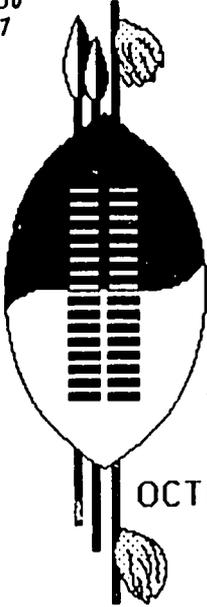


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ANNUAL WORKPLAN

SWAZILAND
CROPPING SYSTEMS
RESEARCH/EXTENSION
TRAINING PROJECT

OCTOBER 1, 1987 THROUGH SEPTEMBER 30, 1988

SPONSORS

The Ministry of Agriculture and Cooperatives
and

The United States Agency for International Development

CONTRACT

The College of Agriculture
The Pennsylvania State University
in conjunction with

The School of Agriculture and Home Economics
Tennessee State University

Project Number 645-0212

Contract Number AFR-0212-C-00-2006-00

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PROJECT GOAL

The goal of the Project, as stated in the Project Paper, is to increase the economic viability of the Swazi Nation Land (SNL) from a subsistence to a commercial basis. The object of the Contract is to assist the Government of Swaziland to improve and expand the research and extension programs of the Ministry of Agriculture and Cooperatives so that it may develop and effectively extend cropping systems recommendations relevant to the needs of the SNL farmers.

Institutional components of the Project are designed to establish an ongoing capability to:

1. Identify the constraints impeding progress on SNL farms as well as the expressed needs of the SNL farmer.
2. Respond to the situation through a program of on-farm research to identify crops and cropping practices which are relevant to these needs and constraints.
3. Develop appropriate educational materials to extend information to extension workers and farmers.
4. Provide in-service training to improve the technical and motivational skills of the Extension staff.

PROJECT TEAM

The Contract Team will consist of eight members during the 1987-88 Project year. In addition to the Chief of Party, there will be an Extension Training Specialist, an Agricultural Policy Adviser, a Socioeconomist, an Agronomist, an Extension Agronomist, a Horticulturalist, and a Production Economist. In the event the Project is extended it is proposed that an Irrigation Specialist be added to the Project during the last month of the Project year. However, this will increase the number of long term staff to nine only for one month.

The Project's full-time staff will also include an Administrative Assistant as well as three Peace Corps Volunteers. All of the Peace Corps Volunteers will leave during the year. It is hoped that they will be replaced by other qualified and interested volunteers.

The Government of Swaziland is providing counterparts to the Contract Team members as well as Research Assistants. Listed below are the names of the Project Team and the Swazi Counterparts.

POSITION/CONTRACT EMPLOYEE	SWAZI COUNTERPART
<u>Chief of Party</u> Gene M. Love	C. T. Nkwanyana, CRD W. Nxumalo, SAO(EXT) M. Ngwenya, SAO(TS)
<u>Agricultural Information</u>	Donald Hlope, AO
<u>Agronomist</u> C. E. Seubert	Z. Mamba, RO
<u>Extension Agronomist</u> K. Iversen	S. Mamba, DIC M. Dlamini, NSMS
<u>Horticulture</u> D. W. Grenoble	D. Gama, SRO
<u>Socioeconomist</u> J. Curry	Millicent Malaza, RO

Production Economist

N. Petrick

S. Dlamini, RO

Extension Training

J. Diamond

R. Matsebula, AO

D. Khumalo, AO

Policy Adviser

J. L. Fischer

V. Pungwayo, DA

N. Dlamini, DRP

ON-FARM RESEARCH OPERATIONS

Douglas Gama, Coordinator of On-farm Research

Mbuso Hlope, Assistant to the Coordinator of On-farm Research

RESEARCH ASSISTANTS

LOCATION

John T. Bhembe

Mpolonjeni RDA

Paulos Dlamini

Southern RDA

Phindile Dlamini

Northern RDA

Joshua M. Simelane

Sandleni/Luqolweni RDA

Isaac S. Mamba

Mahlengatsha RDA

Andreas M. Matsebula

Tikahuba RDA

Goodwill Maziya

Ngwempisi RDA

Nellie Thwala

Central RDA

Samuel M. Thwala

Mliba/Bhekinkosi RDA

OTHER PERSONNEL INVOLVED IN CSRET PROJECT ACTIVITIES

<u>Peace Corps Volunteers</u>	<u>Location</u>
Sam Harle, Printing Technician	Information Section, MOAC
Beverly Howes, Research Technician	Central RDA
Blase Masini, Research Technician	Southern RDA

In addition to the individuals named above, the work plan will require considerable input from the following MOAC employees.

Research Officers	P. Mkhathswa, SRO J. Pali-Shikulu, RO S. Matsebula, RO E. Nxumalo, RO
Agricultural Officers	P. Dlamini, AO, Irrigation B. Dlamini, AO, Soil Testing
Research Recorders	V. Majole M. Masingo P. Moleza C. Zikalala R. Motso (Lab Technician)

PROJECT OBJECTIVES

To meet the Project's goal of increasing the economic viability of farming on Swazi Nation Land and of enhancing the well-being of homestead farm families, six major objectives were defined to focus on the three interrelated components, namely research, extension training and agricultural information. The six objectives are:

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

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

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

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

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

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

UNDERLYING STRATEGY FOR THE 1987-88 CSRET WORK PLAN

It is planned that the Cropping Systems Research and Extension Training Project will place greater emphasis on extension information, training and delivery systems during the 1987-88 Contract Year. Increased attention will be directed: (1) to the preparation of field support guides based on the results of on-farm trials, (2) to the technical training of extension personnel, and (3) to improved methods of increasing farmer adoption of new and improved practices. Research will continue to be the underlying focus of the Project, and research trials both on-station and on-farm will be directed to meet the expressed needs of SNL farmers as identified (1) through socio-economic assessments and analyses, and (2) through feedback from extension workers, extension officers, national subject matter specialists, et al.

