A.I.D. EVALUATION SUMMARY PART I

(BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS)

A. REPORTING A.I.D. UNIT: USAID/Swaziland (Mission or AID/W Office)

(ES#)

B. WAS EVALUATION SCHEDULED IN CURRENT FY ANNUAL EVALUATION PLAN? yes ☒ slipped ☐ ad hoc ☐

Eval. Plan Submission Date: FY 87 Q 3rd

C. EVALUATION TIMING Interim ☒ final ☐ ex post ☐ other ☐

D. ACTIVITY OR ACTIVITIES EVALUATED (List the following information for project(s) or program(s) evaluated; if not applicable, list title and date of the evaluation report)

Project #	Project/Program Title (or title & date of evaluation report)	First PROAG or equivalent (FY)	Most recent PACD (mo/yr)	Planned LOP Cost ('000)	Amount Obligated to Date ('000)
645-0212	Cropping Systems Research & Extension Training	1981	9/87	$12,900	$10,882

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

Action(s) Required	Name of officer responsible for Action	Date Action to be Completed
1. Assess overall impact of farming systems vis-a-vis project indicators	MOAC/USAID	ASAP
2. Extension Training Advisor should concentrate on planning, budgeting and day-to-day operations.	MOAC/USAID	Jan 1988
3. MOAC should identify full-time counterpart to long term extension technical advisor.	MOAC	6 months
4. Identify alternative candidates for extension training and expedite.	MOAC/PSU	July 1987
5. Extension - Research - Coordination must receive higher priority as well as linkages between researchers and extension agents	MOAC/USAID/PSU	ASAP
6. Extension personnel training at IARCS should be increased	PSU/MOAC	July 1987
7. MOAC should identify additional personnel to be assigned to the Information Section (see attached sheet)	MOAC	July 1987

(Attach extra sheet if necessary)

F. DATE OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION: mo 07 day 10 yr 87

G. APPROVALS OF EVALUATION SUMMARY AND ACTION DECISIONS:

	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
Signature				
Typed Name	L. Martella	MOAC/RSC	PD/J. Johnson	R. Carlson
Date:	12/23/88	20/12/88	12/21/88	1/14/89

H. EVALUATION ABSTRACT (do not exceed the space provided)

CROPPING SYSTEMS RESEARCH AND EXTENSION TRAINING (CSRET) PROJECT

This project was designed under a Title XII collaborative mode with Pennsylvania State University in collaboration with Tennessee State University . The purpose of the Project is to improve and expand the capacity of the Government of Swaziland (GOS) Ministry of Agriculture and Cooperatives (MOAC) to develop and extend cropping systems recommendations relevant to the needs of the SNL small farmer. The Project was designed to assist the MOAC to (a) redirect its research efforts to a systems approach for identifying the constraints and advising solutions to SNL farmers on on-farm crop production problems, (b) strengthen the capability of the Agricultural Information Section to present research recommendations in a manner understandable to both the extension staff and the SNL farmers, and (c) institutionalize a structured, continuous in-service extension training program capable of keeping field workers informed of the latest research findings and improving supervisory and management skills. The project focuses on three major components within MOAC: Research, Extension and Information Services.

This is the second mid-project evaluation. The first occurred in FY 1984.

The validity of the project's goal, purposes and output were evaluated and found to be valid.

The evaluation found that a significant number of on-farm verification trials had been completed and results published on a wide range of subjects: herbicides, fertilizer usage, planting methodology, horticulture varieties, and new crops not indigenous to Swaziland. The formal degree program has exceeded original project goals.

One of the major findings was that impressive gains have been realized since implementation of CSRET, particularly in the area of formal degree training.

Lessons Learned:

Establishment of strong linkages between the U.S. based institution and the recipient country institution is critical to the success of this type of project.

I. EVALUATION COSTS

1. Evaluation Team

Name · Affiliation	Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (US$)	Source of Funds
International Resources Consultants Inc. 1025 15th Street NW Washington, DC	25 days x 4 PIO/T No. 645-0212-3 30104	$54,000 IQC No. POC-1406-I 007010-00	Project 645-0212

Agricultural Research Scientist
Agricultural Extension Specialist
Policy/Inst Development Specialist
Communications/Information Specialist

2. Mission/Office Professional Staff Person-Days (estimate) 1

3. Borrower/Grantee Professional Staff Person-Days (estimate) 2

(Attachment from page 1))

8. Initiate further training for Information Section Personnel at the B. Science degree level and IARC courses	MOAC-PSU/TSU	ASAP
9. Further attention is required to improve the quality (content and style) of radio messages	MOAC/PSU/TSU	ASAP
10. Additional short-term TA resources are required to ensure completion of socio-economic analyses	PSU/TSU	6 months
11. Additional short term TA support is recommended to the Rural Sociologist	PSU/USAID	July 1987
12. Continued TA support and training to be given to Research	MOAC/USAID	
13. Placement of a Senior Scientific Advisor (Research Methodology) advisor at the Malkerns Research Station		Sept. 1987
14. Consider two year continuation of the long term TA Economist position beyond planned end of tour.	MOAC/USAID/PSU	Aug. 1988
15. Additional investment in TA, Swazi staff, USAID funding, and training (both degree and practical) for a viable extension service.	MOAC/USAID/PSU	ASAP
16. Considerable training in extension (4-5 M.Science and 3-4 B. Science) is required as well as two long term TA Extension Specialists.	MOAC/USAID/PSU	Aug. 1988

A.I.D. EVALUATION SUMMARY PART II

J. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS AND RECOMMENDATIONS (Try not to exceed the 3 pages provided)
Address the following items:

- Purpose of activity(ies) evaluated
- Purpose of evaluation and Methodology used
- Findings and conclusions (relate to questions)
- Principal recommendations
- Lessons learned

Mission or Office: USAID/Swaziland

Date this summary prepared: September 1987

Title and Date of Full Evaluation Report: Cropping System Research and Extension Project (645-0212)

Mid-Term Evaluation May 1987

A. The validity of the Project's goal, purpose and output were evaluated and found to be valid, but that the means of measurement or indicators need to be re-examined and subsequent compliance needs to be assured. The basic argument revolves between the cropping systems or farming system approach to these indicators. For survey purposes the family or homestead needs to be judged on a holistic basis but the terms of reference of the CSRET has limited the mandate to cropping systems. Consequently, the Project now has a farming systems approach with the homestead survey providing the basis for a cropping system research and an associated extension development program. This can be resolved later if and when the animal component is added. In the meantime, it is prudent to continue to collect livestock data along with crop data in the farmer surveys. The problems of shifting technical assistance emphasis from socioeconomics to horticulture and before staffing that position shifting to a production economist and then the including and dropping of the irrigation specialist are discussed in this section.

B. This section was only briefly discussed relating to the identification of research priorities which are reviewed in more detail in other sections. Essentially, priorities and domains are established by the previously mentioned surveys, Extension feedback, and using the farm trials. Output of research is relayed to extension via Subject Matter Specialists and/or the Agricultural Information Section.

C. The flow of information from Research to farmer is discussed in more detail in this Section and the problems of relaying technology are identified, quantified and recommendations for improvement are offered. There is a proposal in this Section for linking research and extension under one Director.

D. The structure and organization of MOAC continues to be indistinct and fragmented. The terms of reference did not call for suggestions to reorganize the MOAC but the evaluation would be remiss to ignore both the lack of a formal structure and the paucity of the operating budget. However, the MOAC has continued to support CSRET even though it uses a considerable part of their budget. Of the total operating budget for research about 83% is consumed by staff salaries.

E. The assessment of the flow of information into and out of the research system is substantially covered in other Sections, but in Section H some of the shortcomings are noted particularly with reference to external sources. Information from the Research Station has not been relayed to the policy decision-makers on a regular basis because the analyses initially were from informal surveys and rather unreliable. Later, better surveys have been completed, but the analyses are presently incomplete. With the employment of a TA production economist and his counterpart there will be more crop production data fed into the policy and planning section of MOAC, permitting the Planning Division staff to deal with broader policy issues relating to crop production.

F. Training is considered the most important component of the Project and has, as such, been adequately stressed. The formal degree training has exceeded its goals. In-country Extension Training is operational and active, however, it lacks budget, transport and focus. The Swazi staff support has been minimal and there is no depth of leadership in Extension Training. Farmer training at the Farmer Training Centers has been active and reportedly successful. Greater emphasis is again stressed for practical training at IARCs.

G. This Section lists the needs in training for the three components of research, information and extension for the 18 month extension. There is not much depth in staff and the competence is presently at a threshold level. In 18 months many local counterparts will be able to assume leadership roles. The danger then becomes one of the existing leader being promoted with no qualified replacements

H. The relationship between the University Faculty of Agriculture and the Malkerns Research Station is friendly and informal, but with essentially no official ties. This situation has arisen from the fact that they belong to two different Ministries and that one is outside the Civil Service being essentially a public corporation while the other is functioning as a part of a line Ministry. Basically there is little to offer as incentives for formal linkages and it is probably best to keep these linkages informal.

I. The review of the activities of the Policy Advisor showed high acceptance by the key MOAC officials with whom he is working. He will continue to be effective as long as his direct advisory linkages are intact. Current policy assistance, however, will not significantly improve the capabilities of the Planning Division of the MOAC to carry out their policy analysis and project formulation responsibilities. A larger-scale, long-term effort is needed for that important capacity-creating objective.

J. The evaluation of the Information Section indicates that during the short time of its development it has achieved a great proficiency in publishing high quality training aids to support the Extension Training Component. The radio messages are becoming an increasingly important component of the total extension message and has somewhat trailed behind publications as an information medium. A reorganization of the Information Section is proposed as well as suggesting alternative sources for practical training in communications.

K. Final evaluation of the Project should utilize the indicators of impacts identified in Section D of the report. In addition, the Team recommends that the Project establish a conceptual framework for the integrated analysis of the effects of technology and policies on these target households, other benchmarks that should be utilized include a definitive assessment of land tenure issues, identification of policy constraints and their alternatives, and the successful achievement (quantitative and qualitative) of institutional development in the research-extension system.

ATTACHMENTS

K. ATTACHMENTS (List attachments submitted with this Evaluation Summary; always attach copy of full evaluation report, even if one was submitted earlier)

1. Evaluation Report dated May 1987
2. PIO/T No. 645-0212-3-30104 with SOW
3. Bio Data of International Resources Team Staff

MISSION COMMENTS ON FULL REPORT

L. COMMENTS BY MISSION, AID/W OFFICE AND BORROWER/GRANTEE

The evaluation followed the objectives defined in the Mission's scope of work/terms of reference, Article III. These were discussed in detail with the team members during th initial in-house meeting.

In terms of recommendations, all but two are incorporated under Section E. The two deleted were related to activities being proposed under a new project in the agricultur sector in the areas of marketing, agri-business, policy and planning.

The second mid-term evaluation, occurring less than 18 months before scheduled PACD, provided the basis for preliminary discussions and in-depth review with the GOS/MOAC on possible extension of the PACD, more training, the adding of more resources and a revised technical mix to address those areas identified as weak and in need of strengthening and to ensure achievement of stated projects EOPS.

- In early Feb 88, USAID/MOAC and representatives from PSU/TSU met and agreed to take actions over the next six months to extend the PACD and restructure the project in orde to achieve stated project EOPS. In sum most of the recommendations have been implemented.

-

Major Findings:

Impressive gains have been realized since implementation of CSRET particularly in the formal degree training of Swazis to prepare them to assume the continuing research and extension program leadership.

Lessons Learned:

Establishment of strong linkages between the U.S. based institution and the recipient country institution is critical to the success of this type of project.

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MBABANE, SWAZILAND

CROPPING SYSTEMS RESEARCH AND EXTENSION PROJECT (645-0212)

SECOND MID-TERM EVALUATION

Prepared for:

U.S. Agency for International Development
Mission to Swaziland

Submitted:

International Resources Consultants, Inc.
1025 15th Street, N.W., 5th Floor
Washington, D.C. 20005
(202) 638-2002
Telex: 249111 IRC UR

May 1987

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UNITED STATES GOVERNMENT

memorandum

DATE: September 1, 1987

REPLY TO ATTN OF: Joan C. Johnson, DPPD

SUBJECT: CSRET Project (645-0212): May 1987 Evaluation by International Resources Consultants, Inc.

TO: Lili Martella, ADO

As the Mission's Evaluation Officer, I have reviewed the final CSRET evaluation report submitted by International Resource Consultants, Inc. The final evaluation report does not contain information on the team's composition (names, expertise, etc.), the dates the evaluation was conducted, or the original SOW. Part of this information was included in the final draft (mark-up copy) discussed with the team during the in-house review. I suggest we attach a copy of the original SOW and the listing of team members as an insert to the official Mission copy. This insert should also be sent to AID/W recipients.

Attached are the recommendations PPD gleaned from the CSRET evaluation report. Kindly review and, where appropriate, consolidate with the list you have compiled. Once the recommendations are agreed upon, we can prepare the PES facesheet for GOS signature and submittal to AID/Washington.

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

OPTIONAL FORM NO. 10
(REV. 7-76)
GSA FPMR (41 CFR) 101-11.6
5010-112

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WORK ORDER FOR MID-TERM EVALUATION
USAID/SWAZILAND

CROPPING SYSTEMS RESEARCH AND EXTENSION TRAINING PROJECT
645-0212

BACKGROUND

Cropping Systems Research and Extension Training (CSRET) Project. The CSRET Project represents AID's initial effort to improve the low productivity and income levels of the small farmers on Swazi Nation Land (SNL), which covers 60 percent of Swaziland's total land area, and contribute to the goal of increasing the economic viability of farming. The Project was initially obligated in FY 1981. The purpose of the Project is to improve and expand the capacity of the Government of Swaziland (GOS) Ministry of Agriculture and Cooperatives (MOAC) to develop and extend cropping systems recommendations relevant to the needs of the SNL small farmer. The Project was designed to assist the MOAC to (a) redirect its research efforts to a system approach for identifying the constraints and advising solutions to SNL on-farm crop production problems, (b) strengthen the capability of the Agricultural Information Section to present research recommendtions in a manner understandable to both the extension staff and the SNL farmers, and (c) institutionalize a structured, continuous in-service extension training program capable of keeping field workers informed of the latest research findings and improving supervisory and management skills.

One of the purposes of this evaluation was to assist the USAID Mission in deciding how to allocate its much scarcer future resources to provide continuing support to the research, information and extension training functions which have been greatly expanded by this Project.

Pennsylvania State University in collaboration with Tennessee State University provides technical expertise in cropping systems, rural sociology, agricultural economics, agronomy, horticulure, agricultural extension training, agricultural information, policy guidance and specialized consultancies to assist in assuring that the Project meets its objectives.

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CROPPING SYSTEMS RESEARCH AND EXTENSION TRAINING PROJECT

EXECUTIVE SUMMARY

The following paragraphs summarize the response of the 1987 Evaluation Team to the subjects listed in the Terms of Reference.

A. A detailed listing of major inputs and their subsequent outputs are listed. These include surveys, research trials, linkages, degree training for Research Staff facility construction, in country training for extension, development of an information section, degree training of Extension Workers, and a flagging of the need to increase staff leadership depth in the Information Section. The final portion of this section evaluates the achievements to date and commends USAID/MOAC for their wisdom in extending the Project 18 months to complete the development of the CSRET. There is also a forecast for achievements at the End of Project Status. *Extension Training appears to be the component that is lagging and will not be complete in October 1988.*

B. This section assures USAID/MOAC that the present purpose of CSRET does not need to be altered as the original purpose is still valid. It validates the investment in training and TA. Training schedules are being followed and many of the research positions can be transferred from TA to returning or returned Swazi staff. *A program for additional training in skills is urged using established courses at the International Agriculture Research Centers.*

C. The original five objectives of the Project are listed along with the sixth objective (policy, planning, evaluation) that was added in 1985. The objectives are evaluated with the progress to date noted. *By and large the objectives are being achieved and both the MOAC and Contractor have kept these in the forefront of their planning and operations.*

D. *The validity of the Project's goal, purpose and output were evaluated and found to be valid, but that the means of measurement or indicators need to be re-examined and subsequent compliance needs to be assured.* The basic argument revolves between the cropping systems or farming system approach to these indicators. For survey purposes the family or homestead needs to be judged on a holistic basis but the terms of reference of the CSRET has limited the mandate to cropping systems. Consequently, the Project now has a farming system approach with the homestead survey providing the basis for a cropping system research and an associated extension development program. This can be resolved later if and when the animal component is added. In the meantime, it is prudent to continue to collect livestock data along with crop data in the farmer surveys. The problems of shifting technical assistance emphasis from socioeconomics to horticulture and before staffing that position shifting to a production economist and then the including and dropping of the irrigation specialist are discussed in this section.

