undertake, among others, the following actions:

- a. Assess the effectiveness of utilization of inputs provided under the project and the impact these inputs have had on achieving project outputs.
- b. Assess composition, appropriateness of technical skills and functions of the technical assistance team.
- c. Evaluate commitment, adequacy, timeliness and level of support from Contractor, Government of Lesotho and AID in project implementation.
- d. Review and analyze project outputs and assess the extent to which they have led toward accomplishment of project purposes.
- e. Examine the impact the project has had to date on developing the institutional capacity of the GOI to carry out an effective research program based on relevant research needs for the country.

- f. Assess the viability of the Research Division in regard to planning and implementing effective research programs.
- g. Visit the three prototype areas and farmers' fields established under the FSR and to review ongoing research activities.
- h. Assess farmer and community involvement in the planning and implementation of research activities in the prototype areas.
- i. Identify problems and constraints which have been encountered in the implementation of this project, and make suggestions and recommendations to alleviate them.
- j. Assess progress made on recommendations of the Washington State University review team conducted in January-February, 1985.

3. Prior external evaluations

The original project approach and expected outputs were modified by two external evaluations conducted in 1981 and 1983 and were briefly summarized for the final evaluation team as follows:

"The results of the first external evaluation in April 1981 led to agreement by the concerned parties on certain changes in project approach and outputs. First, the revised approach of the project is to work with the Research Division towards the joint goal of added emphasis on the farming systems approach rather than to create a separate Farming Systems Unit per se. Secondly, the revised approach extends the focus of field research from being limited to three prototype areas exclusively to including work on other areas of Lesotho.

"The results of the second external evaluation in March 1983 led to agreement to extend the project two years, to July 1986 to ensure further strengthening of the MOA's research capability until the Lesotho Agricultural Production and Institutional Support (LAPIS) project with an agricultural research component, was approved and implementation commenced."

4. Evaluation Procedures

Prior to arrival in Lesotho, external team members reviewed the FSR Project Paper, prior evaluation reports, Congressional Presentations on the Lesotho USAID program, the 1981 Frolik Report on "A National Agricultural Research System for Lesotho", and an array of FSR reports, especially those reporting on FSR and Farming Systems Research/Extension (FSR/E) experiences in Africa.

During the course of in-country evaluation large numbers of draft and final reports were reviewed including the 1985 Lesotho Country Development Strategy Statement, technical assistance team end-of-tour reports, TA team and counterpart reports, the "Agricultural Research Policy" (October 1983) statement of the Research Division (RD-B-24). Particularly useful were draft sections of the seven-year summary report being prepared by the TA team. Other reports were found to be useful, e.g. the two volume report of the Southern African Development Co-ordination Conference (SADCC) on research resource assessment, Volume I on "Regional Analysis and Strategy", and especially the Volume II "Country Report: Lesotho". Another example is the Project Paper on the Lesotho Agricultural Production and Institutional Support Project (LAPIS), October, 1984.

The evaluation team with MOA team associates interviewed all technical assistance team members with their counterparts as available, and observed the work of TA graduate students and one Peace Corps associate in the field. The physical facilities of the Research Station at Maseru were observed including field experiments, laboratories, library, offices, and field equipment..

Field visits were made to two of the three prototype areas (Siloe and Nyakosoba) where the following were observed: physical facilities, equipment and MOA staff at PA headquarters; all on-farm field crop replicated trials presently in the fields under overall direction of the TA team agronomist and direct field supervision of a Peace Corps Volunteer and MOA field assistants; a PA headquarters replicated trial field supervised by WSU graduate students; a farmer field demonstration of vegetable production; visits to two combination farms in the Nyakosoba PA with the farm management field assistant (and others), one farmer with a poultry project; observation of controlled grazing of range under the direction of a Village Agriculture Committee (VAC) range sub-committee.

The visit to the Nyakosoba PA afforded the opportunity to observe the functions, procedures, and effectiveness of a VAC as a means of implementation of research activities and technology transfer and adoption by farmers. The presence of District Agricultural Officers (DAO's) under the leadership of the Director of Field Services and the RD Extension Section permitted observation of the transfer of concepts and methods developed under FSR through extension to other areas of Lesotho.

Visits were made to the Acting Principal Secretary, L.R. Ntokoane, Ministry of Agriculture (formerly Director, Crops Division) and the Director of Special Services, Winston P. Ntsekhe (formerly Director of the Research Division for six years of the FSR project).

Initial orientation discussions were held with the USAID Assistant Mission Director and Program Officer, L. Dean Bernius; the Agricultural Development Officer, Barry H. Hill; and the Assistant Agricultural Officer, Abdel M. Moustafa. There were frequent informal discussions with Dr. Moustafa who gave leadership in an initial meeting of WSU TA team members and Research Division counterparts, and accompanied us on the visit to the Siloc prototype area.

Following ten days of activities as outlined above with the objective of understanding seven years of work, the team began synthesis of information, tempered with judgements, into a report that hopefully will be useful to all concerned as the GOI proceeds with the important tasks of improving the production and productivity of its physical and human resources in the agricultural sector and in improving the levels of living of the Basotho people.

The evaluation team scope of work provides the outline for the main body of the report that follows.

II. RESPONSE TO SCOPE OF WORK

A. and B. Combined as Follows:

- A. Assess Effectiveness of Utilization of Inputs Under the Project and Impact on Achieving Outputs,
and
- B. Examine Impact Project Has Had on Capacity of GOL to Carry Out an Effective Research Program.

1. General

The technical assistance provided has been extensive. Virtually all types of experimentation, and transfer of technology to Extension and farmer-users can be continued, within limits of trained counterparts being available. The WSU team members have also been involved in numerous services other than agricultural research and extension. For example, Dr. J.D. Downes has taught courses in statistics at the LAC.

The former Director of the RD reported that much progress has been made during the seven year period that the WSU assistance program has been underway.

In the discussion that follows, the educational work with farmers is handled largely under the Extension section, even though staff members in all sections were very much involved with working with farmers, through research, writing up circulars intended for the farmers, and personal services. No attempt is made to cover all research findings and recommendations as these are available in the seven-year report and many other publications, well organized and cataloged in the Library. The research results are very well and thoroughly documented.

2. Technical Assistance Programs

a. Agronomy

There has been a strong emphasis as called for in the PP and subsequent evaluations on "on-farm trials". Less emphasis has been placed on generating solid research data. There is no conflict here between basic and applied (adaptive) research, because all of the agronomic research is of the latter type. The thought of adapting research results from the Station to farm conditions is largely a myth -- for the most part they are one and the same type of research in Lesotho -- the difference is principally one of number of entries and location of the experiments.

In view of the above, it is not surprising that agronomists have concentrated their efforts on "on-farm-trials."

Many trials have been conducted covering numerous varieties and treatments with the results being published in numbered reports. The results will also be utilized in developing the 1986 planting guides and summarized in the seven-year report. The introduction of pinto beans followed by wide acceptance constitutes an excellent accomplishment of the RD/FSR agronomic programs (5,6). The agronomists have been very innovative in modifying equipment for planting and fertilizer placement for use in establishing research plots and by farmers. They have developed fertilizer and varietal recommendations, and constructed the box level (float) used in preparing seedbeds. With the help of the Lesotho Steel Company they also developed a portable wheat thresher. They report that they developed the concept of bin-drying maize which permits earlier harvesting. They emphasize the importance and numerous advantages of late fall plowing. Dr. Richardson is working with Dr. Dow in preparing the agronomic section of the seven-year report and with Mr. Ford is updating the field crop production guides.

As pointed out elsewhere in this report, excellent progress has been made in orienting the RD staff to doing research which is meaningful to farmers and in accomplishing technology transfer. However, it appears that now there should be a concerted effort to improve the experimental procedures, and conduct of replicated field trials. The suggestion is based on the observations which follow.

All field crop experiments now in the field at the Research Station, Siloe and Nyakosoba were inspected. They included maize, sorghum, soybeans, chick peas and ground nuts, in which the treatments included varieties, fertilizers, density, seedbed preparation, and time of planting. None of the tests could be classed as satisfactory¹, except for two conducted by graduate assistants.² The situation may be more favorable with small grains. One or more of the following were factors in the shortcomings of the tests inspected:

1. Poor or at least inadequate stands (true of virtually all tests)
2. Time of planting
3. Weeds including inadequate control and skips resulting from careless removal
4. Failure to thin
5. Theft
6. Farmer cutting off maize stalks just above the ears before harvest -- depending on when done, this could result in differential effect on yield
7. Variation in width between rows because the oxen pulling the planter veered to one side or the other
8. Frost damage before maturity
9. Bird damage - both in pulling young plants and eating grain before harvest
10. Portions of experimental area ruined by sewage or excess water running over the plots
11. Grazing by livestock

 1. Dr. Richardson stated that the trials at Molumung are much better than those at Siloe and Nyakosoba. Unfortunately, lack of time forced us to cancel the visit to that location.