Extension field staff, who work closely with SNL farmers, will receive training designed to help them serve as the "eyes and ears" of both the farmers and the researchers. For example, with the help of the research staff, they will be trained to identify, develop, field-test, and use needed technical field support guides which respond directly to farmer needs. They will be taught appropriate methods of teaching farmers, including problem solving.

Management training for middle and top level administrators will be continued. It will include both in-country and out-of-country formal and informal training. The introduction of an acceptable participatory management style at all levels of administration will improve program outcomes as front-line personnel accept greater responsibility in helping administrators set priorities and solve problems. Also, a comprehensive manpower assessment of the personnel needs of the Ministry is being conducted by the Ministry. These are essential ingredients in the implementation of a "farming systems approach" to agricultural development which will function effectively.

Thus, a major goal of the 1987-88 CSRET Work Plan is to institutionalize in the Ministry of Agriculture and Cooperatives a "farming systems approach" to the achievement of the objectives of the Project while helping to translate the goals of The Agricultural Development Strategy of the Kingdom of Swaziland into workable sectoral programs.

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

Excellent progress toward this objective was made during the past Contract Year. Informal surveys to identify the salient features of the SNL farming systems were completed in the Hluti and Sandleni RDAs, the last two RDAs to be surveyed. As projected in the 1986-87 Annual Workplan, Swazi personnel are now capable of collecting this type of survey data.

The Dietary Consumption Survey and Household Expenditure Survey were completed. Results have been summarized and reported.

The 1985-86 Labor and Input Survey Results have been summarized for maize. The summaries for cotton, legumes and sorghum will be completed during the First Quarter of this Contract Year. Data are currently being "cleaned" and verified for accuracy. Socioeconomic analyses will be completed during the year. This activity has proven to be more time consuming than originally anticipated. Publication of results and recommendations will follow during the year. Knowledge gained by the researchers who collected these data describing the needs and preferences of SNL farmers, has been useful in the design of on-farm and on-station trials for the 1987-88 cropping season. Completion of the analysis of the data will contribute further to the institutionalization of FSRE.

An informal survey of MOAC field staff regarding topics and preferred form of educational materials for use with SNL farmers was completed. A series of needed field support guides was developed, field-tested, published and distributed to extension field staff (See list of publications completed).

The Extension Agronomist spent numerous hours in the field interviewing extension personnel and farmers. In addition to informing extension workers and farmers of available new technology, he helped identify problems the farmers were having. These problems were fed-back (1) to the researchers and used in the design of on-farm and on-station trials aimed at solving the technological problems, and (2) to the Information Section and the Extension Training Section to respond to needs for information and training by extension workers. The interaction among these segments of the CSRET Project Team improved significantly during the year, as a result of the outcomes of activities planned under this objective.

Subobjective	Activity	Outcomes
1. Better understand SNL Farming Systems needs and constraints which limit productivity.	1.1 Complete analysis of Labor and Input Survey data for: a. maize, b. cotton, c. legumes, and d. combined enterprises, during the First Quarter. (Malaza and Curry)	1.1 Completion and publication of reports of a. through d. during the First Quarter.
	1.2 Complete analysis of Dietary Survey data: a. nutrient content of sample diets, b. foodgroup frequencies and weights for children's diets, and c. identification of homesteads at risk of nutritional stress in the Second Quarter. (Huss-Ashmore, Curry and Malaza)	1.2 Completion of consultant's report during the Second Quarter
	1.3 Analysis of homestead expenditure data: a. collect price information, b. complete data set with price information, and c. summarize homestead monthly expenditures by commodity group during the Third Quarter (Curry and S. Dlamini)	1.3 Completion of report of results during the Third Quarter.
	1.4 Informal interaction with extension staff, farmers, and other agriculturalists at extension meetings, field days, on-farm demonstrations and trials to identify farming systems used and con-	1.4 Reports summarizing data collected will be fed back to researchers and extension officers continuously for program development during the First and Second

straints in production, price incentives and disincentives, methodology, credit and availability of inputs during the First and Second (Iversen, S. Mamba, and NSMSs) Quarters and an Annual Report on Systems and constraints to productivity will be written during the Third Qtr NSMSs.)

1.5 Survey 50 SNL households to determine characteristics of beans, maize and sorghum preferred by, during the Second and Third Quarters. (S. Dlamini, Patrick, Malaza, Curry, Z. Mamba, Seubert and Home Economics Section) 1.5 Report of preferred characteristics for use in crop screening and Seed Multiplication Sections, during the Third Quarter.

