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FINAL EVALUATION

OF THE

SWAZILAND CROPPING SYSTEMS RESEARCH

AND

EXTENSION TRAINING (SCSRET) PROJECT

Submitted to:

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LIST OF ACRONYMS AND ABBREVIATIONS

ADO	Agricultural Development Officer
A.I.D.	Agency for International Development
ARD	Agricultural Research Division
BIFAD	Board for International Food and Agricultural Development
CAPM	Commercial Agricultural Production and Marketing Project
CIMMYT	International Center for Maize and Wheat Improvement
CDSS	Country Development Support Strategy
CIAT	Center for International Tropical Agriculture
COP	Chief of Party, Leader of a Technical Assistance Team Extension Officer
CSR/E	Cropping Systems Research and Extension
EOPS	End of Project Status, a Logframe Programming Term
EW	Extension Worker
FSR/E	Farming Systems Research and Extension
FSSP	The Centrally Funded Farming Systems Support Project
GOS	Government of Swaziland
IARC	International Agricultural Research Centers
ICRISAT	International Center for Research in the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IITA	International Institute for Tropical Agriculture
ILCA	International Livestock Center for Africa
INSORMIL	International Sorghum and Millet Program
IQC	Indefinite Quantity Contract
LOP	Life of Project
MOAC	Ministry of Agriculture and Cooperatives
MRS	Malkerns Research Station
NAMBoard	National Agricultural Marketing Board
NSMS	National Subject Matter Specialist
PACD	Project Anticipated Completion Date
PID	Project Identification Document
PP	Project Paper
RDA	Rural Development Area
RSA	Republic of South Africa
SACAR	South African Council for Agricultural Research
SADCC	Southern African Development Coordination Conference
SAO	Senior Agricultural Officer

SAO	Senior Agricultural Officer
SARCCUS	Southern African Regional Committee for Conservation and Utilization of Soil
SCSRET	Swaziland Cropping Systems Research and Extension Training Project
SEO	Senior Extension Officer
SMS	Subject Matter Specialist
SNL	Swazi National Land
SRO	Senior Research Officer
TA	Technical Assistant
TSU	Tennessee State University
T&V	Training and Visit (System)
UNISWA	University of Swaziland

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EXECUTIVE SUMMARY

A. Project Background

The Swaziland Cropping Systems and Extension Training (SCSRET) project, funded by the US Agency for International Development (A.I.D.), ran from April 1982 through August 1991. It was implemented under a contract with Pennsylvania State University, with Tennessee State University as collaborating subcontractor. The project was designed to be an institutional development project that utilized the Cropping Systems Research and Extension (CSR/E) methods to strengthen capacity within the Ministry of Agriculture and Cooperatives (MOAC) for research and extension targeted toward farm homesteads on Swazi National Land (SNL) rural areas. The nearly 10-year length of this project was unusually long by A.I.D. standards. However, the length was appropriate, considering the institutional development objectives of the project. Both in its objectives and in implementation, SCSRET was a complex project.

B. Purpose, Procedure and Scope of the Evaluation

This report constitutes the end of project evaluation of the Swaziland Cropping Systems Research and Extension Training (SCSRET) project. The evaluation was undertaken by a team mounted by Devres, Inc. The evaluation took place in Swaziland between June 22 and July 16, 1991, ending one month before the SCSRET Project Anticipated Completion Date (PACD) of August 20, 1991.

The project has been previously evaluated twice by external teams and has been the subject of one internal audit and several assessments. Following the second mid-term evaluation, the Project Paper (PP) was amended to extend the activity, refocusing inputs and implementation activities to enhance attainment of certain revised objectives.

With two prior mid-term evaluations on hand, the present evaluation team was instructed to concentrate on project performance during the 33 months since the PP amendment of August 12, 1988. However, a review of the project's prior history and performance was also required. As the evaluation unfolded, the team found it necessary to conduct a fairly thorough assessment of the first seven years of this ten year project in order to provide an adequate basis for findings relating to the last three years.

Observations, interpretations and conclusions included in this report are based on many sources of information. First, a wide range of documents were made available by A.I.D., the SCSRET project office and various offices in the Ministry of Agriculture and Cooperatives of the Swazi Government. Second, many individuals gave freely of their time for extensive discussions. A full list of individuals contacted in the course of the evaluation study is attached in Annex 2. In addition to office interviews and an extensive review of the literature, field trips were taken to two field locations for on-site discussions with farmers and extension field staff.

Using a method paralleling the "sondeo" of cropping systems research, most interviews were conducted in interdisciplinary pairs. The evaluation team met informally each evening and three times weekly in a more formal setting to compare observations and assessments. As the report developed, drafts and preliminary conclusions were discussed with Mission personnel in weekly briefing sessions. Upon completion of the field phase, written and oral reports were made to the Mission and the Ministry leadership and staff.

C. Findings and Conclusions

1. Summary of End of Project Status (EOPS) achievements

The project's life span was contemporaneous with many major changes in institutional capacity within MOAC. The Ministry is certainly a more mature agency today than it was in 1982. It is, today, delivering a great many more services than previously. The SCSRET project made a number of valuable contributions to this evolution. Most significant among them are:

- Institutional accumulation of human capital, including:
  - -- Academic concepts and professional/technical skills now incorporated in individual capabilities among a large number of MOAC staff;
  - -- Experimental learning-by-doing acquired through collaborative work with the expatriate team; and
  - -- Structural impacts of MOAC, including the development and staffing of the Agricultural Research Division, the Information Section, the Soils Laboratory, and the MOAC Library.
- Institutional processes and functions adopted, including:
  - -- On-farm trials and demonstrations;
  - -- Activity planning, primarily in extension;
  - -- Research-Extension interaction;
  - -- A flow of research recommendations and extension materials;
  - -- Professional linkages with International Agricultural Research Centers (IARC), Southern African Development Coordination Conference (SADCC) and other regional research institutions; and

- -- New or revitalized functional units within MOAC, e.g., Soils Laboratory, Information Section and Library.

- Farmer and extension worker exposure to new technology, including:

  - -- Diversified agronomic and horticultural experience;

  - -- Broader selection of improved varieties; and

  - -- New agronomic techniques.

The above listing of achievements, at least in its major headings, is presented in declining order of sustainability. The achievements listed last are at greatest risk of fading over time.

2. Life of project impedance factors

While the project achievements are impressive, the project's outcomes were limited by the presence over the life of the project of several generic constraints. First, project design did not reflect the situational realities of SNL farm homesteads. Nor did this situation improve much during project implementation. Second, CSR/E methods were never fully understood nor adopted as the core integrating philosophy or method. Third, certain deficiencies in the management and oversight by A.I.D. prevented mid-course corrections that would have been important. Finally, the Swazi institutional environment was incompletely understood and incompletely addressed. A formalized strategy for institutional change did not emerge.

3. Provision of inputs

The contractor did a generally excellent job of meeting quantitative requirements for input delivery. Specific examples include:

- The liberal and imaginative use of short-term technical assistance (TA);

- The contractor's responsiveness in adjusting the degree training program to reflect new needs as they were identified; and

- The timeliness of input delivery.

Input provision is summarized in Table 1 (page 7) and detailed in Annexes 4-A and 4-E.

On a less positive note, significant problems were noted in the selection of several long-term field team members, with respect to both professional qualifications and personal factors that are important to effective counterpart interaction. Fewer team members than desirable had an understanding of CSR/E or had long-term field experience in related Third

World settings. This factor both stemmed from, and reinforced, the lack of acceptance of CSR/E as the central core of the project.

4. Output achievement

Outputs achieved by the project are multiple and diverse. An extensive list is provided on pages 11-14. Output attainment was perhaps more visible with respect to the extension thrust than it was with research. In part, this reflects the fact that the project emphasized extension from 1987 until the point that this evaluation took place, while leadership and implementation of research initiatives was shifted to Swazi institutions three years ago. Output attainment suffered, in part, from the absence of the intended integrating core CSR/E method. For example, in research, trials remain largely commodity or technique specific and not holistic; research is performed in disciplinary fractionated ways; and research efforts are over-balanced to varietal testing as opposed to integrated crop practices and cropping systems. In extension, the on-farm system that governs adoption behavior is not well understood nor incorporated within extension methods. Further, the farmer is only marginally involved in the process, if at all.

5. Sustainability issues

Several important sustainability issues remain. These issues are detailed in the body of the report along with follow-up actions to enhance the longevity of SCSRET initiatives. In brief, sustainability faces the following issues:

- The supply of skilled persons trained by the project and now serving in MOAC is generally only one person. Further, significant incentives exist that could draw several of these individuals into other employment.

- The pipeline that might supply replacements is not only "empty", it does not exist at present. Linkages between MOAC and University of Swaziland (UNISWA) (Faculty of Agriculture) are essentially not-existent, to the detriment of both institutions.

- There has been only limited (often only promised) movement to adjust MOAC recurrent budgets to sustain activities initiated and supported by the project.

- Managerial skills within MOAC remain only partially developed. Further, the management environment is constraining and management resources are stretched to the limit.

- Other institutional constraints remain within MOAC. Probably the most important of these is the urgent need for reorganization along lines that will improve functional effectiveness.

6. EOPS Attainment

The End-of-Project Status (EOPS) contained in the SCSRET Logframe is specifically stated as: "The Ministry of Agriculture should be capable of a series of activities." Capability is different from actually "doing" these activities. Institutional capability requires a strong functioning institution. Five institutional components that provide this type of effectiveness are recognized. Summary of MOAC capabilities at the end of the project rates these five components of institutional development as follows:

Leadership--The leadership component of MOAC is rated good. This rating averages the very good intent, serious desire and moderate exposure to modern management practices on the part of senior MOAC leaders with significant entrenched structural, budgetary and other constraints from putting these principles into practice.

Resources--The human resources available to MOAC are excellent, and once again the project's training and human development achievements are to be commended. The budgetary portion of the resource picture must be rated as inadequate and at risk.

Structure--This element has significantly improved since the project's 1982 beginning. However, as discussed in considerable detail herein, structure remains a significant bottleneck to further efficiency.

Program--Both extension and research can be classified as moderately successful, having moved forward, but only part way toward the vision that is written into design and mid-project evaluation documents. However, since the phasing out of active project inputs and implementation of research, this function has slipped noticeably, bordering on falling into the marginal category (at least, if measured in terms of potential impact on farmers practices).

Philosophy--The philosophy with which MOAC is managed, and which is reflected in the attitudes of professional and support staff, is very good. The difference between this ranking and one of excellence lies in the partial adoption of CSR/E.

D. Recommendations

The evaluation team recommends the following series of activities and decisions in order to ensure sustainability and further development of SCSRET achievements.

- MOAC should extend their commitment to cropping systems research and extension in Swaziland and find a way to more fully incorporate this method as the core of their research/ extension activities. As long as MOAC efforts are targeted toward SNL land, there is no substitute for Farming Systems Research and Extension methods;

- External assistance in farming systems methods should be continued for at least two more years. Emphasis should shift from theoretical classroom work to hands on, field applications. This could be accomplished with either a long-term expatriate or a series of short-term technical assistance inputs.

- MOAC officials should give priority to, and take leadership in restructuring of MOAC as proposed in the GOS National Plan 1991-1994. The CAPM project should provide such assistance through their organization and management component.

- In-service management training for all senior staff should be continued and strengthened. An overall administrative/ management plan of work parallel to the research/extension plan of work would be an important addition.

- Farm management training and field activities should be included in all field staff programs. Outside assistance in this area should be sought.

- The 1991-92 plans for research and extension should incorporate the concept of doing a situational analysis in selected Rural Development Areas (RDAs.) This should involve farmers, researchers, extentionists, NAMBoard, cooperatives and others. Out of this extensive review, which can be done using rapid reconnaissance techniques, should come a long range plan for that agro-ecological region.

- Priority within future MOAC staffing plans should be given to deepening the supply of trained agricultural economists.

- A major research effort should be launched to disaggregate the SNL farm homestead population into separately identifiable target groups, using a detailed analysis of their resources, economic demographic and other environmental factors. Future research and extension programs should be based on this new understanding. The SNL homesteads are NOT a homogenous lot. The single most limiting constraint to research and extension programs in Swaziland today (and to foreign assistance designed to help them) is the complete lack of understanding of differentials in actual conditions on Swazi SNL farms, and how these affect farming and its potential for technological change. Until this changes, future programs and projects will have limited effectiveness.

I. INTRODUCTION

This report constitutes the end-of-project evaluation of the Swaziland Cropping Systems Research and Extension Training (SCSRET) project. The evaluation was undertaken by a team mounted by Devres, Inc. The team was interdisciplinary, reflecting the cropping systems concept, the composition of the contractor field team and the diversity of the overall project scope of work. Individuals of the team were selected for their expertise in Third World agricultural research and extension institutions as well as their experience in applications of farming systems research and extension (FSR/E). The evaluation took place in Swaziland between June 22 and July 16, 1991, ending one month before the SCSRET PACD of August 20, 1991.

A. Focus of the Evaluation

The project has been previously evaluated twice by external teams and has been the subject of one internal audit and several assessments. Following the second mid-term evaluation, the Project Paper (PP) was amended to extend the activity, refocusing inputs and implementation activities to enhance attainment of certain revised objectives.

With two prior mid-term evaluations on hand, the present evaluation team was instructed to concentrate on project performance during the 33 months since the PP Amendment of August 12, 1988. However, a review of the project's prior history and performance was also required. As the evaluation unfolded, the team found it necessary to conduct a fairly thorough assessment of the first seven years of this ten-year project in order to provide an adequate basis for findings relating to the last three years.

B. Methods

Through the course of the evaluation, lead responsibilities were assigned to individual team members for different components of SCSRET with the explicit understanding that each team member had supporting responsibilities in all areas.

Observations, interpretations and conclusions included in this report are based on many sources of information. First, a wide range of documents were made available by A.I.D., the SCSRET project office and various offices in the Ministry of Agriculture and Cooperatives of the Swazi Government. Second, many individuals gave freely of their time for extensive discussions. A full list of individuals contacted in the course of the evaluation study is attached in Annex 2. In addition to office interviews and an extensive review of the literature, field trips were taken to two field locations for on-site discussions with farmers and extension field staff.

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II. THE SCSRET PROJECT THROUGH 1987

A. Project Programming History

The SCSRET Project Identification Document (PID) was signed in Mbabane on March 13, 1980. SCSRET was designed in the collaborative assistance mode involving a team of professionals from MOAC, Pennsylvania State University and Tennessee State University and A.I.D.. The Project Paper (PP), dated August 17, 1981, calls for an institution building project designed around three major components:

- Cropping systems research;
- Agricultural information; and
- Extension training.

These components were intended to impact the economic viability of farming on Swazi National Land (SNL) farms. The contract was signed on April 8, 1982. The first Chief of Party began work on April 6, 1982, with the rest of the initial field team of eight arriving in Swaziland between April 23 and September 13, 1982. The project originally had a PACD of September 30, 1987. However, a one-year PACD extension to September 25, 1988, was approved in June, 1986.

The first external mid-term evaluation was conducted in November-December, 1984. This evaluation provided a number of recommendations on a variety of implementation issues (Fisher, et al, 1985). Details of this evaluation findings are discussed more fully in Chapter IV.

A second external mid-term evaluation was completed in May 1987, through a contract with International Resources Consultants, Inc. The main thrust of this report was that institutional development objectives in the area of research would be met by the PACD, but that achieving desired extension outputs would require a project extension and redirection. These conclusions and recommendations were strengthened by A.I.D. internal audit of the project (A.I.D. -- 1988b) which recommended a focus on obstacles and constraints to effective extension of research results.

Consequent to these two evaluation and audit reports, the PP was amended on August 12, 1988. The PP Amendment states:

> The Amendment extends the PACD by 35 months--and respecified (sic) the technical inputs in order: 1) to ensure that Swazis are prepared to assume full leadership for research and extension programs initiated by long-term technical assistance; and 2) to enhance the effectiveness of the agricultural extension program by firmly establishing in-service training programs, by expanding the

capacity of the Information Section to disseminate new technology, and by strengthening existing linkages between research, extension personnel and farmers.

Of particular importance to the present evaluation, the PP Amendment substantially altered the LOGFRAME identification of outputs and objectively verifiable indicators of output attainment. This evaluation is based on these amended specifications.

Subsequent to the Amendment, the contractor proceeded with implementation for the final 35 months. Close-out procedures are being implemented in anticipation of the final PACD of August 20, 1991.

B. Summary of Status as of January 1988

The project achieved a number of important outputs in its first seven years. Among them were:

- Exceeding targets in degree training;
- A substantial increase in crops research;
- Accumulation of a variety of socio-economic analyses and related data;
- New techniques and procedures designed, tested and adopted by extension;
- Major strengthening of the agricultural information functions; and
- Construction and improvement of physical facilities.

These achievements are documented in the second Mid-term Evaluation Report (International Resources Consultants, Inc., 1987), and in the report below.

Despite the rather substantial volume of outputs achieved in the early phase of the project, its status as of 1987 included a number of unresolved issues that significantly affected potential accomplishments during the three-year extension; thus, the predictable end of project status. These issues are summarized as follows:

- The project never clearly adopted a true cropping systems approach to its activities. A number of the components were in place, wholly or in part. However, the integration of activities that would have occurred had the cropping systems philosophy pervaded all dimensions of the project is missing. Consequently, the multiple outputs and results of very considerable expended energy did not add up to the coherent whole that was needed to achieve project purposes and the stated goal.