2. Acceptable replicated tests are being conducted as follows: 1) maize tillering test at the Research Station, and 2) a fodder species trial at Nyakosoba. Enough time and care were devoted to each test to make the treatments fully comparable and the results reliable.

With a heavy overload of many on-farm replicated tests, the researchers (both expatriates and Basotho) have done their best to extract as much information as possible from the data obtained. At the Station the traditional methods of harvesting trials have been utilized, i.e. harvesting the center row(s) except for 1/2 meter at each end. At the "on-farm trials" various systems of taking yield data have been employed as follows:

1. Taking 4 evenly spaced samples from adjacent areas in the plot totalling 8 or 10 meters from non-border plot rows (1)
2. Similar to above except that the sample areas are selected in each plot to be representative of "the normal plant response to the treatment"(2).
3. Triangular sampling frame, "ring", or "square" placed at random in the plot. Similar to method used by the Bureau of Statistics, GOL to obtain crop production estimates (1). Such a method is especially useful in taking yield data on broadcast-planted crops (2).

Where possible, the data were analyzed statistically, using traditional methods, including paired comparisons with the chi-square method of determining significant differences. The statistical analyses were superior to what was observed in the field. As Irving Dow stated when we were inspecting one of the "on-farm trials": "The best of statistical analyses cannot improve on what occurred in the field."

Holland (1, p.57), in referring to maize, states "The hand-planting tool ... is a possibly important tool in Lesotho agriculture for overcoming poor plant stands" (1, p.57). He was referring to replanting, but we would like to see the hand planter investigated for making the initial maize plantings.

Considering the importance of agronomic work in Lesotho, the section is woefully understaffed. With Trower Namane in the position of Acting Director of the RD, there is presently no Masotho with a degree working in the Agronomy Section. One agronomist, the Director of the RD, is working on a Ph.D. degree. There is also another Masotho working on his M.S. degree. With the present situation, there will in time be two Basotho with M.Sci. degrees working in the Section. Additional participants should be added in this area and at least one more Masotho should earn a Ph.D. degree as soon as possible.

Recommendations

1. Drastically reduce the number of "on-farm replicated trials". We agree with Holland et al (1 p.16) that "...research involving a randomized block design is best left ... to researcher-controlled fields A simple strip design is best for farmer-controlled fields."
2. Concentrate research immediately on stand establishment and maintenance. Success here would greatly improve the value of field crop experiments, and if it could be adopted by farmers, along with using other improved practices, would greatly increase yields in Lesotho.
3. Stop using oxen in conducting replicated field trials. Not everything can be done as the farmer does it if progress is to be made. If it is necessary to use tractor power for preparing a seedbed and hand planting to obtain acceptable stands and avoid skips, do it. Adaptation to farm conditions can follow -- the farmers might surprise the researchers in their capabilities and willingness to modify their farming operations in order to be able to take advantage of improved technology (if profitable) -- the Farm Management Section and Extension could be a major factor in crossing this bridge.
4. Correct as many of the constraints listed above as possible. The methods of doing so are well known in many cases even though perhaps difficult to carry out. Getting sound, meaningful data justifies the effort. Examples of correction: Graduate Assistant David Granatstein supplied night guards with a dog, which seems to have been effective in eliminating theft.
5. Enough is known about cultural practices; fertilisation, if soil tests are employed; and on varieties from past RD/FSR research and from the RSA; from commercial companies, from International Centers, and other sources, to advise farmers for a year or two while emphasis is placed on improving research techniques and procedures. Meanwhile, emphasize strip tests for farm demonstrations.
6. When acceptable research procedures have been worked out, design and conduct the experiments so that the data can be summarized over a period of years -- not now being done for the seven year report.

7. Continue the education of at least one M.S. degree holder to the Ph.D. level as soon as possible. Add one more staff member with a M.S. degree and one with a B.S. degree.

8. Provide the assistance of an expatriate as soon as possible so as to overlap with Dr. Richardson.

b. Horticulture

There have been only two years of technical assistance provided under the WSU contract, i.e. Dr. J.D. Downes will have been in residence June, 1984 to completion. He has one counterpart presently in Lesotho, Makalo Ishmael Motsokane, who specializes in vegetables. Downes stated that he had not had time to examine the old records. A good deal of the information on horticulture was obtained from an interview with Mr. Motsokane.

Conducting replicated field trials involves some of the same difficulties as listed in the agronomy section but not all. Since it is common practice to water at times of seeding small seeds and in transplanting, it may be somewhat easier to secure stands. The planting is done primarily by hand which removes another constraint encountered with machines pulled by oxen, as is commonly done with field crops.

A great many tests, both replicated and observational, have been conducted at the 3 PA's and at Maseru, covering various crops, varieties and treatments. Included have been potatoes, cabbage, tomatoes, leafy greens, onions, carrots, garden peas, tepary and lima beans, and other vegetables. Plantings were also made of tree fruits and pecans. Some studies were made on intercropping.³ The field plantings were not inspected by us since most had been harvested.

With respect to possibilities of producing vegetable crops on individual, irrigated farms, Downes believes that there is a potential for some of them to be profitable in Lesotho. However, he states that such an enterprise should not be regarded as a panacea nor should it be thought that the introduction of irrigated agriculture will be easy. He believes there are many institutional barriers which stand between the potential and realization. Dr. Holland is concerned about the economics of such an enterprise.

3. Tests on intercropping were also conducted by Ms. Makohlolo M. Kotosokoane (no longer on the RD staff) some years in advance of Dr. Downes' arrival.

Downes insists that any commercial production of vegetables should be preceded by a market study. Otherwise, the farmers may come up with good production which is left to rot in the fields.

We wonder if production of peaches under irrigation might not be investigated. They appear to do unusually well here if insects are controlled. Air drainage on non-level land is excellent. Brokken points out the danger of hail and frost.

Dr. Downes has covered a lot of ground in the time he has been here. He has accomplished about as much as was possible in the short period of time available to him. He is working with Mr. Ford in updating guides for vegetable production.

To date, plans for renovating the horticulture lab have not materialized. A horticulture storage/equipment shed and 5 small research greenhouses have been constructed.

There are presently no Basotho with degrees in the Horticulture Section. There is one Masotho with a M.S. degree on leave, one working on a M.S. degree and one on a B.S. degree.

Recommendations

1. Renovate and properly equip the horticulture laboratory.
2. Upgrade the training of the B.S. degree holder to the M.S. level and have one of the degree holders work on a Ph.D. degree.
3. Provide expatriate help for at least four years.

c. Plant Protection

The RD has a reasonably well equipped plant pathology laboratory. The room for entomology has little equipment. There is in press a handbook on plant diseases and insects. The two laboratories have a collection of plant diseases and insect specimens.

Entomological research has centered on cutworms, stalk borers in maize and sorghum, and identification of a nematode in potatoes. There was a short-term consultant here on weeds, who put together a paper on control.

Presently, there are no Basotho staff with degrees on duty at Maseru. One Masotho is studying for the M.S. degree in Plant Pathology and one for the M.S. degree in Entomology. Since this will be primarily a service Section, these two staff members should be able to make a valuable contribution to the Research and Extension programs. Ultimately, additional training is indicated.

Recommendations

Continue to strengthen the plant protection work. Equip the entomology laboratory to make it functional. Add scientific equipment to the Plant Pathology laboratory as needs arise.

d. Seed Program

The seed testing laboratory needs equipment, renovation, and some expatriate help to make it functional. Seed testing is essential in conducting plant research and is also needed by Extension and farmers.

An organized system of processing, labeling, storing and preparing seed for planting, along with suitable building space and equipment are needed in research operations.

Recommendations

1. Establish a functional seed testing laboratory.
2. Establish a system and provide adequate building space and equipment to handle seed used in research operations.
4. The recommendation stands regardless of the Division to which the seed laboratory is assigned, organizationally.

e. Soils

An excellent soil testing laboratory has been established with a well qualified expatriate, Dr. Behjat Pedamchian in charge. The laboratory is fully functional. Complete analyses can be made, including determination of trace elements. This laboratory provides the basis for a Soils Section in the RD, which is much needed. Actually, soils should have been included in the original project design program, including a long-term expatriate from the start.