1.6 Survey 25 homesteads in 4 RDAs where soybeans were introduced in past years to determine acceptance of soybeans, during Third Quarter. (S. Dlamini, Patrick, Malaza, Curry, Z. Mamba and Seubert) 1.6 Summary report on acceptance of soybeans during the Third Quarter

1.7 Survey 25 homesteads growing sorghum to determine current production practices, price incentives, and disincentives during the First and Second Quarters. (S. Dlamini, Patrick, Malaza, Curry, Z. Mamba, and Seubert) 1.7 Summary report on current sorghum production practices during the Third

1.8 Survey selected homesteads using crop rotations to identify farmer objectives and to assess current practices during the Second and Third Quarters. (S. Dlamini, Patrick, Malaza, Curry, Z. Mamba and Seubert) 1.8 Summary report of current crop rotation practices during the Third Quarter and a suggested plan for testing crop rotations at MRS, during the Fourth Quarter.

	1.9 Update previous discussion paper with 1986-87 rainfall data, and labor and input data to quantify management characteristics of SNL maize growers, during the First Quarter. (S. Dlamini, Patrick, Ag. Ext. Metr'l.)	1.9 Summary report of management characteristics of SNL maize growers, during the First Quarter.
	1.10 Survey 50 homesteads using herbicides on maize to determine which social factors affect the adoption of herbicides, during the Third Quarter. (Malaza, Curry, S. Dlamini, and Patrick)	1.10 Summary report of social factors which affect the adoption of herbicides by SNL farmers, during the Third Quarter
	1.11 Survey factors stimulating or depressing the production or marketing of produce from SNL farms, during the Second Quarter. (S. Dlamini, Patrick and SSTA)	1.11 Publication of a field support guide or similar publication to be used by extension workers to assist SNL farmers in marketing their produce during the Second Quarter.
2. Identify patterns of adoption of new research technology by SNL farmers.	2.1 Survey 200 homesteads, 20 each in the 10 RDAs during the Second and Third Quarters. (Malaza, Curry, S. Dlamini, and Patrick)	2.1 Summary report of findings including a list of recommendations on how to improve adoption of new research technology.

Professional Training Required: The Rural Sociologist and the Agricultural Economist will require additional training in analytical techniques of survey analysis by the SSTA. This training is planned for the Second Quarter. The training will consist of practical exercises using dBase III, Symphony, and SPSS software packages. In addition both officers should, if schedules permit, participate in the CIMMYT training course on these packages scheduled for March 1988, in Addis Ababa. The Rural Sociologist will require training in survey design and analysis of social surveys by a short term consultant who specializes in social statistics. This activity is planned for the Second Quarter.

Publications Planned: Listed below are publications planned during the year.

1. Four analytical reports of the Labor and Input Survey Data during the First Quarter. (Malaza and Curry)
2. Consultants report of the dietary and nutrient content survey, during the Second Quarter. (Huss-Ashmore, Curry and Malaza)
3. Report on homestead expenditure study, Third Quarter (Curry and Dlamini)
4. Preferred characteristics of beans, maize, and sorghum varieties, during the Third Quarter. (S. Dlamini, Malaza, Patrick, Curry, and C. Motsa)
5. Acceptance of Soybean cropping among SNL farmers, during the Third Quarter. (S. Dlamini, Malaza, Patrick and Curry)
6. Current sorghum production practices, during the Third Quarter. (S. Dlamini, Malaza, Patrick and Curry)
7. Current crop rotation practices, during the Third Quarter. (S. Dlamini, Malaza, Patrick and Curry)
8. Management characteristics of SNL maize producers, during the First Quarter. (Patrick and S. Dlamini)
9. Social factors affecting the adoption of herbicides, during the Third Quarter. (Malaza, Curry, S. Dlamini, and Patrick)
10. Marketing of agricultural products from SNL farms, during the Third Quarter. (S. Dlamini, Patrick and STTA)
11. Patterns of technology adoption on SNL farms, during the Fourth Quarter. (Malaza, S. Dlamini, Curry and Patrick)

Professional Support Needed: An eight week consultancy during the Second Quarter (Huss-Ashmore) will be required to complete the analysis of nutritional data set. A six week consultancy (Worland) during the First and Second Quarters will be needed to help train the Rural Sociologist and the Agricultural Economist in survey methods.

A 3 week consultancy by a qualified expert will be needed during the Second Quarter to determine the needs of SNL farmers in the area of marketing.

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

Progress during the past year toward Objective two was on target. The Project is on-schedule with regard to the long-term plan of activities. Results during the past five years of adaptive on-farm research have defined very well the factors which constrain agricultural production for many of the crops produced by SNL farmers. For example, the most limiting factors in the production of maize, in order of importance based on farmers practices during the last five years, are: (1) plant population, (2) weeding practices, (3) level of fertilization, (4) date of planting, and (5) use of hybrid seed. However, the order of importance varies from farmer to farmer depending upon level of management and from location to location depending upon environmental conditions. The socio-economic implications of the on-farm trials for farmers have not been fully investigated. Thus, the thrust of on-farm research during the 1987-88 Contract Year will include socio-economic analysis in-so-far-as available data will permit.

As planned, agronomic and horticultural trials were conducted in 10 RDAs. Yield data were summarized and reported. These trials will be continued this year but in fewer RDAs. Preliminary analysis of the results of the trickle irrigation trials are very promising. This adaptive research technology with fruits and vegetables will be continued. Other, on-farm activities to be continued include studies of weed management constraints, maize variety yield trials, reduction of vegetable seedling losses, strawberry production systems, and peach and vegetable cultural practices.

A training session on the philosophy and implementation of on-farm research results, stressing skills required by the RAs was completed. Training for RAs will continue this year.

New activities will include evaluation of: the yield potential of grain sorghum varieties, Leucaena bushes as a winter forage, soil moisture conservation techniques with sorghum and maize, identification of patterns of adoption of new technology by SNL farmers, methods of field control of bacterial wilt, reduction of post-harvest losses of fruits and vegetables, and improvement of the RAs understanding of FSR research processes.