- The lack of a central core philosophy which should have integrated most managerial decisions led to considerable variability in staffing of the TA team. Continuity of emphasis was negatively affected. Reflecting the absence of an over-riding cropping systems perspective, only three of the approved long-term TA team members were skilled in cropping systems research, two of whom joined the team only in the post 1987 period.

- By 1987, significant constraints had surfaced in the structure, internal incentives, operational modes and resources of the MOAC. An early institutional assessment could have identified these problems at the outset for remedial action. Such an assessment was not undertaken, nor were these problems addressed in a systematic fashion during the remaining three years of the extension. These deficiencies, which still exist, put post-project sustainability of project activities at risk.

- Management and oversight by A.I.D., which could have assisted the project in focusing its efforts and methods on those specified in the PID and PP, was deficient. In part, this was found to be due to deficiencies in project documentation; specifically, an adequate set of verifiable indicators with which to monitor progress was missing. It is also doubtful that Mission personnel fully grasped either the value or intricacy of the systems approach during the project's early years.

- In addition to the lack of indicators mentioned above, the Logframe included serious flaws in the assumptions leading from one level of performance to another. Between inappropriate assumptions and others that were assumed but not stated, the project design reflects an erroneous perception of the reality of Swazi SNL agriculture.

Each of these points is discussed more fully in Chapter VI of this report. It is necessary, however, to note them at the outset, since the presence of these factors throughout the life of the SCSRET project affected the findings and conclusions at most stages of the evaluation.

III. QUANTITATIVE EVALUATION

A. Summary of Inputs

1. Whole project

The first element of project implementation is provision of inputs. Project design specified a fully adequate set of inputs for the intended purposes and goal. Discussed below are inputs that pertain specifically to the extension and research components. Table 1 summarizes quantitative indicators of the total provision of inputs over the life of the project. Considerable detail on each specific item is provided in Annexes IVA-IVD. The evaluation team is indebted to Penn State for access to a preliminary draft of their final report for these details.

From a quantitative perspective, the contractor achieved generally excellent provision of the inputs required. Particular examples include:

- The liberal and imaginative use of short-term TA;
- Responsiveness to changing needs of MOAC and project field activities in delivering participant training; and
- The timeliness of delivery.

Qualitative concerns focus on selection of expatriate technical assistance team members. These are discussed in Chapter IV of this report.

Turning to individual components of the project, the input status as of the end of the project was identified. (See Table 1.)

2. Extension component

Table 2 summarizes the status of the inputs provided for the project's extension component.

Table 1: Summary of Total Life of Project (SCSRET) Inputs

Input Type	Require by Logframe	Actually Delivered	Achievement
Technical Assistance			
Long term	71 PY	68 PY	96%
Short term	116 PM	110 PM	95%
Participant Training			
Long term	77 PY	75.5 PY	98%
Short term	60 PM	76.5 PM	128%
Equipment and Commodities			
(Project was not commodity intensive)			Very good
Construction: Under Contract			
Agricultural information building*			Yes
Soils Laboratory			Yes
Library			Yes
1 Technical Assistance house			No
14 Houses for Research Assistants			Yes
10 Field Research Storage Sheds			Yes
Construction: MOAC Contribution			
Training Center at Malkerns Res. Station			No
Housing for NSMS at Malkerns Res. Station			No

PY = Person Years
PM = Person Months

* Constructed third floor of MOAC Headquarters Offices.

Table 2: Summary of Extension Component Inputs

Logframe Inputs	Verifiable Indicators	
Technical Assistance		
Long term	Original contract	570 PM
	Extension TA	249 PM
Short-term staff with direct extension job description	Proposed total	109.5 PM
	1/88 to 8/91	33.25 PM
Participant Training		
Long-term degree months	MSc	
	Proposed	450 DM
	Actual	528 DM
	BSc	
	Proposed	456 DM
	Actual	214 DM
Degree recipients returning to extension posts	MSc recipients	10
	BSc recipient	3
Short-term overseas training	76.5 PM provided (nearly all extension (38 staff))	
Library training	6 PM provided	
Evaluation/assessment	Task force study of T&V Project impact assessment study Study of alternative means of EW transport	
Equipment acquired and installed	SEO (in 4 Regions) Central Office equipment visual aids, teaching tools kits, reference books, communication equipment, computer, fax machine, camcorder and VCR, Caramate, typewriter tape recorder, production screen, library facility at MOAC, public address system, print shop equipment.	

3. Research component

The project provided six long-term technical assistance personnel during the PP extension phase, two of which were posted at Malkerns Research Station (MRS) to work in the Agricultural Research Division (ARD). One position, the Farming Systems Research Methodologist, was a new position and the other, the Production Economist, renewed a position from the previous phase of the project. The first was a 33-month assignment and the latter a 24-month assignment.

a. Farming systems research methodologist

According to the PP Amendment, the Farming Systems Research Methodologist was to work with ARD officials to prepare, review and revise a 3-5 year rolling research plan. He would serve as resource person to help ARD researchers prepare their annual research programs with a view towards reducing the coefficient of variance of their trials. Finally, he would help identify appropriate training programs for Swazi agricultural researchers at the International Agricultural Research Center (IARC) as part of his efforts to establish linkages between the Swazi agricultural research community and the regional and international research community.

b. Production economist

This position, from the previous phase of the project, was extended to essentially avoid creating discontinuity in the economic evaluation of survey data and production information. The production economist was called upon to institutionalize the capability of ARD to establish the economic value of the technical recommendations developed by the MOAC agricultural researchers.

In addition to these staff, some commodities were provided by the project extension to the Agricultural Research Division. Finally, under the research component of the project extension, provision was made for short-term technical assistance, long-term participant training, short-term participant training and in-country in-service training.

B. Summary of Outputs

The evaluation team devoted considerable time to discovery of outputs delivered by the SCSRET project. Once the data were tabulated, an impressive list emerged. Listed below in tabular form are findings organized to follow the list of indicators in the Output Section of the project Logframe. In some cases, output exceeded expectations. Such was the case mainly in those outputs associated with the extension component.

1. Research outputs

Logframe Outputs	Indicators
• On-farm survey	Several surveys were conducted, both formal and informal: informal TA team survey (1982) leading to baseline report, 1983. Four formal surveys: Curry survey (1985), Malaza survey (1988), Dlamini survey (1988), and Dlamini survey (1991). A formal survey (1983) carried out by R.A.'s had its results used but not published.
• Research experiments	A fairly large number of commodity research experiments on maize, vegetables and beans were designed and conducted on station and on-farm during the first phase of the project, based on constraints identified in the first surveys. Very little research has been done in the last phase of the project. Except for TA staff, project funding for research activities has almost ceased.
• Production of an MOA Annual Research Report	As of this evaluation, the last published ARD Annual Report is dated August 1990, and covers the 1988/89 cropping season. The 1989/90 ARD Annual Report is currently under preparation. During the 10-year LOP, six ARD Annual Reports were published.
• Research results to be incorporated in cropping systems recommendations	Considerable amount of commodity into research has taken place during the LOP. This has lead to recommended component technologies which are slow in getting to farmers hands because of multiple difficulties identified at the Agricultural Information Service. These useful technologies, however, have not yet been incorporated into cropping systems packages. A 450-page Farmer's Handbook has just been published as the project's last and perhaps most important contribution to agricultural recommendations.

• Researchers and staff fully prepared to carry out a national research program in the areas of horticulture, biometry, and plant pathology	A total of eight researchers were trained at the level of MSc, with capability in cereal agronomy, biometry, agricultural, economics, cotton, entomology, pasture production and agronomy, management, socio-economics, pastures fertility horticulture and soil. Three more have research capability in rural sociology, entomology and plant pathology.
• Establish national research capacity in agricultural economics	An agricultural economist is among eight trained research scientists now working at the Malkerns Research Station.
• Research station management capacity to be enhanced	The FSR methodologist has completed a review of ARD activities and prepared a five-year strategic plan for agricultural research, delivered three weeks before the end of the project. No training program or actual experience in using this plan has been organized. This once, largely expatriate-driven exercise does not suffice to establish a formal process of long-term research planning.
• Linkages established with IARCs	Such linkages are established and bearing fruit, in particular, links with CIMMYT, CIAT, INTSORMIL, ILCA and ICRISAT. While of considerable value, these links and the required work that goes with them pre-empt considerable time from other, locally identified research activities.
• At least three Swazis trained in research areas critical to national research program	Training was completed, but there was no evidence of a plan or budget for further staff development.

2. Extension

• In-service training expanded and implemented	- 159 extension workers received 12 days of annual in-service training between 1989-91 - A three-year (1990-94) staff development plan was written based on EW individual needs - From 1987 to 1990, a total of 65 training activities were carried out involving 2,567 program hours and 3,044 MOAC staff
• Emphasis placed on enhancing training and management	- 51 person months long-term extension training advisor - Training officer (MSc), and assistant posts filled in MOAC - Researchers (13) and MSMS (16) provided subject matter training to EW's. - 3 study tours to MOAC staff on training of trainers - MSMS positions, largely replaced after several were moved to research
• Expand production of multi-media materials by information section	- Field support guides printed and distributed increased from four (1986) to 45 (1990) - MSc degree for Head of Information - 13 short-term study tours in communications for staff of the Information Unit - Many radio broadcasts, publications prepared and printed and videos produced - 45-page comprehensive Handbook for EW Reference, prepared and printed - 80 percent of EW's used field support guides
• Enhancement of extension management capacity	- 35 person months of extension organization\ planning advisor, COP - P.S administrative order on revised extension system memo dated 12/88 - SEO technical services completed MSc and is in place - 50 MOAC staff trained in computer communication network - 40 senior MOAC staff received one-week management training - 17-short management related study tours - Determined cost effectiveness of alternative transport systems for EW's

• Extension training	- Modified T&V system to farmers needs process, with administrative support to the level of P.S. - An increase in farmer contacts by extension from 2 percent in 1986 to 40 percent in 1990

3. Research-Extension linkages

Logframe Outputs	Indicators
• Strengthened links between research, agriculture information extension and UNISWA agriculture faculty	- Research officers teaching in-service course for Extension workers. - Research officers contribute to Information Section - July 1990, first annual research/extension collaborative meeting to identify farmer needs for research - Bi-monthly meetings, Research and Extension. - Research officers participate in regional-national extension program planning process - Field days and Research Station Reports for EW and NSMS staff - TA assists UNISWA in curriculum development for Extension Research on needs and invitation basis
• Linkage training or cross-training	- Two courses on communication skills have been offered to research officers - Management and research/extension planning reporting
• Farm demonstrations	- On-farm demonstrations and field days have taken place. Only two farmer field days were organized by ARD. Extension officers did several on their own - Over 100 on-farm trials serve, in part, as results of demonstrations of EW programs
• Facilities in place	- Office, library and Information Section building were provided - Soils Lab in place - Neither the training facility nor the NSMS housing at MRS was constructed

C. Evaluation of Assumptions

The evaluation team carefully reviewed the assumptions that link vertical components of the Logframe. Some were found to be correct, some only partly so, and several that were incorrect. The latter largely reflected the faulty understanding of the environment, both institutional and agricultural, that characterized the design of this project. It further appears that there were a number of assumptions made, but not written into the PP Logframe. Many of these are also erroneous. In the tabulation below, a code indicates the validity of Logframe assumptions: + = correct, 0 = partially correct, and - = incorrect.

Level of Assumption	Stated in Logframe
• Purpose to Goal	+ GOS policies encourage cash cropping + Production inputs are available and timely 0 Market can absorb added production + SNL irrigated area increases
	Assumed but not stated
	- All SNL farmers want to increase crop production on their land - Research adoption is a short run phenomenon 0 Research/extension deficiencies are seriously limiting farmers economic status 0 Research/extension officers will effectively communicate with farmers 0 The 60,000 SNL farms are the most economic method of increased maize production - Isolation and measurement of the impact of research extension on SNL farms is simple

- Output to Purpose

Stated in Logframe

0 MOAC will receive adequate recurrent expenditure budget
0 Participants will return to position trained for

Assumed but not stated

- MOAC and the Swazi economy will have increased budget available
- Organizational structure of MOAC and administrative/management capability are optimum
0 TA (Contractor) staffing is appropriate for stated purpose
0 Extension workers will know how to effectively work with SNL farmers as decision makers in economic aspects of farming

- Input to Output

Stated in Logframe

- GOS will establish required posts
+ Qualified Swazis are available to train
+ Posts essential to project will be filled by Swazis

Assumed but not stated

- Established posts are easily changed
0 UNISWA is turning out well-qualified students
- Adequate, appropriate research is available for direct impact on farmer output, considering farmers must make the changes
0 Training (overseas and local) will translate to technology adoption

D. End of Project Status (EOPS)

Logframe Specified	Actual Status
• Extension capable of:	
Conducting on-farm demonstrations	- Have capability, limitations are transport, supervisory support and budget
Conducting field days and extension training	- Both capabilities are in place with 2-3 years of results
Reaching 75 percent of SNL farms with research recommendations	- Reaching an estimated 40 percent (1991)
Conducting in-service	- 3-year plan developed - 12 days training sessions per worker annually (1990/91)
Putting research into recommendations in usable form	- 45 field support guides - 16 field support guides ready - 7 field support guides being developed - Research reports presented in reporting session each year - 450-page Farmer's Handbook printed and distributed for use by Extension workers
Information program to support direct contact	- 2 radio extension staff - Newspaper work - Print shop in place, staffed and equipped
Other	- Formalized planning process and written POW (last 3 years) - Minimum qualifications for EW moved from certificate (1 year) to diploma (2 year) - General improvement in morale of Extension officers - Research Extension linkages have improved but much more needs to be done in this arena.

IV. QUALITATIVE EVALUATION

A. The Extension Component

The Swaziland Agricultural Extension Service dates from 1930, when it was a British Colonial system. When the SCSRET Program was initiated in 1981, only three positions were held by expatriates in counterpart capacity. A 100 percent Swazi organization was in place. Though the organizational structure has been modified, many of the original colonial characteristics remain evident. Though extension is considered an educational function in most countries, Swazi extension workers still have mixed duties, including education, regulation and service. Swazi extension has very few ties to the University of Swaziland (UNISWA), but is firmly based in MOAC. Internal MOAC linkages between Extension and the Department of Agricultural Research are also weak, most of them being informal, occasional contact between individuals.

The number of posts in the GOS establishment for both research and extension has remained constant for many years. The number of positions filled depends on budget and support resources, both of which have been under pressure for years. In 1982, there were about 300 extension workers, while only 182 remained in 1991.

Working conditions have, in the past, seriously constrained the impact of the extension organization on farm output and farm family well being. Among these problems were: lack of adequate training of staff (both technical and programmatic), the ratio of extension officers to farmers (1:500), little or no transport in the field, low staff salaries, little opportunity for advancement, and lack of appropriate, relevant research to respond to farmers problems. Through the SCSRET Project Amendment for 1988-91, Extension was to be given special attention to build its capability to work with farmers through well trained staff, targeted research, and improved methodologies.

1. Institution building for effective extension

The SCSRET project, both the original and amended versions, has had an institution building focus. As a collaborative effort, project design was not started from ground zero, but rather can be looked at as organizational renewal. Thus, design could follow theory and principles of organizational development, considering the function, structure and process as units of inquiry.

In retrospect, a desirable initial step probably should have been an in-depth collaborative institutional and situational analysis. This would have more clearly delineated project goals and feasible institutional objectives that were compatible with the Swazi environment. From such analysis, a broader based farming systems program would have evolved with a greater degree of institutionalization of process and results. From an extension perspective, such an analysis would have clearly recognized extension's role as one

of education and behavioral change at the level of the farm family. It is the farm family who must adopt the results of research. While considerable resources were used in the project to attach technical limitations to improved agricultural production, very limited research was devoted to identifying the human elements in application of technology. Farm family decision makers base their decisions on what makes sense to them--past knowledge and experiences, risk avoidance, community acceptance and a host of related variables. Effective extension program development is very dependent on staff training and competency in relating to the people at their level.

Through an institutional analysis, the functioning of the extension system would have been clearly articulated. More importantly, local people and key leaders would have been involved in the process. Following an identification of institutional goals, existing components of broad agricultural organizations can be involved. This is done in a collaborative manner to develop the most effective structure for facilitating goal attainment. This is where units such as MOAC, UNISWA, Ministry of Education, National Agricultural Marketing Board (NAMBoard), and legislative bodies become involved. The part each should play in building the broad institutional system must be analyzed objectively. The analysis should address such questions as:

- Will UNISWA conduct in-service training?
- Will extension officers be responsible only for education or have dual education/regulatory roles?
- How are responsibilities for research and extension delineated among units and individual MOAC staff?
- What is the relationship between student teaching, agricultural research extension and agricultural education?
- What is an appropriate administrative structure?

The organizational structure in MOAC between and within existing units is difficult to change. The human element and political expectations must be recognized. Objective external analysis is needed. When the goals and objectives of the organization are known, tasks needed to attain goals follow. These translate into terms of reference for individual positions. Supervisors of positions should consider principles of management such as the span of control, delegation and communications.