In the seven-year report, the section on Soils is divided into three major parts as follows:

- 1) Soil development, classification and survey.
Over the years a good deal of work has been done in this area. Under the FSR project, the soils of the PAs have been mapped by Chris Mack (9). This was a valuable contribution.
- 2) Soil erosion/conservation
Work in this area under the seven-year project was carried on principally by the Range and Agronomy sections
- 3) Soil fertility management
An attempt was made to relate fertilizer response and soil fertility problems to soil series in both Agronomy and Horticulture field tests. Unfortunately soil samples were not taken in connection with the 1985-86 "on-farm" agronomic trials.

The need for soils research in Lesotho is almost unlimited. Severe sheet erosion and the dongas constitute a problem that is dramatically evident. Responses to N and P fertilizers have been striking. What is most needed now are extensive correlation studies, so that more accurate fertilizer recommendations can be made on the basis of soil tests.

There is no Mosotho staff member with a degree working in soils. One Mosotho is working on a M.S. degree.

Recommendations

1. Develop a full fledged soils section, which should be provided with adequate quarters to include provision for the soil testing laboratory (now critically short of space). Arrange for financial support for chemicals and other costs in conducting soil tests, perhaps through a user fee to be retained by the laboratory.

2. Utilize the services of an expatriate for at least five years.

3. Train one Masotho to the Ph.D. level and one more to the M.S. level.

f. Range Management

Dr. Tiedeman and Basotho staff attempted setting up a grazing association which Dr. Goebel said was abandoned because Tiedeman thought he could maintain numbers of livestock which proved impossible. Tiedeman (T) and Basotho colleagues concluded that research should be concentrated on solving the problem of overstocking, and that low priority should be placed on research on range seeding, brush control, or fertilization.

Goebel and his Basotho counterparts have 1) done work on perennial forage trials; 2) made observations on the LCRD project on forming grazing associations; 3) done research on brush control; 4) made use of exclosures and other ungrazed areas to study change in composition; 5) emphasized fodder production; 6) studied effects of burning; 7) done reseedling; 8) and identified important range species.

Tiedeman, Klosterman, and Goebel and their Basotho colleagues all agree that overstocking is the heart of the range problem. Goebel suggests the problem can be solved by one or a combination of the following: 1) associations (theft is a problem); 2) charge grazing fee; or 3) establish grazing privileges.

The range management section of the seven year report includes a comprehensive literature review of range research carried on in Lesotho from as far back as records are available to the present. The report, though too detailed for the casual reader, contains a wealth of material for future research and development projects. Included is information gleaned from reports by the Conservation Division, the Range Component of the Livestock Division, and donors.

Goebel makes 12 general recommendations and 7 for the "Range Division". The sense of his recommendations is that the overstocking problem must be solved without which other improved practices will be of little value.

The Range Management Section has one staff member with a B.S. degree and none in degree training.

In attempting to reduce the numbers of livestock on the range, assistance will be required of a range management specialist and a socio-economist. These are not presently available with adequate training and experience and accordingly appropriate expatriate staff assistance will be required.

Recommendation

Train the current staff member and one additional one to the M.S. level.

g. Animal Science

Mr. Earle W. Klosterman was the only WSU staff member stationed here. This was from 1980-84.

He reported (8), along with Basotho associates, having done work on 1) winter lick for cattle; 2) hominy chop for wintering cattle; 3) performance testing beef cattle; 4) supplemental feeding of ewes; 5) village milk production; 6) integrated draft-beef production; 7) sheep and goat production; 8) poultry production; 9) feeding growing fattening cattle; 10) fattening cattle; 11) fodders; and 12) overgrazing.

During 1985-6, a project was conducted to determine the biological and economic feasibility of small poultry flocks.

Klosterman is credited with initially emphasizing much more fodder production for ruminant livestock.

The Section has one staff member with a M.S. degree, and two more participants in training in the U.S., one for a M.S. degree and the other for the B.S. degree. Proceeding from the findings made by Klosterman and Basotho counterparts, the Section has the potential for a sound program, assuming that some expatriate help can be provided, a livestock economist (expatriate) could be helpful in studying the economics of producing and purchasing supplemental feeds.

Recommendations

1. Continue participant training, with the B.S. holder to work on a M.S. degree and one of the staff to work on a Ph.D. degree.

2. Bring in an expatriate livestock economist on a short-term basis.

g. Agricultural Engineering

WSU has not had a long-term agricultural engineer in Lesotho, and there are presently no RD Basotho engineering staff with degrees.

Recommendations

1. Bring in an expatriate engineer(s) to:
 - a. If the necessary information is not already available, assess irrigation potentials to grow certain high value vegetables and fruit crops
 - b. Continue the work which has been done by agronomists to procure/develop acceptable equipment for conducting replicated field trials, which equipment might also be utilized on small farms.
 - c. Investigate the possibilities of utilizing minimum till/no till production methods.
2. Initiate a participant training plan for the subject matter area.

i. Farm Management

Technical assistance in farm management has had the benefit of continuity of efforts with Dr. Joel Plath (1980-1982) and Dr. David Holland (1982-1986). Plath initiated the farm record keeping program with 120 farmers in the three prototype areas. Mr. Tlali Jobo, a returned participant, who now heads the Farm Management Section, participated in this work. The primary purpose of the record program was to obtain data to understand Lesotho agriculture from the farm household perspective. It also provided good entrees to farmers providing a base for the selection of farmers for combination farm and poultry projects. A bulletin on costs and returns from field crops resulted.

Plath also participated in the Farming Systems Baseline Survey conducted under the direction of the Rural Sociology Section and two publications on agricultural problems (RD-B-14) and agricultural commercialization (RD-B-20) were issued by the Farm Management Section.

Holland built on the foundation work of Plath using farm record and baseline survey data to identify recommendation domains toward which farming systems research and extension programs were to be targeted in the prototype areas. There was close association with the Agronomy Section in establishing agronomic trials in the PAs, but trials that were not well organized until 1983-84.

A wide range of economic analyses have been carried out under Holland's guidance and close association with other RD staff, both within and outside the Farm Management Section, and WSU graduate students. Among these are studies of labor migration and enterprise budgets for field crops, fruit crops, and vegetables under both non-irrigated and irrigated conditions. The Farm Management Section took the lead in establishing the six combination farms in the prototype areas and economic analyses for two years are reported in RD-R-37 and RD-R-49.

This work of the Farm Management Section is clearly summarized in the upcoming seven-year report. Included are priority items to continue and extend ongoing work. It is disappointing for the evaluation team to conclude that neither the pace nor quality of this work can be continued with RD staff.

Recommendations

1. That the Research Division, with MOA, and donor project leadership capitalize on the results of economic analyses reported by the Farm Management Section. These include the results of farm data-based studies that are highly significant in planning programs to benefit farmers, e.g. the findings on potential gains from improved technologies and enterprise mixes using traditional field crops, the dominating influence of petrol costs in production of irrigated crops, and the potential for fruit production.

2. That there be a careful review of Holland's "further research priorities" section of the seven-year report that also includes comments regarding the immediate future of the work of the Research Division. In short, the excellent work that is fundamental to keeping the work of the entire RD oriented to farmers' needs and their opportunities, cannot be sustained with current staff without assistance of an experienced Ph.D level trained farm management economist with his/her feet on the ground.

J. Rural Sociology

The Social Analyst on the first technical assistance team, Dr. Lorna M. Butler, gave leadership to the Farming Systems Baseline Survey as well as review of some 50 Lesotho reports, papers and studies pertaining to social and cultural aspects of agricultural production.

The primary purpose of the survey was "to give the RD a more accurate, quantitative description of current farming and livestock production systems.⁵ Other RD staff and WSU team members from agronomy, range, animal science, marketing, farm management, extension and communications, nutrition, as well as rural sociology contributed to design and pretesting of the questionnaire, training of interviewers, and preparation of data for analysis.

The process of planning and conducting the baseline survey oriented the combined RD and WSU team to the farmer and community environment and problems. The data provided the basis for publications from not only the Rural Sociology Section but also from farm management, marketing and extension.

The TA social analyst position was discontinued in 1981 in response to recommendations of the 1981 external evaluation and of the RD Director. This prevented a follow-up survey and continuing research in rural sociology; however excellent progress has been made in training two RD rural sociologists to the masters level, one who returned from training in late 1985 and the other due to return in May 1986. Both persons were RD staff members and had experience with the 1980-81 baseline survey.

Recommendations

1. That the Rural Sociology Section revitalize the type of work intended by initiation of the baseline survey, not necessarily repeating the large general survey, working in close co-operation with staff of other sections.