Subobjective	Activity	Evaluation
1. Alleviate the weed management constraint that faces SNL maize farmers.	1.1 Conduct herbicide trials for maize under farmer conditions using four applications of two pre- and two post-emergence treatments compared with traditional hand weeding. Two trials will be conducted in each of the four RDAs, during the First and Second Quarters. (Z. Mamba, Seubert, M. Dlamini, and Iversen)	1.1 Summary report of weed control assessments and grain yields will be made to produce a weed management package for SNL farmers during the Third Quarter.
	1.2 Assist in the selection of farmers for on-farm weed management trials and in the design, administration and analysis of farmer assessments. (Malaza, Curry, S. Dlamini, and Patrick)	1.2 Ensure that the report noted in 1.1 above includes a socio-economic analysis of the weed management trials.
	1.3 Complete economic analysis of on-farm weed management trials, during Second and Third Quarters. (S. Dlamini and Patrick)	1.3 Publish field support guide on the use of herbicides on maize.
2. Test improved maize varieties under farmer conditions to assess their yield potential.	2.1 Conduct 12 maize variety trials using 8 hybrids in 6 RDAs in cooperation with the MRS Crop Screening Section and the Seed Multiplication Unit, during the First and Second Quarters. (Z. Mamba, Seubert, Pali, M. Dlamini and Iversen)	2.1 Summary report of maize grain yields, streak virus resistance and emergence percentage, during the Third Quarter.

3. Evaluate grain sorghum varieties under farmer conditions to assess yield potential.	2.2 Cooperate with on-farm agronomist in the selection of farmers for maize trials and in the design, administration and analysis of farmer assessments (Malaza, Curry, S. Dlamini, Patrick, relevant NSMSs)	2.2 Ensure that the report noted in 2.1 above includes a socio-economic analysis of maize trials
	3.1 Conduct eight sorghum variety trials in four RDAs using hybrid and open-pollinated lines which have shown promise in on-station trials, during the First and Second Quarters. (Z. Mamba Seubert, M. Dlamini, Iversen)	3.1 Summary report of sorghum yields, disease resistance and germination rates, during the Third Quarter. (Mamba, and Seubert)
	3.2 Cooperate with on-farm agronomists in farmer selection and in the design, administration, and analysis of farmer assessments of sorghum varieties, during the First and Second Quarters. (Malaza, Curry, S. Dlamini, Patrick and Rel. Ext. Per'l)	3.2 Ensure that the report in 3.1 above includes appropriate socio-economic analysis, during the Third Quarter.
4. Alleviate the problem of lack of winter animal forage.	4.1 Conduct five trials in farmer's fields in five RDAs and three ecological zones to determine the forage potential of Leucaena bushes in contour strips between farmers' fields, First and Second Qtrs. (Mkhatshwa, S. Mamba, Khumalo, Nsibande, Iversen, Z. Mamba, Seubert)	4.1 Summary report of plant survival rates, forage yield, TDN, and palatability, during the Third Quarter.
	4.2 Cooperate with on-farm and pasture agronomists in the selection of farmers, and in the design, administration and analysis of farmer assessments of the leucaena trials, during First and Second Quarters. (Malaza, Curry, S. Dlamini, Patrick and Rel. Ext. Per'l)	4.2 Ensure the report in 4.1 above includes an appropriate socio-economic analysis during the Third Quarter.

5. Improve food security by reducing risk of crop loss for farmers in dry Mveld and Lowveld.

5.1 Conduct one soil moisture conservation technique exploratory trial for maize in the dry Middle Veld using tied ridges compared to the usual practice of no ridges, in cooperation with the Swaziland Development Foundation, during the First and Second Quarters. (Z Mamba, Seubert, M. Dlamini, and Iversen)

5.1 Summary report of biweekly soil profile moisture measurements, grain yield and farmer assessments of labor involved with tied ridges, during the Fourth Quarter.

5.2 Cooperate with on-farm agronomists in farmer selection and in the design, administration, and analysis of farmer assessments of trials involving food security, during the First and Second Quarters. (Malaza, Curry, S. Dlamini, Patrick, and Rel. Ext. Personnel)

5.2 Ensure that the report in 5.1 above includes an appropriate socio-economic analysis, and publication of needed field support guides and other resources to help improve the adoption of new technology.

6. Test trickle irrigation systems for SNL farmers.

6.1 Test trickle irrigation systems at MRS and Central RDA with apples, peaches, cabbage, beets, carrots, and beans, during all Quarters. (Gama, and Grenoble)

6.1 Summary report of crop yields, labor requirements, and costs of setting up and operating the different systems including a socio-economic evaluation of trickle irrigation, during the Fourth Quarter.