E. This section was only briefly discussed relating to the identification of research priorities which are reviewed in more detail in other sections. Essentially, priorities and domains are

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established by the previously mentioned surveys, Extension feedback, and using the farm trials. Output of research is relayed to extension via Subject Matter Specialists and/or the Agricultural Information Section.

F. The flow of information from Research to farmer is discussed in more detail in this Section and the problems of relaying technology are identified, quantified and recommendations for improvement are offered. *There is a proposal in this Section for linking research and extension under one Director.*

G. *The structure and organization of MOAC continues to be indistinct and fragmented.* The terms of reference did not call for suggestions to reorganize the MOAC but the evaluation would be remiss to ignore both the lack of a formal structure and the paucity of the operating budget. However, the MOAC has continued to support CSRET even though it uses a considerable part of their budget. Of the total operating budget for research about 83% is consumed by staff salaries.

H. The assessment of the flow of information into and out of the research system is substanially covered in other Sections but in Section H some of the shortcomings are noted particularly with reference to external sources. *Information from the Research Station has not been relayed to the policy decision-makers on a regular basis because the analyses initially were from informal surveys and rather unreliable.* Later, better surveys have been completed but the analyses are presently incomplete. With the employment of a TA production economist and his counterpart there will be more crop production data fed into the policy and planning section of MOAC, permitting the Planning Division staff to deal with broader policy issues relating to crop production.

I. *Training is considered the most important component of the Project and has, as such, been adequately stressed.* The formal degree training has exceeded its goals. *In-country Extension Training is operational and active, however, it lacks budget, transport and focus.* The Swazi staff support has been minimal and there is no depth of leadership in Extension Training. *Farmer training at the Farmer Training Centers has been active and reportedly successful.* Greater emphasis is again stressed for practical training at IARCs.

J. This Section lists the needs in training for the three components of research, information and extension for the 18 month extension. There is not much depth in staff and the competence is presently at a threshold level. *In 18 months many local counterparts will be able to assume leadership roles. The danger then becomes one of the existing leaders being promoted with no qualified replacements.*

K. *The relationship between the University Faculty of Agriculture and the Malkerns Research Station is friendly and informal, but with essentially no official ties.* This situation has arisen from the fact that they belong to two different Ministries and that one is outside the Civil Service being essentially a public corporation while the other is functioning as a part of a line Ministry. Basically there is little to offer as incentives for formal linkages and it is probably best to keep these linkages informal.

L. The review of the activities of the Policy Advisor showed high acceptance by the key MOAC officials with whom he is working. He will continue to be effective as long as his direct advisory linkages are intact. *Current policy assistance, however, will not significantly improve the capabilities of the Planning Division of the MOAC to carry out their policy analysis and project formulation responsibilities.* A larger-scale, long-term effort is needed for that important capacity-creating objective.

M. The evaluation of the Information Section indicates that during the short time of its development it has achieved a great proficiency in publishing high quality training aids to support the Extension Training Component. The radio messages are becoming an increasing important component of the total extension message and has somewhat trailed behind publications as an information medium. *A reorganization of the Information Section is proposed as well as suggesting alternative sources for practical training in communications.*

N. Final evaluation of the Project should utilize the indicators of impacts identified in Section D of the report. *In addition, the Team recommends that the Project establish a conceptual framework for the integrated analysis of the effects of technology and policies on these target households, other benchmarks that should be utilized include a definitive assessment of land tenure issues, identification of policy constraints and their alternatives, and the successful achievement (quantitative and qualitative) of institutional development in the research-extension system.*

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EVALUATION

SWAZILAND CROPPING SYSTEMS RESEARCH AND EXTENSION TRAINING PROJECT (AID 645-0212)

In Compliance with the Terms of Reference supplied with PIO/T No. 645-0212-3-30104 the following details are provided in response to paragraphs A through N in Article III:

A. Review Project outputs as stated in the logical framework and, while noticing relationship between inputs, outputs and output assumptions, quantify progress made towards achieving output indicators and provide a detailed explanation of those areas where Project outputs either exceed or fall short of targets. Include recommendations for overcoming shortfalls identified. Review the validity of output to purpose assumptions; this is critical to the purpose and utility of the evaluation.

The outputs of CSRET Project were described in the Project Paper (PP) as consisting of the following:

1. *Conducting base line surveys of Swazi Nation Land (SNL) farms to provide benchmark data for future evaluations;* and

2. *Continuing surveys of homestead in SNL to measure changes in production, yield, acceptance of new technology, and socio-economic factors.*

Eight Informal Surveys of the Rural Development Areas (RDAs) have been conducted, seven of which have been completed to date. In addition, six Formal Surveys have been conducted, three of which are completed. Two of these are ongoing and one is to end in March 1988. Five Baseline Surveys have been completed. Two other surveys are incomplete as they are awaiting farmers' assessments of the on-farm trials. A 1983 Extension Field Officer Survey on Farming Systems of the SNL was reported in the 1982-83 Annual Report. Although most surveys have been made, the analyses have not been completed, but within the next 18 months the necessary and relevant analyses are expected to be completed. Winrock International produced a comprehensive Livestock Report which was a narrative survey of the livestock sector of the SNL. Consequently, the Evaluation Team considered that both the Baseline and Continuing Project Evaluation Surveys in Outputs 1 and 2 have been partially satisfied. Further details of these surveys, authors, subjects and dates are supplied in Appendix A.

3. *Providing 350 on-farm research verification trials of improved practices over a five year period.*

On-farm verification trials are established as research is developed. As the research pipeline is filled the need for on-farm verification increases. Such trials in the 1986/87 season include maize herbicides, cotton herbicides, maize varieties, maize fertilization, bean plant populations, groundnuts, jugo bean harvesting, rhizobium collection, sweet potato planting

dates, onion varieties, cabbage and onion fertilizer trials, and these will consist of over 272 individual plots. The researchers and the 1987 Evaluation Team consider the *number* of trials or plots as rather irrelevant criteria and would rather measure the degree and scope of the research that moves from the research station to farmers' fields for verification and its subsequent acceptance by extension into demonstration plots. But by any measurement, the researchers are submitting to the farmers far more testing than the research assistant can presently cope with because they are presently limited by mobility and the relatively short season suitable for planting. Consequently, in the future it will be the quality and not the quantity of on farm research which should be evaluated. The coefficients of variability of research plots should not exceed 40% in well supervised and designed farm trials.

4. *Develop linkages between crop-research-extension, information and the faculty of agriculture in the University of Swaziland. The crop research, extension and information sections will coordinate training and development. Relationships will be established between TA and Swazi staff and with the programs of the international agricultural research centers and other national and regional programs in Africa.*

The linkages between the three major components of research, extension, and information have been excellent. This is largely due to the efforts of the Penn State Chief of Party and his counterparts. The coordination between these three components and Policy Advisor has been less effective and at times strained. The Policy Advisor largely considered himself outside the Penn State team and prefers to work directly with the Director of Research and Planning and has considered his primary role as advisor and confidant to the Minister of Agriculture.

He has been very effective in this advisory role, but his contribution to CSRET has been minor. Much of the baseline data, social and technical progress resulting from the CSRET Project, and the technical competence of the Swazi and TA staff at Malkerns that could contribute to policy advice to MOAC has not been forthcoming or is overlooked. Conversely, the Policy Advisor has only recently contributed to Annual CSRET Reports and Work Plans since his employment by Penn State. However, he has been very perceptive in discussions with USAID and Penn State. His talent in recognizing the bureaucratic constraints in the agricultural development process is unique. However, his strategy for such identification and elimination of constraints needs to be shared more frequently with his colleagues in the field as well as with the Minister of Agriculture.

The CSRET Project has not made use of the network of the International Agricultural Research Centers (IARCs). With the exception of the International Maize and Wheat Center (CIMMYT) which has a Regional Cropping System Office in Nairobi and its staff make occasional visits to Swaziland and are very willing to provide varietal and insect and disease screening nurseries for maize. Some of these nurseries have been tested at Malkerns by local staff but a greater coordination is justified. The International Institute of Tropical Agriculture (IITA) in Nigeria has collected a variety of tropical and subtropical maize and pulse varieties and cultivars that could be adapted to the Lowveld in particular. The International Potato Institute (CIP) in Peru could provide the most recent technology in potato disease resistance

and potato seed production. The International Center for Research in the Sub Arid Tropics (ICRISAT) in India is an excellent source for technology on rain fed cropping systems. Similarly the Multiple Cropping Program at the International Rice Research Institute in the Philippines has a long history of providing technology relevant to intensive cropping with systems of intercropping, relay cropping and increasing cropping intensity with early maturing lines of beans and maize.

The CSRET Project did use staff from Winrock and the International Livestock Center in Africa for preparing a report "Livestock in Swaziland Cropping Systems Research and Extension Training" in July 1986. The use of resources outside of Penn State and Tennessee State University (TSU) is to be commended and encouraged. However, there was only limited use of non Penn State/Tennessee State for both consultants and degree training. Reference can be made to Appendix B where 35 out of 38 consultants were from Penn State/Tennessee State and Appendix C where 15 out of 19 degree candidates were trained at Penn State and TSU.

5. *Fifteen local staff will receive formal training in research disciplines. Nine of these will be at the M.Sc. level and six will be trained in skills in areas such as statistics and field research methodology. In addition, research staff will receive long term on-the-job training as counterparts.*

Nineteen candidates were sent for degree training. Thirteen have or soon are scheduled to complete training at the Masters' level. Four will have Bachelor of Science degrees and two candidates (one M.Sc. and one B.Sc.) have dropped out of training. This number has exceeded the target of only nine degree candidates. Ten participants have already had short term training in skills. This has also exceeded the targeted six participants. Both the Penn State staff and MOAC are to be commended for the effort in releasing this number of training candidates and also for operating research, extension and training without these critically needed workers. In addition, during 1986 the MOAC was able to send another 18 participants for long term degree training and 87 participants for short term skills training from other resources (see Appendix D).

Both the Research Staff at Malkerns and the Subject Matter Specialists at Manzini have had on-the-job training with Penn State TA Staff. In addition, Swazi Staff in MOAC associated with Extension Training, Agriculture Information Systems and Policy Development and Planning have had considerable "one on one" training in operations and management in their respective positions. Such training has been difficult to evaluate but in nearly all cases Swazi counterparts have reported that they have improved sufficiently in competence and that they anticipate being able to operate without resident advisors by October 1988 when the present CSRET support will be concluded.

6. *A facilities construction input by the Project would include a new Library/Conference Room and an extension of the Soils Research Laboratory will be constructed and equipped. Also a series of thirteen houses will be constructed in selected RDAs for Research Assistants.*

counterpart who has a MOAC responsibility to schedule and clear all MOAC staff for training. In 1986 this involved 18 candidates for long term training and 87 candidates for short term training outside Swaziland. In addition, he is also presently responsible for all internal training supervised by the MOAC.

9. *Eight Swazi Extension Workers will receive long term overseas training in individual agricultural disciplines to the B.Sc. level and upon return will be employed as Subject Matter Specialists in the Crop Production Section of the Extension Service of MOAC.*

A series of National Subject Matter Specialists were employed by the Crop Production Program at Manzini prior to the CSRET Project. This source of skilled and trained manpower was depleted to become the Research Scientists at Malkerns Research Station. The intention was to replace this talented corps and make the replacements the technology base for Extension Service. USAID has met its obligation to train a new corps of Specialists and has re-established this pool of talented agriculturists. One TA Extension Agronomist who has been assigned to work with these extensionists since December 1986 has provided both technical advice and extension-communication skills. He has also been instrumental in providing photocopying, typing, and computer facilities but the transport has not improved. Ten specialists share three vehicles of which two are inoperable.

10. *Five Swazi Agriculturists with the Crop Production Section of Extension would be transferred to the Crop Research Section and subsequently receive M.Sc. degrees. Prior to and following their graduate degree training these crop scientists will function as counterparts to assigned TA Specialists.*

The five B.Sc. holders in the Crop Production Section were selected for training at M.Sc. level in the early stages of the CSRET Project. These were:

1.	Themba Masuku	-	Agriculture Engineer
2.	Douglas Gama	-	Horticulturist
3.	Paul Mkatshwa	-	Agronomist
4.	Zodwa Mamba	-	Agronomist
5.	Sebenzile Matsebula	-	Agr. Ed./Biometrics

M. Petros Mtshali failed and left the program. Themba Masuku upon returning was employed by the Swazican Pineapple Corporation. Basil Maphalala, Economist, Magalela Ngwenya, Soils, and Funekile Simelane, Rural Sociologist, were selected for Masters degree training.

Presently at Malkerns most scientists have M.Sc. degrees funded by the CSRET Project and all have Penn State or Tennessee State TA discipline oriented Counterparts except Paul Mkhatshwa the Pasture Forage Specialist and Sebenzile Matsebula the Biometrician. However, the Socioeconomist will assist the Biometrician in on-the-job training.

The Swazi counterpart for Agriculture Education/Extension appears to be the biggest void in the training program for both B.Sc. and M.Sc. candidates.

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11. *An Agricultural Information Service (AIS) would be established and upgraded to complement the Research and Extension Services with a series of posters, charts, slide shows, bulletins and other extension aids. A new facility for AIS would be constructed and equipped during the first two years of the Project. As research results are forthcoming in the third, fourth and fifth year of the Project then AIS will prepare, edit and print appropriate reports and publications. Efforts will be made to use more diverse information disseminating techniques such as audio-visual (radio and television), fact sheets, press releases, etc. Three AIS staff will receive further formal training. One senior staff will be sent for M.Ed. in Agricultural Information and two others will receive short term training in audio-visual techniques and another in equipment maintenance and repair.*

The Agricultural Information Service has been the best served of the three components. The quality and quantity of their output reflects this investment. The local Swazi leadership for AIS is concentrated in Donald Hlophe, and if he is removed from this position his absence will create an immediate and serious crisis. If there are plans for his advancement then an immediate replacement of similar high quality will need to be trained. This position will be critical in 18 months when Penn State's technical assistance ceases.

Ample office and working space for this Section is available in MOAC with the third floor addition. Sufficient equipment has been purchased, installed, and is operating efficiently. The quality and number of publications have increased dramatically. The use of a PCV has greatly aided the printing operation. The AIS is a valuable service for the entire MOAC and should be operated and funded to provide services outside of the CSRET Project.

The diversification of information services into better quality radio and television programs will complete its effective role. This will probably require additional training and is discussed in more detail in the report on Information Services included as Section M in the body of this evaluation. The requirements for training, organization and diversification are likewise covered in Section M.

12. *The future of the CSRET Project with the extending of the contract another 18 months has provided an unusual opportunity to expand training, eliminate critical constraints, solve technical problems and improve efficiency. Similar to most development, this Project had accelerated slowly but in the past two years the pace has been exceptional. The 18 months' extension will provide a period of time to hand over more deliberately and effectively. It would have been a very imprudent decision to terminate this Project in March 1987. The MOAC, USAID and Penn State are all to be commended for agreeing early to the 18 months' extension.*

The Penn State Workplan has forecast the following prognosis for the Project prior to October 1, 1988. The evaluation team believes most of these targets will be achieved.

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END OF PROJECT STATUS

Based on current levels of proficiency and anticipated progress over the next year, the following represents a prediction of end-of-project status.

Cropping Systems Research

The Research Division will be capable of conducting economic, social, and technical research on a continuing basis with on-farm and on-station research integrated into a single program. Researchers will be contributing to regular publications of recommendations in an effort to extend knowledge to extension workers and farmers.

Agricultural Information

The Agricultural Information Section of MOAC will be capable of editing manuscripts and converting information to a variety of formats for extension workers and farmers. Additionally, the unit will be capable of delivering messages through press and broadcast media which serve an educational purpose for the Ministry's various publics.