2. That short term technical assistance be provided to assist the two rural sociology staff members plan and settle in to a meaningful and manageable adaptive research program that contributes to the overall research program of the RD.

5. Butler, Lorna Michael "End of Tour Report", 1981, p.6.

k. Marketing

The three marketing economists on the TA team, Dr. Emer E. Broadbent (1979-80), Dr. Peter Wyeth (1980-84), and Dr. Ray Brokken (1984-86) have conducted adaptive research, in association with the Marketing Section, on a wide range of markets, marketing functions, and farm commodities. In addition they have contributed to marketing policy analyses in co-operation with other MOA divisions and donor organizations, and made substantial contributions to training of farm leaders, extension personnel and those in private and public marketing organizations. To their credit, they have dealt with input supply problems as well as product marketing and have not confined their work to the prototype areas.

The late Dr. Broadbent, whose service was ended after a few months due to health problems, concentrated on marketing mohair.

Dr. Wyeth and his associates conducted studies on co-operative marketing and input distribution, impact of marketing on food grains production, financing and production of food grains and pulses; fruit and vegetable marketing, quality of mohair sales, and farm level marketing. These studies followed preparation of an annotated bibliography of agricultural marketing to ensure building on the base of earlier work. Reports of these studies are in Research Division bulletins 4, 5, 25, 26, 27, 31, and 32.

Dr. Brokken has emphasized studies of marketing livestock, hides, and skins; work on inter-ministerial committees on policies with respect to livestock grading and pricing, feedlots and a national abattoir; training programs on improving the quality of hides and skins as they leave the farm (for farmers and livestock officers); and training programs for vegetable growers on marketing and pricing of their products. Data have been collected on a major nationwide survey (549 households) on livestock production, marketing and slaughter with the capable assistance of two Marketing Section counterparts.

It was gratifying to find the interaction of Dr. Brokken and his associates with other divisions of the MOA, organizations in the RSA and such organizations as the Southern African Center for Co-operative Agricultural Research (SACCAR) and the Institute for Southern African Studies (ISAS).

Recommendations:

1. That the analysis of the data from the national survey of livestock production, marketing and slaughter be completed and a workshop be conducted to inform key personnel of the MOA of the results of this research and the implications for policies and programs to improve the extremely important livestock sector.
2. That the LAPIS marketing specialist become thoroughly familiar with the contents of marketing research reports developed by the RD/FSR following which he, with the RD Marketing Section staff, conduct a two-day workshop for the several production-oriented LAPIS specialists on the three LAPIS teams. This general purpose would be to:
 - a. make participants aware of the results of marketing research, and
 - b. to emphasize the importance of markets, marketing functions, and pricing (domestic, with respect to RSA, and internationally) on farm production potentials and constraints.
3. That the Marketing Section continue to be strengthened within the RD. Comments regarding the place of marketing research in the MOA structure were disturbing and disconcerting. It is crucial that the marketing research continue to be farmer marketing problem oriented, recognizing the importance of off-farm marketing functions and economic forces. This can only be done in the now farmer-oriented RD. The importance of continued close co-operation and co-ordination with the work of the MOA Planning Division is to be emphasized.
4. That the good start in developing staff for the Marketing Section be continued. The two staff members are doing excellent work and are capable of success in advanced degree work; however, only one can be spared at any one time.

1. Extension

The extension technical assistance has been provided by Mr. Seth Beckerman (1979-81) and Dr. David Youmans (1981-86). The work of Beckerman, a communications media specialist, is summarized by Youmans (draft seven year report) as follows:

"With specific reference to agricultural communications, it is to the lasting credit of the former expatriate advisor that a system for dealing with the publication of research results was designed and set in motion. The notion of simplifying single research topics in research circulars (fact sheets) which could form pages of a field manual in a dynamic and growing way was a fact of life when the more recent expatriate extension advisor arrived on Lesotho assignment, and a few circulars had already been printed. Considerable work had also been done in audio-visual aids (Beckerman, 1981). It remained for Extension, however, to ramrod and edit the majority of the circulars now in print, and to extend the system to include the publication of reports, bulletins and special manuals and handbooks. The work was and is done by commercial printers since the Agricultural Information Services capability falls short of Research Division requirements. At this writing seventy-six (76) circulars, fifty-five (55) reports, forty-five (45) bulletins and three (3) handbook/manuals have been published. A standard distribution is made of these publications to assure that MOA professionals and other agriculturalists are best served."

Youmans, as extension specialist, has given leadership to what he calls "the pro-active task to carry results to clientele" emphasizing the importance of "linkage and liaison" and the receptivity of extension workers and farmers "if you make the first move." The Extension Section is fortunate to have had, as of 1979 and as a continuing staff person, one with more than 20 years of extension experience; a well-trained, perceptive person who has completed B.S. and M.S. degrees under FSR participant training; and an excellent Research Extension Assistant now in participant training.

The pro-active task to carry results to clientele has been carried out through training of extension personnel, with close co-operation of LAC, and close co-operation with Farm Management Section staff and those working in the prototype areas. Included were extension programs with village chiefs and headpersons, and meetings to organize and discuss the roles of the VACs in the FSR program in the PAs. As facilities were completed at the PA headquarters, the locus of training shifted from the Farmers Training Centers to the PA headquarters.

Youmans and associates' work began to build in a strong adaptive research component about 1984 the objective "to determine the impacts of the extension education programmes during 1979-1984 of farming systems research in Lesotho on members of farmer contact groups." (RD-B-40E, p.25). Results of this research have been drawn upon in other sections of this evaluation report. It is not possible to briefly summarize the work of Youmans and co-workers reported in 27 publications. The "Extension Programs" section of the 7-year report and RD Bulletin RD-B-40E "The Impact of Farming Systems Research Extension Programmes on Members of Farmer Contact Groups in Lesotho" by David V. Youmans and Cecilia M. Ramakhula, give an excellent (but not brief) summary of this work.

In summary, FSR technical assistance has provided excellent leadership to building a program of linkage and liaison with other MOA divisions in Maseru and with their representatives, farmers and their contact groups in the PAs. The adaptive research component in Extension, an essential ingredient, has come on strong during the past three years.

Recommendations:

1. That the Extension section be continued as a vital and viable section of the RD.
2. That the strong analytical (adaptive research) component in Extension, introduced during the past three years, be maintained. Co-operation with other sections, particularly rural sociology and farm management, is essential. Short term technical assistance will be needed as the W&U Extension Specialist ends his assignment.
3. That the training and linkage functions be continued, but with efforts to get LAC and Extension to take more active roles, permitting adequate time to be devoted to 2. immediately above.

N. Trained Basotho Personnel

The PP provided that 16 long-term trainees and ten short-term trainees were to be trained and assigned to the research section (modified to the RD) and complementary positions elsewhere in the MOA. It was later agreed by GOL/WSU/USAID to increase the number of long-term trainees to 19. The PP also provided for ten in-country short courses for extension personnel.

The training targets will have been attained by the end of the project. Twenty-one participants have been sent for B.S. and/or M.S. level training in the U.S. As of April 25, 1986, nine have completed the degree for which they were programmed and one was unsuccessful. Eight are expected to complete their degree requirements by July 1986. Two of the three "late starts" are scheduled to complete degrees in August 1987 and May 1989 respectively. In addition to the above degree training, one participant completed third country diploma level training.

Of the nine who returned from degree training, six are on duty at the RD and two are in complementary positions in the MOA, one with the Agricultural Information Service and one as a District Agricultural Officer in the Department of Field Services. One is on leave from her field position in the RD and has accompanied her husband to the U.S. for training.

The following table shows the highest degree of Research Division staff at the start and end of the FSR project:

| Highest degree | Project start | Project end |
|----------------|---------------|-------------|
| Bachelors | 5 | 10 |
| Masters | 5 | 11 |
| Ph.D | 1 | -- |
| Total | 11 | 21 |

Of the degree holders with the RD at the start of the project, only two remain active in the Division. One received a M.S. degree as a project participant and now serves as head of the Agronomy Section and Acting Director of the RD while the Director is in the U.S. for Ph.D training, sponsored by INTSORMIL. The other will complete a Masters degree in rural sociology by mid-1986. Four others are in other divisions of the MOA including the RD Director during the first six years of the FSR project who was promoted to the position of Director of the Department of Special Services. Five of the original degree-holding staff retired or resigned, two of whom returned home to Zimbabwe. Five certificate or diploma holders who were on the RD staff in 1979 will have bachelors and/or masters degrees by the end of the project. All of these are on the 1986 RD staff.