	<p>6.2 Cooperate with the horticulturalists in the selection of farmers, and in the design, administration, and analysis of farmer assessments of trickle irrigation systems, during the First and Second Quarters. (Malaza, Curry, S. Dlamini, Patrick and Rel Ext Personnel)</p>	<p>6.2 Ensure that the socio-economic evaluations noted in 6.1 above are included in the reports, during the Fourth Quarter</p>
	<p>6.3 Conduct socio-economic evaluations of the trickle irrigation systems, during the First and Second Quarters. (Malaza, Curry, S. Dlamini, and Patrick)</p>	<p>6.3 Publication of a field support guide regarding trickle irrigation, during the Fourth Quarter</p>
<p>7. Investigate methods of field control of bacterial wilt of tomatoes and evaluate cultivars for resistance.</p>	<p>7.1 Conduct field trials to investigate the use of mulches to maintain lower soil temperatures and methods of soil sterilization. Collect and evaluate germ plasm at the Luyengo Campus for resistance to wilt, and do economic analysis of the results, during the First and Second Quarters. (Gama, Grenoble and Dr. Rao at the Luyengo Campus)</p>	<p>7.1 Summary report of yields, labor requirements and costs of treatments and of the fruit characteristics, yields, and plant disease resistance for variety evaluations, during the Third Quarter.</p>
<p>8. Evaluate methods of reducing vegetable seedling losses after field transplanting.</p>	<p>8.1 Test three methods of applying an antitranspirant to tomatoes and cabbage in a series of 8 on-farm trials, during the First and Second Quarters. (Gama and Grenoble)</p>	<p>8.1 Summary report of rates of seedling survival including a socio-economic analysis of costs and of farmer assessments.</p>

	8.2 Cooperate with horticulturalists in farmer selection and in the design, administration and analysis of the antitranspirant trials, during the First and Second Quarters. (Malaza, Curry, S. Dlamini, Patrick, and Rel	8.2 Report as noted in 8.1 above as well as a field support guide and other extension aids as needed by extension personnel, during the Third Quarter. (Ext. Pers'l.)
9. Develop and test appropriate systems for producing strawberries by SNL farmers and evaluate varieties for runner production	9.1 On-farm tests of the Hill (single plant) and the Hedge Row systems of production will be conducted in the Central and Northern RDAs and Station Trials will be conducted of propagation methods, during all Qtrs. (Gama Grenoble, A. Kunene, Iversen)	9.1 Summary report of yield and labor requirement data including a crop budget, during the Fourth Quarter.
	9.2 Cooperate with horticulturalists in the selection of farmers, and in the design, administration, and analysis of the strawberry trials, during the First and Second Quarters. (Malaza, Curry, S. Dlamini, Patrick and Rel. Ext. Pers'l.)	9.2 Summary report of the socio-economic evaluations of the strawberry trials as noted in 10.1 above and publication of a Field Support Guide, during the Third Quarter
10. Develop peach cultural practices appropriate for commercial production by SNL farmers.	10.1 Compare scheduled pesticide applications, fertilizer, and annual pruning to farmer practices in on-farm trials, during the First and Second Quarters. (Gama, Grenoble, A. Kunene, and Iversen)	10.1 Summary report of crop yields, labor, and costs. Farmer's opinions will be assessed at harvest time and reported, during the Third Qtr.
	10.2 Cooperate with horticulturalists in the selection of farmers, and the design, administration, and analysis of the peach cultural trials, during the First and Second Quarters. (Malaza, Curry, S. Dlamini, Patrick and Rel. Ext. Per'l)	10.2 Summary report of the socio-economic evaluations of the peach trials as noted in 11.1 above.

<p>11. Develop and test a modified seedbed/production system conducive to adjustments in cultural practices for SNL farmers.</p>	<p>11.1 Flat top, raised beds will be compared to the conventional ridge/furrow system in farmer managed trials which incorporate the use of mulch and higher plant populations, during the Second thru Fourth Quarters. (Gama, Grenoble, S. Dlamini, Patrick, Malaza, Curry, A. Kunene, and Iversen)</p>	<p>11.1 Publication of preliminary reports, including socio-economic factors, and a Summary Report during the Fourth Quarter.</p>
<p>12. Reduce post-harvest handling losses of fresh fruits and vegetables and improve market quality.</p>	<p>12.1 Assessments will be made of the post-harvest handling methods of SNL farmers who commercially produce horticultural crops, to determine factors stimulating or depressing the production or marketing of fruits and vegetables, during the Third Quarter (Gama, Grenoble, Malaza, Curry, S. Dlamini, Patrick, A. Kunene, NSHIS, Iversen and Ext. Act. Nat'l Ag Mkt. Bd)</p>	<p>12.1 Summary report of recommended practices and publication of field support guide, during the Third Quarter.</p>
<p>13. Assess the soil fertility and liming situation on SNL and summarize findings with respect to fertilizer needs and recommendations.</p>	<p>13.1 Analysis of the soil test results for SNL farms to determine future fertilizer grade needs and perform economic analysis, during the Third Quarter (Seubert, B. Dlamini, E. Nxumalo, and Iversen)</p>	<p>13.1 Summary report of the fertility status of SNL farm fields and recommendations to CCU and others on fertilizer grades needed in each area, during the Third Quarter.</p>
	<p>13.2 Conduct trial at MRS on maize at three levels of plant population, three levels of basal fertilizer and two levels of weed and nitrogen management and conduct economic analysis, during First and Second Quarters. (E Nxumalo, Seubert, S Dlamini, Patrick, M. Dlamini and Iversen)</p>	<p>13.2 Summary report of the findings including a socio-economic analysis, during the Fourth Quarter</p>

13.3 Conduct liming trials at MRS, testing the following methods of lime incorporation:

1. broadcast-shallow plow,
2. broadcast-deep plow,
3. deep plow-broadcast-harrow, and
4. deep plow-broadcast-shallow plow, during the year. (E. Nxumalo, Seubert and Iversen)

13.3 Summary report of the findings including soil extractable acidity to determine the best method of lime incorporation, and an economic analysis of the results of the trials, during the year

13.4 Conduct a trial at MRS on the response of maize to the delayed applications of basal P and K fertilizer, during the First and Second Quarters. (E. Nxumalo and Seubert)

13.4 Summary report of the findings and recommendations for future research, including an economic analysis of the results, during the Fourth Qtr.)