The organizational structure of public agricultural institutions in Swaziland leaves much to be desired. Job descriptions are vague, lines of reporting are often dual or unclear; delegation (particularly at upper levels of administration) is not effective; and communication between units is inadequate. During the life of the SCSRET project, the question of responsibility and linkages among staff and units has been a constraint. Research roles, and

especially subject matter specialist roles, are not clearly defined. Extension work is dispersed into separate efforts in agriculture, forestry, fisheries, veterinary services, livestock and cooperatives. Research, extension and technical services need clearer definition of their roles and responsibilities. The principal issue for structural analysis of an organization is in clarifying what unit and which position has responsibility for various roles and tasks. The second concern is to have clear lines of administrative authority and supervision to assure that duties and responsibilities are carried out. This facilitates processes such as training and communication and provides for a strong program of individual staff performance appraisal, so essential to the organization.

More attention should have been given to the structure component in the early phases. The sustainability issue is influenced by the ability of administrators and managers to provide the leadership necessary to maintain SCSRET initiatives. The importance of the structure component has been recognized by Government of Swaziland (GOS) officials and appears in the National GOS Plan for 1991-1994. Also, interviews with the Director of Agriculture and Director of Extension clearly indicated their interest in some form of restructuring.

Process is the third component of organizational renewal. It is the area where the SCSRET project concentrated its efforts. Involved is development of the human resources of the system. Both graduate and short-term training were a very strong feature of the 10-year project. Sequencing might have given more attention to extension earlier, however, the priority was research.

Staffing of MOAC positions to carry out programs has presented some problems. National Subject Matter Specialist (NSMS) were transferred to research and these positions have not been replaced with experienced extension staff. Field staff are lacking in formal training. While critical at all levels, MOAC directors indicated that all Senior Extension Officers (SEOs) should have MS level training, and front line officers should have a minimum of a diploma. The evaluation team concurs with this recommendation.

A strong program has been established to identify and respond to training needs of staff. This includes both formal and in-service work. A three-year plan is written for all staff. Twelve days of in-service training are programmed for each officer annually. It is well done, needed and a strong project achievement. Sustainability of resources for training will be a challenge.

The project has provided many of the tools for research/extension beyond staff training. These include an Information Section in the MOAC media work, office and field supplies and library materials. Printed reference materials, especially the completed 450-page Handbook are a major strength.

A process component provided by SCSRET is reflected in the coordination fostered in research/extension planning and reporting. This appears well institutionalized and will be funded annually according to a statement by the Permanent Secretary of MOAC. Regional

and national research and extension planning and reporting conferences are the primary response to the linkage or integration question which featured so prominently in the scope of work for the evaluation.

In an effective process, staff must have necessary support. The most critically lacking support is field officer transport. It is holding back programs and must be dealt with. Salaries and, more importantly, rewards for excellent performance are inadequate to foster top quality staff effort. Some well qualified staff are leaving MOAC for private work. It is expected that some trained and experienced staff will leave. This should not, however, impede efforts by GOS, MOAC, UNISWA and others to train agriculturalists.

A process for conducting agricultural research, converting research to extension information and taking it to farmers is in place. It has been greatly strengthened by the project, but has a long way to go. As discussed above, the functional and structural dimensions of institutions may limit the potential output of a well developed process. Design, staff, timing, sequence and implementation methods have also had an effect on the directions the project took. Hindsight should be useful for the next step in Swaziland, and for work in other countries.

2. Logframe component evaluation

a. Goal statement

The project goal conforms with GOS long-range plans and policies. Through the project, the extension program could and did make a goal contribution. The difficulty is in measuring the impact of extension effort toward the goal. Two factors are apparent:

- Extension's technical recommendations might not be accepted by farmers because of an external situation, e.g., off-farm employment, under-developed markets, import availability, economic disincentives, etc.; and

- Full attainment of the project's purpose (capacity building) is impeded by the fact that it will take more than three years to achieve a 10-20 percent increase in the number of farms providing for the market. Education and change are long-term processes.

b. Purpose

The objectives of building MOAC capacity in research and extension programs to meet to SNL farmers economic needs is appropriate and was the core of SCSRET. Extension attainments are the number one strength of the project.

The EOPS for extension programs shows capability in: 1) conducting on-farm demonstrations (110 were conducted in 1990; 500 farmers attended meetings in 1991); 2) conducted research field days (10 in 1990); 3) identifying in-service training needs and conducted courses (3 year training plan was developed allotting 12 days per year per extension worker-training); and 4) publishing usable research results, (45 field guides plus other media). The project strengthened the support to extension workers via communications tools and printed references.

Through graduate training, overseas study tours and short-term TA consultants, a much stronger, specialized staff has evolved. Contractor staff collaborated in considerable in-service training during the project and in developing long-range plans for staff development and training. There is a continuing need for outside TA for specific training areas such as farm management, program development and supervision.

The most important weaknesses in building the extension capacity are the following:

- General, basic formal level of training of extension workers (field, National Subject Matter Specialist (NSMS) and administrative. They will be second-class partners unless they are on a par with research colleagues.

- The late emphasis on extension during life of the project. An integrated systems approach would have involved farmers, extensionists and researchers as a systems team from the outset.

- Lack of a detailed study of farmer characteristics and needs in relation to technology adoption. Also, the ultimate farmer client was not adequately involved in needs determination and program development.

c. Outputs

A modest in-service training capacity is in place. Sustainable support resources to continue an adequate staff development program are more in question. Targeting of training in the future should be based on the performance appraisal process. Forms and procedures are available, but they are not being used effectively. The EW supervisor should be trained and have responsibility for interacting with subordinates to identify training needs (formal and in-service).

Closely related to the organizational structure is the position and role of the NSMSs. This is key to linkages between research and extension. Presently, their roles are not clearly defined. Their responsibilities are cluttered with many duties beyond the scope of research-extension. Clearly, these positions should require MS degrees. They should have split appointments; 50 percent research and 50 percent extension. The Director of Agriculture should be their head, but reporting to the P.S. through both extension and research and not

through technical services. They should be trained and positioned as colleagues, respected by both research and extension staff. Only on this equal collegial basis can they be both trainers and backstoppers for extension field staff, assuring appropriate linkages between the two branches.

During the life of this project, the MOAC (by executive memorandum from the P.S.) changed the general method of extension work from T&V (Training and Visit) to a people oriented, problem solving involvement model. The project is to be commended for assisting with this change. As stated by the Director of Extension, T&V did not fit the cultural background of Swazi farmers, and did not target farmer needs very well.

Given the advanced degrees of the Training Officer and Information Unit head, training planning and management should be sustainable. There is evidence of current or recent specialized training (i.e. irrigation, microcomputer use, statistics, video productions, farm management). Training centers are available and capable research staff have experience in training.

One major question concerns the sustainability of an advanced degree support effort. Funds should be sought on a continuing basis. A second concern is strengthening the UNISWA extension curriculum such that the extension staff have a base level of education enabling them to internalize in-service offering. Short course in-service staff development for MOAC extension workers could be done at UNISWA. Their Agricultural Economics Department is very interested, and ways to fund this training should be considered.

For extension/research programs to be effective, the organization must have strong leadership. Leaders can lead if they are perceived as competent, fair and concerned in their work. While the project did some management training (in-service, graduate training and study tours), there was lack of strong management skills on the part of several senior officers in administrative positions. Continued emphasis on strengthening the managerial capacity should be encouraged at all levels. With a loose bureaucratic structure and a dependence on consensual decision making, strong leaders are essential.

The indicators toward the outputs listed for extension are appropriate. They were consistent with the extension thrust of the amended project. Most of the indicators can be verified by the numerous MOAC and project reports (see Annex 3).

Assumptions are weak in stating that GOS will establish required posts. The posts appear on the establishment registry. Both bureaucratic delays and lack of budget prevented or delayed filling these posts.

The Information Unit has been well established and has trained leaders and staff. Forty-five field guides were printed and distributed and several are in the pipeline. A 450-page Handbook is ready for distribution. This is consistent with output expectations. The Information Unit is seriously backlogged. The MOAC and other government agencies

have discovered its value and place high level demands on it that pre-empt much of the needed routine work. This situation should change with the recent arrival from training of the unit head.

d. Inputs

Inputs included were technical assistance, participant training, equipment and commodities. With respect to long-term TA, the contract shifted to an extension emphasis for the amended period, meeting 96 percent of specified inputs in this regard. Short-term TA provided during this period included 33.25 person months directed to extension, out of 109.5 total TA resources were well targeted with noticeable capacity building results.

The evaluation team looked carefully at work carried out and written MOAC plans of work for extension. Plans of Work are very calendar ordered. Perhaps the next refinement needed is to develop extension work plans to reflect primarily what change (knowledge, skills, attitude) will be expected on the part of the farmer. Educational activities should then focus on the change expected, the nature of the learner and content of the teaching. Research results cannot be simply delivered to the farm; they must be integrated into the learning environment of the farm family. Herein lies the key to effectiveness of the extension educator.

Equipment provided is appropriate to the situation. Internal communication via fax and to farmers via visuals and equipment in regional officers should be helpful. Simple aids should be encouraged for front line officers.

Discussion with project staff indicated that lack of transport at the field level could be alleviated in part with a well managed planning and scheduling effort. Each level of supervision should give attention to this matter.

Having TA who understood extension was an asset to this phase of the project. Specialization in training and in organization and planning of two long-term TA staff show up directly in the output plans and processes that are in place. Short-term TA were very supportive of this thrust.

3. Summary statement

a. Purpose

Capacity building is appropriate to the stated goal. Project activities and inputs did substantially improve the MOAC capabilities in extension. Measured against an optimum model, however, there is need for considerable further change. The purpose to goal relationship needs to be examined carefully. In the short-term, the extension component cannot unilaterally be responsible for substantial growth in farm outputs resulting in marked

improvement in economic conditions of SNL farms. The role assumed for extension in reaching this goal appears to be based on a simplistic model of what happens when new research results are available and taken to farmers. Behavioral change (knowledge. skills, attitudes) aspects of technology adoption were under-emphasized during project design.

b. Outputs

A modest in-service training program is in place. The project should be given high marks for initiating and installing the process, and training staff for its continued leadership.

Many training needs relate to individual staff competencies. A strong performance appraisal process (not in place at present) is the starting point for developing training needs. Extension workers need training in both technical subject matter and in working effectively with people in the role of extension educator. The installment of a three-year in-service training plan and the annual 12-day in-service training for each EW during each of the past two years are major accomplishments. Work planning and results reporting have been carried out for the last two years of the project. Plans of work, while not ideal, are written and the process is in place. Of some significance is the linkage or involvement of researchers in developing extension work plans. The information section has been activated and some staff trained. The production of this unit is very useful to extension. There are some problems with backlog and budget that need attention.

Although commodities provided to support field staff and regional and central offices were minimal under the project, they were very supportive of the training work done during the life of the project.

c. Inputs

The long-term TA staff were perhaps the most significant input. Training, organization and planning were major strengths of the long-term TA during this amended project. Numerous study tours and six overseas degrees in extension were also a contributing factor in neutralizing the extension effectiveness. The information building and library were needed inputs and strongly support extension.

There is need for consolidation and further strengthening of the good work started in the following areas: training, program planning, communications, farm management, administration and supervision. This, as well as a new infusion of extension education principles for Extension Workers (EWs), should be considered for follow-up activities by MOAC. The farming systems approach remains appropriate for effective extension. A sound comprehensive extension program development process should be established and maintained.

4. Results

- Research capability has been expanded from one person in 1981 to 13 MSc graduates in 1991 who can:

  -- Conduct research based on farmers identified problems;

  -- Train extension field staff; and

  -- Provide technical back-up and problem solving for extension.

- All extension staff have had training and experience in extension program development, including:

  -- Emphasis on written Plans of Work;

  -- Interaction with researchers; and

  -- Two years of written work plans, 1989/90 and 1990/91.

  As a result, farmers needs are as better perceived by extension staff based on field experience and observation.

- In-service training has been provided during the life of project (LOP) and three-year staff development plans are written for all EWs.

- T&V system has been modified with more appropriate methods such as:

  -- Basing plans on EW perceived farmer needs;

  -- Contacting farmers with relevant information; and

  -- Increasing the number of farmers contacted.

- A modest start has been made in MOAC Administrative/Management training, including:

  -- Degrees (2) and study tours (17) completed; and

  -- Management training for all senior officers.

- Ministerial restructuring was included in GOS National Plan 1991-1994 (pp. 72). This thrust can be indirectly attributed to project input. It can enhance MOAC effectiveness, address problems of linkages and administrative leadership.

- The Information Unit has been strengthened. In support of this assertion:
  - -- An MS has been obtained by the Section Head;
  - -- Technical staff is in place (although they lack needed training);
  - -- Output has increased (45 Farmers' Guides distributed);
  - -- Radio programs have been developed and well received (survey indicates strong reliance on radio by farmers); and
  - -- Four component units--publications, audio visual, public media, library services--are in place.
- Research-extension linkages and interaction has been strengthened. Related outputs include:
  - -- Planning conferences and Plans of Work (2 years);
  - -- Reporting conferences and Annual Reports (2 years);
  - -- Bi-monthly meetings (planned, but often not called or poorly attended); and
  - -- Researchers serving as in-service EW trainers.
- Supporting equipment is in place and staff has been trained in their use. Equipment includes:
  - -- Computers;
  - -- Fax machines (in regional offices);
  - -- 35mm camera, overhead projectors, screens;
  - -- Tape recorder, camcorder; and
  - -- Typewriters.
- Reference and teaching materials for field staff have been produced and distributed. These include:

- -- 45 Field Support Guides;
- -- Farm management reference books and manuals; and
- -- 450- page Farmers' Handbook.

- Field educational activities have increased, including:
  - -- Farmers training courses which have been restarted;
  - -- 10 field days involving farmers and EWs;
  - -- Over 100 on-farm research trials or demonstrations; and
  - -- Increased meetings and farm visits.

- Strong support has been provided by TA staff in extension, including:
  - -- Extension program development by the COP;
  - -- Farm management training;
  - -- Placement of a training officer;
  - -- Placement of several short-term TAs on extension subject matter;
  - -- Management training for senior officers in MOAC; and
  - -- Placement of an irrigation extension specialist.

- Participant training degree work and study tours have been undertaken, including:
  - -- Three BS and 10 MS degree holders, trained and returned to extension posts;
  - -- Seventy-eight PM short-term overseas extension related training; and
  - -- Six months of library training.

5. Problem areas

- A broadly based systems approach is not in place; thus, farmers' need research/extension information may not be targeted to situations where input toward goals are expected.

- The structure of the organization may be impeding potential effectiveness of research/extension. Such items as clear lines of authority, span of control, delegation of authority and internal communication need attention. Starting with tasks to be performed to reach organizational goals; listing possible positions, clearly assigning roles or duties to each position, providing appropriate lines of authority, providing for needed linkages and communications, all are part of an effective organizational structure.

- Extension needs to be viewed as education. Refinement of work plans, identifying farmer problems, stating objectives in behavior change terms and selecting appropriate teaching methods are the next step to the good work stated in planning.

- More formal training of front line and senior extension officers is needed, primarily in the manner in which they carry out their work. Communications skills and teaching methods are important needs for all. Managers (Senior Extension Officers, etc.) need leadership/management training. UNISWA should be involved in both formal training and on-the-job courses for extension workers.

- Subject matter specialists roles need to be clarified. These positions should require a BSc, with an MSc preferred. They should be on split research/extension appointments and be relieved of regulatory and other duties.

- Farm management training needs additional emphasis. This need was expressed by both senior and lower echelon staff. Extension workers contact farmers who have a wide range of interests and should be prepared to assist families as they analyze their individual situations. Jointly, the farmer and the extension officer can deal with alternatives--what to produce, how much to produce and how to produce it. A good start was made under SCSRET. Now MOAC and UNISWA need to continue the effort.

- Recurrent expenditures and replacement of budget items supported by SCSRET may limit both research and extension. MOAC leaders need to prioritized the work and seek continued support funding from GOS.

B. The Research Component

1. Design and implementation issues

Agricultural research started officially in Swaziland in 1958 with the nomination by the British Government of A.C. Vern as the first Research Officer. Four years later, the first recommended new varieties and production techniques were emerging from this new service. In 1971, the agricultural research function was transferred to the University of Botswana, Lesotho and Swaziland. In 1977 it was transferred back to MOAC. Other important dates in the history of research and extension in Swaziland include the 1965 publication of a Farmers' Handbook by the Department of Agriculture, the publication in 1977 of Advisory Bulletin No. 1 and the 1982 start of the A.I.D.-funded SCSRET project. The new Farmers' Handbook published by SCSRET constituted another landmark.

Agriculture in Swaziland is carried out on two very distinct sets of farms: 1) Title-Deed Land farms, larger, privately owned farms operated with a commercial orientation and 2) Swazi National Land farms, which are smaller, allocated under traditional tenure practices and usually farmed with a subsistence orientation. In 1981/82, it was recognized that only a few prior research results were being used by the SNL farmers because of their particular circumstances. Producing mainly for their own consumption makes them less inclined to take risks and change their production techniques. Their agricultural input use is low because of risk aversion and their view of farming as only one of the may interacting activities of the homestead.