Extension Training

Through implementation of a modified T&V approach to training and message transfer, the Extension program of MOAC will reach all field staff on a fortnightly schedule. Additionally, the Training office will be capable of processing training opportunities for advanced degree work "off-shore" as well as processing short-term training in coordination with a MOAC Training office responsible for direct processing of training requests with Establishments and Training. The Training division will also be capable of coordinating farmer field days and other contacts with SNL farmers.

The evaluation team has concurred and the only exception to complete acceptance of these targets by October 1, 1988 will be the Extension Training Component. There will have to be greater investment in TA, Swazi staff, USAID funding, Swazi funding, and training (both degree and practical) before a viable Extension Service will be operative.

B. Review the Project purpose and note the extent to which Project inputs and outputs are, or are not, leading to the achievement of that purpose by the amended (extended) Project assistance completion date (PACD). Since this is primarily an institution-building Project, the Team will be expected to assess the capacity of Swazis working in the MOAC to assume the key tasks associated with each section. The primary focus in this section of the report will be to detail the progress made by Swazi staff at the research station, and in the extension training and information sections. Have they acquired the skills necessary to assume full responsibility for all aspects of their work? Is primary responsibility being transferred in a manner to ensure that the institutions will be viable by the end of the Project? Where shortcomings are noted, make specific recommendations for achieving viable institutional capacity by the end of the Project. If achievement of Project purpose during Life of Project (LOP) is not considered

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likely, indicate reasons for this and what additional measures would be required and what is actually recommended.

Alterations in the CSRET purpose are not needed before PACD. Inputs and outputs noted in the Logical Framework, modified and updated by Plans of Work, will lead to achievement of the original and amended purpose (1984-85 Evaluation Team Report) by PACD. *To assure continued progress toward the Project goal a follow-on project will be needed with reduced TA in Research, continued support in Information and in-country training, continued academic training, strengthening of Research-Information-Extension integration, and TA input into aspects of marketing and policy.*

The Swazis who have participated in the Project Training programs, and who have (or will have) close and continued association with the Contract Team members will be capable of assuming key tasks in their respective sections. The Contract Team members in some sections have already turned over primary responsibilities to their Swazi counterparts and are assuming an advisory role. This is particularly noted in Research. Additional comments on Information are found in Sections F and M and on Extension in Sections I and J.

Implementation and scheduling of TA and consultants are timely. The Contractors have heavily relied on staff from their own campus and are urged to consider expertise from other institutions for short-term TA during the remainder of the Project. Suggestions for Research Information and Extension are noted in Sections F, G, H, I, and M.

The CSRET training programs are on schedule, but it is likely that not all participants will have completed their degrees by PACD (consultation with COP). Despite the large and diverse CSRET training program, there is a need for further academic training to provide back-up staffing and strength in Research, Information, and Extension. *In-country and in-service training is underway and will continue during the LOP but will also be needed in a follow-on program.* The Contractors and Contract Team have used IARC and NARS eastern and southern Africa facilities and representatives but should now make use of practical or skills training programs at the IARCs.

C. Review the goal of the Project and state the extent to which the activities under the Project are or are not leading to achievement of the Project goal. The review must also examine the validity of purpose-to-goal assumptions.

The activities generated to achieve the goal originally were limited to five objectives in the PP. Following the 1984-85 Evaluation, a sixth objective involving policy, program implementation, and project planning and evaluation was added. The objectives were accepted by MOAC and the Contractor (Penn State) and are listed below in the 1987 Plan of Work for the Swaziland Cropping Systems Research and Extension Training Project. The "Progress to Date" comments were provided by COP Penn State and the 1987 Evaluation Team; both concurs and commends the MOAC and Contractor for their achievements to date.

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PROJECT OBJECTIVES

In meeting the Project's goal of increasing the economic viability of farming on SNL and enhancing the well-being of homestead farm families, six major objectives have been defined to focus on the three interrelated components: Cropping Systems Research, Agricultural Information, and Extension Training. The six objectives are:

1. To understand the express needs of SNL farmers and to identify the constraints which impede productivity.

2. To develop, through a program of on-farm experimentation, cropping practices that are relevant to the needs and constraints of SNL farmers.

3. To increase the capability of the MOAC Research Station system to support research applicable to SNL farmers.

4. To use appropriate methods and materials to increase the effectiveness of agricultural information that is understandable and relevant to the Swazi farmer and to enhance the organizational effectiveness of the Information Section of the Ministry of Agriculture and Cooperatives.

5. To improve the Extension Training Program of the Ministry as well as to assist in the selection and training of designated Swazi Nationals to improve (through formal and informal means) technical, methodological, and motivational skills to insure that integrated research-information-extension programs in agriculture will continue after the conclusion of the Swaziland Cropping Systems Research and Extension Training Project.

6. To improve the capability of the MOAC to formulate policy, plan and implement programs and projects which will relieve macro-economic constraints to farmers/homesteaders becoming more productive and commercialized by adopting relevant, improved practices and innovations developed by research and recommended by extension.

PROGRESS TO DATE (Taken from COP report)

Objective No. 1

The team has completed informal surveys in all ten RDAs where the Project is working. Formal verification surveys undertaken in 5 RDAs (Central, Northern, Mahlangatsha, Tikhuba, and Mpolonjeni) have identified major components and their variants of rainfed maize and cotton production systems. In addition, farmer management practice surveys have been administered to farmers in six irrigation schemes in four RDAs (Central, Northern, Ngwempisi, and Mpolonjeni).

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Objective No. 2

More than 400 on-farm trials and observations have been performed in ten RDAs. The results of these trials have served several functions: past recommendations have been evaluated in light of the current agricultural situation, the appropriateness of new technologies has been tested under SNL farmer's conditions, feedback to research station based researchers on areas of research which address farmers' needs, and researchers have achieved a higher level of extension worker and farmer contact which enables them to better evaluate the level of complexity and detail of their extension publications and training activities.

Objective No. 3

The capability of MOAC Research Officers to support research applicable to SNL farmers has been increased by: long-term degree training in specific areas of agricultural research; short-term training in FSRE methodology, statistical analysis, and micro-computer usage; and "hands-on" training in implementation and management of on-farm trials. Research Recorders and Research Assistants have also benefitted from specific short-term training sessions and on-farm research activities. A subsequent Appendix (D) presents a listing of the participants who have been selected for long-term training, field of study, degree earned and date of return or completion.

Objective No. 4

The proposed building plan was revised to provide the required space in the form of an additional story to the existing MOAC Headquarters Building and was completed in 1985. Equipment has been obtained and specialized training provided, primarily in support of the printing and mass media aspects of the unit's function. Donald Hlophe, A.O. (Information), successfully completed requirements for his M.A. in Agricultural Education and returned to head the unit in 1985.

Improved use of radio and newspapers as well as printed items has been demonstrated. Flip charts, developed by the Extension Training section, have further enhanced the unit's capacity to extend information. Through coordination with the development communications aspects of the Manpower Development Project, the educational value of MOAC's broadcast efforts has been enhanced.

A short-term print media consultant has visited the Project twice, first to design a print-related facility and then to review its use and make recommendations for improvements. As a result, the print-related functions of the unit have been significantly improved over the past two years.

The unit has successfully printed and distributed materials authored by project team members as well as other sources for relevant information from both the Ministry and the private sector. Appendix E provides a list of 113 publications that have been or are in the process of being printed. Training in information skills as an integral part of extension methodology has been provided to research and extension staff associated with the Project.

Objective No. 5

Degree-oriented training has been successfully completed or is in process for all projected positions except for the Extension Training Specialist. A listing of participants still in degree programs appears in the discussion of activities/methods to be undertaken within each component, extension training, Section D. The A.O. (Training) has successfully completed a special six-month training course in the U.S. and returned to the Unit in 1986.

The extension training component served several roles during the development of a Swaziland modification of the T&V approach to Extension. It has participated in the developmental phase of the system and also provided leadership in the development of messages to be delivered through the system. As an integral part of the T&V extension approach, research/extension linkages have been encouraged and implemented through a series of monthly T&V meetings.

TA team members have served as instructors for extension field staff in regional training sessions and have also been part of the pre-service certificate training for young persons contemplating careers in agricultural extension.

Objective No. 6

Preliminary findings of the evaluation team during 1984-85 have identified marketing, pricing, and other macro-economy problems as major constraints to farmers/homesteaders adopting productivity increasing innovations and increasing production of maize and vegetables. The 1985 Evaluation Team's findings were consistent with the conclusions of all other MOAC Project and Program evaluations conducted since 1982 and verified the need for attention to be given to improving the macro-economic environment through changes in government policy, better planning, and more effective projects/programs.

An agricultural policy advisor was added to the team in 1985 to work with the Ministry of Agriculture and Cooperatives to increase its policy formulation, planning, administrative, and project preparation/management capability. The addition of this advisor provides vital interface between the macro-economic planning mechanism which deals with the national level needs for food, exports, and job creation and the macro-economic situation faced by the individual farmers. The position further enhances the Project's ability to encourage and institutionalize research/extension linkages as well as adding a unifying influence to all aspects of activity in the agricultural sector.

D. Critically assess the validity of the outputs, purpose and goal of the Project, given progress and changes in conditions since the PP design, and make recommendations for changes, as appropriate.

VALIDITY OF PROJECT GOAL, PURPOSES, AND OUTPUTS

This Project represents USAID's major response to the Government of Swaziland (GOS) goal to "raise the productivity of homestead families residing on SNL, increase their incomes,

and improve the economic viability of farming on SNL." This goal of the Project was re-validated in the 1985 Midterm Evaluation. Nothing has occurred in the interim to lessen the importance of the goal. Indeed, the country's less favorable economic environment and employment situation in the 1980's increased the importance of enhancing productivity, incomes, and levels of living for the half of the population farming on SNL as a means for the overall development of Swaziland.

The previous Evaluation recommended that the Project design "be updated by adding verifiable indicators that measure change from the holistic perspective of the homestead/farmer." Some indicators were suggested in the Evaluation but we find no evidence that this recommendation has been implemented. *We suggest that the following indicators be utilized:*

1. Percentage of maize acreage on which recommended production packages are utilized.

2. Increase in (real) value of output per hectare on target farms.

3. Increase in net family incomes of target households.

4. Improvement in health and nutritional status of the target population.

5. Proportion of women working in agricultural 'production' receiving technical assistance.

The original purpose of the Project was "to improve and expand the capacity of the MOAC research and extension program to develop and effectively extend cropping systems recommendations relevant to the economic needs of the Swazi Nation Land farmer." After the Midterm Evaluation, the purpose was implicitly expanded to include improvement of policy analysis and planning and management and decision making in the MOAC. The additional purpose, however, has not been formalized by selection of indicators to measure purpose accomplishment.

In terms of the original purpose, which in our opinion remains the appropriate focus of the Project, the use of the farming systems/household approach is crucial. This has several implications for evaluating achievement of the purpose.

First, agronomic research results cannot be accepted as "useful" to the target group unless their economic and social implications have been evaluated along with their technical conclusions. Second, the FSR concept cannot be institutionalized in the MOAC unless a social/economic research capability is created and integrated along with an agronomic capacity. Third, given the importance of livestock to SNL households, livestock cannot be excluded if a whole farm/family approach is used.

With regard to the expanded purpose, a valid case can be made for the importance of policy and marketing constraints on the overall success of the Project. Also, the need to improve management and administration in the MOAC is clear and of obvious importance to

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this Project. The decision by USAID to assist GOS in improving the policy and marketing environment to encourage production for the market by the small farmers through this Project, as well as the internal management and administration of the Ministry, should be viewed in that light. We conclude that such assistance is warranted, has been highly useful, and should be continued through the extended Project completion date (PACD). However, decisions between USAID and GOS should begin now to develop a separate activity to address agricultural planning, project management, policy research and analysis, and organization and administration of the Ministry.

The output to purpose assumptions of the Project mainly concern the adequacy of GOS budget support for recurrent expenditures and the extent to which Swazi staff can be trained, employed, and retained in professional positions in the MOAC. *The critical question is budgetary support. The GOS has been faced with relatively high growth in its expenditures unmatched by increase in its revenues.* The resulting severe fiscal constraints raise serious questions about the satisfaction of the assumptions. Within the overall constraints, additional budget support requires that the MOAC either devote more of its existing budget to Project activities or compete successfully for additional budget at the inter-ministerial level. *The best case for increased budget support is the demonstrated success in achieving the goal of the Project.* That is why evaluation of the Project using the verifiable indicators identified above should not be treated as a mere formality of Project implementation.

The validity of the original outputs, purpose, and goals have earlier been established in detail in Sections A, B, and C. The progress achieved and changes in conditions do not greatly alter this validity except in a few cases. There have been changes in the socio-economic component of research. At the early stages there were two positions for a rural sociologist and a production economist. In the original design these were to study and quantify the needs and constraints of the SNL farmers. To do this a series of informal surveys were made but the quality of the analyses were not as complete and accurate as needed. Because of this it was determined that a greater concentration on the social factors was needed and that these two positions would be combined into a single socio-economist position. The other TA slot would then be allocated to a sub-tropical horticulturist. The socio-economist would design and implement greater in-depth formal surveys to create the quality analyses that are needed to support CSRET. These formal surveys have been made and the socio-economist is currently performing the necessary analyses and with some skilled analysts in the form of short term consultants much of the valuable information that is needed should be forthcoming in the next 18 months.

The economics component of the socio-economic position was neglected as far as quantifying the profitability of the crop research. The on-farm household economics though was extensively researched. The decision was made that a production economist was needed to evaluate crop research results. Since late 1986 these positions have been filled by a TA and his counterpart. During the next 18 months they will probably complete the backlog of analyses that have been pending from three years of crop research. However, to make certain that the technical recommendation will continue to be tested for their economic effects, *we feel that additional long-term technical assistance in productive economics will be needed, probably for two years.* This is covered in more detail in Appendix F.

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The position of a subtropical horticulturist TA has not been filled and at present it would appear that high quality short-term consultants can supply the technology necessary to complement the role of the TA horticulturist and his well trained Swazi counterpart. It was decided after the 1985 Evaluation Report that a policy advisor was needed and was requested by the MOAC. To create funds for this position the search for a subtropical horticulturist was terminated.

The Policy Advisor, as recommended by the Mid Project Evaluation, introduces an entirely new component that was largely unrelated to the existing CSRET Project. This new position operates at Ministerial level and the original terms of reference citing five objectives had to be amended with a sixth objective to provide advice and counsel, as requested, on agricultural development policy, planning, project preparation, and management issues. As such the policy advisor was capable of contributing significantly to a MOAC strategy study. The validity of this position and its outputs are discussed in more detail in Section L.

The changes in irrigation research have been debated throughout the CSRET span. The original Project design discussed in detail the importance of irrigation in the intensification and modernization of SNL agriculture. A candidate was selected for M.Sc. training in irrigation and sent for training in the early stages of the Project. Upon his return he left Government service and joined one of the private sugar producers in Swaziland. The TA Specialist in irrigation primarily worked in establishing the irrigation system at Malkerns and evaluating the operational effectiveness of other established irrigation schemes, he did little in promoting irrigation with SNL farmers. It must be said in defense of this TA that his demand at Malkerns was perceived as being greater than in the very limited (less than 1%) irrigated land in Swaziland. Irrigation is still of primary concern in the MOAC even though it is a very minor component of total production. Little water from either surface impoundment or ground waters is available at this time for supplemental irrigation. However, in the future, horticultural crops, particularly fruit trees, will need to be grown under irrigated conditions if a viable fruit and vegetable intensive production system is established. As such it would be advisable in the future to train local agriculture engineers in irrigation and drainage and to involve the new international irrigation institute in Sri Lanka into skills' training, systems design and irrigation policy matters.