13.5 Conduct four trials on farmers' fields using different lime application rates, during the First and Second Quarters. (B. Dlamini, Seubert, and E. Nxumalo)

13.5 Summary report of the findings, including an economic analysis of the results, during the Fourth Quarter

14. Improve MRS Research Officers understanding of the FSR research process.

14.1 Provide a step-by-step summary of the history of Swaziland's FSR process. The FSR process and technique will be discussed and presented in a three day workshop involving the research officers, during the Second Quarter. (Seubert and Curry with support from CIMMYT)

14.1 Clear documentation of the FSR process with emphasis on the interdisciplinary aspects of the research and improved ability of the ROs in conducting interdisciplinary OFR

Professional Training Required: The Rural Sociologist and the Agricultural Economist will need to finish the cycle of CIMMYT FSR training, during the Second Quarter. (CRO)

The research assistants will need two five-day training sessions (Agronomy and Horticulture) and three two-day up-dates during the year (Gama)

The Station On-farm Agronomist should participate, if schedule permits, in FSR Training in Zimbabwe, during the Fourth Quarter (CPO)

The Station Biometrician should participate in the FSR Workshop on Data Analysis in Zimbabwe during the Fourth Quarter. (CPO)

Related Publications: Listed below are the publications related to objective two which will be completed during the annual year

1. 1983-84 Trials: maize herbicides, fertilizer value of kraal manure, maize varieties, cutworm bait, hand jab planter, and modified ox-drawn planter shoes, during the First Quarter (Seubert).
2. 1984-85 Trials: maize varieties, lime levels, drybean spacing, maize herbicides, basal fertilizer+plant population, and topdress nitrogen timing, during the Second Quarter (Seubert).
3. 1985-86 Trials: maize varieties, lime levels, drybean spacing, maize herbicides, basal fertilizer+plant population, topdressed nitrogen timing, during the Second Quarter (Seubert).
4. 1986-87 Trials: maize varieties, maize herbicides, drybean spacing, lime levels, basal fertilizer+plant population, during the Third Quarter (Z Mamba and Seubert)
5. 1987-88 Trials: Maize Varieties, Grain Sorghum Varieties, Maize Herbicide, Maize Basal Fertilizer and Plant Population Levels during the Fourth Quarter. (Z. Mamba)
6. Mechanical Weed Control Field Support Guide, during the Second Quarter (Mkhonta and Seubert)
7. Herbicide Recommendations for Maize (including yield data), during the Second Quarter (Mkhonta, Seubert, and Z. Mamba)
8. Cutworm Control Field Support Guide, during the Second Quarter (Masina and Seubert)
9. Maize Variety Recommendations, during the Fourth Quarter (Pal)

10. Fertilizer Grade Recommendations, during the Third Quarter (Seubert)
11. Field Support Guide on Trickle Irrigation, Fourth Quarter (Gama, Grenoble, and Daum)
12. Progress Report on Methods of Reducing Vegetable Seedling Losses after Field Transplanting during the Third Quarter (Gama and Grenoble).
13. Strawberry Production Guide during the Fourth Quarter (Gama, Grenoble and Ferretti).
14. Progress Report on Peach Cultural Practices in On-farm Trials during the Fourth Quarter (Gama and Grenoble)
15. Guide for Handling Fresh Produce during the Second Quarter (Gama and Grenoble).
16. Technical Report on Modified Seedbed/Production Systems during the Second Quarter (Gama and Grenoble).
17. Ox-drawn Planter Use Field Support Guide during the First Quarter (Seubert and Enguro-Ebino).
18. Stalk Borer Control in Maize Field Support Guide during the First Quarter (Masina and Seubert)
19. Plowing with Oxen Field Support Guide during the First Quarter. (Enguro-Ebino, A. Dlamini, and Seubert)
20. Maize Streak Virus Field Support Guide during the Second Quarter (Kunene and Seubert).
21. Calibrating a Knapsack Sprayer for Herbicide Applications Field Support Guide during the First Quarter (Seubert and Mkhonta).
22. Chemical Weed Control Field Support Guide during the Second Quarter (Mkhonta and Seubert)

Professional Support Needed: a short term consultant, Donald Daum, will be needed for four weeks during the Fourth Quarter to assist in the preparation of the field support guide on trickle irrigation. (Grenoble)

A short term consultant, Peter Ferretti, will be needed to help with the analysis of strawberry trial results and to help prepare the production guide during the Fourth Quarter. (Grenoble)

A short term consultant, Francis Witham, will be needed for four weeks to make initial assessments and formulate recommendations on post-harvest losses of fresh fruits and vegetables during the Second Quarter. (Grenoble)

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

The capabilities of the MOAC Research Station increased in a number of ways during the past year. The level of interaction among and between sections improved. Interaction between on-farm and on-station researchers also improved. Likewise, the dialog between extension personnel and researchers increased in ways that have impacted the design of research trials to benefit farmers. Emphasis will continue to be focused on close interaction among personnel during the 1987-88 Contract year in an effort to institutionalize the FSR&T approach to agricultural development.

Research officers and research assistants participated in training programs last year which have improved their capacity to more effectively conduct research. The use of microcomputers in the analysis and reporting of research results increased. Additional training of the RAs is planned for the coming year.