The SCSRET project was designed to build MOAC capabilities to research and extend appropriate recommendations for this large and important group of farmers. Selected Swazis were sent to graduate training in order to staff the Agricultural Research Division. Besides staff development, the project design called for a cropping systems approach to technology development.

Before proceeding with qualitative evaluation of the research component, a definition of the key concepts of cropping systems research is required. Three key terms are instructive: cropping pattern, cropping systems and cropping systems research. These definitions are adapted from the 1984 book, "Cropping Systems in Asia: On-Farm Research and Management," published by the International Rice Research Institute. That book, in turn, draws heavily from "A Methodology for On-Farm Cropping Systems Research" by H.G. Zandstra, et al., (IRRI, 1982). These two publications are highly recommended to cropping systems research and extension practitioners.

- A cropping pattern is a crop arrangement in space and in time on a specified land area.

- A cropping system is the set of all cropping patterns used on a farm for crop production, together with their interactions with the farm resources, the other household enterprises and the physical, biological, technological and socio-economic factors or environments.

- Cropping systems research consists, therefore, of research activities carried out mainly in farmers' fields to help understand farmers' existing cropping systems and the subsequent design, testing and development of new improved cropping patterns and component technologies for selected environments to efficiently utilize available farm resources.

Further, it is useful to compare cropping systems vs. farming systems. A cropping system is often a component of a farming system which might include several other components, such as a livestock production component, or an artisanal activity. In either cropping systems research or farming systems research, the system is studied and improved as a whole with all its components and their interactions explicitly considered, as well as interactions between this holistic system and the environment.

The expected result from cropping systems research is generally a new improved cropping pattern or set of agronomic practices designed and tested in the farmer's environment that will better utilize available farm resources. Developing commodity or component technologies is often part of the research process. However, as explicitly requested in the SCSRET Project Paper, these technologies must be incorporated into systems-type recommendations.

Technology testing in the context of cropping systems research covers three general aspects:

- Biological stability, that establishes the consistency or sustainability of the results;

- Agronomic productivity, which often has to be significantly greater than that of already available technologies in order to lead to adoption by small-scale, limited resource farmers; and

- Economic profitability that ensures profit with more efficient use of scare resources.

a. Implementation of a CSR/E approach

The SCSRET project never actually implemented a CSR/E program in the accepted sense of the term. A correct interpretation of cropping systems research approach is found in each of the six published Annual Reports of the Agricultural Research Division 1983/84. However, no comprehensive set of cropping systems research activities was found

during the life of the project. Indications looked for and not found were identification of and use of interdisciplinary research teams, including both biological and socio-economic researchers to carry out on-farm trials and the use of the household or homestead as the focal point for holistic analysis, design and testing of new cropping patterns, or cropping systems recommendations.

Useful results from commodity research have been obtained. Some are already in use by farmers. Others will be extended soon. The obvious question is whether it is cropping systems research/extension is still necessary? The evaluation team believes that the answer is yes, especially if progress on SNL farms remains a national goal. In fact, the on-going extension of commodity specific technologies constitutes an unplanned and uncontrolled testing of these technologies as they are included by some farmers in their cropping systems. It is very difficult to predict the outcome of these activities. One can only hope that the credibility of the research and extension personnel is not compromised. Cropping systems research is designed to avoid precisely the kinds of occurrences, which could be disastrous for small-scale, limited-resource farmers and make them still more reticent to changes.

b. Staffing considerations

Staffing in a cropping system research project requires an appropriate mix of biological and socio-economic researchers. This ensures proper testing of newly designed cropping patterns (biological stability, agronomic performance and economic profitability). The presence and participation of the extension personnel facilitates considerably all field activities.

At the beginning of project implementation, staffing within the TA team and at MRS was adequate to compose interdisciplinary research teams for carrying out cropping systems research and extension activities. The level of competency of the local researchers needed improvement. However, since the first research phase would normally have focussed on identifying existing cropping systems, household parameters and cropping constraints, the presence of these researchers on the interdisciplinary teams was essential. In retrospect, one must conclude that the responsibility for implementing a systems research approach rests with the technical assistance team, and especially its leadership. Prior experience with cropping system research would have been desirable, but not essential, for two reasons. First, cropping systems research methodology, if not in its infancy, was still being refined as a field method. Second, appropriate backstopping, which was available through other institutions at that time, could have been used to improve field team skills in this field. However, it appears that the initial field team lacked experience in CSR/E and were fielded without remedial orientation. The first in-country exposure to CSR/E concepts and methods came with CIMMYT assistance, some five years into the project.

After the start of the project, some key positions were allowed to remain vacant for varying periods of time in both the local research team and the technical assistance team. This occurrence made difficult, if not impossible, the formation and continuance of core interdisciplinary research teams for cropping systems research.

Proper care was not taken in planning study leaves to ensure that all trainees did their thesis work on the project and that all trainees, upon their return, would spend a reasonable amount of time working with their counterparts to make sufficient field applications of their newly acquired skills and knowledge.

c. Backstopping and use of short-term technical assistance

Backstopping is usually used in project implementation to complement the competence of the long-term technical assistance team. Short-term technical assistance is, in general, limited and planned to take advantage of very discrete skills difficult to find in the combination of qualifications required in the long-term assistance team.

The level of short-term technical assistance used in the project was truly substantial. This resource was used to bring in a wide range of skills to complement those available from the long term TA team and their counterparts. However, two absolutely key areas were slighted. More short-term TA should have been devoted to cropping systems training and orientation, and to socioeconomic specialists in farm and household analysis.

2. Program implementation

a. The last three years

During the last three years of the project, emphasis by the contract TA team shifted to extension activities in order to bring this component of MOAC up to the standard needed to ensure the flow of research results to the farmers and into field use. According to the second mid-term evaluation and the A.I.D. program audit of the SCSRET project, it was believed, at that time, that institutional development within the Research Division was well on its way toward meeting desired End-Of-Project Status. Reflecting this shift in emphasis, the project phased out expatriate support to certain research activities, including reporting of research results.

Accordingly, the contractor's annual plan of work represents specific research activities for the 1988-89 cropping season. Thirteen items were listed as follows:

- maize variety screening;
- maize variety vs environmental factors;
- sorghum variety screening;
- grain legume variety screening;
- moisture conservation techniques;
- trickle irrigation research;
- bacterial wilt resistance in tomatoes;
- crop rotation trials;
- apples and peach variety trials;

- fruit cultural practices trials;
- vegetable variety screening;
- forage production systems; and
- economic analysis of agricultural production systems

The 1988-89 Project Annual Report presented results for only two out of these thirteen research activities--crop rotation trials and the economic analysis of agricultural production systems. Of the other eleven research activities, nine were listed as on-going research while two (trickle irrigation research and vegetable variety screening) were postponed to the following year.

For the 1989-90 cropping season, technical assistance for research was reduced to one major activity; to assist in planning, conducting, analyzing and reporting agricultural research. Two other minor activities listed in the 1989-90 project plan of work are the use of consultants in research programs and the purchase of research equipment.

The 1989-90 Project Annual Report presents the contributions made by the Agricultural Economist and the FSR Specialist as advisors to research activities. Their activities were not fully in response to the work plan for the year, but were in response to responsibilities written into their job descriptions. The Agricultural Economist Advisor prepared a report on "Crop Rotation Experiments at Malkerns Research Station" and a paper entitled "Maize Production and Input Levels in Swazi Nation Land Farmers." He also developed cost benefit budgets for ten common summer vegetables and five common winter vegetables under high, medium and low management levels. Activities outside the plan of work performed by the FSR advisor were made at the request of the Chief Research Officer. They included drafting of a plan for reorganizing the Agricultural Research Division and outlining the plan for the Manzini Conference and Training Center to be built at the Malkerns Research Station.

The plan of work for 1990-91, the last year of project implementation, specified assistance for planning, conducting analysis and reporting of agricultural research as its principal contribution to research. Other activities listed were a field day planned at MRS for February 1991, a National Research Conference to present research results (planned for April 1991), an external evaluation review, and finally a Southern Africa Extension Research Meeting planned for July 1991. The entire technical assistance team is scheduled to depart from Swaziland soon after that meeting.

In conclusion, evaluating research activities for the last three years simply from a review of the contractor's activity reports is probably inappropriate. During this phase, the contractor was passing responsibility for planning, implementing and reporting research over to host country institutions and their leadership. This is an appropriate and needed step in the institutional development process. It is more appropriate to examine the Swazi Agricultural Research Division's last three years of research activities. Such an evaluation should indicate the sustainability of institutional changes since project direct involvement in research withdrew.

As a first observation, the latest ARD Annual Report available is that for 1988-89, the first year of the project extension period. Further, only one ARD annual plan of work has been prepared over the last three years of project implementation. The 1988-89 ARD research work plan can be found as Addendum B to the 1988-89 SCSRET plan of work.

The process of preparing annual research work plans has not been fully institutionalized at Malkerns Research Station. Preparing work plans and annual reports of accomplishments must fit within an annual schedule of other activities, including actually conducting research trials. Among the more time consuming of these are the on-farm trials which the project sought to institutionalize within ARD procedures. However, a formal process of preparing and approving annual ARD research work plans remains important for sustaining improved performance at the Malkerns Research Station. The idea of preparing a longer-term research proposal is accepted by the Research Division. However, it is not clear whether the research division sees both processes as being necessary and complementary, which is precisely what this evaluation advocates.

The MOAC/ARD 1988-89 work plan is extremely well prepared. Particularly noteworthy are the identification of activities to be undertaken and outputs to be expected. In this regard, the MOAC/ARD 1988-89 work plan is quite complete. It contains thirteen main components:

(1) New technologies for field, pasture and horticulture crops, which subdivided in 23 sub-components corresponding to 23 research proposals prepared by the Swazi research personnel;

(2) Livestock production research, which is composed of five sub-components or research proposals covering animal nutrition to pasture improvement;

(3) Support for new technologies, a combination of unrelated research activities that should have been included in other components, although they seem to have a statistical element in common;

(4-7) Concern dissemination of research findings to different interested groups of people or institutions.

(8) Covers on-going long-term training of research officers;

(9) Covers in-service training of research assistants;

(10) Entitled, "Implementation of Farming Systems Research in all ARD Sections" is the most important and revealing component of the work plan. In its six sub-components, it expresses a firm decision of the local research team to embrace the farming systems research approach. Subcomponent 10.3 is entitled, "Remove distinction between

MRS and SCSRET". The corresponding activity is: "Improve working relations between Swazi and U.S. staff to carry out research programs". The expected output is: "U.S. inputs fully integrated into ARD system". While the output is wholly appropriate for this stage in the project, it is surprising that listing "improved working relationships" should be explicit activity this late in the life of the project.

(11) "Update the skills support staff" refers to the research recorders;

(12) Calls for the purchase and maintenance of equipment for research; and

(13) Proposes further training for research officers.

Most of the on-farm trials reported in the 1988-89 Annual Report were classical multi-factor trials with randomized, complete block designs, two repetitions, and two to six rows, six to ten meters long. These are classical component technology experiments carried out on farmers' fields and might be better called "off-station" rather than "on-farm" trials. True cropping systems research would have involved a team of researchers (including the farmer) designing and conducting these trials; testing of a cropping pattern on a land type or in a typical agro-ecological environment; and larger-size fields (1/10 to 1 ha), with each field being the repetition, managed by a farmer keeping track of labor and other input used to allow determination of economic viability or cost-return analysis.

To conclude the review of the ARD research report, a considerable amount of research is underway. Although it may not be integrated with an overall cropping systems framework and reporting of results may be less than timely, the amount and diversity of research being performed apparently exceeds that at the beginning of the project by a substantial amount.

b. The first seven years

A fairly large number of research reports and other documents published before 1989 by the project research team indicates that considerable research took place during the project's first seven years. Some of the technologies developed are already in use by farmers. Others have been the subject of several extension bulletins. Other have been delivered to the information section for publication. These facts confirm the usefulness of research work performed during that period.

The following procedures were used step-by-step in the project research process (Networking Workshop Report, 1988).

- Collection of background information
- Informal interdisciplinary diagnostic surveys
- Formal surveys
- Identification and prioritization of major constraints facing farmer
- Design of on-farm trials

- Conduct on-farm trials and farmer assessment
- Feedback to on-station and on-farm research
- Summarize results
- Recommendations to extension

The resulting recommendations were usually disseminated in one of three ways: 1) extension training workshops; 2) research and extension field days; or 3) written publications (field support guides or fact sheets). Most of these results are also compiled in the newly released Farmers' Handbook.

These procedures are appropriate to the conduct of a farmer based, cropping systems research program. Why then, did such a program not emerge? As we show elsewhere, the project started with a faulty understanding of the rural economic, social and political environment. It proceeded with a weak baseline study that did not produce an understanding of on-farm systems, never desegregated the SNL clientele to identify recommendation domains (target groups), and did not involve farmers in any meaningful way.

Thus, while considerable agricultural research was done, and the procedures for cropping systems research methods were known (at least in 1988), the research achievements that emerged closely parallel those that could have been expected from a standard Land Grant University experiment station mode. It was precisely the failure of this model to effectively change technologies on small Third World farms that gave birth to the cropping systems or farming systems process as an alternative with some potential. In its limited goal attainment, the SCSRET project again proved the need for something other than conventional Land Grant models for developing technologies for the small farmer setting.

3. Results and discussion

a. Training

Institution building has taken place through the careful screening and training of a core of Swazi researchers. These professionals are capable of carrying out useful research for the benefit of Swaziland. Sustainability of this important result can be achieved in several ways. First, there should be a continuous flow of competent research personnel through the ARD research system from the rank of research assistant through the level of senior research officer. Certificate training should be restored. Both researchers and national subject matter specialists should participate in dispensing this training. Then, Diploma training and first degrees should follow. The first university degree (BSc) should be followed with a short period of specialization as final preparation for the position of "research assistant" or to allow a series of short courses and field practical to take place during the cropping season as part of university training. A.I.D., together with MOAC, has begun the building of a very important institution for Swaziland. Together they should be committed to its sustainability.

b. MOAC structure

Although not a critical constraint for research, the organization of MOAC can be improved to enhance efficiency. While this subject is covered elsewhere in this report, it is worth noting that given the limited number of research personnel and the need for research and extension to work hand in hand, better results would be obtained if both sets of activities are located in the same department or division. Joint appointments would also help distribute more evenly and assist in collaboration. At the field execution level, considerable rationalization of skills and assignments is needed along with an accompanying reorganization to maximize staff effectiveness and managerial direction.

c. Research planning

Research planning in the ARD is deficient. Researchers develop, separately or section by section, their research proposals which they then discuss with each other. Improvement can be brought in the present system in three different ways. First, it is necessary to train a few Swazi researchers who would in turn train other researchers in cropping/farming systems research. That would facilitate institutionalization of research capacity currently in place. Second, a long term research plan of either three or five years is needed. It should be updated yearly, in accordance with the concept of a rolling work plan. Annual presentations of research results and research proposals should take place in a series of conferences. Third, research efforts should be concentrated and not be dispersed.

d. Research funding

Having trained enough competent researchers, having developed a technically sound research plan, what is needed next is the means to "deliver the goods". This requires a recurrent budget equal to the tasks at hand. All Swazis contacted, in both extension and research, have expressed concern over this recurrent budget issue. There is a need for urgent attention to this problem which goes to the heart of the sustainability question.

C. Socio-Economic Research and Farmer Impact Assessment

1. Introductory discussion

The set of general quantitative measures of project achievements relate to increased maize self-sufficiency and increased maize sales from SNL farms, and a rise in the production of vegetables and fruits from SNL irrigation schemes. The Project Paper Amendment states that the percentage of SNL farms producing primarily for commercial markets will increase to 20 percent by 1992 and to 30 percent by 1997. The Logical Framework further indicates that the percentage of SNL farms producing marketable surplus above subsistence will increase to 60 percent by 1992 and to 80 percent by 1997.

According to the PP Amendment (1988: 11), it can be reasonably expected that the project will:

- increase consumer welfare by increasing food supplies;
- increase the income and employment of farm workers;
- increase net income of the agricultural sector;
- increase the contribution of agriculture to general development;
- preserve the environment; and
- expand the income and employment opportunities of rural people.

Evaluation faces a fundamental difficulty in identifying causal connections between these objectives and SCSRET project activities. A number of important exogenous variables significantly influence the economic viability of SNL farms. Chief among them variable annual rainfall and its impact on crop production, and the dominant contribution of off-farm wages to the SNL household economy. Improvements in the economic viability of SNL farms (resulting from the adoption of new technologies, the use tractor plowing, etc.) often represent capital inputs which are supplied from off-farm incomes. In general, SNL farms do not produce sufficient income from farming to purchase inputs, new technologies, and the like. Thus, while research and extension activities developed over the life of the project have a potential to contribute to the development of SNL farms, there is no clear way in which they can be linked directly to project activities.

This basic problem of linking SCSRET to changes measured at the farm level is further exacerbated by the fact that no holistic, systems approach which could have analyzed project interventions within a wider, whole farm context was implemented. Farming is but one component of the SNL household economy. Farms are typically composed of old people and the young. Most able-bodied family members are away working for wages in more lucrative non-farm sectors. Significant family investments are made in cattle and small ruminants (mainly goats). Having no complete image of the farming system in use on SNL land, it is not clear from project documents whether this indicates that rural SNL households operate an agro-pastoral system or a pastoral system with an agricultural component. Such knowledge is basic to comprehending the context in which SNL farmers make decisions concerning the allocation of scarce financial resources, labor, and land.