The following table compares the positions identified as requiring degree level training, by administrative unit, as outlined in the research policy report (RD Agricultural Research Technical Information Bulletin RD-B-24, October 1983) with the FSR end-of-project staff with Bachelors and Masters degrees. Forty-four posts are identified as needed for the RD. Twenty-one degree holders will be on the RD staff at the end-of-project (assuming all return and can be retained), five of whom are in the U.S. in training or on leave.

Research Division Degree-Level Positions and
End of FSR Project Status of Filled Posts
by Administrative Unit

| | Division posts | EOP posts filled | Remarks |
|----------------------------------|-------------------|------------------------|--|
| Administration | 3 | 2 | Director in US for Ph.d |
| Field Crop Production (Agronomy) | 6 | 3 | Agronomist Act'g Dir |
| Horticulture | 4 | 2 | 1 in US on leave |
| Animal Science + Ecology (Head) | 1 | | |
| Range Management | 2 | 1 | |
| Animal Science | 2 | 2 | |
| Herbarium | 1 | | |
| Forestry | 1 | | |
| Farm Management (Head) | 1 | | |
| Farm Management | 2 | 2 | 1 in US for MS until Aug 87 |
| Rural Sociology | 2 | 2 | |
| Marketing | 2 | 2 | |
| Human Nutrition | 2 | 1 | |
| Agricultural Engineering (Head) | 1 | | |
| Irrigation Engineering | 2 | | |
| Machine Design and Testing | 2 | | |
| Farm Structures | 1 | | |
| Auxiliary Tech Services (Head) | 1 | | |
| Soil Testing | 2 | 1 | |
| Plant Protection | 3 | 1 | In US for MS (Pathology) |
| Biometrics | 1 | | |
| Extension | 2 | 2 | 1 in US for BS until May 89 1 Acting Dpty Dirctr |
| Library | Dipl | Dipl | |
| Total | 44 | 21 | |

Thus, while training targets have been achieved, the RD is less than half-staffed with personnel, many of whom have limited research experience and with the need to select from a limited personnel resource reservoir for additional degree training at all levels. Many posts will be filled by B.S. degree holders, posts targeted to be filled by M.S. and Ph.D. level personnel.

About 25 in-country short courses have been held for extension personnel and short courses have also been held in the following areas: statistical design, photography, computer use, typing and clerical work, and laboratory techniques and methods. Five contract staff members have taught courses at Lesotho Agricultural College. In addition there has been a substantial amount of in-service training of RD and extension staffs through close association as counterparts, short courses and field experience.

In summary, by the end of the FSR project, good progress has been made in degree-level training of RD personnel. However, the process is a slow and costly one with many participants entering U.S. universities at the beginning bachelors level. There has been some, but not extensive, use of non-degree level training at international agricultural research centers and the U.S. There has been an active program of short course and in-service training with counterparts. Nevertheless, with the departure of the WSU team, the RD is not a viable research institution in terms of the adaptive research goals set forth in its policy statement. This statement applies both to the training, experience and critical mass required and to the capacity to plan, implement and administer effective research programs.

The following recommendations are offered as efforts continue to strengthen the capabilities for research and its leadership in the RD.

Recommendations

1. The MOA, working with appropriate units of the GOI, should develop a rank, grade, and pay-scale system for research officers providing for advancement within the Research Division on the basis of education, experience, research productivity, and ability to give leadership to others in research. This is crucial to retaining those trained for and experienced in research and to capitalizing on the tremendous investment in their education and experience.

2. Make a thorough review of the administrative structure and staffing plan as outlined in the 1983 research policy statement (RD-B-24) including the proposed structure in the J. Clark Ballard end of tour report (p.16). There is need to consolidate the currently fragmented sub-discipline sections into four areas: 1) Agronomy, Horticulture, Soils, and Plant Protection; 2) Animal Sciences and Range Management; 3) Rural Social Science; and 4) Farm Mechanization and Engineering.

3. Develop a long range staffing plan using as a framework the requirements determined in 2. above; assess the qualifications of current staff in terms of both research capabilities and ability to give participatory-type leadership to others in planning and implementing research. Compare the staffing plan with the personnel assessment and use this as the basis for the degree level training plan.

4. M.S. and Ph.D. level training should include courses, short courses, and other experiences to improve the leadership (personnel management, organization and co-ordination, etc.) abilities of staff; this is in addition to the usual requirements for an M.S. or Ph.D. in a discipline.

5. In the future, a wider range of U.S. universities should be used for participant training than has been the case in the FSR project.

6. Innovative thinking should be directed to means of strengthening and co-ordinating the resources of the Research Division, Lesotho Agricultural College, personnel in other MOA units, and the National University of Lesotho to provide B.S. level training -- or at least a level acceptable for admission in agriculture to U.S. and other developed country universities at well above the B.S. entrance level. Thorough reconsideration should be given to the potentials in obtaining B.S. level training at the several good agricultural colleges, faculties, and universities in Africa.

7. Short course training for extension and private sector personnel should be aggressively pursued in co-operation with LAC.

8. The training and capabilities of all support personnel should be greatly enhanced. More use should be made of the international agricultural research centers through participation in short courses and special programs for those involved in station research and on-farm trials and demonstrations.

4. Facilities and Commodities

FSR provided a new building at RD headquarters that is used for offices, library, conference room, and two small plant protection (plant pathology and entomology) rooms. Field, laboratory, and library equipment and vehicles to improve transport and communication were procured. The collection of books and journal subscriptions is a major stride toward development of a good library. The buildings at PA headquarters are vital to field research and extension and are being well used.

There is general satisfaction with the progress made on facilities and commodities. The numbers of vehicles became a constraint as the project focus was broadened from a FSR section to the entire RD. For the most part, equipment and supplies are maintained and in service. The soil testing laboratory is the best example of physical renovation, equipment, supplies and personnel being co-ordinated under competent direction to serve both research and extension functions.

With the return of staff now in training and needs for further development of staff and program, the current physical facilities will be inadequate. A long range plan for physical plant renovation and expansion is needed. This can be started, but not completed, until long range research plans for the Maseru station are more clearly developed.

Physical and other changes to provide security for crops grown on experimental fields are absolutely essential. Improvements in management and housekeeping are needed to reflect the care and discipline required for good research.

5. Agriculture Research Library

The PP provided that "an adequate library for the Farming Systems Section will be established and co-ordinated with the Agricultural Planning Library by July 1981. It is anticipated that a GOI program for retaining an effective Current Agriculture Research Library will be operative at the end of the project."

In general this output has been accomplished. The RD had a librarian at the beginning of the FSR project whose library training has been upgraded to diploma level. Effective use has been made of project consultants. The library room, shelving, books and periodicals provided by USAID have been indispensable in establishing the library.

The library has been designated the official library of the MOA and there is evidence that major strides have been made in centralizing research reports from other divisions and donor projects in the agricultural sector. The librarian estimates a collection of some 4,000 books and periodicals with some 100 journals and periodicals. The primary clientele is the RD staff; however it is encouraging to find the resources of the library are made available to all -- the entire MOA, teachers and students of IAC, NUL, and NTTC. The librarian understands the importance of teaching patrons how to access and use library resources and developing ties and exchanges with other regional, national and foreign libraries.

The library now serves as both the repository and distribution center for the several series of RD publications. These series are filed in an orderly and accessible manner. While there is need for close liaison between the library and publications distribution, the distribution function is certain to encroach on the limited resources of the understaffed library.

The agriculture research library resources should continue to be the foundation for the MOA library. It should be the central unit for collection and acquisition, cataloging, and other library services. Small collections for specific uses may be needed by other units; however these should be a part of the "main" library; to emphasize the only MOA library.

Recommendations

1. That the MOA clarify the status of the Research Division as the "official MOA library" in view of discussions of expanding library resources of other units, e.g. Lesotho Agricultural College.

2. That plans for expansion of physical facilities for the library be reviewed to ensure that they meet the needs for the next 15 years; this can be done only after the action recommended in 1. above.

3. That a library consultant be engaged to assist with the further development of library facilities, collections, staff, and services.

4. That the librarian post be upgraded to degree level with an assistant librarian at diploma level. Other staff assistance will be needed as collection and services expand.

5. That the publication distribution function be divorced from the library.

C. Assess the viability of the Research Division in regard to planning and implementing effective research programs

If left to its own, i.e. without any expatriate help, the RD would face difficulties. The chief problem is that there are not presently anywhere near enough adequately trained and experienced staff members to provide the necessary leadership in the various sections. Returning participants will help but even then, making some allowances for attrition, there will still be a shortage for quite some time to come. This is not to say that significant progress has not been made since 1979, for it has.