Trickle irrigation technology, which appears to be a very promising technology for Swaziland, will be introduced to the Station this year. This development will make it possible for the Station to service the future technological needs of farmers who are interested in extending the cropping season into the winter months. Apple and peach tree varieties have been planted at the station for the purpose of exploring their potential as commercial crops in Swaziland. Equipment needed to measure "chill units" during the winter months was installed last year in support of this program of research. Also, overhead netting to protect fruit trees from hail damage has been installed. A fruit tree nursery is planned for establishment during the next three years for the purpose of supplying planting stock to meet the future needs of farmers. All of this adaptive research will continue.

Plans are currently being laid to establish a rotation of crops among Station panels over the next several years and to collect crop histories which can be used to advise farmers on the best rotation for improving production while conserving resources.

A Malkerns Research Station Research Fieldday was held in January. It provided an opportunity for interested agriculturalist to learn what goes on at the Station. This activity is planned for January 1988 and will likely become an annual event.

Additional laboratory equipment for the Soil Testing and Soil Chemistry Labs was acquired last year. Also, improvements were made in the lab techniques for making farmer recommendations. Long-term fertility plots to evaluate the use of pH, K and P levels in crop production were established and the results reported. An on-farm soil fertility program is planned for this year.

Improvements were made in the MOAC and MRS Libraries. Additional shelving was added. The plan to up-grade the training of the library staff to shelve and retrieve library texts and periodicals was delayed pending the appointment of personnel to supervise the libraries.

A management training seminar was held last year for mid- and upper-level administrators in the MOAC. This training will be continued this year.

Subobjective	Activity	Evaluation
1. Provide a source of tree fruit stock for SNL farmers and promote the establishment of orchards.	1.1 Establish a production nursery at MRS for apples and peaches and promote the production of tree fruits, during the next three years. (Gama and Grenoble)	1.1 Records of numbers and quality of stock produced and sold in the nursery and the number and location of farmers purchasing trees, during the next three years.
2. Develop cultural methods for the production of deciduous tree fruits by SNL farmers.	2.1 Test methods of reducing hail damage to fruit and controlling dormancy breaks in fruit trees. Evaluate new cultivars. Maintain a source of propagation materials at MRS, during the Fourth Quarter. (Gama, Grenoble, A. Kunene, Iversen)	2.1 Summary report of yields and fruit quality for various treatments of cultural methods, during the Fourth Quarter.

<p>3. Develop and maintain information on new cultivars of important vegetable species for use in making recommendations to SNL farmers.</p>	<p>3.1 Test new varieties of vegetables including onions, cabbage, tomato, pumpkin, potato, cauliflower, melons, and traditional vegetables and compare with current recommended varieties, during the First Quarter through 1989. (Gama, Grenoble, Kunene and Iversen)</p>	<p>3.1 Summary report of visual as well as measured varietal performance for yields, pest resistance, and quality during the Third Quarter.</p>
<p>4. Provide a source of subtropical plant material for future research and demonstration purposes and maintain a source of propagation stock.</p>	<p>4.1 Establish new plantings of several current cultivars of citrus and banana at MRS, during the First Quarter. (Gama and Grenoble)</p>	<p>4.1 Summary report of performance of plants at different locations, over the next several years.</p>
<p>5. Develop improved and simplified methods of tillage and planting for vegetable crops for SNL farmers.</p>	<p>5.1 Test three methods of tillage (full, strip and slot) on-station using both raised and flat bed systems, during the Fourth Quarter. (Gama, Grenoble, and S. Matsebula)</p>	<p>5.1 Summary report of crop yields and overall performance of the methods, during the the Fourth Quarter.</p>
<p>6. Investigate chemical and nonchemical means of controlling nutsedge.</p>	<p>6.1 Several chemical treatments will be compared with the use of rust fungus for controlling nutsedge in fallow soil in a MRS panels, during the First and Second Quarters. (Gama, and Grenoble)</p>	<p>6.1 Summary report of plant counts before, one month after, and one year later, during the Third Quarter.</p>
<p>7. Develop improved potato production practices and screen new varieties for use of SNL farmers.</p>	<p>7.1 Evaluate potato lines from CIP and investigate fertilizer methods and rates, during the First Quarter and continuing through 1990. (Gama and Grenoble)</p>	<p>7.1 Summary report of yields, pest resistance and quality, over the next several years</p>

8. Develop fertilizer rate recommendations for SNL farmers engaged in commercial vegetable production.	8.1 Test three rates each of phosphorus and potassium under different soil levels of each using cabbage and tomatoes as the test crops, during the First and Second Quarters. (Gama, Grenoble, E. Nxumalo, S. Dlamini, Patrick, and S. Matsebula)	8.1 Summary report of yield and other quality factors including an economic analysis of the test results, during the Fourth Quarter
9. Increase winter feed sources for cattle grazing on SNL.	9.1 Assess the potential of adapting cultural practices, crop species and fodder rotations being used in other countries to the agro-ecological, and crop and livestock farming patterns on SNL. (Mkhatshwa and Seubert)	9.1 Summary report of recommendations for future research strategies, during the Fourth Quarter.
10. Develop strategies for meeting national and homestead goals through crop rotations.	10.1 Begin planning a long range research program on-station and on-farm, during the First Quarter and continuing through the year (Patrick and MRS Staff)	10.1 Lay ground work for cropping rotation strategies which will conserve natural resources in Swaziland.
11. Improve the usefulness of soil test reports to SNL.	11.1 Use linear programming to evaluate various types of fertilizers to meet needs identified by soil test results, by the Fourth Quarter of 1989. (S. Dlamini, Patrick and the Soil Test Unit)	11.1 Soil test reports to farmers and extension workers that include least cost fertilizer alternatives.
12. Reduce the variability of on-station research results.	12.1 Develop a record system for on-station panels with regard to past history, during the first Quarter. (Patrick, S. Matsebula, and all research officers)	12.1 Institution of an historical record system for research panels at MRS.