The production of staple maize on SNL farms is essentially a subsistence activity for family members residing on the homestead. Plots are small, the average holding is about two hectares, and many homesteads cultivate less than one hectare. Maize production on this scale is hardly likely to yield significant sums of cash from the sale of surpluses which can be reinvested in project developed technologies. The absence of a global picture of SNL farm household types, including demographic, economic, and agricultural characteristics, makes it very difficult to discern the logic of SNL homestead decision making. The absence of this type of understanding also seriously constrains the ability of agriculture and research to identify technologies that might be adoptable on these farms.

Applied socio-economic research contributes to project success in at least four ways. First, it is fundamental to identifying research problems through a fuller understanding of the farmers' decision making milieu. Second, it is central for identifying constraints and opportunities and for ranking them in order of importance. Third, it provides a means of evaluating the potential utility of new technologies or practices in the context of the intended beneficiaries. Finally, it establishes a basis for measurement of changes or successes achieved over the life of the project.

In the case of the SCSRET project, it is evident that beyond training experts in sociology and agricultural economics, little was achieved with respect to the four uses outlined above. The low priority given to socio-economic research is reflected in the use of short-term technical assistance as reported in Annex IV. Of a total of 109.5 person-months (just over nine person-years) only 6.75 person-months (or about 6 percent) of short-term technical assistance was used for socio-economic activities. Gaps and turnover in long-term expatriate personnel combined with absences for training of local personnel also contributed to slow development of an accurate and useful definition of the environment in which the project was to intervene. Furthermore, adequate baseline studies were not undertaken at the outset, precluding any clear assessment of project achievements.

The project did produce a number of socio-economic studies, most of which were of good technical quality when examined as individual pieces of work. What appears to be missing throughout, however, is an integrated approach which could have focused and integrated socio-economic components into the research process and informed the research-extension system. Good pieces of socioeconomic work demonstrate the quality of training received and the abilities of those trained. However, if this training and ability are not applied in mobilizing the capacity of the larger institution towards achieving appropriate goals and objectives, institution-building will not be fully complete.

Socio-economic research is not a passive activity which responds to specific needs. It is a pro-active undertaking which contributes fully to developing and up-dating research agendas. For example, an effective socio-economic unit assists the research process through by identifying specific beneficiaries who are likely to use research outputs on their farms. To date, recommendations stemming from the project are of a general or "blanket" type directed to all SNL farms. Work has apparently not been done to differentiate SNL farmers on the basis of fundamental criteria such as land, labor and capital. SNL farms are not homogeneous; rather they show considerable variations in land and labor resources as well as in access to cash from a wide range of off-farm sources. To date there is no evidence that the socio-economic support unit has gone beyond general surveys and specific studies of constraints to adoption of project-derived technologies. If the benefits of project-financed training are to bear fruit, it is essential that the socio-economic unit play a leading role in the research process as well as in research-extension activities.

The SCSRET project is essentially an institution-building activity with outputs directed toward support for production. Ideally, research is focused on the development of agricultural technologies, practices, and packages which improve the productivity of SNL farms by means of an effective agricultural extension system. As noted earlier in this report, the focus of this evaluation falls chiefly on the last three years of the SCSRET project during which the project sought to strengthen the capacity of the Agricultural Extension Service.

2. Impact on maize production

The PP Amendment identified a set of benchmarks for measuring progress in maize production. These are:

- low plant populations;
- late planting;
- shortages of plowing equipment;
- labor shortages at weeding time;
- stalk border infestation;
- aluminum toxicity; and
- nitrogen deficiencies.

Concerning the production of maize, socio-economic surveys have identified a lack of cash, supplied from wage earnings, as the main obstacle to technology adoption (Warland-Dlamini, 1991: 10, 39). Under prevailing circumstances, labor is allocated to places where it can make the greatest gains, those technologies which are adopted tend to be substitutes for labor (such as tractor plowing and herbicides).

It can neither be confirmed nor denied that the project had any significant impact on the adoption of improved maize production technologies or techniques by SNL farmers. As noted above, the absence of a comprehensive baseline study precludes a reliable quantitative assessment at the end of the project. Given that there is no clear causal connection between impact indicators and project activities, and given that a comprehensive survey of all aspects of the farming system was not undertaken, changes in rates of adoption can only be said to be coincidental with project activities.

The project did undertake a number of socio-economic studies of SNL farmers. Although a baseline survey (Watson, 1983) was carried out early in the project, comprehensive surveys only began in the 1985-86 agricultural year (Curry) with a sample of about 120 SNL homesteads. Dlamini, an agricultural economist, surveyed some 200 homesteads in 1988; Malaza, a rural sociologist, studied a sample of 203 homesteads in the same year. The final, and most comprehensive work, which drew on data from previous surveys, was the Dlamini-Warland study of early 1991 which looked at adoption rates of project-related technologies and practices for a sample of 200 homesteads.

Dlamini and Warland acknowledge that their data, "provide indirect evidence of the impact of the Swaziland Cropping Systems Research and Extension Training Project on the uses of recommended practices." The findings from the Warland-Dlamini impact study should be viewed with considerable caution because it is not clear how representative the samples are. In all cases but that of Malaza, surveyed homesteads were also used for on-farm trials or had been associated with the project in other ways. Malaza's sample shows much lower rates of adoption compared to the other samples from the same year. According to this report (1991: 21), maize self-sufficiency in 1988 was 50 percent in the Malaza sample, 67 percent in the Dlamini sample, and 86 percent in the Curry sample. Recall that the homesteads in Curry's sample were involved in on-farm trials, Dlamini's group had considerable interaction with the project, and Malaza's sample was randomly chosen. No repetition of Malaza's study was made, but in early 1991 94 percent of Curry's group and 71 percent of Dlamini's group were reported to be self-sufficient in maize.

Although the Warland-Dlamini report can only cite correlations between project activities and adoption rates without recourse to any solid causal links, it is likely that the project did have an impact on SNL farms associated with project activities through the research and extension system. Evaluation team discussions with the Director of Agriculture/MOAC revealed that surplus maize sales to the National Maize Corporation have risen from about 8,000 tons to 20-26,000 tons per year over the life of the project. The authors of the impact study report that: "... farmers who indicated they were self-sufficient or sold maize reported more contacts with the various research and extension programs than did those SNL farmers who were not self-sufficient or did not sell maize."

A definitive answer to the question of increased self-sufficiency in maize is impossible to determine on the basis of project reports. It is highly unlikely that the number of SNL farms producing primarily for the commercial market has increased significantly. This determination is further confounded by a lack of data in the samples which shows what percentage of SNL farms were commercially oriented at various points over the life of the project.

In view of the fact that maize production is essentially a subsistence undertaking and that maize plots are small, it is a realistic goal to promote greater household self-sufficiency with an increased potential for surplus. However, the goal of increased commercialization of maize under these circumstances is highly unrealistic. The production of high value vegetable and fruit crops, on the other hand, holds a great deal more commercial potential for small SNL farms.

3. Impacts on vegetable and fruit production

Concerning the production of fruit and vegetables, the PP Amendment (p. 12) identified the following measures of adoption of fruit and vegetable varieties now being developed at the Malkerns Research Station and at regional research centers:

- annual determinations of the acreage of horticultural production under irrigation;

- increases in the production of tomatoes, squash, and various types of greens; and

- increases in the production of apples, peaches and strawberries from a propagation nursery at Malkerns.

Swaziland currently has some 42,000 hectares of irrigated land. Just over 1,000 ha. are located on the SNL of which only 25 to 30 percent is actually in use by SNL farmers. Currently some 25 schemes exist varying from about 10 to 25 ha in size. The average participant has an irrigated cropping area of about 0.5 ha. Five of the schemes are managed by the Taiwan Development Agency and are used principally for the production of rice. Heavy soils and a paddy-type irrigation arrangement mean that these schemes have had little success in producing vegetables during the winter months.

Most of the SNL irrigation schemes were established in the late 1970's and early 1980's. A severe cyclone washed out significant portions of the infrastructure of these schemes in 1984. IFAD has been involved in rehabilitation work since 1987. In the past these schemes were built free of charge and little or no attention was paid to farmer organization, irrigation management, or maintenance and sustainability aspects.

The SCSRET project's first irrigation specialist spent from 1983 to 1985 engaged in rehabilitation of washed out schemes and village water supplies. The current expert, whose counterpart is away in the UK on training, compiled a survey of the schemes with the team now implementing the CAPM project.

Discussions with the SCSRET TA, and visits to three of the schemes identified the following constraints to their development. On the production side: poor organization and management, low levels of local participation (i.e., farmers are requested only to provide labor as a contribution), a lack of trained extensionists specialized in irrigation, the absence of a Swazi subject matter specialist in irrigation, and a drain of expertise from public sector irrigation projects to the more lucrative private sector. It is also difficult for farmers on the SNL to obtain credit because, under SNL tenure arrangements, land cannot be used to secure loans.

Serious marketing problems which are likely influential in discouraging participation in irrigated schemes exist: high transportation costs and poor access to an already small local market. Two of the schemes visited were heavily under used. Only one scheme, at Ntamakuphilh, appeared to be operating with some degree of success. On this scheme (with women accounting for over two-thirds of participants) arrangements had been made with Namboard (Swazi National Agricultural Marketing Board) to purchase produce. This IFAD-supported scheme had purchased its own tractor and had allocated communal plots from which profits were saved to cover recurrent costs for the purchase of more equipment.

This scheme's apparent success is a result of good indigenous organization and a progressive chief, as well as the all-important link to a market.

Although it may be outside the immediate scope of this evaluation, the market factor is of obvious and paramount importance to the success of commercial agriculture. Although small-holder subsistence maize production has restricted potential for commercialized disposal, the production of fruit and vegetables, which yield much higher returns, was an obvious window of opportunity for the SCSRET project's efforts to raise the standard of living of SNL farmers. It is true that the SCSRET project is an institution-building endeavor with production support outputs, but efforts in support of production cannot be fully realized without the attractive forces of the market. In retrospect, it is unfortunate that the CAPM project, which overlapped with SCSRET, did not attempt to establish market connections for some of the schemes so that SCSRET's efforts on the production side could have had a higher probability of realization.

In summary, the SCSRET project had little impact on the development of SNL fruit and vegetable production from irrigated schemes. This is unfortunate, given that about 80 percent of the country's fruit and vegetables are imported from neighboring South Africa.

The Malkerns research station has demonstrated to local SNL farmers that apples are a viable crop in Swaziland. This year orders through the extension service are for some 250 apple, 400 peach, 100 plum, and 20 apricot seedlings. Some 80 requests for vine roots (grapes) were also reported. The bulk of this material is imported from suppliers in South Africa at E.4.00 per seedling. Output from the Malkerns Research Station is insufficient.

According to a horticultural extensionist, efforts in the production of tomatoes have also been successful . Yields have risen from 8 to 10 tons/hectare to over 15 t./ha. last year. The extension service has targeted a yield of 22 t./ha. for this year. These gains were made by extension efforts promoting the use of fungicide sprays at the right times in the production cycle.

In general, however, there appears to have been little systematic work done with respect to SNL irrigated schemes through a concerted application of research and extension needed to bring irrigated fruit and vegetables into being as a significant component of the SNL farming system. The horticultural extensionist at Manzini reported modest increases in the production of vegetables and fruits, although no up-to-date data could be found to substantiate this assertion.

4. Summary and conclusions

The evaluation team found that the application of socio-economic research in the implementation of the SCSRET project was inadequate and that overall project accomplishment suffered as a result. The absence of comprehensive socio-economic baseline surveys precludes a quantitatively verifiable determination of attainment of goals, purpose, and objectives.

The project TA team was unable to develop and operationalize comprehensive systems approach which includes and integrates essential socio-economic information concerning different types of SNL homesteads, the circumstances of their decision-making, and the relative importance of constraints and opportunities to development.

The absence of a systems approach to research likely contributed to an atomization or diffusion of the research effort in as much as it encouraged each specialization to follow its own agenda and effectively prevented interdisciplinary collaboration.

An assessment of project impacts undertaken in early 1991 could not draw any concrete conclusions of benefits from the project on SNL homesteads because no baseline data or systematically implemented systems of project tracking had been in place. However, it can be said that those homesteads which participated in on-farm trails are likely to have adopted project-derived practices and technologies.

The project's two goals were not realistic and could not be verified given the project's mandate. The first: to increase (to 20 percent in 1992, and to 30 percent by 1997) the percentage of SNL farms producing for the commercial market is unrealistic and cannot be causally linked to the activities of the SCSRET project. External factors, such as rainfall and transfers of capital from off-farm employment into homesteads, have much more impact on the adoption of technologies or on the productivity of SNL homestead farms in general than project-derived technologies and practices. SNL farms are generally small (about 2 ha.) and cannot be expected to produce significant marketable surpluses above family consumption needs. Small surpluses are usually disposed of informally through kin and neighbors. SNL farms generally rely on wage earnings from off-farm employment to cover production expenses. Since rainfall is not a controllable variable, the second goal of increasing percentages of SNL farms producing marketable surplus above subsistence increases to 60 percent by 1992 and by 80 percent by 1997 is also unrealistic and at best only remotely traceable to the SCSRET project.

V. PROGRAMMING AND MANAGEMENT ISSUES: 1980-1987

Viewed at the end of the project, SCSRET is a mixed success at best. While much was accomplished, an opportunity for real breakthrough was missed. The project never, in fact, implemented a true cropping systems research program and, therefore, was unable to fully institutionalize cropping systems procedures within the research function. Lacking the farmer tested, appropriate technologies that such a research process can develop, the extension message or content is currently limited to standard single component technologies and varietal recommendations, much as it has been for the past decade. Further, in the absence of a clear definition of farm environments, many of the areas of research undertaken are not well targeted toward SNL farm needs. Integrated packages of technologies, designed to meet a carefully articulated set of household and farm enterprise needs, are not generally available. Further, extension and research remain separated at the level of field operations, rather than functioning as an integrated unit, as is envisioned under cropping systems methodology. In the absence of these critical dimensions of the research-extension process, impact on target SNL farmers has been muted.

These findings are discussed at many points in the above text. It became apparent in the course of the study that confining our attention on the 1988-1991 period would have left us unable to adequately explain the background and causes of deficiencies and problems found. Therefore, at the risk of seeming to second guess earlier evaluations, or of repeating earlier work, this evaluation team felt it necessary to provide a fairly detailed review of design, implementation and programming aspects of the pre-1988 period. This section is offered with the thought that the primary user and potential beneficiary of this evaluation report will likely be A.I.D., and specifically the Swaziland Mission, and that many of the lessons learned during the ten years of the SCSRET project are still valid as guidance for future project activities.

The main issues which affected implementation of SCSRET during the first seven years of the project, in the collective view of the evaluation team, are detailed in the following sections:

A. Project Design Issues

Part of the project's problems can be traced to weakness that are apparent, admittedly in the vision of hindsight, in the PID. First, there is only limited indication that the extremely difficult economic environment for traditional agriculture in southern Africa was understood well enough to underpin design thinking at the PID stage. Southern Africa is unique in this regard and requires unique approaches. Given the pervasive influence of oscillating migration to the Republic of South Africa (RSA), the influence of RSA's wage rates, the resulting high level of monetization in rural areas and the influence of logistic isolation of farm and household prices, agricultural development strategies for traditional farming must be very carefully articulated. While we were unable to find the document for closer scrutiny,

quotations in other project documents (eg. Fischer, et al.) suggest that the CDSS in place when the PID was written contained a wholly unrealistic view of agricultural potential on SNL lands.

Of particular interest in this connection, the first output-to-purpose assumption in the PID Logframe which states, "Prices are favorable for the development of economically viable cropping systems package" (A.I.D., 1980, p.B4), was untrue. Price relationships did not meet this requirement when that assumption was written and trends clearly evident at the time suggested that price relatives would turn even further against small farm agriculture, at least during the first years of the project. Thus, the expectation "that the percentage of small farmers involved in commercial agriculture as a principal source of income will increase from 10 percent to 25 percent by 1991" (A.I.D., 1980, p. A13) is unrealistic.

In the AID/W review of the PID (Department of State, 1980) the issue of the feasibility of the project to provide incomes sufficient to entice male labor to remain with agriculture was flagged as requiring further attention by USAID/S. Addressing this issue might have caused a deeper analysis of the economic environment and perhaps a different project design.

The term "cropping systems" is not defined in the PID, nor is much detail given as to how this concept is to be operationalized. This leaves considerable room for interpretation by the collaborative PP design team. Several of the main components of a cropping systems research program are mentioned in the PID and annexes. However, the rural household as the point of analytical reference and a number of other key elements of the systems approach to small farm technology development, such as the influence of external factors (prices, markets, labor, transport, etc.), do not appear in the text.

The comments immediately above refer to the period before a Title XII university contractor was chosen. Discussions with all Mission staff currently involved in agricultural projects indicate that there has been little or no accumulation of Mission understanding on these issues in the interim.

The PID provides a scope of work and position identifications for the three members of the design team to be provided by the potential contractor selected from the Expressions of Interest received from a national solicitation. Included in the minimum qualifications for these positions are the following statements.