The WSU staff members and the RD Director, utilizing the FSR approach, have been very successful in orienting the RD to conducting research programs closely tied to farmers and farm problems. Working with farmers both directly and through Extension has been exploited to a considerable extent, all of which is on the favorable side.

The problem is that similar progress has not been made in building the production research capability of the RD including the Station and substations. The situation with social science disciplines is more favorable because much of the research is normally carried on with farmers and others off of the stations.

There have, however, been marked physical improvements at the Research Station. It is our understanding that little progress in this respect has been made at the substations, which are in a very weak condition.

A limited number of staff, including expatriates, could not be expected to do everything. It is not for the present evaluation team to question the PP, previous evaluations, or even the FSR approach. But we are reasonably certain that devoting a large share of the resources under the WSU contract on the FSR approach, has resulted in less progress in Basotho capabilities of planning and implementing production research at the Research Station and substations than if more resources had been devoted to institutional building.

In this connection it is interesting to note what FSSP ((10), p.1V-5) suggests on the subject. It states "National subject matter research efforts can vary greatly in size. They can be substantial and assume responsibility for technology generation.....or they can be very small, perhaps only one person, and work with the ITN to supply technological alternatives."

We do not agree with the latter FSSP alternative suggested above but it does cause one to reflect seriously on the size and number of research station/substation

facilities, size of staff, and programs that should be developed.

The FSSP suggestion underscores the importance of utilizing technology generated outside the RD. Although, there have been linkages during the past 7 years with other agencies generating agricultural technology and superior germ plasm, much more about these linkages can be done in the future. Only a river separates Maseru from the RSA, where there are strong agricultural research programs. The institutions and agencies include research stations, agricultural colleges, regional organizations like SARWEIN, and private seed and agricultural chemical companies which can be and (as has been pointed out to us by the RD researchers) are most generous in sharing their knowledge and materials.

International research centers are available to help. They are located in various parts of the world with prime responsibilities in each case for certain subject matter areas. Some have a central headquarters in one country and outlying stations in other countries. Those whose programs are of special interest to the Research Division are:

- AVRDC - Asian Vegetable Research and Development Center (Taiwan)
- CIAT - International Center for Tropical Agriculture (Colombia)
- CIMMYT - International Maize and Wheat Improvement Center (Mexico)
- CIP - International Potato Center (Peru)
- IBPGR - International Board for Plant Genetic Resources (FAO, Rome)
- ICRISAT - International Crops Research Institute for the Semi-Arid Tropics (India)
- IITA - International Institute of Tropical Agriculture (Nigeria)
- ILCA - International Livestock Center for Africa (Ethiopia)
- ILRAD - International Laboratory for Research on Animal Diseases (Kenya)

There are of course also many in-country research programs not only on the African continent but in various other parts of the world, the resources of which can be utilized through scientific meetings, publications and personal correspondence.

Such organizations as SADCC and the AID-supported CRSP programs can also be of assistance. INTSORMIL (sorghum and millet) and the small ruminant animal CRSPs are examples.

More interchange of subject matter information with other Divisions of the MOA can be mutually beneficial in taking advantage of facts gained and observations made by all.

Researchers can well afford to allocate a significant portion of their time to a continuous, organized program of obtaining technology and materials (like germplasm) being generated elsewhere.

Recommendations

1. Continue to build and strengthen the RD to the point where it is able to supply the technology deemed essential to meeting the agricultural goals of the GOL. Financial constraints must be recognized in this endeavor. It should also be borne in mind that a certain critical mass is essential in building a research institution to cover all major disciplines and major problem areas.

2. Start by fully developing the Research Station at Maseru, with respect to personnel, buildings and equipment. Secondly, determine major ecological zones of Lesotho, including giving attention to soil types and climate. If and as finances permit, locate viable substations to represent each of these zones. If the selection process results in such locations coinciding with existing substations and/or any of the present prototype headquarters, so much the better. But such existing facilities should not enter into the selection process. Unless there are compelling reasons for doing otherwise, close out all other substations.

3. Take fuller advantage of observations which may be made by other Divisions in the MOA and by other donors operating in Lesotho; of research done by the international research centers; of in-country research programs outside of Lesotho, especially in the adjoining RSA; and of international programs such as the CRSP's supported by AID; and of technologies developed by private companies.

Formalize this activity by allocating a portion of each researcher's time to this effort. All pertinent information obtained is to be summarized in written form and made available in a special report series in the library.

D. Visit the Three Prototype Areas and Farmers' Fields Established Under the FSR to Review Ongoing Research Activities.

(See Evaluation Methodology in Introduction)

E. Assess Farmer and Community Involvement in the Planning and Implementatron of Research Activities in the Prototype Areas.

An expected project output was the development of effective strategies for reaching farmers. Project design, as indicated in the PP, wisely identified that "as the thrust of this project is on adaptive research, demonstration testing, and adoption of recommended systems, the need to develop effective means to reach farmers and gain their understanding and acceptance of the practices recommended is crucial" (PP, p.13). It logically followed that it was necessary to have farmer and community involvement in not only research and demonstration testing, but also in individual farmer improved practice and farming system adoption as well as influence of these farmers on others as a part of an extension education programme.

The early-initiated baseline survey of a sample of 444 prototype area households in the three prototype areas, coupled with analysis of secondary data and earlier reports pertaining to social and cultural aspects of agricultural production, provided a wealth of information on farm households, farming systems and practices, and constraints to change (technical, economic, social). While there were delays in analysis of the data, the process of TA team and RD staff participation in this effort provided an early focus on the problems of farm families within their prototype area environments.

The baseline survey provided the basis for focusing on the individual farmer for adaptive research and demonstration testing, and the Village Agricultural Committee (VAC) members being involved in choice of research problems and farmers for on-farm trials. The VAC's have also become a leader group with whom extension personnel work and provide an effective innovation diffusion network.

The "VAC approach" builds on an understanding of the village and its chief and headpersons with eight elected members from each village forming the VAC. The three prototype areas have a total of 28 committees. Each VAC has an executive committee that represents the committee as members from each village come together at prototype area headquarters for discussions of problems with extension and Research Division personnel.

A report of research by Youmans and Ramakhula, referred to earlier (RD-B-40E), concludes that VAC members "have proved to be effective disseminators of agricultural information and diffusers of innovations" pointing out that each VAC member has influenced an average of 3.8 persons through a combination of telling, showing, and facilitating the observation of agricultural innovations. Extrapolating from a sample of 54 of the 224 VAC members it is concluded that "it is likely that farmer contact group members have diffused innovations deriving from farming systems research to nearly 2000 persons during the period under study." (1979-1984)(pp.84-90). It is pointed out that the study did not measure adoption rates.

The visit to the Nyakosoba prototype area confirmed written reports and consensus among TA team members and RD staff that there was active farmer and community involvement in prototype area activities. Farmers are involved in on-farm trials. The question of effectiveness of on-farm replicated trials versus demonstration testing will be treated in another section of this report; nevertheless, there is active farmer involvement. Two leading women farmers clearly explained changes on their two combination farms. Another farmer (woman) explained her vegetable production system with detailed knowledge of varieties, fertilization rates, dates of planting, and involvement of other farmers as a means of diffusing improved practices to them. The village chief and range sub-committee of the VAC explained the progress and problems in improving forage production through controlled rotation grazing.

The above attests to the significance of this FSR-developed strategy for both reaching farmers and reversing what was called the start of project "top to bottom communication link" by the Acting Director of the Research Division. He summarized: "We can now get information from research out and also get feedback of farmers." The Acting Deputy Director indicated that there is now a "belongingness of farmers." The effectiveness of the VAC's in the three FSR prototype areas has resulted in the Extension Division of the Department of Field Services adopting this model for all 10 extension districts of the country. The visit to the Nyakosoba PA coincided with a field study tour of the 10 District Agricultural Officers (DAO's) of the Department of Field Services led by the Director of the Department and the RD Extension Section Leader. Forage trials to identify species tolerant to low pH were observed at PA headquarters and visits were made to a vegetable farmer and to hear an explanation of range management work. A meeting followed of the VAC members and the DAO group at PA headquarters. Research field assistants, farm management assistants, and RD staff participated.

The farmer and community participation in prototype area activities was clearly demonstrated. About 50 farmer members of VAC's (40 women and 10 men) assembled at PA headquarters. The farmer leader of the PA group explained the development of the VAC's, how VAC executive committees form the PA group, and how they work with extension and farm management field assistants in identifying problems and transferring improved practices to a larger village group.