An interim position was created at Malkerns for an Agronomist to supervise the Research Assistants who are establishing the on-farm research verification plots. This position appears tenuous presently, and will be terminated in August 1987. There is no replacement planned but there is an obvious need to replace this TA with a local agronomist or a Research Assistant. There is also a position that has been created for an Extension Agronomist who would work as a counterpart to the maize/beans National Subject Matter Specialist. This position is a one-on-one, and though productive, could be more efficient if the TA's responsibilities were directed more toward extension training as a subject. Such a move could relieve some of the pressure that is on the TA Training Specialist who has a tremendous work load in operating the in-country extension training program. However, the entire training section in extension needs greater support with counterpart staffing and funding. As such, a dilemma exists. Will TA strengthening of Extension Training necessarily induce further Swazi counterpart staffing, or will the Extension Service decide that having two Penn State Advisors should be sufficient to

operate the section? Thus, a decision has to be made by MOAC that Extension Training needs more support at this time, and if it is forthcoming then the necessary TA for the on-the-job training should be provided.

With the above minor modifications and changes, the purpose to goal validity of the Project is acceptable and in fact has become more relevant than when originally designed. Nearly all changes have improved the relevancy, scope, and rate of development. Though the Project suffered some delays in its initial implementation it has now accelerated and has improved sufficiently that it is more focused and more closely adhering to its scheduled plan.

E. Assess the appropriateness and/or validity of: (1) the identification of priority farm problems and selection of the research agenda; (2) the identification of research and recommendation domains; (3) the translation of research to published findings and extension recommendations.

The Cropping Systems approach, as based on the FSRE methodology, prioritizes farm problems and constraints and is appropriate and valid through its utilization and analyses of CSRET informal and formal surveys, results from on-farm adaptive trials, and feedback by Extension Officers (EO) and Research Assistants (RA) in the T&V program. More meaningful information applicable to the SNL farmer/homesteader will be forthcoming with more complete analysis of data already collected and to be collected by PACD. This information and the subsequent analytical results are being effectively used to identify on-farm research and target group/recommendation domains. On-farm and on-station research findings are steadily and continuously fed into information for dissemination through extension (see also Sections F, G, H, and M).

F. Assess the degree and effectiveness with which this Project has developed linkages among scientists, extension personnel and farmers. Where there are gaps in the communications chain, identify the causes and recommend steps to ameliorate them.

Downstream flow of technology has been delayed until the technology was developed by research and assembled into appropriate packages. The research component has done exceptionally well in biological research, particularly horticulture, agronomy and field crops by testing, verifying on farmers' fields and packaging results in only three crop years. The social scientists have collected massive amounts of data and these are in the process of being analyzed and shortly there will be a virtual deluge of recommendations resulting from analyses. The next 18 months should be very informative in identifying and understanding the constraints to agricultural production. The economic analyses are only in the early stages of information release because production economics were earlier ignored and it is only during the last three months that there has been an active economic analysis unit in operation.

The Information Section has the responsibility of relaying the research information to both the Extension Training Section and the farmers. The rapidity and quality of technical data release is far beyond expectations for such a relatively small staff with a very limited

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operational budget. The publications in particular are impressive in scope and simplicity. The amount of agricultural radio programming is equally impressive and broadcasts agriculture information about a total of three hours weekly. Because the Evaluation Team could not understand siSwati we had to accept the general consensus of the contacted Swazis that the quality of the radio reports needed to be improved in both content and style.

Research information is also directly relayed to Extension via the National Subject Matter Specialists (NSMS) attached to the Manzini Crop Production Program. This is done at monthly meetings at Manzini between the NSMS and RO's from Malkerns. These are at best informal meetings and only recently have minutes been recorded. However, they do serve the important function for two way exchanges for research and extension. *Discussions between Extension staff and Research staff have recognized that these meetings need to be expanded in scope, scheduled more in advance, and more formally reported.*

The linkages within the Extension Service and particularly between Extension and the farmer need great improvement. The problem here becomes threefold. First, there is a lack of transport for both the NSMSs and the Frontline Extension Workers (FEW). Even though Swaziland is a small country there is a need for vehicles because farmers are dispersed and there is limited or no rural public transport. Secondly, the FEWs are educated but not trained in skills of extension and farming. This is the function of the Extension Training Component. This Section is only partially staffed, poorly funded, but also appears to be poorly organized. These three characteristics are interrelated. The present two man operation in the MOAC for Extension Training have, by default, been assigned both in-country and foreign short term and degree training responsibilities for the MOAC. The T/A Extension Training Specialist has an active in-country extension and farmer training program. His counterpart Rogers Matsebula devotes full time to MOAC training awards and associated clearances. Rogers has only limited time to interact with Dr. Diamond; consequently in-service training is influenced accordingly.

Thirdly, there is the recent implementation of the T&V Extension System. Extension Workers regard this as an imposed program established to enforce a routine schedule of visits to farmers on their farms. With little or no transport and delayed and obtuse messages, the T&V system is resented and there is a corresponding lack of motivation by the FEW.

One incentive would be the provision of transport, a second would be the more timely relaying of the weekly or biweekly extension message as developed and delivered by the NSMS (again a reflection of limited transport). A third factor would be the training of the trainers to motivate the FEWs. Enthusiasm is contagious. Competition is also a great motivator. Isolation causes discontent. Frequent visits and the associated recognition could turn a disgruntled employee of MOAC into an inspiring rural leader.

Thus increasing the competency of the leadership of Extension, adding qualified teaching staff, increasing GOS financial support for training in country, improving mobility and motivating the FEW would be necessary inputs for producing an efficient Extension Service that could improve both profitability, production and diversification needed in the traditional agricultural sector.

Essentially linkages between research-extension-information and policy studies are informal and relatively weak. Greater evidence exists about linking through the Penn State Team because of the positive role of the COP. However, the MOAC needs to greatly improve their linkages. One possible solution would be putting research and extension under one Director.

G. Review the organizational structure of the MOAC research function and evaluate how research priorities are established, support levels determined and resources allocated.

The Research Division presently resides in the Directorate of Research and Planning. The more usual organizational structure locates agriculture research with administrative leadership vested in, and more directly aligned with, the Director of Agriculture. This would assure efficient functioning, effective operation, a sharp focus on research activities, and a smoother flow of information. *The MOAC authorities should consider relocating Agriculture Research under a Directorate of Research and Extension.*

Research priorities are solidly and appropriately established as follows: (1) Results and analyses of CSRET informal and formal SNL farm/homestead surveys, (2) Feedback from EOs and RAs who express farmer opinions, (3) Knowledge and experience gained by ROs and Contract Team members involved in on-farm trials, and (4) Inputs from interaction of ROs with regional IARC and NARS organizations, attendance and participation in their workshops, access to their research activities and information (see also Section H).

The financial support of research by GOS/MOAC has continuously declined since initiation of the Project. At present 83% of the research allotment goes into salaries. The Chief Research Officer (CRO) and ROs prepare a yearly budget but have little opportunity to explain and justify it, and thus must be acceptive of the budgetary allocation. They have, however, effectively used this meager budget well to complement the CSRET Project.

H. Assess the flow of information into and out of the research system – e.g., is the communication between the Project and the International Agricultural Research Centers (IARC) and National Agricultural Research Systems (NARS) in the region adequate to ensure the exchange of findings and identification of research priorities? If not, propose measures to increase this exchange, as appropriate. Are research findings of policy significance channelled to policy makers? If not, recommend pprocedures to establish this flow of information.

There is a significant flow of information in the form of publications, research findings, regional and international reports, and notices of seminars and workshops into and out of the research system. All ROs are on mailing lists of IARC, their satellite organizations in eastern and southern Africa, and NARS. They participate and have input into regional conferences and workshops and regularly receive genetic material which is evaluated on-farm and on-station. These contacts and the flow of information have been greatly enhanced by the CSRET and will continue beyond PACD. The CRO maintains close contact with the RO activities and reportedly only forwards research of policy significance to the Director of Research and Planning. (See also Section L).

The perception of senior officials in the MOAC is that few research findings of policy significance have been channelled to them. The main explanation is that little such information has yet been produced by the Project.

Socioeconomic analysis is essential to the underlying concept of the Project and was designed as an integral part of the analysis of both on-farm and on-station research. The initial Project team included both a rural sociologist and an agricultural economist forming a Research Station. Both of these initially worked without Swazi counterparts. They were heavily involved in the design and implementation of farm surveys carried out in the early Project period. When these two persons had completed their contracts, a decision was made to combine the responsibility of the two positions into a single job description for a "socio-economist." This position was filled by an anthropologist in 1984 who began to work without a counterpart. This team feels that this decision was ill-advised. We are pleased that it was reversed with the appointment of an Agricultural Economist in January 1987. Moreover, Millicent Malaza, rural sociologist, and Sam Dlamini, agricultural economist, have been appointed as counterparts to the Project's social scientists. For the first time, the social science section of the Cropping Systems Project is fully staffed. It is important that this team be held in place and given the supporting short-term technical assistance that will be required during the remainder of Phase I. The social/anthropological work should emphasize the analysis of survey data to improve knowledge of the cultural/social constraints on adoption of technology by the target farmers.

The economists must stress the economic analysis under actual farm level conditions of the profitability and risks associated with the technological packages. All the social scientists should participate in the evaluation of the the socio-economic impacts of the new technology on the target population. As this information is generated, it should be made available to policy analysts and project designers in the Planning Sectiom.

It is unlikely that the socio-economic section will have advanced to the point that it can operate successfully with only occasional short-term technical assistance by the PACD. A continuing need for a long-term agricultural production economist is anticipated for the second phase of the Project.

I. Assess the effectiveness and appropriateness of the Project's training programs. In areas of weakness, suggest measures to strengthen this.

The training component is perhaps the most effective input in the project. Training consists of formal degree training, short-term skills training, on-the-job training with the counterpart TA, in country short-term training for the extension workers, and farmer training.

Formal degree training and short term skills training outside Swaziland are covered in more detail in Appendix C. This component has been judged successful even though two out of nineteen participants were returned because of academic performance. The investment in skills training for Swazi Agriculturists should be accelerated and greater use made of three to six month courses offered by the IARC.

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Reports about on-the-job training by Swazi counterparts range from highly profitable and enjoyable to mediocrity and neglect. By and large the relationships have been fruitful.

Extension Training, one of the Project's major components has also reportedly had its ups and downs. The system has never lacked enthusiasm or dedication on the part of the TA. Effectiveness ratings would however, fluctuate. Some of this is due to lack of GOS funding, scheduling and coordinating of such training. The new T&V system being inserted into Extension at mid Project development by the MOAC did not aid the Extension Training Program.

Farmer training is doing very well. In the Evaluation Team's visit to the Farmer Training Center at Big Bend we found about six courses for T&V, two courses for irrigation, a chiefs' workshop and program for adult education all scheduled for the month of April. Also in attendance were 19 women in a five month course learning crafts. The Farmer Training Center was essentially booked to capacity and its Director reported that the four other Centers in the country were being equally utilized.

J. In those areas in which the Swazi staff are not already assuming full responsibility or are not expected to before the PACD, identify the extent and level of inputs (T.A., training, etc.) which will be required to prepare them to assume the leadership. If there are other serious institutional constraints, identify these too and suggest action to resolve them.

With the 18-month extension of the contract there should be time, in most cases, to fill the gaps in leadership for the CSRET Project. However, even at the completion of the 18-month extension there will be serious shortfalls in leadership and technical ability for the Project to successfully continue without USAID-supported long-term and short-term TA.

The Research component will require the services of a four or five year long term consultant to function as an advisor to the Director of Malkerns Research Station. The present Director has asked for such a senior scientific advisor in the planning, monitoring, implementation and evaluation of research on Malkerns Station. This individual would also assist the scientists in the design and analysis of the various experiments. He would also aid them in writing or reporting their research results. He should be a scientist with wide experience and many professional contacts with the IARCs.

The Production Economist at Malkerns also has a large backlog of data to analyze and the TA Economist has only been recently employed. His Swazi counterpart, who has also been recently assigned, will depart for long-term training in the near future. The withdrawing of the socio-economist and the production economist at the completion of the Project would create a large void in the Section's capability to provide economic evaluation of both surveys and production analyses at the farm level. Consequently, as the need is greatest in Production Economics rather than rural sociology, which can be more appropriately served with short term consultants, *a two year continuation of the long term TA Economist position is recommended.*

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The Information Section and Component have been well served by TA during the present Project. The local Swazi leadership in the Information Section is primarily limited to its present head. If he is promoted or leaves the MOAC, then the Section will be in great difficulty. Consequently, additional training for greater depth in leadership is of highest priority. *If the present Section Head leaves, and no equally qualified replacement is available, then a long term TA Specialist is essential for at least two years.* In the interest of maintaining a strong level of local leadership a well-qualified candidate for M.Sc. in Agricultural Communications needs to be identified immediately and sent for training at Penn State.

The Extension Section has perhaps the greatest need for both leadership and technical competence. Considerable training (4-5 M.Sc. and 3-4 B.Sc.) is needed as well as two long term TA Extension Specialists. The groundwork has been laid for an active and effective extension component. Skills in extension technique and knowledge of the crop are greatly needed. Much of this can be learned at the IARCs in six month production courses. At least 10-12 participants should have such training. The degree training and the practical training can be offered to the same individual to have him both technically competent and skill trained. *The TA Extension Advisors need to help continue the Extension Training and a Senior Advisor should be employed to help the Extension Section with planning, budgeting, and day-to-day operations.*

There is a continuing need for assistance to the MOAC in planning and policy analysis. Whether that assistance is provided under a second phase of the Project or a separate project, is a decision that GOS and USAID need to make. What is needed goes beyond a single long term Policy Advisor and must be planned on a coordinated basis with other donors. Our recommendations are given in Section L.

K. Explore the potential for greater support/interaction between the research station and the University of Swaziland (UNISWA). Identify the constraints which have prevented this and recommend ways of addressing them. Re: Extension Training – Do the same. – Is there scope for greater cooperation? If so, propose measures to realize it.

The support/interaction between the Malkerns Research Station and the Faculty of Agriculture (FAC) of UNISWA remains at a low level. There are occasional invitations by the FAC for lectures by RO's and Contract Team members. Because the research station has no entomologist, assistance is frequently requested by MRS and granted by the FAC. The FAC and RO's had considerable joint input into the 1-year Certificate Program (training of Extension Workers) which was discontinued in 1985 (Extension now only employs the two year Diploma graduates).

Collaboration between the two institutions is restricted because they are located in different ministries, both operate with severe staff shortages, and differences exist in criteria for promotion which affect their professional activities. The matter of a formalized linkage between the two institutions can only be resolved by authorities in the two ministries.

Information cooperation can be increased by (1) Continued invitations to RO's and Contract Team members as guest lecturers, (2) Use of MRS ongoing experiments for FAC student practicals, (3) Consultations with regard to research priorities, (4) Interchange of ideas concerning student training programs, (5) More frequent use of the FAC library facilities by RO's and (6) Assistance from the FAC librarian in organizing and possibly consolidation of the libraries at MRS and MOAC headquarters.

L. Keeping in mind that the need for the position of Policy Advisor arose out of circumstances not existing at the time the Project was designed, but identified in the previous evaluation, evaluate the impact of the Policy Advisor position on the MOAC in general and on other elements and CSRET. Is there a need to strengthen the ties between researchers and policy makers? If so, identify steps that would support this. Evaluate constraints to increasing the effectiveness of the MOAC's policy section.

In November 1985, a Policy Advisory joined the Project team as the policy economist to work with top MOAC management on agricultural development strategies, policies, and administration in the Ministry. As discussed earlier, the rationale for this assignment was provided in the mid-term evaluation. This assignment led to the formulation in the 1986-1987 Project Work Plan for an additional Project objective:

> "to improve the capability of the MOAC to formulate policy and plan and implement programs and projects that will relieve macro-economic constraints to farmers/homesteaders becoming more productive and commercialized by adopting relevant improved practices and innovations developed by research and recommended by extension."

The Policy Advisor is effectively using his considerable economic/administrative expertise and experience in his role as policy advisor. He works directly with the Minister and Director of Planning and Research in the MOAC. He advises key decision-makers directly on pending policy questions and assists high-level MOAC staff in mobilizing information and negotiating with other ministries and external organizations.

Among his many contributions, is one deserving special mention, is his key role in the preparation of "The Agricultural Development Strategy for the Kingdom of Swaziland." This strategy was published in September, 1986. It was based on the 4th National Development Plan and emphasized the functions of the MOAC in formulating and implementing policies, projects, and programs for agricultural development and evaluating the impacts of those policies, projects, and programs. While the strategy did not analyze policy alternatives nor fix priorities for projects and programs, it is the major first step toward identifying objectives and establishing overall GOS policy directions.