For the Cropping Systems Specialist (Ag Economics):

Minimum MSc Degree in Agricultural Economics with actual overseas field experience in developing a cropping systems research program and conducting production economics research in a cropping systems context.

For the Cropping Systems Specialist (Horticulture):

Minimum of MSc degree in Horticulture with overseas experience in applied agriculture research in single crops, multi-cropping, inter-cropping and cropping/farming systems research. (emphasis in PID)

If these minimum specifications had been met, the design latitude permitted by the lack of detail in the PID description of the cropping systems research component would have been appropriate. However, the staffing nominated by Penn State and approved by MOAC and A.I.D. did not fulfill any of these minimum experiential qualifications except the degree level of education. The agricultural economist had only limited short term overseas experience when nominated and no experience with cropping systems work or production economics in Third World settings. A review of the horticulturalist's biographical information for his pre-project career indicates no international work experience at all. Hence it is not surprising that the research program written into the PP does not reflect cropping systems concepts or procedures.

While it is recognized that the PP, and not the PID, constitutes the formal document against which evaluation occurs, the fact that a true cropping systems research effort was not mounted by this project probably has its early roots in this deviation from PID specifications.

The Regional Inspector General for Audit conducted an audit of the SCSRET project in 1988. This report's principal finding concerning design deficiencies was that:

- Although the project improved the Ministry of Agriculture and Cooperatives' capacity to generate research recommendations, only a few farmers received the research information through the extension system. This was due in part to the project's design, which failed to focus adequately on weaknesses in the organizational linkages between the researchers and the farmers, and to provide a feedback mechanism on project impact on the farmers.

- Unless linkages are created to better convey research information to the target group, through the extension system, the impact of the project's eventual $8.6 million investment will be significantly limited. (Inspector General, 1988b, p. 4)

This audit report then recommended that the Mission should:

- require a restructuring of the project to identify and focus on the obstacles and constraints to the effective extension of research and training or discontinue the project. (Inspector General, 1988b, p. 4)

In another design related concern, the audit found that:

- The project's logframe did not require objectively measuring the project's impact on farmers on comparing the impact to realistic targets. Without such project indicators, the Mission was not in a position to identify or take action on the project's limited impact on farmers through the extension system. (Inspector General, 1988b, p. 8)

These factors suggest that the project set out with a faulty understanding of both the SNL environment and the government institutional environment, did not use systems methods to develop a clear understanding of where it was headed and how to get there, and did not have in place the measures that would provide clear and current monitoring of progress.

B. Staffing Issues: Contractor and USAID

The Project Paper calls for a contractor field team of six professionals headed by a "General cropping systems specialist" serving as COP and including a "cropping systems agronomist" and a "cropping systems horticulturalist" (emphasis added). Yet, the specialty of the initial COP was "Extension Administration." The contractor's explanation of this discrepancy rests on an internal policy that the COP should be one of their own staff, and the fact that they had no one on staff specialized in cropping systems to the level implicit in PP specifications.

Furthermore, while "cropping systems" is explicit in the titles given the above three positions listed in the PP (p. 32), these adjectives had disappeared from the agronomist and horticulturalist positions (pp. 33, 35) by the time Appendix J was written. Qualifications for these two positions do not specify prior experience in cropping systems internationally. The horticultural position does not require international experience of any type. In fact, the initial nominee accepted by USAID for this position had no international and no cropping systems experience. The strong presumption is that the job description was written to accommodate the individual rather than to maximize project effectiveness.

In addition, it is apparent that the required qualifications for the COP as given in the copy of the PP made available to this evaluation team, had been altered at some point in the process through cut-and-paste methods. The altered COP qualifications do not call for a cropping systems expert as specified in the body of the text. The altered text excuses the COP from having African experience (making such experience "desirable but not required") and suggests only that the COP "must be knowledgeable about and accept the cropping system concept as the framework for the project."

The drift away from cropping systems or a generic systems approach as the core method for the project was likely set in stone with the nomination by the contractor and the acceptance by MOAC and USAID of the first Chief of Party and others on the initial field team. The contractor, again with MOAC and USAID approval, subsequently posted three additional Chiefs of Party with specializations, in chronological order, of Agricultural

Information, Agricultural Education and Extension Organization and Planning. Only the latter was appropriately qualified for the scope of work in place during his tenure, that being the extension emphasis of the post-1987 contract extension. No person with cropping systems experience was assigned to lead this project when those were the skills needed.

There has been considerable turnover in the Mission personnel charged with oversight and management of the SCSRET project. During the 35 month contract extension, turnover at the level of USAID project management has been particularly severe, with four individuals holding the ADO position and two serving as Agricultural Development Officers (ADOs.) Coupled with four contractor COPs, it is not surprising that continuity in leadership, so necessary to the integration of a complex project of this type, has suffered.

C. Non-Sustainability of USAID Program Emphases

The length of the Swaziland Cropping Systems Research Project (10 years) exceeded the length of AID/W interest and support to cropping (or farming) systems projects as a development strategy. USAID's interest in FSR/E blossomed in about 1981, coincident with the design of the SCSRET project. From essentially no project commitments in Africa in 1979, USAID moved to over $600 million of obligations in this field by 1985. These projects were variously called farming systems, cropping systems, mixed farming and other names but all had the central expected methodology which is now called Farming Systems Research and Extension (FSR/E). This thrust was further supported by the highly successful centrally funded Farming Systems Support Project (FSSP) from 1982 through 1986. However, word was delivered in 1987 to the Steering Committee of the International Farming Systems Research and Extension Network (developed worldwide under FSSP) that farming systems had lost its currency in USAID/W and had been replaced as the major program thrust in agricultural development by "sustainability" and a shift in emphasis to commercialization and private sector initiatives.

Even this emphasis is waning now, to be replaced by "Democratization." Institutionally, this is a symptom of a severe problem, a loss of direction and focus. From the perspective of individual projects, still being let under five to seven year contracts, this phenomenon promises even greater risks for the contractor of being judged a failure in the end when everyone's attention has turned elsewhere.

Given the magnitude and speed with which USAID bought into the farming systems concept and strategies, and the speed with which the agency dropped the idea, this sequence has to represent one of the most substantial flip-flops in foreign assistance history. Before pulling the financial rug out from under this strategy, which this team still believes to be viable, A.I.D. succeeded in creating an international cadre of interest among thousands of professional workers in perhaps forty countries or more.

The Swaziland Mission similarly redirected its agricultural support for Swaziland to commercialization of agricultural production and marketing in 1987/88. As noted elsewhere, this decision appears to have been based on findings of mid-term evaluations and project audits, findings which are inadequately unsupported. Effective with this redirection of Mission interest, it is likely that management priority given by USAID to SCSRET waned.

D. Management Deficiencies

During the process of conducting the audit of the SCSRET project, problems noted with respect to the Missions's project management led the Regional Inspector General for Audit to conduct an audit of USAID/Swaziland's overall management system (Inspector General, 1988a). A number of areas of needed improvement were noted which do not need repeating here. The following audit conclusion does, however, affect the present evaluation of SCSRET:

> "The problems discussed in this report all adversely effected (sic) the Swaziland Cropping Systems Research and Extension Training project. Further, problems obstructing the project's target group impact were not identified or acted upon, and this jeopardized the success of the project's $8.6 million investment" (p. 12).

Thus, in the opinion of the Regional Inspector General, the culpability for SCSRET's shortfalls is a shared one. This evaluation team concurs in this finding.

E. Summary

It is clear from the above that the Swaziland Cropping Systems and Extension Project did not implement a cropping systems project in the normally understood sense of that term and as the PID (and probably earlier programming documents) had anticipated. Significant departures from what was needed, if such a program were to have been achieved, occurred throughout the design phase, staffing decisions, contractor implementation and Mission oversight and management. It is also clear that culpability rests as much with the Mission as it does with the contractor. Since the results of this project will become part of the overall legacy of the Title XII-BIFAD-USAID relationship, and since a frequent response is to blame the contractor, one must ask some bottom line questions. Why, however seriously interested and well intentioned they may have been, was a University selected that did not have, within their institution, the expertise needed to do the job? Our inquiries in this regard suggest that the site visit process utilized by USAID (consisting of a team of USAID and host country administrators) needs a fundamental review. Further, how could a project which contained enough structural flaws to put its possible success at risk from the outset be collaboratively designed, approved and funded?

Much of the constraining impact of these departures on project success, particularly in the area of farmer impact, was already being felt at the point of the project redesign in 1988. Thus, the amended PP started life with more than one strike against it. Performance during the final phase, especially in the extension area, was excellent considering the status existing when the final COP arrived.

VI. RECOMMENDATIONS

The evaluation team recommends the following series of activities and decisions in order to ensure sustainability and further development of SCSRET achievements.

- MOAC should extend their commitment to cropping systems research and extension in Swaziland and find a way to more fully incorporate this method as the core of their research/ extension activities. As long as MOAC efforts are targeted toward SNL land, there is no substitute for Farming Systems Research and Extension methods;

- External assistance in farming systems methods should be continued for at least two more years. Emphasis should shift from theoretical classroom work to hands on, field applications. This could be accomplished with either a long-term expatriate or a series of short-term technical assistance inputs.

- MOAC officials should give priority to, and take leadership in restructuring of MOAC as proposed in the GOS National Plan 1991-1994. The CAPM project should provide such assistance through their organization and management component.

- In-service management training for all senior staff should be continued and strengthened. An overall administrative/ management plan of work parallel to the research/extension plan of work would be an important addition.

- Farm management training and field activities should be included in all field staff programs. Outside assistance in this area should be sought.

- The 1991-92 plans for research and extension should incorporate the concept of doing a situational analysis in selected Rural Development Areas (RDAs.) This should involve farmers, researchers, extentionists, NAMBoard, cooperatives and others. Out of this extensive review, which can be done using rapid reconnaissance techniques, should come a long range plan for that agro-ecological region.

- Priority within future MOAC staffing plans should be given to deepening the supply of trained agricultural economists.

- A major research effort should be launched to disaggregate the SNL farm homestead population into separately identifiable target groups, using a detailed analysis of their resources, economic demographic and other environmental factors. Future research and extension programs should be based on this new understanding. The SNL homesteads are NOT a homogenous lot. The single most limiting constraint to research and extension programs in Swaziland today (and to foreign assistance designed to help them) is the complete lack of understanding of differentials in actual conditions on Swazi SNL farms, and how these affect farming and its potential for technological change. Until this changes, future programs and projects will have limited effectiveness.

VII. LESSONS LEARNED

The SCSRET Project incorporated a wide range of activities focused on differing program emphases over its 10-year lifetime. In the process, the project accumulated a great deal of experience. Several components were unqualified successes. Others made significant contributions. As might be expected in such an ambitious project, a number of problems were encountered which led to outcomes below expectations. The project was evaluated and audited frequently. It is well documented and provides considerable material from which lessons learned can be derived. The SCSRET project constitutes a case study that might be usefully read, especially by USAID/Swaziland personnel. Lessons learned include the following:

- A strong, collaborative program of technical assistance and local training can assist in building in-country capacity for agricultural development.

- Institution building is a long term effort and with proper design, ten years for developing an effective research/extension system is appropriate.

- An initial institutional analysis, done jointly with the country leadership and organizations, is a basic requirement for success of any project effort that seeks to institutionalize significant change.

- USAID programming processes should be carefully monitored and provision made for revision, when necessary, early in a project. In many instances, there is a need for project redesign in the first year based on the first months of accumulated experience. If this evaluation team could redesign USAID programming procedures, we would insert a formal Logframe and strategy refinement exercise as a matter of procedure in the first year of any major project.

- Extension should be viewed as education, to influence the decisions that farm families make regarding research/technology applications.

- Extension workers who interact with farm families need good technical backgrounds but more importantly the capability to provide a broad based farm/home management approach to farmer needs.

- The structure, functions and processes of agriculturally related organizations must not impede effective research-extension program development and linkages.

- In the absence of a well defined organizational structure, administrative management and leadership take on increasing importance. In these instances, long-term, in-depth management development and training is essential.

- Sustainability of programs initiated during a project must be realistically assessed throughout the life of a project and explicit activities built into project implementation to utilize available resources host country toward this end.

- A strong socio-economic research component is essential to guiding research towards appropriate target/client populations.

- Staffing Lessons

  -- Choice of team Leader for the technical assistance team is the single most critical decision affecting project achievements.

  -- Team building, both within the expatriate team and between expatriates and local counterparts must be addressed explicitly with a definite program of activities targeted toward this end.

- USAID country programming should stress program complimentaries through time. In the case of SCSRET, the adoption of technologies developed and extended by the project was hindered by market-related constraints. Yet, there are few links between SCSRET and CAPM projects even though they have overlapped for more than two years in Swaziland. Whenever possible, concerted efforts to use the later projects to sustain gains and fragile outputs from predecessor efforts is justified.

ANNEX 1

Scope of Work

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

SCOPE OF WORK FOR FINAL EVALUATION
USAID/SWAZILAND

(June 17 to July 12, 1991)

BACKGROUND

The Cropping Systems Research and Extension Training Project, (CSRETP) began in 1981, and was designed as an institution building project aimed at redirecting the Ministry of Agriculture and Cooperatives (MOAC)'s research and extension efforts to small-scale farmers. The goal of the project is to increase the economic viability of farming on Swazi Nation Land (SNL).

The purpose of the project is to improve and expand the capacity of the MOAC research and extension programs to develop and effectively extend cropping systems recommendations relevant to the economic needs of the SNL farmers.

The project originally had a Project Assistance Completion Date (PACD) of September 30, 1987; however, a one-year PACD extension, to September 30, 1988 was approved in June, 1986. The project was again amended to extend that PACD by 35 months from September 30, 1988 to August 20, 1991. Minor adjustments were then made to the output statements in the logical framework to clarify them without changing them substantively. Technical inputs have been redirected in order to: 1) insure that Swazis are prepared to assume full leadership for research and extension programs initiated by long-term technical assistance, and 2) to enhance the effectiveness of the agricultural extension program by firmly establishing in-service training programs, by expanding the capacity of the Information Section to disseminate new technology, and by strengthening existing linkages between research, extension personnel and farmers.

Pennsylvania State University (PSU) in collaboration with Tennessee State University (TSU) has provided technical expertise in cropping systems, rural sociology, agricultural economics, agronomy, horticulture, agricultural extension training, agricultural information policy guidance and specialized consultancies to assist in assuring that the project meets its objectives. The project was initially obligated in FY 1981 and the Chief of Party arrived in April 1982. The first mid-term evaluation was performed in late 1984 and the second mid-term evaluation was completed in May 1987. This evaluation found less progress in extension than in other areas of the project, and suggested that more support be given in the future to extension, with technical assistance, training, transport and funding.

The evaluation team will perform a final project evaluation of the CSRET project. The evaluation team will consist of an Agricultural Extension Specialist, an Agricultural Economist, an Agronomist and a Social Scientist. One of the team members will serve as a Team Leader.

ARTICLE I - TITLE

Cropping Systems Research and Extension Training Project (CSRETP) 645-0212
Final External Evaluation

ARTICLE II - OBJECTIVE

The contractor shall provide a four person team with the necessary technical backgrounds (see ARTICLE III, Qualifications) to evaluate the CSRETP in its entirety in relation to the stated goal, purpose, and outputs.

ARTICLE III - STATEMENT OF WORK

The Evaluation Team shall:

A. Review project outputs as stated in the logical framework of the Project Paper (PP) Amendment, while noting relationship between inputs, outputs and output assumptions, quantify progress made in achieving output indicators and provide a detailed explanation of those areas where project outputs either exceed or fall short of targets.

B. Review the project purpose and note the extent to which project inputs and outputs have led to the achievement of that purpose. Since this has been 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 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? Has primary responsibility been transferred in a manner to ensure a smooth transition of institutional duties?

C. Examine progress in addressing Maize production constraints. Specific benchmarks, outlined in PP Amendment Page 12, include annual determinations of the acreage under irrigation and increases in production of tomatoes, squash and various types of greens. Increases in the production of apples, peaches, and strawberries on SNL farms were additional benchmark measures for the final three years of the project.

D. Review the goal of the project and state the extent to which the activities under the project have or have not led to achievement of the project goal of commercialization of agriculture on small SNL farms. Quantify any contribution that this project has made towards targets for small farmer commercial production as described in the Mission's Assessment of Program Impact (API) document.

E. Critically assess the validity of the outputs, purpose and goal of the project, given changes in conditions since the PP design. In the same context also address the issue of sustainability of institutions and institutional linkages that this project has supported over the last ten years.

F. Assess the degree and effectiveness with which this project has developed linkages among research, extension personnel, and farmers. Where there have been gaps in the communications chain, identify the causes.

G. Review the organizational structure of the MOAC research function and evaluate how research priorities were established, support levels determined and resources allocated. Are organizational structures and functional relationships effective?

H. Assess the flow of information into and out of the research system and discuss exchanges of information among MOAC, the International Agricultural Research Center, (IARC) and National Agricultural Research Systems (NAR) in the region.

I. Assess the effectiveness and appropriateness of the project's long-term, short-term and in-country training programs.

J. Explore the potential for greater support and interaction between the research station and the University of Swaziland (UNISWA). Identify the constraints which have prevented this and recommend ways of addressing them in the future.