The leader was an articulate spokeswoman and involved other farmers in responding to questions raised by the DOA's. Eloquent and sincere appreciation was expressed for the work of the FSR project but concern was directed to the Director of the Department of Field Services regarding continuity of assistance on on-going activities and pointing up such problems as threshing of wheat and marketing of vegetables at acceptable prices. Reference was made to the PA farmer group that had provided the nucleus for organization of a co-operative which will assist with input supplies and obtaining loans from the Agricultural Development Bank.

In summary, farmer and community involvement, built on understanding of the complex combination of technical, economic, and social interactions is impressive and is beginning to be spread throughout the extension programme countrywide.

Recommendations:

1. Strong efforts should be continued to build on the solid foundations of farmer and community involvement through VAC's and with the Extension Division of the Department of Field Services taking a more aggressive role. Rural Sociology, Farm Management, Marketing and Extension sections of the RD should give leadership assisted by Agronomy, Horticulture, Range and Livestock Sections. Care should be taken to see that this work does not dominate the adaptive research base needed by all sections of the RD.

2. The RD with co-ordinated involvement of several sections should continue research to better understand the technical, cultural and economic forces affecting decisions of farm families on production for family use, village trading, and commercial markets.

F. Review and Analyze Project Outputs and Assess Extent to Which They Have Led Toward Accomplishment of Project Purposes

"The purpose and principal focus of this project is [was] to create more productive agricultural enterprise mixes which are acceptable to farmers, sensitive to farmers' management ability, appropriate to the resources available, and protective of the land base." (PP, p. 11)

Establishment of a farming systems research unit in the Research Division (RD) was a means (output) to give leadership in attaining this purpose. This means was modified from establishment of a FSR unit per se to strengthening the overall capacity and program of the RD.

Use of a combination of project inputs in pursuit of a mix of product outputs has led to creation of significant "agricultural enterprise mixes." The Farm Management Section of the RD has been in the lead role in this effort with good co-operation from other sections such as agronomy, horticulture, animal science, range, marketing, rural sociology, and extension. While the original FSR focus was diffused to strengthening the entire RD, with a FSR approach, the technical assistance farm management economists with their Basotho counterparts have given effective focus on the farmers' problems and socio-economic milieu. The establishment of farm record-keeping with assistance of farm management oriented field assistants, reliance upon on-farm trials, and establishment of combination farms in each prototype area were effective means of identifying practices and enterprise combinations more productive, profitable, and acceptable to farmers. These means were supplemented by farm records on new enterprises such as poultry that gave information for technical and economic analysis.

The farm management oriented efforts to identify and introduce improved practices and enterprise mixes was undergirded by the analysis of data from the early-initiated Farming Systems Baseline Survey resulting in two publications from the Farm Management Section (RD-B-14 and RD-B-20).

Records from combination farmers show that major changes in practices and enterprises were made resulting in increased incomes from field crops on five of the six farms during 1983/84 (research report RD-R-49). The maize field on one farm was virtually wiped out by drought but the experience on this and other farms confirmed that grain sorghum is a promising crop compared to maize in the southern lowlands, an area with soils subject to erosion, with poor water holding capacity and difficult to manage.

The visit to the Nyakosoba PA confirmed that the combination farmers and Village Agriculture Committee are effective means of transferring improved technologies developed from on-farm trials and combination farms to a wider group of farmers. Examination of farm records and interview with the farm management field assistant clearly demonstrated that both farmers had adopted several improved practices (such as improved seed and more fertilizer), and introduced new crops and livestock enterprises (potatoes, pinto beans, grain sorghum and poultry).

The PP established the expectation "that at least five percent of the farmers in the project's prototype areas will be using the systems developed" by the end of the project. The 1981 external evaluation led to an amendment to the project agreement clarifying somewhat the idea of "farming systems" or "enterprise mixes" accepting that "the introduction of research recommendations is a continuous process based on examining existing farming systems and leading to incremental improvements in them". Eleven percent of the farmers in these prototype areas are members of Village Agriculture Committees (VAC's). A 1985 survey of a sample of 196 of the 224 VAC members who had participated in one or more of four training courses gave the results shown in the following table.

Percent of farmer members of Village Agriculture Committees in three prototype areas who received benefits from participation in the FSR program during 1979-1984.6

| Benefit | Percent who received benefit |
|----------------------------------|------------------------------|
| More income from farming | 39 |
| More trading with neighbors | 43 |
| Acquisition of more property | 15 |
| Acquisition of better animals | 39 |
| Stored and/or preserved food | 67 |
| Better meals for family | 80 |
| Better education for children | 43 |
| Higher crop yields | 65 |
| Better condition of animals | 50 |
| Able to purchase improved inputs | 50 |
| Able to secure credit/loans | 0 |
| Improved farm records | 17 |
| Better markets | 37 |

6. From Youmans, David V. and Cecilia M. Ramakhula, "The Impact of Farming Systems Research Extension Education Programs on Members of Farmer Contact Groups in Lesotho", Research Division, Ministry of Agriculture Agricultural Research Technical Information Bulletin RD-B-40E, February 1986, p.74.

While some of the benefits are not indicators of changes in farming systems, a combination of benefits clearly shows that an effective process of incremental improvement in practices and enterprises was established. Field observations confirm a continuation of this process during 1985 and 1986. The following benefits are indicators of positive changes: higher crop yields, acquisition of better animals, better condition of animals, ability to purchase improved inputs, more income from farming, acquisition of more property, more trading with neighbors, better meals for family, and more markets.

The above data and evidence of VAC influence on other farmers, to be covered in another section of this report, leads the evaluation team to the conclusion that the five percent target has been attained.

Recommendation

The social science sections of the RD (farm management, rural sociology, extension) should continue research on 1) the impact of adaptive research and technology transfer efforts on practice and farming systems changes, incomes and family welfare, and 2) means of accelerating the rate of adoption of improved practices and systems in the PA's and to other areas of Lesotho.

G. Assess Composition, Appropriateness of Technical Skills and Functions of the Technical Assistance Team

Complying with the PP, the initial composition of the technical assistance team seems to have been pretty much on target. The 1981 evaluation recommended a concentration during the ensuing few years on food crop production, and further that as openings occurred, hiring a total of 3 agronomists. Subsequently, the team was increased to 2 agronomists at the expense of a sociologist. In 1984, the expatriate agronomy staff was cut back to one, the animal science position was terminated and a horticulturalist was added.

With respect to the tasks assigned, the contractor demonstrated compliance with meeting the needs and showed flexibility in shifting subject matter positions. WSU certainly cannot be criticized for the way it carried out the responsibility.

With respect to qualifications, WSU in general complied satisfactorily. Aside from administrative assistants, all but one of the entire WSU long-term staff during the 7 years, held doctorate degrees. Most apparently adjusted to the FSR approach, in some cases possibly to a fault.

The RD Acting Director and Acting Deputy Director, while speaking favorably of the WSU staff, agreed that getting younger people still in their main careers would be preferable to employing retirees. The previous Research Director thought that in one case the expatriate was too old to withstand the physical exertion required. The RD Acting Deputy Director said it is more difficult for a younger Masotho to empathize with an older person, that the Masotho would hesitate to make critical suggestions to older persons.

It is, of course, impossible for the evaluation team to make a meaningful appraisal of each of the WSU team members who have served here during the seven year period. We believe all have made a conscientious effort to make a contribution. As is true in any endeavor, some have been more effective than others. It has also been our experience that degree of success in the U.S. does not always match up with degree of success overseas -- some prove to be more successful and some less successful in overseas assignments than in the U.S.

The team has functioned pretty much as the inputs of the PP and subsequent evaluations have called for. Most of the efforts have gone into the FSR approach. As mentioned elsewhere in this report, there should have been more of a shift in functions and perhaps added resources to comply with the 1981 evaluation calling for a broadened emphasis on institutionalization of the RD.

H. Evaluate Commitment, Adequacy, Timeliness and Level of Support from Contractor, Government of Lesotho and AID in Project Implementation.