The Policy Advisor has also initiated a series of short-term training activities designed to improve the management capabilities of top MOAC officials. While it will be difficult to release over-committed officials for these training activities, their completion should be very helpful to the individuals involved.

Although his work is not closely related to other components of the Project, the Policy Advisor's services are highly regarded by the key officials with whom he works. The MOAC is anxious to retain him through the end of the Project, and beyond, if possible. As long as his direct advisory relationships are intact, he should continue to be effective in his personalized advisory role and continue to be funded under the Project.

Nevertheless, current efforts cannot be expected to have much impact on the overall organization and management of the MOAC nor to greatly improve its planning and policy analysis capacity. This should not be a surprise because the current activities have evolved through an ad hoc expansion of a Project whose central focus in on institution-building for research and technology transfer. They are not of the scope and intensity required to significantly improve the capacity for planning and policy analysis in the Ministry.

Among the many constraints the foremost is the lack of trained personnel for planning and policy work. Efforts should begin immediately to identify and send planners and policy analysts out of the country for long-term M.S. training under this and other projects.

As a next step USAID and GOS should formulate a long-term plan for improving the the Government's capacity to develop sector and sub-sector strategies, identify, appraise, and implement projects and programs, analyze policy alternatives, and monitor and evaluate implementation and impacts of policies and projects. While much of this additional capacity should be located in the MOAC, *effective linkages should be established with the Ministry of Finance, Economic Planning and the Budget and Planning Committee. The lack of these linkages is a series constraint on the design and implementation of agricultural policies and programs at the present time.* The goal of this program should be to enhance the capability of MOAC to fulfill its role in providing information on markets and prices to private decision-makers, formulating and implementing overall agricultural policies and programs within a framework of national priorities, and coordinating foreign aid for agriculture within the sector and between the subsectors.

This plan should specify needs for short-term and long-term technical assistance and the support various donors are willing to provide. Areas deserving early attention include:

- development of a sector strategy by the GOS within a priority framework for achieving specified goals such as diversification of agricultural production and greater food self sufficiency;

- improving GOS capability for appraisal of proposed projects and continuous monitoring and evaluating projects during implementation;

- identification of needed policy reforms and analysis of the consequences of policy alternatives;

- in the framework of the new National Agricultural Marketing Board, establishing effective marketing arrangements for domestic crops including provision of infrastructure and market information to support private marketing activity.

In addition to strengthening policy analysis and planning capabilities, continued attention to the organization and management of MOAC is needed. These are highly complementary areas of institutional development. More and better information for policy decision-making will not be effective unless the capacity to utilize that information to improve policy formulation and implementation is also enhanced.

Both internal and external forces are creating heavy pressures on the MOAC at the present time. Since 1970 the GOS has channelled its investment in traditional agriculture through the Rural Development Areas Program (RDAP) that now covers about 51% of the SNL. RDAP received government support and funding from a number of donors. It tripled the extension staff and added large numbers of other employees to the MOAC personnel roster. External aid to this program has since dried up and the GOS is now faced with using its own limited resource to sustaining what can be salvaged from the RDAP. In addition, the unfavorable GOS budget situation has created overall conditions of fiscal austerity in the government.

These factors have resulted in a crisis situation in the MOAC in supporting its recurrent cost needs for its many units. Since salary costs account for a large part of the budget, few funds are left to cover other costs. This seriously weakens the operational capabilities of units such as research and extension that depend on travel and field support funds.

It could be expected that the MOAC has inadequate mechanisms for rationing its scarce resource among and within competing programs. This problem needs to be addressed in the context of a comprehensive approach to improve the internal organization and administering the Ministry. *The success of the present Project will be greatly affected by these management problems but the Project itself is not the appropriate instrument for systematically addressing them.*

M. Evaluate the impact of the Information Section's staff to assume full responsibility for the various functions assigned. Propose means to build on the capacity which has been established. If appropriate, identify the training and support required to achieve a broader communications support for agricultural development.

Communications Support for Agricultural Development is a Major Project Activity

1. Present State of Development of the Information Services

Information Services (IS) is a relatively successful component of the Project. The publications program in particular has been established and a significant number of useful publications have been printed. IS has sought authors from a variety of sources – scientists, extensionists, and persons from the private sector. The printing plant has been installed and is operating well. It appears to be adequate for MOAC needs for the immediate future. The Visual Information Officer has benefited greatly from the training he has received and is now very capable in using the Apple MacIntosh for publications, graphics and illustrations. The secretary compre-

hends what IS is, and has become something of an expert in word processing. Secretaries from all around MOAC are now turning to her for instruction and assistance.

More recently, the Agricultural Officer–Information (AOI) has completed his graduate training program and is assuming responsibility of the IS. He has demonstrated outstanding skills in planning, production, and training.

The Unit has the support and acceptance it needs from MOAC program directors. The leadership of the Ministry is discovering IS and the quality of help and service it can provide. So despite the workload at this point being mostly extension-related, the growing volume of work for other units suggests that the future for IS is becoming Ministry-wide.

(a) The Project initial emphasis with IS was on implementation. This has been accomplished. The IS that has evolved has a high probability of operating effectively after the Project ends. However, that survival is somewhat tenuous right now as its survival and competence base among the Swazis lies solely with the single AOI. *The need is to to retain the competent staff, eliminate the incompetent and unmotivated, and improve the quality of the staff. Along with staff training this has to be a major goal for the IS part of the Project during the next 18 months.*

(b) IS needs restructuring. The accompanying organization chart proposes a structure for IS within the MOAC. An Assistant AOI should also head the Publications Division. The present publications staff is not motivated and are not competent as editors. This section needs new talent. The editor would primarily edit the extension material and the Publications Officer would edit the research materials. Both would share the other editing duties.

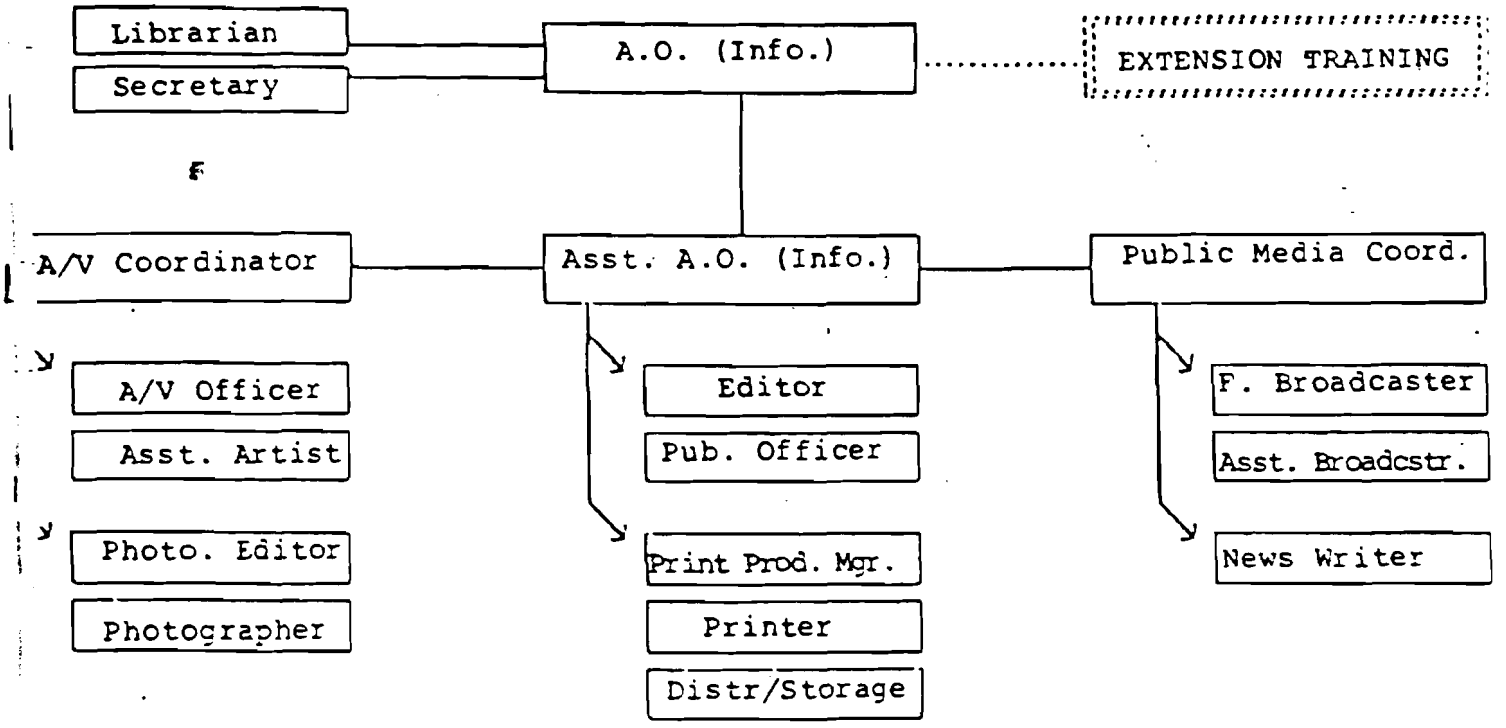
A Print Production Manager would handle the print shop and all storage, distribution, and mailing for IS, as well as maintaining the appropriate mailing lists.

The Audio Visual Coordinator would report to the Assistant AOI and would head two sections – a graphics section to produce illustrations and graphics for publications and visual presentations, and a photography section. The Public Media Coordinator also would report to the Assistant AOI. One of his sections would deal with radio programming and training, and the other with news writing. One writer should also be trained as a science writer. This IS structure contains all the necessary specialists and a logical structure for a fully operational MOAC IS.

(c) Of the staff above, the Assistant AOI and the Science Writer should be chosen and sent for training before this Project ends. The Assistant AOI must be trained in the total publications process. The International Rice Research Institute (IRRI in the Philippines) has an excellent publications course that lasts four months. If that is unavailable, the International Livestock Center for Africa (ILCA) has competent editors and could help in training. CIAT in Columbia, South America, also has a fine editor.

The Science Writer should be able to find a suitable course in the Republic of South Africa or possibly Kenya. There is an African Communication Organization in Nairobi that

ORGANIZATIONAL STRUCTURE OF MOAC
INFORMATION SECTION



also might be helpful. These two, if competent and motivated, will provide the AOI with the critical specialities he needs for his staff to succeed.

(d) It is understood that the MOAC plans to implement more of a budget planning process this year and to provide IS with its own budget. This is a highly desirable feature for IS.

(e) IS should have sufficient budget so it can buy bulk quantities of paper and other supplies. Presently, all organizations outside of extension service have to buy their own paper and provide it to IS before their publications can be printed.

(f) Publication distribution is critical. IS has checked each stage of the process under their control, yet field staff still complain about not getting relevant information. An effort should again be made to rectify this problem associated with the distribution of pertinent publications.

(g) After the TA Information Specialist leaves, a long-term (one year) replacement consultant should be brought in to continue the IS development. This person should be an expert in publications and be able to train other communicators and continue the training of extensionists and others in communication skills. If he has had an organizational communication background and interest, that also would be helpdul.

We would suggest this should not be a Penn State person. The three Penn State IS consultants have done an excellent job getting IS going. Now IS should benefit from exposure to different ways of thinking about communicators, their roles, etc.

(h) IS should seek short term training for other staff either locally, nationally, or in nearby neighbor states. Agencies, private firms, and universities may offer worthwhile relevant training in communications. The staff should also have access to pertinent trade and professional magazines. They should likewise belong to professional groups and should organize, present and attend communication-related seminars and discussions. All of this would help move the staff toward a more professional behavior and attitude.

(i) IS staff should continue conducting communication training of other MOAC staff as much as possible. These skills are needed and new staff who are inexperienced should be trained in skills.

(j) IS must begin building its science communication capacity with a science writer and research reports editor.

(k) The whole question of translating materials into siSwati for farmers needs further consideration. Editors may do translations, or IS may be able to hire translators on a piece work basis.

(l) Finding competent, motivated staff will be a continuing problem for IS. Help from the Personnel Directorate and the top administrators of MOAC will be important to the success of that effort.

(m) Further contacts are needed with IARCs. IS should make a conscious effort to find ways to communicate with them and to solicit their help with information and communications. Each has competent communicators on its staff.

(n) MOAC should consider changing IS to "Communication." "Information Services" increasingly is restricted to the work librarians and database managers do. "Communications" is a broader term and inclusive of the broader activities and responsibilities IS is conducting.

2. Library

There are rudimentary document collections at MOAC, Malkerns, and one or more field stations. There is also a proposal for 16 Regional Resource Centers. These will all need the attention of professional librarians. The MOAC should not attempt to establish these as complete libraries. They should only specialize in documents and papers concerning Swazi agriculture. The University of Swaziland/Luyengo campus, across from Malkerns, should be supported as central repository instead of building an extensive agricultural collection at Malkerns.

The MOAC library should make special collections in support of MOAC areas of work and responsibility. It should be equipped and staff trained to access electronic literature data bases. Also, collections might well be acquired in microfiche form.

There is a need for a short term library consultant to help plan for and organize the various libraries. It is important to have a plan developed and agreed upon before this Project ends.

3. Research Reporting

Adequate, regular reporting of research provides the basis for new agricultural recommendations as well as for the recording of scientific achievement. The Swazi Experimental Stations apparently have a basic reporting system. It should, as such, be used. This is a system requiring project proposals, regular progress reports, and final comprehensive reports. Extensionists, training staff, and IS need access to these records for their individual purpose.

4. Organizational Linkages

These come about naturally as people learn to work together to meet their individual needs. Substantial progress has been made between the Research Assistants and the Extension Workers, within Extension, and between discipline oriented researchers and extension specialists. We would expect these linkages to grow over time. It also requires a formal process to determine the needs and to prepare educational packages for Extension, to call for joint participation by researchers, extensionists, training staff, and IS. Training sessions and task forces bring people together. General conferences also help create coordination. MOAC might even consider advisory boards to both research and extension. These boards would be composed of representatives from research, extension, farmers, agribusiness, IARCs, and any other interested groups. Their function would be to hold annual reviews of the research and the

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extension programs. Linkages with the University of Swaziland should be developed and strengthened. IS has informal contacts, but as yet no formal ties.

5. The Development Communications Center

This unit, through the Swazi Broadcast Service, has established a 2-year training program in radio production. It appears to be a thorough and worthwhile course. Approximately 23 persons are in the initial class, and 25 more will start soon. The Farm Broadcaster in IS has already taken radio training with DCC and found it very satisfactory. There is a similar need for programs to be developed in such topics as writing, audiovisual production, and graphic design.

DCC also is encouraging SBS to establish a group of radio specialists assigned to specific governmental units such as MOAC. The MOAC radio specialist would be responsible for helping MOAC personnel plan and produce programs for radio. If this system develops, IS should determine what role the SBS radio person can best play for MOAC. The SBS person can not be a substitute for IS's Farm Broadcaster. DCC trains generalists in the media – on the assumption that a well-trained journalist can produce radio programs with any topic. While this may be true in general for mass media work, it is not necessarily true in educational communication work such as the IS staff is involved. The Farm Broadcaster must be associated with, trusted by, looked to, and be very familiar with agriculture, research, and extension – as well as being a professional radio producer.

6. Training

The MOAC Training Section has developed similarly to IS under this Project. Both have started by doing things – implementing training in this case. Both are now at the stage where thought to the mission, organizational structure, programs and staffing are vital. The training section is behind schedule of IS development for a number of reasons. Therefore, it seems unlikely that a stable, viable unit can be in place by the end of this Project. What could be done is to (1) develop the mission, structure, and staffing pattern of Extension Training as a blueprint; (2) continue an active extension training program to the end of the Project; and (3) in the meantime select a promising Swazi for advanced training as potentially the Section Head.

There are many tasks a Training Section could undertake. These include direct training, coordination of training, development of educational materials, training trainers, and organizing and coordinating academic and short term training programs for individuals. MOAC needs to determine exactly what they expect from this Unit and then develop the Unit to conduct those functions. The Training Section could logically have oversight of the proposed 16 Regional Resource Centers for extension. To get all this under way, it would be helpful to engage a short term specialist in training, organization, structure, and staffing to help the current staff leave behind for the Swazis a master plan toward which they can continue to move.