K. Evaluate the impact of the Information Section's staff to assume full responsibility for the various functions assigned. Identify the training and support required, if any, to achieve a broader communications support for agricultural development.

L. Identify those accomplishments which the evaluation team believes have had or will have the most significant impact on agricultural development in Swaziland, and discuss the possible impact.

M. Identify principal constraints (transport, lack of extension workers etc.) to agricultural development in Swaziland and discuss the possible impact and propose solutions.

Qualifications of Evaluation Team Members

1. Agricultural Extension Specialist:

This position will be responsible for evaluating the impact of training in extension management including the in-service training program and the effectiveness of the present extension workers in reaching farmers.

The person should have education and experience in extension training, and in establishment and management of agricultural extension programs in LDCs; experience assessing linkages between and within institutions (especially research and extension). Should also possess knowledge of and experience with using a variety of media (print, radio, posters, facsimile, etc.) for educational campaigns; experience in Africa applications important; experience with application directly to agricultural extension people would be most useful.

2. Agronomist:

This position will evaluate the impact of the research and extension program on benchmarks outlined above in item "C"including a thorough assessment of the research management capability of the Swazi staff to successfully conduct research program after project completion. S/he will also evaluate the work carried out on the irrigation schemes by the Extension Irrigation Advisor and his counterparts.

Ph.D. degree in Agronomy, preferred, and more than five years experience in the establishment and assessment of on-station and on-farm agricultural research systems. Experience in the Southern African region desirable.

3. Agricultural Economist:

This position will be responsible to evaluate the impact of the work done by the Farming Systems Research component on researchers, extension workers and farmers including assessment of farmer surveys carried out to measure project impact. S/he will also be responsible to determine the capability of the Agricultural Economics unit established at the Melkerns Research Station.

Ph.D. degree in Agricultural Economics, and more than five years experience in the agricultural development economics of LDCs; and farming systems research experience, preferably in the African context.

4. Social Scientist:

This position will be responsible to evaluate the impact of this project on the Swazi Nation Land (SNL) farmers and relate those to project outputs. S/he will interview farmers, chiefs, extension workers and MOAC officials, and review farmer surveys carried out to date to assess this impact.

An advanced degree in Sociology and at least five years professional experience in international development and USAID project evaluations. Previous experience working with small farmers desirable.

One of the evaluation team members will act as a team leader.

ARTICLE IV - REPORTS

The team leader will be expected to consolidate the contributions of each team member into a single, cohesive report.

The evaluation team leader is expected to present an organizational outline of their final report within 5 days after arrival in Swaziland. The evaluation team will complete a draft report and present it to USAID/Swaziland no later than July 10, 1991. The evaluation team will present a summary of their findings, conclusions and recommendations to USAID and to MOAC on July 11, 1991.

The evaluation team leader will be authorized up to 3 additional days away from post to incorporate any necessary changes to the draft report. A final report with ten (10) copies will be provided to the ADO, USAID /Swaziland within thirty (30) days after final team member departure.

The format of the final report shall be consistent with the Project Evaluation Summary (PES) format and should also include an executive summary.

ARTICLE V - RELATIONSHIPS AND RESPONSIBILITIES

The evaluation team will coordinate its work through the USAID Swaziland Agricultural Development Officer and or his designate. The evaluation team leader will have weekly briefings with the Mission ADO about the progress of their work.

ANNEX 2

List of People Contacted

List of People Contacted

USAID\SWAZILAND

Roger Carlson	Director
Mary Huntington	Deputy Director
Ed Baker	Project Develpoment Officer
Dennis Sharma	Agricultural Development Officer
Tom Palmer	Assistant Agricultural Officer

MINISTRY OF AGRICULTURE AND COOPERATIVES

Paul Mkhatshwa	Chief of Research
Donald Hlophe	AO, Information Systems
Rodgers Matsebula	AO, Training Officer
Willard Nxumalo	SAO, Extension Director
Dickson Khumalo	SAO, Technical Systems
Paul Dlamini	SEO, Shizelwini Region
Clifford Manana	SEO, Manzini Region
Phillip Tlwala	Project Manager, Central RDA
Nellie Thwala	Extension Officer, Central RDA
Tom Sukati	EO, Project Manager, Shizelwini
Samuel Dlamini	EO, Shizelwini Region
Thende Lupupa	Extension Horticulturalist, Manzini
Sebenzile Matsebula	R. O Biometrician, ARD/MRS
Theophelus M. Mhlanga	Extension Worker, Central RDA
Ruth Mnisi	Extension Worker, Shizelwini Region
R. Little	S. R. O. (Cotton) ARD/Big Bend
Doug Gama	S.R.O. Horticulture, ARD/MRS
Sam Dlamini	R.O. Agricultural Economist
Edgar Nxumalo	R.O. Soil Chemist, ARD/MRS
J. Pali-Shikhulu	R.O. Cereals Agronomist, ARD/MRS
M. H. Nxumalo	R.O. Cereals Agronomist, ARD/MRS
V. M. Mkhonta	R.O. Weed Scientist, ARD/MRS
Z.I. Mamba	R.O. Grain Legume Agronomy
L. M. Dube	Chief of Party
Don Brosz	Irrigation Specialist
Bill Shaner	Farming Systems Methodologist

PENNSYLVANIA STATE/TENNESSEE STATE TEAM

J. Dean Jansma	Campus Project Director
Troy Wakefield	Director, International Programs, Tenn. State
Sammy Comer	Project Coordinator, Tennessee State
Charlie Pitts	Chief of Party
Don Brosz	Irrigation Specialist
Bill Shaner	Farming Systems Methodologist

FARMERS AND OTHERS

A. M. Shongwe	Executive Secretary, NAMBoard
Zombodze Family	Farmers
Ludzeludze Ndwandwe	Farmer
Garnet Simelane	Farmer
Vimbi Simelane	Farmer

ANNEX 3

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ANNEX 4-A

SCSRET Degree Training Summary

ANNEX IV.A

SCSRET DEGREE TRAINING SUMMARY

1. MASTERS DEGREE

A. Original Contract

Subject	Participant	MOAC Position Before	MOAC Position After	Months Plan	Months Actual	Place
Rural Socio.	Funekile Simelane	Ext Support	Ext Support	24.00	21.00	PSU
Agronomist	Paul Mkhatshwa	Ext[1]	Res[2]	24.00	29.00	Geo.
Ag Economist	Basil Maphalala*	Ext	Support Staff	24.00	21.75	PSU
Horticulturist	Douglas Gama	Ext	Res	24.00	23.50	PSU
Ag Irrigation	Themba Masuku**	Research	Private	24.00	12.50	U.Mo.
Ag Ext Educ	Maxwell Dlamini***	MSMS	MSMS	24.00	19.00	TSU
Ag Info Spec	Donald Hlophe	Tng Officer	Ag Info	24.00	15.50	PSU
Horticulture	Themba Mavuso	Ext	Private	24.00	22.00	PSU
Agronomist	Magalela Ngwenya	Ext	Ext	24.00	24.75	PSU
Dairy Science	Job Mavuso	Ext	Ext	24.00	17.75	PSU
Ag Engineering (Sm Farm Mech)	Sampson Nxumalo*	Ext	MSMS	24.00	22.50	PSU
Total MS Degree Months in Contract				264.00	229.25	

B. Additional MS Degree months in Contract Extension

Ag Econ	Samuel Dlamini	Supt Staff	Res	24.00	27.00	PSU
Agronomy	Michael Nxumalo	Res	Res	18.00	20.75	TSU
Entomology	Leonard Msibande****	Res	Res	24.00	22.50	TSU
Mgmt (MPA) Ext	Sipho Nxumalo	SEO	SEO	12.00	12.25	A.D.Little
Mgmt (MPA) Res	See note No. 1			12.00		
Agron (soils)	Brenda Dlamini***	Res	AO	24.00	29.75	TSU
Agron (plants)	Lillian Dlamini	Res	Ext	24.00	28.50	TSU
Ag Econ	Arthur Simelane	Res		24.00	19.00	U.W.VA
Forestry	Nicholas Matsebula	Forestry	Forestry	24.00	20.25	U. Tenn
Total MS Degrees in Ext. Contract				186.00	180.00	
Total Contract MS Degree months				450.00	409.25	

Additonal MS Degrees

Entomology	Benedict Bhembe	Res	Res		28.25	NC St
Ag Engineering	Agrippa Dlamini	Ext	Ext		21.75	PSU
Agron (plants)	Zodwa Mamba	Res	Res		21.00	TSU

1 Res = Research 2 Ext = Extension

Biometrics	Sebe Matsebula	Res	Res		22.25	PSU
Agron (plants)	Elliot Mavimbela**	Res	Res		14.00	NC St
Entomology	Petros Mtshali*	Res	Res		12.25	PSU
Total Additional MS Degree months				---	119.00	
C. Total Degree months - MS Level				450.00	528.75	

II. B.S DEGREE

A. Original Contract

Agronomy	Arthur Simelane	Ext	Seed Mult	48.00	31.25	TSU
Ag Econ	Themba Mavuso	NSMS	Private	48.00	28.25	TSU
Ag Econ				48.00		
Agronomy	Edgar Nxumalo	Res	Res	48.00	37.00	TSU
Irrig Tech				48.00		
Entomologist	Leonard Msibandze	Res	Res	48.00	32.00	TSU
Small Farm Mec	MS Sub see line 33					
Plant Pathology	See note 2			48.00		
Total B.S. Degrees in Contract				384.00	128.50	
B. B.S. Degrees in Contact Extension		See Note No. 3				
Ag Ext/Agron	G. Ndlangamandla	Ext	NSMS	36.00	30.75	PSU
Ag Info Spec	Philip Shabangu	Ag Info	Ag Info	36.00	33.00	PSU
Ag Ext Educ	Late Rueben Nxumalo			22.25		PSU
B.S. Training in Contract Ext.				72.00	86.00	
Total B.S. Training				456.00	214.50	
TOTAL MONTHS BS & MS TRAINING		See Note No. 4		906.00	743.25	

* Identifies the three participants who did not complete degree program
** Identifies participant that started training under other than Swazi project
*** Participant in progress of completing degree with proejcted months included in total
**** Masters completed, practical training in progress

Notes:
1. Swaziland decision for Chris Nkwanyana, Dickson Khumalo and Pual Mkhatshwa to attend Executive Management Course at Penn State rather than going to MPA.
2. Research Officer in Plant Path attend Penn State on customized 6 month STTT program.
3. Number of months incontract does not include proposed but not implemented program of 4 SEO's attending UNISWA for 2 years because of admission problems at UNISWA.
4. Proposed 906 person-months (75.5 py's) in column B (77.5 person years) is in general agreement with log frame "input indicator" of 77 person years of degree training.

ANNEX 4-B

SCSRET Degree Training and Timing During Project Life

ANNEX IV.B

SCSRET DEGREE TRAINING AND TIMING DURING PROJECT LIFE

Long Term Participant Training	Degree	Field	University	Start of Program	End of Program	Length of Program in Months
Benedict Bhembe	MA	Entomology	NC State	10 Jul 85	19 Dec 87	28.25
Agrippa Dlamini	M.Agr.	Ag Engineering	Penn State	10 Jul 85	30 May 87	21.75
Brenda Dlamini (in prog)	M.Sc.	Agron/Soils	Tenn State	7 Jan 89	30 Jun 91	29.75
Lillian Dlamini	M.Sc	Agron/Plants	Tenn State	3 Jan 89	15 May 91	28.50
Maxwell Dlamini (in prog)	M.Sc	Ag Sc	Tenn State	30 Dec 89	31 Jul 91	19.00
Samuel Dlamini	M.Sc	Ag Econ	Penn State	15 Jul 87	28 Dec 87	4.50
Remainder S. Dlamini Program				13 Aug 89	5 May 90	22.50
Douglas Gama	M.Sc	Horticulture	Penn State	13 Aug 83	17 Jul 85	23.50
Donald Hlophe	M.Ed	Ag & Ext Educ	Penn State	13 Aug 84	27 Nov 85	15.50
Zodwa Mamba	M.Sc	Plant Science	Tenn State	18 Aug 84	16 May 86	21.00
**Basil Maphalala	Incomplete	Ag Econ	Penn State	13 Aug 84	7 June 86	21.75
*Themba Masuku	M.Sc	Ag Engineering	U of Missouri	12 Dec 82	4 Jan 84	12.50
Nicholas Matsebula	M.Sc	Forestry	U. Tenn	3 Jan 89	10 Aug 91	20.25
Sebenzile Matsebula	M.Sc	Ag & Ext Educ	Penn State	22 Aug 82	30 Jun 84	22.25
*Elliot Mavimbela	M. Agr.	Crop Science	NC State	7 Jun 83	5 Aug 84	14.00
Job Mavuso	M.Sc	Diary Science	Penn State	10 Aug 85	2 Feb 87	17.75
Themba Mavuso	B.Sc	Horticulture	Tenn State	3 Jan 83	5 May 85	28.25
Themba Mavuso	M.Sc	Horticulture	Penn State	1 Jan 87	29 Oct 88	22.00
Paul Mkhatshwa	M.Sc	Agronomy	U of Georgia	6 Sept 82	9 Feb 85	29.00
**Petros Mtshali	Incomplete	Entomology	Penn State	22 Aug 82	31 Aug 83	12.25
George Ndlangamandla	B.Sc	Ag & Ext/Agron	Penn State	21 Oct 88	19 May 91	30.75
Magalela Ngwenya	M.Sc	Agron	Penn State	14 Aug 83	9 Sept 85	24.75
Leonard Nsibande	B.Sc	Plant Sc	Tenn State	26 May 86	21 Dec 88	32.00
Leonard Nsibande (in prog)	M.Sc	Plant/Entomology	Tenn State	21 Aug 89	10 Jul 91	22.50
Edgar Nxumalo	B.Sc	Agronomy	Tenn State	30 Aug 83	29 Sept 86	37.00
Michael Nxumalo	M.Sc	Agronomy	Tenn State	15 Aug 87	15 May 89	20.75
**Sampson Nxumalo	Incomplete	Ag Mech	Penn State	13 Aug 83	30 Jun 85	22.50
(Late) Reuben Nxumalo	B.Sc	Ag & Ext Educ	Penn State	13 Sept 88	24 Jul 90	22.25
Sipho Nxumalo (in prog)	MPA	Management	AD Little	15 Jul 90	25 Jul 91	12.25

Philip Shabangu	B.Sc	Ag & Ext Educ	Penn State	13 Aug 88	19 May 91	33.00
Arthur Simelane	B.Sc	Agronomy	Tenn State	3 Jan 83	10 Aug 85	31.25
A. Simelane						
(Break in prog)	M.Sc	Ag Econ	U West VA	3 Jan 89	6 Jun 89	5.00
A. Simelane				3 Jan 90	7 Mar 91	14.00
Funekile Simelane	M.Sc	R. Sociology	Penn State	22 Aug 82	25 May 84	21.00
TOTAL DEGREE TRAINING						743.25

Summary of all degree programs, including projections of participants currently in their programs
Total Months of Degree Training = 743.25 pm
Total number of Master's completed = 22
Total numbers of BSc completed = 6
Months of training for 20 Master's totally under SCSRET Project = 445.75 or 21.6 months per degree
*Months of Master's training for two individuals to complete programs started elsewhere = 26.5 or 13.2 per degree
Months of Degree Training for BSc participants = 192.25 or 29.2 months per degree
**Months of training not resulting in degree = 56.5
Months training for late Reuben Nxumalo = 22.25