The team was directed to evaluate commitment, adequacy, timeliness and level of support from the three institutional entities involved in the FSR project: the contractor, (WSU); GOL; and USAID. The first three years of the project can be characterized as a period of "slow take-off" and "shakedown". There were problems of timeliness in getting PA headquarters facilities established as bases for field operations; completion of the new RD building two years after the first WSU team arrived in a timely manner. Field assistants were belatedly posted to support the work in the PA's, a problem that was never adequately resolved leading to "filling in" by Peace Corps Volunteers. Carefully selected candidates for participant training were slow in being identified. The Research Division was newly formed with a succession of acting directors and deputy directors followed by a director who gave strong direction to both the RD staff and contractor team. There were uncertainties regarding the concepts of FSR and their applicability to Lesotho research, technology generation and transfer and farmer adoption. The question of FSR as a section of the Research Division versus being an integrated philosophy and staff throughout the RD became a major issue between the Director and the Contract team. The Director was faced with the task of building a new research division with young staff neither well-trained nor experienced in research. The contractor, under direction of the design reflected in the Project Paper agreed to by USAID and GOL and a contract with USAID was committed to developing a FSR section in the RD.

The 1981 external evaluation team concluded that "the designers of the project were overly optimistic in determining that a separate Farming Systems Research Unit be established in a newly created research division" and recommended adjustment of the project purpose to include "institutionalization of an effective agricultural research capacity in the MOA". This was congruent with the direction desired by the Director of the RD and resulted in a contract amendment embodying this concept.

The 1981 evaluation team indicated that "it seemed to us the Management (Contractor, MOA and USAID) found it difficult to coalesce efforts in directing and guiding the project for establishing a unified approach in planning and implementing activities at the National and Prototype Area level."

The current (1986) WSU team leader has indicated in a draft report on contractor administration that "the project made considerable progress in establishing a research program and initiating necessary activities during the first three (3) years in spite of the many problems it faced in getting underway. By the summer of 1982 the major administrative and co-ordination problems that had plagued the project from its beginning had been resolved".

We agree with the above assessment, insofar as it applies to GOL, WSU, and USAID working reasonably well together, within the limits of their resources on a day-to-day basis. With the advent of the "second team" about 1982, relationships among institutional entities improved. However, attitudes developed in the early years have persisted.

This final evaluation team believes that the difficulty of coalescence of management (WSU, MOA, and USAID), identified five years ago, has been the major and persisting weakness in institutional entity commitment and level of support. If our assessment is correct, all parties must share in the responsibility. Among the contributing factors have been continuity of leadership of personnel among entities, uneven support for the Research Division within and among levels of the MOA, lack of a mechanism for institutional entity leadership to give joint policy and program direction (including resolution of conflict), and lack of definite plans and strategies for developing either a research program or the RD as a strong institution (the two are complementary but not the same). The continuous internal evaluation, planned during the project design, (PP, p.59) and to be carried out by joint project management, was not done. One excellent USAID Mission evaluation was conducted in 1980 but this practice was not continued in succeeding years.

I. Identify Problems and Constraints Which Have Been Encountered in the Implementation of this Project, and Make Suggestions and Recommendations to Alleviate Them.

This report has identified problems and constraints all of which were present, to varying degrees, at the start of the project. The FSH project has alleviated a number of the constraints; a number still persist. Recommendations have been included in the "principal recommendations" sections and throughout the report. The "problems" and "solutions" in this section are supplementary to the preceding general and specific recommendations.

1. Problem: Slowness in strengthening the RD, the Research Station and substations.

Solution: Greatly reduce the number of "on-farm" replicated experiments and shift the resources so made available to increasing both amount and quality of experimentation at the stations. This does not imply reducing the emphasis on Extension nor reducing on-farm demonstrations, including strip tests of crops.

2. Problem: There appears to have been a lack of adequately well defined plans of work. To a very limited extent expatriates tended to "do their own thing". There was also a tendency to "cover the waterfront" of research and service areas, rather than building on previous findings and restricting programs to manageable size.

Solution: Develop well defined plans of work -- to the extent possible, lay the groundwork for this in advance and submit a copy to the potential expatriate. Modifications can be made and details supplied after the expatriate arrives in Lesotho and has had some time to become acquainted with conditions. Unless the candidate is willing to operate under such a policy, he probably should not be in the technical assistance effort.

3. Problem: Overstocking of the rangelands to the extent of at least double and perhaps more of the estimated total carrying capacity.

Solution: The only solution lies in the GOL adopting a policy of reducing the number of animal units on the rangelands by at least half. Admittedly, this will be a process requiring GOL policy decisions on programs and incentives, and disciplined implementation.

4. Problem: The prestige of owning and using oxen for field work. In some cases the oxen may constitute a luxury which Lesotho can ill-afford to maintain.

Solution: Seek alternatives to oxen-power, and use the feed saved for milk, mohair, wool and meat production. As with reducing the number of grazing animals on the rangelands, such a change would not come easily.

5. Problem: The various problems encountered in conducting successful field crop experiments on the Research Station fields.

Solution: Develop better production practices through stronger management. Researchers (not assistants) should personally supervise all field operations when an experiment is being conducted, from planting through harvest.

J. Assess Progress Made on Recommendations of the WSU Review Team Conducted in January-February 1985.

In general, compliance with the recommendations is being carried out satisfactorily. Specifically, the recommendations and responses are as follows:

Recommendations

1. Recording research data and information
 - a. Issue seven-year report
Compilation of all research data is being done in a very orderly and comprehensive manner under the leadership of Mr. Irving Dow
 - b. Production guides
 - 1) Update 1981 production guidelines and 1983 horticulture guidelines -- Being done under the leadership of short-term consultant William Ford.
 - 2) Prepare guidelines for livestock production, range and pest management. It has been decided not to issue guidelines for livestock and range management since the Animal Production Division provides these types of publications. A handbook on plant pest management is in press.
 - c. Slide/tape preparation. Show impact of RD activities, project activities, and the farming systems approach -- This has been done.
2. Final year research -- emphasis to be placed on filling gaps, and concentrating on producers' farms. -- It appears that for the most part activities continued as plans had been made initially. Emphasis continued to be placed heavily on farms. There is no apparent lack of attempting to fill the gaps.
3. Further emphasize institutionalization and strengthening the RD -- We do not see that any significant change has taken place here. With less resources devoted to on-farm experimentation, more could have been done to institutionalize and strengthen the RD.

4. Explore with AID the possibility of additional trainees starting their training under WSU and finishing under LAPIS -- This has been approved by USAID.
5. U.S. staff: Continue long-term staff. Augment with additional short-term consultants, graduate students, and PCVs. Continue assisting the LAC. -- The first two and the last items have been complied with. Additional PCV's have not been used.
6. Continue to provide information on benefits from RD research programs to appropriate administrators in the MOA and GOL -- This has been done as follows:
 - a. Extension schools in methodology have been conducted for DOAs. Informed the Director of Field Services of the findings for transfer of information to farmers. The Director of Field Services and all DOAs have made a study tour of a prototype area.
 - b. Agronomists and horticulturists participate in GOL meetings on production guidelines.
 - c. Marketing specialists have organized schools to teach marketing fundamentals and options to GOL personnel.
7. Near the end of the project, conduct a workshop to report results of the project and define activities that should be given priority in LAPIS; to involve RD staff, both U.S. and Basotho, USAID, other relevant government ministries and divisions, and WSU. -- Plans are underway to conduct such a workshop, with some modifications which were suggested by USAID.

III. Literature Cited (a partial list)

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IV. List of Persons Contacted or Conferred with by
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V. Acronyms and Abbreviations

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| AID | Agency for International Development |
| CD | Crops Division |
| CRSP | Collaborative Research Support Project |
| DAO | District Agricultural Officer |
| EOP | End of Project |
| FSR | Farming Systems Research |
| FSR/E | Farming Systems Research and Extension |
| FSRP | Farming Systems Research Project |
| FSSP | Farming Systems Support Project |
| GOL | Government of Lesotho |
| INTSORMIL | Sorghum and Millet CRSP |
| ISAS | Institute for Southern African Studies |
| KOL | Kingdom of Lesotho |
| LAC | Lesotho Agricultural College |
| LAPIS | Lesotho Agricultural Production and Institutional Support Project |
| LOP | Life of Project |
| MOA | Ministry of Agriculture |
| NTTC | National Teacher Training College |
| NUL | National University of Lesotho |
| PA | Prototype Area |
| PACD | Project Assistance Completion Date |
| PCV | Peace Corps Volunteer |
| PP | Project Paper, Project No. 632-0065 |
| PS | Principal Secretary |
| RD | Research Division |
| SACCAR | Southern African Center for Co-operative Agricultural Research |
| SARWEN | South African Regional Wheat Evaluation and Improvement Nursery |
| SADCC | Southern African Development Co-ordination Conference |
| TA | Technical Assistance |
| USAID | U.S. Agency for International Development |
| VAC | Village Agricultural Committee |
| WSU | Washington State University |