N. Finally, identify those accomplishments which the evaluation team believes have had or will have the most significant impact on agricultural development in Swaziland. Also identify, to the extent possible, benchmarks related to impact the project may have on Swazi agriculture and which the Mission could use for the purposes of internal review.

At the time of this evaluation the project has had little verifiable impact on agricultural development in Swaziland. Thus, this discussion centers on relevant *benchmarks* that can be used for evaluation at the PACD.

Given the core concern of this Project with research and extension directly linked to households on SNL, *the first benchmark should relate to the successful institutionalization of a capacity to apply FSR concepts in a continuous and ongoing fashion to the research/extension linkage*. The generation of technically sound production packages *that are also socially and economically appropriate within the environment of small Swazi farmers* is the key operational concept. The actual adoption of those packages and the positive socio-economic impacts of that adoption should be used to demonstrate the achievement of this benchmark.

The second benchmark we suggest relates to the basic methodological framework of analysis. The Project focuses on the homestead and recognizes that it is the unit that allocates labor between farm and off-farm production, makes decisions on what and how much to produce, and how to allocate its income to consumption and human capital investments (i.e., education, health). Much data have been collected under this Project and in other studies about the production, labor use, and consumption activities of the target households. The analyses of these data should provide much more definitive knowledge of the goals, constraints, and decision-making characteristics of these units. Generating this information should be a major focus for the remaining Project period.

It is recommended *that immediate action be taken to establish a conceptual framework for the overall analysis. We believe that the rural household production/consumption model is the appropriate choice*. The key to this model is the recognition of the interdependence of labor allocation, production, consumption, and investment decisions by the household decision-making unit. Non-farm employment, on-farm work by women, and subsistence constraints on household maize consumption are features that should be incorporated into a relevant model for the SNL households. The point is that the model should provide for *integrated* analysis that shows how new technology and policies would affect production, labor allocation, and consumption patterns of the families. Use of this model in other countries has recently been summarized in the book *Agricultural Household Models*, edited by Singh Squire, and Strauss. Application of a suitably adapted model framework should be used as a benchmark for the successful completion of this Project.

A third benchmark relates to the successful completion of the land tenure study. While we were not asked to evaluate that component of the Project, its importance is obvious to us.

There is much confusion about the degree of land scarcity in the SNL areas, the extent to which existing tenure arrangements provide security of land access, and the significance of

tenure as a constraint on credit for, and commercial production by, SNL farmers. Successful completion of a definitive analysis of these issues, some of which may challenge existing "conventional wisdom," is an important benchmark for this Project.

A fourth benchmark is the achievement of maize self-sufficiency at minimum resource cost for the country. This involves the potential productivity of the new production packages and analysis of their relevance under the resource and socioeconomic constraints of different groups of farmers. Production of maize beyond national consumption needs does not appear to be socially profitable. How best to guide production to the desired level and then cope with the price and storage implications of variations in annual production that exceed and fall short of trend consumption requirements is an issue that should be addressed by the MOAC through this Project.

The *fifth benchmark we suggest relates to the policy and marketing environment of the SNL producers.* Has a systematic assessment been carried out at the farm level? What are farm-level prices of inputs and products, and how do they vary seasonally and year-to-year? Is there a system in place for gathering and disseminating the needed information on a timely basis? What are the major policies that impact on small farmers? Has a process for reforming those policies been initiated? These questions should be answered before the final review of the Project.

Benchmarks relevant to the institution involved in the Project should be used. Because the Project is basically concerned with institution-building, such benchmarks are vital. They should not only quantify the staff and resources involved in research and extension but should also reflect the qualitative aspects of those programs.

O. SUMMARY OF COMMENTS ON SOCIOECONOMIC RESEARCH

The Cropping Systems approach assigns an important role to socioeconomic analysis. This role is important because of the characteristics of rural Swazi homesteads, the effects of previous projects and the problems actually faced by small farmers.

At present, after a long process of getting organized, the socioeconomic research component is well staffed; a useful body of work is in progress; and a sound plan has been developed to transfer leadership to Swazi scientists. *Special support will be needed, however, to bring the research and training activities to fruition before the end of the Project period.* In the research itself, two studies in particular deserve praise and special support. The farm labor and income survey is providing important information on factors in homestead farm production and the nutrition survey is measuring specific connections between food needs and production decisions by farm families. These studies use sound methods of research and promise to contribute greatly to achieving the Project goal. *Technical assistance in statistical methods of analysis and some additional support (specifically an additional IBM compatible computer) are recommended to help assure that these important studies will be completed during the Project period.*

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Progress also is being made in the effort to develop Swazi leadership in this area, although the current counterparts to the anthropologist and economist joined the Project only recently. The counterparts appear to have much potential in research, and additional training for both of them is recommended. *In the case of Ms. Millicent Malaza, counterpart to Dr. John Curry, it is recommended that a plan for her future development as a social scientist be worked out in consultation with the social scientist who would also provide technical assistance to the Project and that she be considered for short-term training and additional long-term training.* In addition, Swazi leadership in this area after the Project ends will need continuing technical assistance from an experienced social scientist for at least two years and periodic contacts with technical consultants for several years to follow.

Researchers in this section in particular should be encouraged to submit their research results for publication in scholarly journals in addition to using them for strictly Project purposes. The work appears to be such quality as to make this possible.

The contract between the cropping systems approach, in which socioeconomic analysis has a central role, and the T&V approach now being used in extension contributes to a gap between the research and extension components of the Project. Closing this gap deserves the attention of Project administration.

Efforts also are needed to develop social science competencies in the planning and policy analysis activities of MOAC so as to complement and supplement the experiment station research.

Overall, the work in this section is excellent. A major accomplishment is being made by delineating specific, researchable problems faced by different types of homestead farming operations. The major studies of socioeconomic and related characteristics provide important benchmarks for measuring future progress toward the goal of this Project and toward even higher goals – such as that of increasing the well-being of homestead families. A strong socio-economic component should be an important part of the Project in the future.

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APPENDIX A

CSRET INFORMAL AND FORMAL SURVEYS AND BENCHMARK REPORTS

APPENDIX A

CSRET INFORMAL AND FORMAL SURVEYS AND BENCHMARK REPORTS (1982-87)

Activity: Informal Surveys:

12/82	Informal Surveys of Central and Northern RDA's; results reported in 82-83 Annual Report. *Status:* Complete.
6/83	Informal Survey of Mahlangatsha RDA; results reported in 82-83 Annual Report. *Status:* Complete.
83-84	Informal Surveys of Tikhuba and Mpolonjeni RDA's; results reported in 83-84 Annual Report. *Status:* Complete.
7-8/85	Informal Survey of Diet among cooperator farmers in Central, Mahlangatsha, and Mpolonjeni RDA's; results reported in Huss-Ashmore's Consultancy Report 8/85; *Status:* Complete.
8/85	Informal Survey of Southern RDA; results reported in 84-85 Annual Report; *Status:* Complete.
9/85	Informal Surveys of Ngwemphisi and Bhekinkhosi RDA's; results reported to planning meeting for 84-85 On-Farm Trials; results yet to be written-up due to illness and departure of Sociologist responsible; *Status:* incomplete.
8/86	Informal Surveys of Hluti and Sandleni/Luqolweni RDA's; results used to design On-Farm Trials for 86-87; results not written-up by research officers responsible; *Status:* incomplete.
6/86	Informal Survey of Livestock Production Practices on SNL; results reported in Getz and Grandin (1986); *Status:* Complete.

General Status: Field Surveys complete in all RDA's; Results in written form for 6 RDA's.

Activity: Formal Surveys:

8-9/83	Formal Surveys of Northern, Central and Mahlangatsha RDA's; results reported in Freund and Maphalala (1984); *Status:* Complete.

5-6/84	Formal Survey of Mpolonjeni and Tikhuba RDA's; results analyzed and used to design On-Farm Trials in Cotton at Ngcina; some results reported in 84-85 Annual Report; useable results to be incorporated in report on labor and input use by cotton farmers; *Status:* Complete.
1984	Formal Survey of Livestock Practices on SNL; results reported in King and Corbett (1985); *Status:* Complete.
11/84–7/86	Labor and Input Use Survey; Data collection complete; data entry 75% complete; Preliminary results reported to MRS Annual Meetings and in Curry and Seubert (1985); results to be incorporated in reports on labor and input use among maize and cotton farmers; *Status:* incomplete.
3/86–3/87	Dietary Consumption Survey; data collection until March, 1987; entry and analysis of data 2-5/87; results reported to MOAC and in Huss-Ashmore's Consultancy Report, 7/86; data analysis to continue into 87-88; *Status:* incomplete.
3/86–3/87	Household Expenditure Survey; data collection until March, 1987; no entered; *Status:* incomplete.

General Status: Formal diagnostic surveys complete; multiple visit surveys incomplete; additional analysis and/or write-up for diagnostic and multiple visit surveys to continue into Years 1986/87, 1987/88.

Activity: Baseline and Other Reports Completed:

1983	Project Baseline Report, Agricultural Economics Section, "Social and Cultural Setting of SNL Agriculture" – V. Watson.
1983	"Draft Animal Utilization and Management on SNL: Trends, Prospects and Recommendations." – V. Watson, *et al.*
1984	"Phophonyani Irrigation Scheme: A Case Study of Emergent Cash Cropping on SNL" – V. Watson.
1984	"Economic Circumstances of SNL Homesteads." – R. Freund and B. Maphalala.
1985	"Current Situation of Agriculture and Methods of Research in Swaziland." – J. Curry.

General Status: Complete.

Activity: 1983 "Farming Systems on SNL: Results of the Extension Field Officer Survey." – V. Watson; reported in 82-83 Annual Report. *Status:* Complete.

1983-1986 Formulation of recommendations based on on-farm trial results farmers' assessments, etc. procedure noted in Freund's End of Tour Report in 83-84 Annual Report. *Status:* incomplete.

1986-1988 Analysis of Survey and On-Farm Trial data to refine recommendation domains outlined in Watson and in 82-83 Annual Report. *Status:* incomplete.

General Status: Since the formulation of recommendation domains is both a research heuristic and an iterative process, this activity is by its very nature in an incomplete status. However, the project has taken steps to institutionalize this process through its OFT and informal survey programs. Attempts will be made to make such recommendation domains as exist more specific as client groups for extension workers in the dissemination phase.

Activity: Livestock Consultancy – *Status:* Complete.

Activity: 1983– Design of farmers' assessment questionnaires; continuous process; *Status:* incomplete.

1984-1986 Labor and input survey to monitor cooperator homesteads; see description under Objective 1, Sub-objective 1. *Status:* incomplete.

1986-1987 Dietary and expenditure surveys to monitor cooperator homesteads; see description under Objective 1, Sub-objective 1. *Status:* incomplete.

General Status: Since On-Farm Research is an ongoing process, all activities under this objective should be considered as incomplete.

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APPENDIX B

SHORT-TERM CONSULTANTS
CSRET PROJECT

APPENDIX B

Short-term Consultants who have worked with Swaziland Cropping Systems Research and Extension Training Project, AID Contract No. AFR-0212-C-00 from March 26, 1982 to March 15, 1987.

1/82	C. Terry Morrow	April 24–May 9, 1982	Computer Technology
2/82	William Grisley	June 17–July 15, 1982	Agricultural Economist
3/82	Robert Bealer	June 24–July 22, 1982	Horticulture
4/82	Evelyn Fancher	August 24–Sept. 19, 1982	Librarian (TSU)
5/82	Donald Daum	Sept. 14–Nov. 10, 1982	Agricultural Engineer
1/83	McDawson Burton	January 1–Feb. 3, 1983	
2/83	Terry Morrow	May 29–June 17, 1983	Computer Technology
4/83	Marshall Ritter	July 13–August 20, 1983	Pomologist
1/84	Wayne Schutjer	January 5-25, 1984	Ag. Econ./Rural Soc.
2/84	Donald Daum	Feb. 22–March 31, 1984	Agricultural Engineer
3/84	Richard Fox	July 4–August 18, 1984	Soils Agronomist
4/84	Clive Harston	Sept. 13-October 3, 1984	Policy Advisor
1/85	Doyle Grenoble	Dec. 26, 1984–Jan. 17, 1985	Horticulturist
2/85	Joseph McGahen	Jan. 6–Feb. 14, 1985	Agronomy Extension
3/85	Harry Carey	March 25-April 21, 1985	Communications
4/85	John Fischer	April 16–25, 1985	Policy Advisor
5/85	David Reicosky	May 21–June 6, 1985	Statistician (USTAT)
6/86	David Redgrave	April 7-21; May 20–July 7, 1985	Irrigation
7/85	Glen Easter	July 7–August 19, 1985	Extension Training
8/85	Rebecca Huss-Ashmore	July 24-August 25, 1985	Nutritionist
9/85	Roy Hapster	August 7–Sept. 11, 1985	Communications
10/85	Crispin Pemberton-Pigot	October 1-15, 1985	Ag. Mechanization
1/86	Rebecca Huss-Ashmore	July 24–August 25, 1986	Nutritionist
2/86	Brian Scully	Dec. 31–Jan. 25, 1986	Pomologist
3/86	Wayne Schutjer	April 6–16, 1986	Ag. Econ./Rural Soc.
	Shannon Stokes	April 6–16, 1986	Rural Sociologist
4/86	Doyle Grenoble	May 7–25, 1986	Horticulturist
5/86	James Rosenberger	May 25–29, 1986	Statistician
6/86	Edgar Yoder	May 20–June 23, 1986	Extension Training
7/86	Will Getz	June 2–July 5, 1986	Livestock Consultant (Winrock)
	Barbara Grandin	June 2–July 5, 1986	Livestock Consultant (Winrock)
8/86	Rebecca Huss-Ashmore	June 5-July 23, 1986	Nutritionist
9/86	James Diamond	July 18–August 5, 1986	Extension Training
10/86	Roy Hapster	July 16–August 15, 1986	Communications
11/86	William Grisley	August 17–October 8, 1986	Ag. Economist

12/86	Robert Crassweller	October 20-Nov. 25, 1986	Pomologist
13/86	William Shuffstall	October 28–Nov. 25, 1986	Computer Technology
14/86	John Malone	Nov. 3–Dec. 11, 1986	Marketing
1/87	Donald Daum	March 13–April 14, 1987	Agricultural Engineer
2/87	Peter Ferretti	March 13–April 14, 1987	Small Fruit Horticulturist

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APPENDIX C

PARTICIPANT TRAINING IN THE SWAZILAND CSRET PROJECT

APPENDIX C

PARTICIPANT TRAINING IN THE SWAZILAND CROPPING SYSTEMS RESEARCH AND EXTENSION TRAINING PROJECT

Benedict Bhembe

North Carolina State University
M.S. – Entomology
August 10, 1985 – Present

Benedict arrived in the U.S. on August 10, 1985 to begin a graduate (M.S.) program in entomology at North Carolina State University. He was serving as a Research Officer, Entomology, at the Lowveld Agricultural Station. Upon completion of his training, he will return to the Station as an Entomologist.

Benedict's major academic advisor is Dr. J. R. Bradley, Department of Entomology, North Carolina State University.

Agrippa Dlamini

The Pennsylvania State University
M.Agr. – Agricultural Engineering
August 10, 1985 – Present

Agrippa arrived in the U.S. on August 10, 1985 to begin a graduate program in agricultural mechanization at Penn State. Agrippa was serving as an Agricultural Officer in the Crops Section of the Swaziland Ministry of Agriculture and Cooperatives (MOAC). He will return to that position at the completion of his training.

Agrippa's major academic advisor is Mr. David Beppler, Associate Professor of Agricultural Engineering.

Douglas Gama

The Pennsylvania State University
M.S. – Horticulture
August 13, 1983 – July 27, 1985

Douglas arrived in the U.S. on August 13, 1983 to begin his M.S. program in Horticulture at Penn State. He completed his program and returned to Swaziland on July 27, 1985. Prior to his departure for Swaziland, he spent two weeks (July 7-25) at the University of Florida for Farming Systems Research and Extension Training. He is now SRO – Horticulture at Malkerns Research Station.