ANNEX 4-C

SCSRET Project

ANNEX IV.C
SCSRET PROJECT

SHORT TERM PARTICIPANT TRAINING	PROGRAM	LOCATION	FROM	TO	PER MTHS
Clara Dlamini	Farming Systems Methods	Third Country (Lesotho)	23-Apr-90	27-Apr-90	0.25
David Dlamini	Training of Trainers Ag & RD	U of Illinois (Interpaks)	16-Jun-86	16-Jul-86	1.00
Jameson Dlamini	Dev & Operation of Ag Ext.	U of Missouri (USDA)	4-Jun-84	19-Aug-84	2.75
Khisimusi Dlamini	Farming Syst. Methods	Third Country (Lesotho)	23-Apr-90	27-Apr-90	0.25
Lillian Dlamini	Grain Storage & Marketing	Kansas State University	5-Jun-89	21-Jul-89	1.75
Nomathemba Dlamini	Ag Policy & Econ Analysis	U of Minnesota (USDA)	15-Jun-87	10-Jul-87	1.00
Ntombi Dlamini	Library Science	Tenn State	13-Aug-89	16-Feb-90	6.00
Ntombikayise Dlamini	Farming Syst. Methods	Third Country (Lesotho)	23-Apr-90	27-Apr-90	0.25
Paul Dlamini	Dev & Operation Ag Ext.	U of Wisconsin (USDA)	28-Aug-85	15-Nov-85	2.75
Peter Dlamini	Drat/Printing	Penn State	14-Aug-89	24-Jan-90	5.50
Sam Dlamini	Communications Mgmt.	NTDI, Orlando, Fla	26-Dec-88	5-Jan-89	2.25
Sam Dlamini	Impact Assessment Analysis	Penn State	21-Apr-91	7-Jun-91	1.50
Sipho Dlamini	Farming Syst. Methods	Third Country (Lesotho)	23-Apr-90	27-Apr-90	0.25
Doug Gama	Tissue Culture for Crops	Nairobi, Kenya (IPBNET)	8-Jan-88	12-Jan-88	0.25
Nicholas Gumedze	Public Enterprise Workshop	Harvard Inst for Int Dev	24-Jun-88	6-Aug-88	1.50
Donald Hlophe	Video Communications	Cornell University	3-Jul-68	13-Aug-88	1.25
Donald Hlophe	Mgmt. of Information Syst.	A. D. Little	3-Sep-90	28-Sep-90	0.75
Jeremiah Hlatshwayo	Training of Trainers of AG &RD	U of Illinois	16-Jun-86	16-Jul-86	1.00
Dickson Khumalo	Exec. Mgmt. & Computer Trg.	Penn State	10-Jan-91	13-Feb-91	1.00
Alfred Kunene	Post Harvest Losses	Cornell (USDA)	6-Aug-90	7-Sep-90	1.00
Bernard Kunene	Training of Trainers in Ag & RD	U of Illinois (Interpaks)	16-Jun-86	16-Jul-86	1.00
Sitsembile Kunene	Plant Disease Diagnosis	Penn State	13-Jun-83	15-Sep-83	3.00
Patrick Lukhele	Public Enterprise Workshop	Harvard Inst for Int Dev	21-Jun-87	31-Jul-87	1.25
Milicent Malaza	Social Science Quantitative Method				
Clifford Manana	Ext. Implement & Mgmt.	Penn State (Co. Ext. Ofc)	4-May-91	31-May-91	1.00
Rogers Matsebula	Management Programs	U of Conn, U of Fla, TSU, PS	3-Jan-86	12-Jul-86	5.50
Rogers Matsebula	Dev & Operation of Ag Ext.	U of Wisconsin (USDA)	22-Aug-88	29-Oct-88	2.25
Wilson Movovo	Farming Systems Methods	Third Country (Lesotho)	23-Apr-90	27-Apr-90	0.25
George Ndlangamandla	Communications Mgmt.	NTDI, Orlando, Fla	26-Dec-88	5-Jan-89	0.25
Magalela Nguenya	Executive Mgmt.	Penn State	13-Jan-90	16-Feb-90	1.00
Milton Nkhabela	Tissue Culture for Crops	Nairobi, Kenya (IPBNET)	8-Jan-88	12-Jan-88	0.25
Chris Nkwanyana	Mgmt. of Ag Research	Wash, D.C. (USDA)/Penn St	24-Jul-85	14-Sep-85	1.75
Chris Nkwanyana	Executive Mgmt.	Penn State	3-Jun-90	29-Jun-90	1.00
Leonard Nsibande	Integrated Pest Mgmt.	U of Florida	14-May-90	1-Jun-90	0.50
Michael Nxumalo	Communications Mgmt.	NTDI, Orlando, Fla	26-Dec-88	5-Jan-89	0.25
Reuben Nxumalo	Dev. & Operation of Ag Ext.	U of Wisconsin (USDA)	1-Jun-86	13-Aug-86	2.50
Willard Nxumalo	Org. & Mgmt. Dev	USDA	27-May-91	28-Jun-91	1.00
Richard Shabalala	Organ & Mgmt of Govt. Organ.	George Mason Univ. (USDA)	30-Apr-86	2-Jul-86	2.00
Richard Shabalala	Public Mgmt of Human Resources	U of Conn	20-Sep-88	17-Apr-89	7.00
Richard Shabalala	Mgmt. Education	A.D. Little	21-Sep-87	11-Nov-87	0.75
Richard Shabalala	Communications Mgmt.	NTDI, Orlando, Fla	26-Dec-88	5-Jan-89	0.25
Philip Shabangu	Communications Mgmt.	NTDI, Orlando, Fla	26-Dec-88	5-Jan-89	0.25
Bhekizwe Vilakati	Farming Syst. Methods	Third Country (Lesotho)	23-Apr-90	27-Apr-90	0.25
Fifteen Participants	Ext/Irri. Field Trip	Third Country (Zimbabwe)	27-Apr-91	4-May-91	3.75
Total for May '1991					75.25
Projected June 1991 - August 1991					
Paul Mkhatshwa	Executive Mgmt. Training	Penn State	14-Jul-91	9-Aug-91	0.75
Irene Mthembu	4-H Training	Penn State (Coop. Ext. Of.)	2 weeks		0.50
Total Projected					1.25
TOTAL					76.50

From: Project Summary Information Provided To The Evaluation Team by J. Dean Jansma, May 1991

ANNEX 4-D

SCSRET Project Long-Term Technical Assistance

August 4, 1982 - August 20, 1991

ANNEX IV.D

SCSRET PROJECT
LONG-TERM TECHNICAL ASSISTANCE
APRIL 4, 1982 TO AUGUST 20, 1991

Position/Key Personnel	From	To	Person Months
Project Manager			
D. Jansma @ 50%	4 Apr 82	30 Jun 84	13
J. Ayers @ 50%	1 Jul 84	30 Jun 87	18
D. Jansma @ 50%	1 Jul 87	20 Aug 91	25
Chief of Party			
T. King/Extension Adm	6 Apr 82	31 May 85	38
K. Hayes/Ag Info	1 Jun 85	17 May 87	24
G. Love/Ag Education	18 May 87	31 Oct 88	17
C. Pitts/Ext Organ & Plan.	26 Sep 88	20 Aug 91	35
R. Sociology/Socio-Economics			
V. Watson	17 May 82	17 May 84	24
J. Curry	1 Aug 84	25 Sep 88	50
Agricultural Economics			
R. Freund	23 Apr 82	8 Jun 84	25
M. Patrick	6 Jan 87	7 Nov 90	46
Horticulture			
D. Grenoble	24 Jun 82	5 Sep 84	26
R. Bevaqua	1 Dec 84	31 Aug 86	21
D. Grenoble	9 Sep 86	25 Sep 88	25
Agronomist			
C. Seubert	23 Aug 82	25 Sep 88	73
Kirk Iverson	1 Nov 86	25 Sep 88	23

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Irrigation Specialist			
G. Dunn	2 Sep 82	30 Nov 86	50
D. Brosz	24 Jul 89	23 Jul 91	24
Ag Planning and Policy			
J. Fischer	1 Nov 85	31 Dec 89	50
Farming Systems Specialist			
M. Horton	6 Aug 85	31 Jul 87	24
W. Shaner	1 Mar 89	20 Aug 91	30
Agric Information Specialist			
G. Bengston	5 Jul 82	30 Apr 84	22
K. Hayes	1 Jun 84	30 Jun 85	13
M. Carey	9 Sep 85	9 Sep 87	24
Extension Training Specialist			
G. Easter	13 Sep 82	12 Sep 84	24
B. Weddle	10 Aug 84	16 Aug 86	24
J. Diamond	1 Sep 86	20 Nov 90	51
TOTAL KEY PERSON MONTHS			819
TOTAL KEY PERSON YEARS			68.25
OTHER PERSONNEL			
Adm Asst (Penn State)50%	4 Apr 82	20 Aug 91	56
Coordinator (Tenn State)25%	4 Apr 82	20 Aug 91	28
Adm Asst (Tenn State)25%	4 Apr 82	30 Jun 90	25
In-Country Adm	1 May 82	20 Aug 91	112
In-Country Asst Proj Mgr	20 Jul 88	28 Feb 90	18
In-Country Asst Proj Mgr	1 Jun 90	20 Aug 91	15
TOTAL OTHER PERSON MONTHS			254
TOTAL OTHER PERSON YEARS			21.17
GRAND TOTAL PERSON MONTHS			1073
GRAND TOTAL PERSON YEARS			89.42

ANNEX 4-E

SCSRET Contractor - Short-Term Technical Assistance

By Calendar Year

ANNEX IV.E

SCSRET - CONTRACTOR
SHORT-TERM TECHNICAL ASSISTANCE BY CALENDER YEAR*

	FROM	TO	PERSON MONTHS
1982			
C.T. Morrow-Compute Cons	24-Apr-82	5-May-82	0.50
W. Grisley-Ag Ec	17-Jun-82	15-Jul-82	1.00
R. Bealer-R. Soc	24-Jun-82	22-Jul-82	1.00
E. Fancher-Library	24-Aug-82	19-Sep-82	1.00
D. Dau-Ag Mech	14-Sep-82	10-Nov-82	2.00
Internal Review			0.25
Total 1982			5.75
1983			
M Burton-Farm Mgmt	1-Jan-83	2-Feb-83	1.00
C.T. Morrow-Computer Cons	5-May-83	17-Jun-83	0.75
F. Simelane-R. Soc	10-Jul-83	8-Aug-83	1.00
M. Ritter-Hort/Fruit	13-Jul-83	20-Aug-83	1.25
Internal Review			2.00
Total 1983			6.00
1984			
W. Schutjer-Ag Econ	5-Jan-84	26-Jan-84	0.75
D. Daum-Ag Mech	2-Feb-84	31-Mar-84	1.25
R. Fox-Soils	4-Jul-84	18-Aug-84	1.50
W. Hock-Pesticide Education	14-Aug-84	24-Aug-84	0.50
C. Harston-Ag Policy	12-Sep-84	3-Oct-84	1.00
Internal Review			1.50
Total 1984			6.50

1985

D. Grenoble-Horticulture	26-Dec-84	17-Jan-85	0.75
J. McGahen-Agron/Maize	6-Jan-85	14-Feb-85	1.50
H. Carey-Ag Info	25-Mar-85	21-Apr-85	1.00
D. Redgrave-Irrigation	7-Apr-85	21-Apr-85	0.75
J. Fischer-Ag Policy	16-Apr-85	25-Apr-85	0.25
J. McCormick-Fiscal Spec	19-Apr-85	12-May-85	0.75
P. Wangsness-An Sci	3-May-85	11-May-85	0.25
F. Witham-Horticulture	3-May-85	11-May-85	0.25
D. Redgrave-Irrigation	20-May-85	7-Jul-85	1.25
D. Reicosky-Analy Stat	21-May-85	6-Jun-85	0.50
G. Easter-Ext Train	7-Jul-85	19-Aug-85	1.50
R. Huss-Ashmore-Nutrition	24-Jul-85	25-Aug-85	1.00
R. Harpster-Print Media	7-Aug-85	11-Sep-85	1.25
C. Pemberton-Piggot/Argron	1-Oct-85	15-Oct-85	0.50
Internal Review			1.75
Total for 1985			13.50

1986

R. Huss-Ashmore-Nutrition	27-Dec-85	15-Jan-86	0.75
B. Scully-Hort/Fruit	31-Dec-85	25-Jan-86	1.00
S. Stokes-R. Soc	6-Apr-86	16-Apr-86	0.25
W. Schutjer-Ag Econ	6-Apr-86	19-Apr-86	0.50
D. Grenoble-Horticulture	7-May-86	25-May-86	0.75
E. Yoder-Leadership Train	20-May-86	13-Jun-86	1.00
J. Rosenberger-Comp/Stat	25-May-86	29-May-86	0.25
W. Getz-Livestock	1-Jun-86	5-Jul-86	1.25
B. Grandin-Livestock	1-Jun-86	5-Jul-86	1.25
R. Huss-Ashmore-Nutrition	5-Jun-86	23-Jul-86	1.75
R. Harpster-Print Media	16-Jul-86	15-Aug-86	1.00
J. Diamond-Ext Training	18-Jul-86	5-Aug-86	0.50
W. Grisley-Ag Economics	17-Aug-86	8-Oct-86	1.75
R. Crassweller-Hort/Fruit	20-Oct-86	25-Nov-86	1.25
W. Shuffstall-Computer Spc	28-Oct-86	25-Nov-86	1.00
J. Malone-Ag Marketing	3-Nov-86	1-Dec-86	1.00
Internal Review			1.25
Total for 1986			16.50

1987

D. Buffington-Ag Eng	26-Jan-87	30-Jan-87	0.25
A. Turgeon-Agronomy	26-Jan-87	30-Jan-87	0.25
P. Ferretti-Hort/Veg	13-Mar-87	16-Apr-87	1.00
D. Daum-Irrigation	14-Mar-87	16-Apr-87	1.00
F. Goode-Ag Econ**	8-May-87	30-May-87	0.75
S. Stokes-R Soc	8-May-87	4-Jun-87	1.00
R. Huss-Ashmore-Nut.	20-May-87	23-Jul-87	2.00
G. Love-Extension	26-Jan-87	30-Jan-87	0.25
R. Fox-Soils	14-Jul-87	12-Aug-87	1.00
E. Yoder- Leadership Training	11-Aug-87	4 Sep-87	0.75
P. Jackus-Computer Prog	18-Dec-87	9-Jan-87	0.75
K. Wilkinson-R. Soc	2-Apr-87	18-Apr-87	0.50
Internal Review			2.00
Total for 1987			11.50

1988

S. Dembner-Tech. Writing	14-Jan-88	2-Feb-88	
S. Dembner-Tech. Writing	9-Feb-88	12-Mar-88	1.75
F. Witham-Hort/ Post Harvest	25-Jan-88	19-Feb-88	1.00
A. Hower - Entomology	14-Feb-88	26-Feb-88	0.50
R. Warland-R. Soc	13-Mar-88	11-Apr-88	1.00
P. Ferretti-Hort/veg	31-May-88	3-Jul-88	1.00
H. Carey-Ag Info	13-Jun-88	8-Jul-88	1.00
R. Matason-Ag Info/Photo	13-Jun-88	11-Jul-88	1.00
R. Huss-Ashmore-Nut.	15-Jun-88	15-Aug-88	2.00
R. Cole-Hort/Potatoes	11-Jul-88	7-Aug-88	1.00
S. Curtis-Leadership Training	18-Jul-88	4-Aug-88	0.75
C. Pitts-Ext Planning	30-Jul-88	4-Aug-88	0.25
P. Jackus-Computer Prog	11-Aug-88	28-Aug-88	0.75
J. Malone-Marketing	10-Oct-88	12-Oct-88	1.50
R. Crassweller-Hort/ Fruit	4-Jun-88	3-Jul-88	1.00
J. Malone-Marketing	30-Oct-88	10-Dec-88	1.50
D. Evans - Extension**	6-Dec-88	21-Dec-88	0.50
Internal Review			2.00
Total for 1988			18.50

1989

A. Hower - Entomology	21-Jan-89	16-Feb-89	1.00
D. Pfannstiel - Extension Planning	17-Mar-89	17-Apr-89	1.00
L. Ragan-Computer Skills	27-Mar-89	3-May-89	1.25
J. Irwin - Extension**	30-Mar-89	13-Apr-89	0.50
L. Satterlee - Food Sci.	10-Jul-89	2-Aug-89	0.75
L. Pruss - Fiscal Admin.**	10-Jul-89	2-Aug-89	0.75
F. Goode - Transport Study	18-Jul-90	11-Aug-89	0.75
V. Micuda - Library**	9-Sep-89	27-Sep-89	0.50
Internal Review			2.00
Total for 1989			8.50

1990

D. Esslinger - Ext. Planning	25-Jan-90	9-Mar-90	1.50
R. Leiby - Ext. Planning	20-Feb-90	30-Mar-90	1.25
J. Welshans - Ext. Planning	20-Feb-90	2-Apr-90	1.25
J. Guffey - Ext. Planning	21-Feb-90	27-Mar-90	1.25
D. Rynd - Ext. Planning	22-Feb-90	29-Mar-90	1.25
W. Schutjer - Ext. Planning	23-Feb-90	13-Mar-90	0.75
H. Ott - 4-H Prog.**	16-Mar-90	29-Mar-90	0.50
J. Scalzi - Fiscal Admin.**	1-Jun-90	16-Jun-90	0.50
H. Harpster - Cattle Nutrition	4-Sep-90	5-Oct-90	1.00
R. Matason - Video Prod.	8-Oct-90	2-Nov-90	1.00
R. Warland - Consumer Preference	1-Nov-90	4-Dec-90	1.00
G. Greaser - Farm Mgmt.	5-Nov-90	30-Nov-90	1.00
J. Rosenberger - Statistics Methods	2-Dec-90	15-Dec-90	0.50
Total for 1990			12.75

1991

R. Leiby - Ext. Planning & Eval.	27-Feb-91	6-Apr-91	1.25
J. Welshans - Ext. Planning & Eval.	27-Feb-91	6-Apr-91	1.25
D. Grenoble*** - Rev. Farmer's Handbook	27-Feb-91	26-May-91	4.00
D. Bransby - Rev. Farmer's Handbook	1-Mar-91	23-Mar-91	0.75
J. Knapp - Rev. Farmer's Handbook	3-Mar-91	6-Apr-91	1.00
E. Serotkin - Rev. Farmer's Handbook	14-Mar-91	20-Apr-91	1.25
R. Mumma - Chemical Pesticide Lab	25-Apr-91	16-May-91	0.75
Total for 1991 (August 20)			10.25

Total STTA for Life of Project**** 109.50

*Does not include 6.25 person-months effort to design team on this collaborative project
**Visit supported by non-project funds
***Split time with CAPM Project
*****Includes 96.75 pm of technical STTA and 12.75pm administrative STTA

From: Project summary information provided to the evaluation team, by J. Dean Jansma, May 1991