Dr. Ernest Bergman, Professor of Plant Nutrition, served as Douglas' major academic advisor.

Thesis: Soil Magnesium x Potassium Interrelationships in Pepper (Capsicum annum L.).

Donald Hlophe

The Pennsylvania State University
M.Ed. – Agricultural and Extension Education
August 13, 1984 – November 27, 1985

Donald arrived in the U.S. on August 12, 1984 to begin his Master of Education program in Agricultural and Extension at Penn State. Donald attended a Farming Systems Research and Development Short Course at the University of Florida for the period of September 10-13, 1985. He completed his program and returned to Swaziland on November 27, 1985. He presently serves as an Information Specialist with the Swaziland Ministry of Agriculture and Cooperatives.

Donald's major academic advisor was Dr. Dennis Scanlon, Assistant Professor, Agricultural and Extension Education.

Thesis: A Communications Strategy for Agricultural Extension Education in Rural Development Areas of Swaziland.

Zodwa Mamba

Tennssee State University
M.Sc. – Agronomy
August 18, 1984 – May 16, 1986

Zodwa arrived in the U.S. on August 18, 1984 to begin a graduate (M.Sc.) program in agronomy at Tennessee State University. She was a Research Officer at the Malkerns Research Station. Zodwa received Farming Systems Training at the University of Florida during the period of May 4-9, 1986. At the completion of her training, she departed for Swaziland on May 16. She has returned and is the Dryland Agronomist stationed at the Malkerns Experiment Station.

Zodwa's major academic advisor was Dr. Kenneth J. Hillsman, Head, Department of Plant Science, Tennessee State University.

Basil Maphalala

The Pennsylvania State University
M.Agr. – Agricultural Economics
August 13, 1984 – June 7, 1986

Basil arrived in the U.S. on August 13, 1984 to begin his graduate program in agricultural economics at Penn State. Basil was a Farm Management Economist at the Agricultural Research Station. Due to poor academic performance, Basil was dropped from his academic program at the end of Spring 1986 Semester. He departed for Swaziland on June 7, 1986.

Basil's major academic advisor was Dr. William Grisley, Assistant Professor of Agricultural Economics.

Themba Masuku

University of Missouri
M.Sc. – Agricultural Irrigation
December 24, 1982 – January 4, 1984

Themba was transferred to the contract's program following an undergraduate program sponsored by USDA. As part of his training, he observed and studied various irrigation systems at the Colby Experiment Station, Kansas River Valley Experimental Field. He is now working on a pineapple project at Malkerns.

Sebenzile P. Matsebula

The Pennsylvania State University
M.Sc. – Agricultural and Extension Education
August 22, 1982 – June 30, 1984

Sebenzile arrived in the U.S. on August 22, 1983 to begin her Master's program in Agricultural Education/Biometrics. She completed her program on June 30, 1984 and returned to Swaziland on July 25, 1984. She is now employed at Malkerns Research Station as a biometrician.

Dr. James Mortensen, Associate Professor, Agricultural Education, served as her academic advisor.

Thesis: Guidelines to Identifying Priorities in Agricultural Research in Production Farming for the Small Farmer in Swaziland.

Elliot B. Mavimbela

North Carolina State University
M. Agr. – Crop Science
June 7, 1983 – August 5, 1984

Elliot was transferred to the contract's program following undergraduate training sponsored by USDA. Dr. William Fike, Department of Crop Science, North Carolina State University, served as his major academic advisor. He is now employed by the sugar industry in Swaziland.

Job Mavuso

The Pennsylvania State University
M.Agr. – Dairy Science
August 10, 1985 – March 30, 1987

Job arrived in the U.S. on August 10, 1985 to begin his graduate program (M.Agr.) in dairy science at Penn State. Job was serving as the Animal Husbandry Officer (Dairy Production) with the MOAC. He has recently returned and will resume those duties.

Job's major academic advisor was Dr. Paul Shellenberger, Professor of Dairy Science.

Themba Mavuso

Tennessee State University
B.Sc. – Horticulture
January 3, 1983 – May 5, 1985

Themba arrived in the U.S. on January 3, 1983, to begin work on his undergraduate program in horticulture at Tennessee State University. Themba completed his program and graduated

with highest distinction and as a University Scholar on May 4, 1985. He has returned to his position with the Swaziland Ministry of Agriculture and Cooperatives.

Dr. Kenneth Hillsman, Head, Department of Plant Science, served as his major academic advisor.

Paul Mkhatshwa	University of Georgia M.Sc. - Agronomy September 6, 1982 – February 9, 1985

Paul arrived in the U.S. on September 6, 1982, to begin his graduate program in agronomy at the University of Georgia. He attended a Farming Systems Research and Development Short Course at the University of Florida during the period of February 4-8, 1985. Paul completed his Master's program and returned to Swaziland on February 9, 1985. He returned to his position with the Swaziland Ministry of Agriculture and Cooperatives at the Malkerns Research Station.

Dr. Carl Hoveland, Professor of Agronomy, University of Georgia, served as his major academic advisor.

Thesis: Nitrogen Fixation by Sericea Lespedeza and Nitrogen Transfer to Associated Grasses.

M. Petros Mtshali	The Pennsylvania State University M.Sc. – Entomology August 22, 1982 – August 30, 1983

Petros arrived in the U.S. on August 22, 1982 to begin graduate studies in entomology at Penn State. He was dropped from his academic program on August 31, 1983, due to poor academic performance and has never returned to Swaziland.

Dr. Charles Rutschky, Professor of Entomology, served as his academic advisor.

Magalela Ngwenya	The Pennsylvania State University M.S. – Agronomy August 14, 1983 – September 20, 1985

Magalela arrived in the U.S. on August 14, 1983 to begin his graduate program in agronomy at Penn State. He attended farming systems training at the University of Florida and visited the International Fertilizer Development Center in Muscle Shoals, Alabama. He completed his Master's program and returned to Swaziland on September 20, 1985. He is now working for the MOAC in Mbabane.

Dr. Leon Johnson, Professor of Agronomy, served as his major academic advisor.

Thesis: Evaluation of Mehlich No. 3 Extractant to Determine the Fertility of K, Ca, and Mg in some Pennsylvania Soils.

APPENDIX D

MOAC SHORT-TERM AND LONG-TERM TRAINING

APPENDIX D

MOAC SHORT-TERM AND LONG-TERM TRAINING (1986)

Training Section Annual Report 1986
Short-Term Training (87 Individuals) *CSR/E Funded

1. Diploma Course in Project Planning and Management – 6 months – Zambia – 3-2-86 to 29-8-86:
   - Joshua Mkhonta.

2. Rural Community Development (with special reference to youth) – Israel – 12-1-86 to 14-4-86:
   - Thamsanqa Mpanza.

3. Agricultural Engineering Technical Course – 18-3-86 to 28-4-86 – Kenya:
   - Reuben Myeni.

4. Regional Training Course for Personnel and Training Management – 17-3-86 to 25-4-86 – Botswana:
   - Margaret Mabuza
   - Nqaba Maseko
   - Richard Ndlovu.

5. SADCC/ICRSAT Sorghum and Millet Improvement Training Course – 24-3-86 to 20-4-86 – Zimbabwe:
   - Meshack Mthethwa
   - Themba Nxumalo.

6. FAO Regional Training Course for Meat Inspectors and Slaughterhouse Personnel – 14-4-86 to 12-8-86 – Botswana:
   - Vusie Msibi
   - Simon Jele.

7. Course on Aquaculture and Extension – 5-5-86 to 7-7-87 – Israel:
   - James Dlamini.

8. Management of Information Systems on African Food Security Training Course 7-4-86 to 7-5-86 – Malawi:
   - Nonhlanhla Thwala.

9. Regional Seminar on Early Warning – 12-5-86 to 16-5-86 – Zimbabwe:
   - Arthur Simelane
   - Chazile Magongo.

10. Course on Training of Trainers in Agricultural Extension – 10-4-86 to 30-5-86 – Zimbabwe:

- Carol Malima
- Thomas Sukati.

*11. Organisation and Management of Agricultural Extension Services – 16-6-86 to 17-7-86 – U.S.A.:

- David Dlamini
- Bernard Kunene.

*12. Training of Trainers for Agriculture and Rural Development – 16-6-86 to 11-7-86 – U.S.A.:

- Jeremia Hlatshwayo.

*13. Development and Operation of Agricultural Extension Programmes – 9-6-86 to 8-8-86 – U.S.A.:

- Reuben Nxumalo.

14. FAO Study Fellowship for Seed Multiplication Unit Staff – 1-8-86 to 30-9-86 – Zambia:

- Jeremia Maseko.

15. Workshop in Advanced Management and Planning for Agricultural – 25-8-86 to 24-9-86 – Israel:

- Cowen Vilakati.

16. Workshop on the Potential of Small Ruminants – August 18-22, 1986 – Kenya:

- Sanele Dlamini.

17. Training of Grain Storage – 14-7-86 to 25-7-86 – Zimbabwe:

- Victor Hlatshwayo
- Sipho Dlamini
- Raphael Dlamini
- Manqoba Shongwe
- Thomas Maseko.

18. Seed Quality Control and Seed Pathology – 25-8-86 to 5-9-86 – Kenya:

- Sipho Simelane.

19. Planning and Appraisal of Agronomy Industrial Projects – 22-9-86 to 31-12-86 – England:

- Nomsa T. Dlamini.

20. Training of Management Educators Course – 15-9-86 to Mid November 1986 – Botswana:

- Nonhlanhla E. Kunene.

21. Heating Water Technical Workshop – September 7, 1986 – RSA:
    - Dr. Jabula Dube
    - Benson Zwane.

22. FAO Study Fellowship for Seed Multiplication Unit Staff – 1-10-86 to 28-11-86 – Malawi:
    - Gideon Sithole.

23. Financial and Management Accounting – 16-10-86 to 29-10-86 – Malawi:
    - Alfred Mashwama
    - Lojiba Dlamini.

24. Train the Trainers Africa 86 – 27-20-86 to 14-11-86 – Zambia:
    - Phillip Shabangu.

25. Farming Systems Workshop – September 1986 – Zimbabwe:
    - Paul Mkhatshwa
    - Douglas M. Gama
    - Michael M. Nxumalo.

26. Project Planning and Management Effective Communication – 20-10-86 to 12-12-86 – Zambia:
    - Josephine M. Zwane.

27. Introduction and Evaluation Forages – October 1986 – Zambia:
    - James Sangweni
    - Steven Zuke.

28. Irrigation and Soil Management – 27-10-86 to 23-12-86 – Israel:
    - Brenda Dlamini.

29. Cowpeas and Soybean Research and Production Technology – 13-10-86 to 5-12-86 – Nigeria:
    - Norman Simelane.

30. Training Seminar in Crop Culture and Vegetable Culture – 6-26-10-86 and 4-23-5-86 – China:
    - Maqhawe Shongwe
    - Wellington Mkhalipi.

31. Workshop on the Conservation of Plant Genetic Resources – 22-24-9-86 – Zambia:
    - Zodwa Mamba.

32. Third Annual Regional Workshop – 6-10-10-86 – Zambia:
    - Paul D. Mkhatshwa
    - Zodwa Mamba
    - Michael Nxumalo.

33. Training Workshop in Audit Manual and Act. Circulars – 4-10-86 – Kenya:
- Elias Shabangu.

34. Seminar on Training and Manpower Resource Development – 3-12-10-86 – Malawi:
- Sinaye Mamba
- Noah Nkambule.

35. Course on Forage Plant Introduction – 20-31-10-86 – Ethiopia:
- Paul D. Mkhatshwa
- Brenton Xaba.

*36. Diploma in Personnel Management Programme – January 1986 – U.S.A.:
- Rodgers Matsebula.

37. Training Workshop for Policy Makers – 13-10-86 to 28-1-86 – UK:
- Jack L. Mbingo.

38. Training on Better Work Methods – 6-10-86 to 31-10-86 – (IDM) Swaziland:
- Alice Dlamini
- Dumisani S. Sihlongonyane.

39. Study Session on Agroforestry in Arid and Semi-zones – 18-11-86 to 17-12-86 – Israel:
- Mthunzi P. Dlamini.

40. Data Collection and Analytical Techniques – 10-11-86 to 22-11-86 – Ethiopia:
- Samuel Dlamini
- Senbenzile Matsebula.

41. Techniques for Seed Gene-Banks – December 13, 1986 – Ethiopia:
- Manasah S. Mkhabela.

42. SADCC Agricultural Marketing Training Workshop – 24-28-11-86 – Malawi:
- Sam S. Hlophe
- Patrick K. Lukhele.

43. Strategy Training Workshop – 11-13-11-86 – Malawi:
- James Dlamini
- Solomon Khumalo.

44. Training Workshop on Small, Stock, Dairy, and Pig/Poultry Production – March 24-27, 1986 – Maseru:
- Sanele Dlamini
- Aubrey Shongwe
- Joseph Mavuso.

45. Workshop on Agricultural Irrigation – 10-13-11-86 – Pretoria:
- Petros Dlamini.

46. Agricultural Policy Planning – 1-6-12-86 – Mauritus:
- Nonmathemba Dlamini.

47. SADCC Extension Visit to Botswana and Lesotho – 1-6-12-86 and 8-12-12-86:
- Clifford Manana
- George Ndlangamandla.

48. SADCC Fisheries Management Workshop Phase II – 1-6-12-86 – Tanzania:
- James Dlamini
- Solomon Khumalo.

49. Training Workshop on Methods and Techniques of Evaluation – Malawi:
- Samuel Dlamini.

50. Agriculture Business Management Programme – 9-1-86 – U.S.A.:
- Patrick K. Lukhele.

*51. Administration/Supervision – 1986 – U.S.A.:
- R. Shabalala.

52. Intergraded Rural Regional Development Planning – 4-4-86 – Israel:
- Sinaye Mamba.

53. Sample Survey in Agriculture and Rural Development – 4-7-86 - UK:
- S. S. Hlophe.

54. On Information Services Improvement – 20-2-86 – SD:
- Donald K. Hlophe.

55. Management Development Programme – 6-1-86 to 12-3-86 – MAMC:
- Edward Bhembe.

56. Management of Irrigation Projects – 24-3-86 to 18-4-86 – MAMC:
- Robert Zikalala.

57. Food Policy Management – 5-30-5-86 – MAMC:
- Christabel Motsa.

58. Agricultural Management in Southern Africa – 6-10-86 to 17-12-86 – MAMC:
- Themba Zibuko.

Officers on Long-Term Training – 1986
(18 Individuals) *CSR/E Funded

1. M.Sc., Plant Breeding – 14-9-86 to 1988 (24 months) – UK:
   - Nonjabulo Zwane.

2. M.S., Agricultural Economics – 8-8-86 (24 months) – U.S.A.:
   - Nonhlahla Thwala.

3. B.S., Food Science – 8-8-86 (36 months) – U.S.A.:
   - Khanyisile Mabuza.

4. M.S., Agronomy – 8-8-86 to 1988 (24 months) – U.S.A.:
   - Meshack Mkhonta.

5. Agricultural Engineering – October, 1986 (24 months) – West Germany:
   - Jabulani Mamba.

6. Diploma Training in Forestry – October 1986 – Ghana:
   - Robert Khumalo.

7. M.A. (Economics) Training Programme – Manchester:
   - Jerome Ndzinisa.

8. M.Sc., Irrigation – 1986 – UK:
   - Reuben Myeni.

9. Bachelor of Veterinary Medicine – 4-3-86 – Harare-Zibabwe:
   - Bernard Dlamini
   - Dumisani Dlamini
   - Mathobela Dlamini
   - Mbusi Dlamini.

10. B.Sc., Veterinary Medicine – 1986 – Australia:
    - Patrick Hlatshwayo.

11. B.Sc., Agriculture – August, 1986 – Luyengo - UNISWA:
    - Sipho Nxumalo.

12. Diploma/Masters in Agricultural Economics – 28-9-86 to 1988 – UK:
    - Victor Sipho Mhlongo.

*13. M.Sc., Vegetable Crops/Horticulture – December 29, 1986 – U.S.A.:
    - Themba Mavuso.

14. Diploma in Forestry – September, 1986 – Cyprus:
    - Wilson Lukhele.

15. B.Sc., Agriculture and Education, Entomology – 24-4-86 – U.S.A.:
    - Leonard Sibandze.

APPENDIX E
PUBLICATION LIST

APPENDIX E

PUBLICATION LIST
OCTOBER 1, 1985 to SEPTEMBER 30, 1986

INFORMATION SECTION, MINISTRY OF AGRICULTURE AND COOPERATIVES
MBABANE, SWAZILAND

1. Grenoble, D., Dunn, and Sithole, 1984. Cabbage Production – Extension Fact Sheet. 4 pp. (Reprint .5M886)

2. Grenoble, D., Sithole, and Dunn, 1984. Beetroot and Swiss Chard (Spinach) Production – Extension Fact Sheet. 4pp. (Reprint .5M886)

3. Grenoble, D., and D. Sithole, 1984. Onion Production – Extension Fact Sheet. 4 pp. (Reprint .5M886)

4. Grenoble, D., and D. Sithole, 1984. Tomato Production – Extension Fact Sheet. 4pp. (Reprint .5M886)

5. Dunn, Gale, 1985. Determining Soil Moisture by Feel – Extension Fact Sheet. 2 pp. (Reprint .5M886)

6. Weddle, B. H., and R. H. Matsebula, 1985. Train and Visit Extension. 1 p. (1M1085)

7. Weddle, B. H., and R. H. Matsebula, 1985. Kufundzisa Ngekuvakashela. 1 p. (1M1085)

8. Mpanza, T., 1985. 4-S Programming Through 1995. 1 p. (.4M1085)

9. Bevacqua, R. F., and D. Sithole, 1985. Citrus Production Guide. 8 pp. (1M1185, Reprint 1M586)

10. Nkwanyana, C. T., 1985. Swaziland Agricultural Research. 8 pp. (.75M1185)

11. Hayes, K. G., and others, 1985. Swaziland Cropping Systems Research and Extension 1984-85 Annual Report. 550 pp. (.05M1185)

12. Mavuso, T. E., and R. F. Bevacqua, 1985. Mango Production Guide. 12 pp. (1M1285)

13. Weddle, B. H., and R. H. Matsebula, 1985. Increase Your Yields and Safely Store Your Crops. 1 p. (.4M1285)

14. Weddle, B. H. and R. H. Matsebula, 1985. Khulisa Sivuno Sakho Uphindze Usigcine Kahle. 1 p. (.4M1285)

15. Weddle, B. H., 1986. Using Your Pace Coefficient For Field Measurements – Field Support Guide FSG 61. 4pp. (.5M286)

16. Mamba, H. S., and Swaziland Ministry of Agriculture and Cooperatives, 1986. MOAC Agricultural Tour – Shiselweni Region (February, 1986). 8 pp. (2.5M286)

17. Marquardt, M., 1986. Enumerator Land Tenure Survey Forms. 18 pp. (.55M286)

18. Gama, D. M., and R. F. Bevacqua, 1986. Pineapple Production Guide. 16 pp. (1M386)

19. Bhekempi, Hon. Prime Minister, 1986. The Coronation Address by his Excellency, the Prime Minister Prince Bhekempi. 4 pp. (.5M486)

20. Bhekempi, Hon. Prime Minister, 1986. Inkhulumo Yandunankhulu Minister Bhekempi. 4 pp. (.5M486)

21. Mswati III, His Majesty the King, 1986. The Coronation Address by His Majesty the King. 4 pp. (.5M486)

22. Mswati III, His Majesty the King, 1986. Inkhulumo Vengwenyama. 4 pp. (.5M486)

23. Simelane, N. E., and Ben-Yahuda, 1986. Broiler Production Guide. 24 pp. (1M486)

24. Doyle, P., 1986. Non-Seasonal Loans for Farmers – Field Support Guide FSG 62. 10 pp. (1M586)

25. Weddle, B. H., 1986. Regional Extension Training Planning Calendar. 1 p. (.2M586)

26. Simelane, N. E. and Ben-Yahuda, 1986. Layer Production Guide. 24 pp. (1M686)

27. Doyle, P., 1986. Seasonal Loans for Farmers – Field Support Guide FSG 63. 10 pp. (1M686)

28. Nkwanyana, C. T., J. Pali (Editor), and others, 1986. Swaziland Agricultural Research, 1983-84 Annual Report. 184 pp. (.3M686)

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SUMMARY:

During the fiscal year of October 1, 1985 through September 30, 1986, approximately 426,000 impressions were printed on the above topics (numbers 1 through 38) in the Information Section. Of these, approximately 211,000 were printed on the new press in the final four months of the reporting period.

PUBLICATION LIST
BEGINNING OCTOBER 1, 1985

1. Seubert, C., 1986. Ox Plough Adjustment – Field Support Guide FSG 64. 8 pp. (1M1086)

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9. Swaziland Ministry of Agriculture and Cooperatives, 1986. Preparation of Tobacco Seedbeds. 10 pp. (.05M1186)

10. Weddle, B. H., 1986. Motivation...A Key to Becoming a Successful Extension Worker – Field Support Guide FSG 66. 16 pp. (.5M1186)

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13. Hayes, K. G., and others, 1986. Swaziland Cropping Systems Research and Extension 1985-86 Annual Report, Volume III – End-of-Tour Reports of Consultants and Team Members. 242 pp. (.05M1286)

14. Crassweller, R., Grenoble, D. and D. Gama, 1986. Budding and Grafting Apples and Peaches to New Cultivars – Field Support Guide FSG 67. 6 pp. (1M1286)

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18. Seubert, C., 1986. Nitrogen Topdressing of Maize – Field Support Guide FSG 71. 14 pp. (2M1286)

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21. Swaziland Ministry of Agriculture and Cooperatives, 1986. Agriculture Extension Service Rural Development Area Programme Monthly Report (April, 1986), Volume 5, Number 4. 14 pp. (.06M1286)

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24. Swaziland Ministry of Agriculture and Cooperatives, 1986. Agriculture Extension Service, Estimation of Outputs (Maize and Cotton). 38 pp. (.3M1286)

25. Swaziland Ministry of Agriculture and Cooperatives, 1986. Agriculture Extension Service, Crop Record Book. 10 pp. (.2M1286)

26. Swaziland Ministry of Agriculture and Cooperatives, 1986. Swaziland Dairy Board 1984 Annual Report. 16 pp. (.08M1286)

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32. Swaziland Ministry of Agriculture and Cooperatives, 1987. Soya Bean Stew Recipe, Malkerns Research Station Field Day. 1 p. (4M0187)

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39. Flory, B., 1987. Advanced Farmer Survey, Part One – Additional Pages and Inserts. 9 pp. (.1M0287)

40. Motsa, C., 1987. Designing Training Modules and Materials for Zenzele Associations, Baseline Study Questionnaire. 15 pp. (.3M0287)

41. Swaziland Ministry of Agriculture and Cooperatives, 1986. Agriculture Extension Service, Rural Development Area Programme Monthly Report, Volume 5, Number 6 (June, 1986). 12 pp. (.1M0287)

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65. Swaziland Ministry of Agriculture and Cooperatives, 1987. Extension Teaching Workshop, March 23-27, 1987 (Program). 2 pp. (.051M0387)

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67. Swaziland Ministry of Agriculture and Cooperatives, 1987. Extension Train and Visit Message – Teaching Plan. 2 pp. (31M0387)

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69. King, John, 1987. Trainers Manual for Developing a Human Resources Planning Process. 52 pp. (.05M0387)

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APPENDIX F
EXTENSION MOBILITY

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EXTENSION MOBILITY

With transportation and mobility of the Extension staff being a major constraint, the following proposal is offered as a possible solution.

The present staff in Extension is large and consists of about 250. This will include various grades and specialists. These positions are distributed approximately as follows:

National and Regional Subject Matter Specialists	20
Project Managers	8
Extension Officers	19
Extension Workers (Generalists)	166
Extension Workers (Specialists)	39
Total	252

The ratio of Extension Worker to farmer is about 1:260 and the designed T&V ratio was 1:200 Extension Workers to farmers contacted on a fortnightly basis. This optimistically presumes that the EW will contact 25 farmers each day on a 4 day/week basis. Supposedly there are three meetings per day for each EW. These farms in the SNL are well scattered and the EW is expected to walk to these farms which will require up to six hours daily of walking. The waste of time and energy in walking from site to site and the paucity of rural transport strongly suggests that many of the scheduled meetings are not kept and the extension message is not being relayed. Farmers are not willing to travel long distances to attend meetings which are delayed or not held during their busy working season.

Consequently, if fewer EWs were made mobile and the time devoted to walking were spent in farmer contact then the delivery system would be more effective and economical. The savings in salaries and allowances could be used to fund travel and mileage allowances. Either motorcycles of rugged construction such as trail bikes or the three wheel all terrain vehicles (ATV) could provide such mobility. Loans could be made to the EWs for purchase of these vehicles so that maintenance and repair are the responsibility of the individual EW vehicle owner. USAID or other donors could be asked to provide the foreign exchange to create the revolving fund for such vehicles. Once the fund was established with about $120,000 it would become a permanent source of revolving funds for replacement vehicles.

A similar arrangement could be made for the more senior staff to acquire loans to purchase small pick-up trucks to be used in their official duties. Conversations with the Extension staff have confirmed the need for transport and their willingness to incur indebtness and assume ownership and provide their own transport for official duties. This is not a new concept and has been recommended many times by various project designers and reviewers. The initial cost to MOAC for creating the fund and providing the recurring compensation for official travel would create a financial obligation far beyond its present budget for Extension Travel.

The reduction in force (RIF) that is proposed would provide limited funds on a recurring basis for travel allowances. The problem then becomes one of having a RIF without disrupting the staff and creating hardships.

If 50 workers could be convinced of leaving the Extension Services when the EWs are made mobile then the staff would be roughly reduced by 20%. The RIFed workers could leave with some sort of direct financial compensation, but then their knowledge and skills would be largely lost to the rural sector. If, however, they could be induced to enter into the private sector, supporting agriculture there would be no major loss of their talents and at little or no cost to the GOS.

For instance, if these discharged workers were given the choice to remain in service or alternatively under the private sector with free or subsidized tractors for plowing, feed mills, poultry operations, dairy operations they would not suffer any personal hardships and would still remain in the agricultural sector relaying their knowledge and services at no cost to GOS.

There needs to be a more detailed study and a proposed plan for increasing mobility of Extension staff and if a RIF is made, then it should be made as painless and profitable as possible.

Leonard Nsibande

Tennessee State University
B.Sc. – Plant Science
May 26, 1986 – Present

Leonard arrived in the U.S. on May 26, 1986 to begin his undergraduate program in plant science at Tennessee State University. He worked for the Seed Multiplication Program at the Malkerns Research Station. Following his training, he will serve as the Research Entomologist for the Malkerns Research Station.

Edgar Nxumalo

Tennessee State University
B.Sc. – Agronomy
August 30, 1983 – September 24, 1986

Edgar arrived in the U.S. on August 30, 1983 to begin his undergraduate program in agronomy (soil science) at Tennessee State University. He was the laboratory technician (chemistry section) with the MOAC. Upon completion of his training, he returned to Swaziland to supervise the Soil Chemistry section at the Malkerns Research Station. Edgar received Farming Systems Training at the University of Florida during the period of May 4-9, 1986.

Samson Nxumalo

The Pennsylvania State University
B.Sc. – Agricultural Mechanization
August 13, 1983 – June 30, 1985

Samson arrived at Penn State on August 13, 1983 to begin his undergraduate program in agricultural mechanization. His academic program was terminated on June 30, 1985, due to poor academic performance. He is now working on mechanization for MOAC.

Dr. James Hilton, Associate Professor of Agriculture Engineering, served as his major academic advisor.

Arthur Simelane

Tennessee State University
B.Sc. – Agronomy
January 3, 1983 – August 10, 1985

Arthur arrived at Tennessee State on January 3, 1983 to begin his B.Sc. degree in agronomy. He completed his training and returned to Swaziland on August 11, 1985. He is now working in Seed Multiplication at Malkerns.

Dr. Kenneth Hillsman, Head, Department of Plant Science, served as his major academic advisor.

Funekile G. Simelane

The Pennsylvania State University
M.Sc. – Rural Sociology
August 22, 1982 – May 25, 1984

Funekile arrived at Penn State on August 22, 1982 to begin her Master's program in Rural Sociology. She completed her program and returned to Swaziland on May 25, 1984.

Dr. Robert Bealer, Professor of Rural Sociology, served as her major academic advisor.

Thesis: Some Socio-Economical Constraints to Agricultural Production Among Small Farmers in Swaziland.

Jameson Dlamini — University of Missouri – USDA Course
June 4 – August 19, 1984

Jameson attended the USDA Course, Development and Operation of Agricultural Extension Program, at the University of Missouri for the period of June 4 – August 10, 1984. Following the course, he visited the Penn State campus for a week (August 11-19) to meet with University and extension personnel prior to his return to Swaziland. Jameson is a Senior Extension Officer of the Manzini District in the Swaziland Ministry of Agriculture and Cooperatives.

Paul Dlamini — University of Wisconsin – USDA Course
August 28 – November 15, 1985

Paul attended the USDA Course, Development Operation of Agricultural Extension Programs, at the University of Wisconsin for the period of August 28 – November 7, 1985. Following the course, he visited the Penn State campus for a week (November 8-15) prior to his return to Swaziland Ministry of Agriculture and Cooperatives at the Lubombo Extension District.

Sitsembile Kunene — Pennsylvania State University
Plant Pathology
June 13 – September 15, 1983

Sitsembile attended a short course in plant disease diagnosis at Penn State. Her program was under the supervision of Dr. John Skelly, Head, Department of Plant Nutrition. Following her program, she returned to her duties with the Ministry of Agriculture and Cooperatives at the Malkerns Research Station.

Rogers H. Matsebula — University of Connecticut – Short Course
January 2, 1986 – July 1986

Rogers arrived in the U.S. on January 3 to attend two courses at the University of Connecticut: The Human Resource Management Program (January 6 – April 11, 1986) and the Fundamentals of Management Program (May 28 – July 12, 1986). Between courses, he received Farming Systems Training at the University of Florida during the period of May 4-9. He also spent a week visiting faculty at Tennessee State University (May 9-18) and Penn State (May 18-24). He is now working in MOAC, Mbabane.

Christopher Nkwanyana — Washington, D.C. – USDA Course
July 24 – September 14, 1985

Christopher is the Chief Research Officer at the Malkerns Research Station with the Swaziland Ministry of Agriculture and Cooperatives. He arrived in the U.S. on July 24, 1985 to attend a

USDA Course, Management of Agricultural Research, at George Mason University in Washington, D.C. Following this course, he visited Penn State during the period of September 6-14 to meet with officials in the College of Agriculture.

Reuben Nxumalo	University of Wisconsin – USDA Course June 2, 1986 – August 8, 1986

Reuben is the Senior Agricultural Officer for Extension with the Ministry of Agriculture and Cooperatives. He arrived in the U.S. on June 2, 1986 to attend the USDA Course, Development and Operation of Agricultural Extension Programs, at the University of Wisconsin in Madison. Following that course he visited Penn State.

Richard Shabalala	Washington, D.C. – USDA Course April 30, 1986 – July 4, 1986

Richard is the top personnel officer in the Ministry of Agriculture and Cooperatives. He arrived in the U.S. on April 30, 1986 to attend the Organizational and Management Development Course, held at George Mason University in Washington, D.C. The course was combined with the Management of Government Organizations and he was extended an additional two weeks. Following the course, Richard visited Penn State.

David M. Dlamini Bernard M. Kunene Jeremiah M. Hlatshwayo	University of Illinois, Urbana June 16, 1986 – July 11, 1986 (INTERPAKS)

Mr. Dlamini and Mr. Kunene are Senior Extension Officers and both were recently appointed to these posts. Mr. Hlatshwayo is the Extension Training Assistant. All are employed as officers of the Extension Service, Ministry of Agriculture and Cooperatives, Kingdom of Swaziland. All arrived in the U.S. on June 16, 1986 to attend the INTERPAKS Course designed to provide Administrators and Trainers with a clear understanding of the principles of leadership, management, and communications. All had an opportunity to visit Penn State prior to their return to Swaziland.