12.2 Develop guidelines for improving the efficiency of the MRS data analysts using micro-computers. Individual training for Research Officers including problem solving to improve skills, during the Third Quarter. (S. Matsetula and Seuhert)

13. Organize MOAC and MRS libraries.

13.1 Train staff in the filing and retrieval of books and periodicals for efficient use, during Second and Third Quarters. (Hlope, F. Matsetula and Diamond)

13.1 Summary report on the use of the libraries during the year.

Professional Training: Station Economist will be trained in the use of linear programming during the Third Quarter. (Patrick)

The Station and Project horticulturalists should attend the annual meeting of the Cape Pomological Society, Cape Town during the Third Quarter. (CRO and COP)

Station Pasture Agronomist and Project Agronomist should visit two ARCs in Africa to view new fodder crop combinations that have the potential for adoption on SNL. (CRO and COP)

Related Publications: Listed below are some of the publications planned:

1. Technical Report on Cultural Methods for the Production of Tree Fruits in Swaziland during the Fourth Quarter. (Gama and Grenoble)

2. Technical Report on Methods of Tillage and Planting Vegetable Crops during the Fourth Quarter. (Gama and Grenoble)

3. Technical Report on Chemical and Nonchemical Means of Controlling Nutsedge during the Fourth Quarter. (Gama and Grenoble)

4. Progress Report on Improved Potato Production Practices and New Varieties during the Fourth Quarter. (Gama and Grenoble)

5. Veg. Crop Recommendations during the Fourth Quarter (Gama, Grenoble)

6. Citrus Production Guide Up-date, during the First Quarter (Gama and Grenoble)

7. Mango Production Guide, during the First Quarter. (Gama and Grenoble)

8. Disease and Insect Control for Fruits and Vegetables (Gama and Grenoble)

Professional Support Needed: A short term consultant, Robert Crossweller, will be needed for four weeks to help establish the tree fruit nursery and to help develop production techniques during the Third Quarter (Grenoble)

A short term consultant, Richard Cole, will be needed to assist in the assessment of varieties and trial results, and to conduct potato production workshops for extension workers during the Third Quarter (Grenoble).

A short term consultant will be needed to train the librarians during the Second Quarter (Diamond).

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

Progress toward objective four during the past year was superior, as pointed out by the USAID Review Team. The most tangible evidence in support of this conclusion was the 105 publications produced, field-tested, published, and distributed. Many were placed in the hands of SNL farmers by front line extension workers. A comprehensive list appears later in the workplan. While it is too early to determine the effect these publications had on agricultural development in Swaziland, the feed-back from extension workers who work with SNL farmers strongly suggests that the publications will prove to be invaluable. They have been so popular that private agricultural businesses working with farmers have asked permission to distribute the publications to farmers, offering in some cases to purchase the materials

The Information Section is operating independently of long-term technical assistance for the first time this year. However, efforts to improve staff performance will be continued this year with the help of several long-term consultants.

A detailed organizational plan was developed for the Section. It will be used to guide the continued development of the Section during the year.

The writing skills workshop planned for last year will be offered this year.

The MOAC Newsletter was up-graded in appearance and in content through field-testing procedures. This improvement activity will be continued.

The research and extension staffs were trained in the development and distribution of support materials for selected audiences. This activity will also be continued.

The network of microcomputers in the MOAC Information Section were improved and up-graded. Five new Macintosh computers and a laserprinter were added to the network and linked by Apple Talk. Two computers were moved to the MRS to increase the capability there to analyze and summarize research results. One computer was moved to the Extension Corp Production Office in Manzini for the use of extension personnel in the preparation of T&V messages, timely reminders, etc. Another IBM microcomputer and printer will be purchased for the MRS and a computer lab created for more efficient use of the computers.

Subobjective	Activity	Evaluation
1. Identify appropriate production topics for field support guides and/or other learning aids	1.1 Interview extension workers, extension officers, NSMS, research officers, research assistants, CSRET team and counterparts, and farmers during the entire year. (R. Motsebula and Diamond)	1.1 Document topics identified and submit to Information Section for development, and field-test after the first draft. Assess the usefulness of material developed as perceived by front line staff.

	1.2 Use informal feedback obtained from field visits and interaction with the research and UNISWA staffs to identify topics for extension messages, during the year. (S. Mamba, NSMSs and Iversen)	1.2 Evaluation of topics to be delivered by NSMSs with the help of ROs and Extension Trn. Section at the monthly meetings
2. Develop appropriate aids for use of extension personnel working with SNL farmers.	2.1 Assign Information Staff to the development of topics identified in (1) above, during the year (Hlope and Project staff)	2.1 Publication of the field support guides and other learning aids as identified by field staff
	2.2 Assist NSMSs and ROs in writing field support guides and other materials for extension field staff based on topics identified in 1. above and prepare specialized materials for SNL farmers. (Hlope, Iversen, R. Matsebula, and Diamond)	2.2 Publication of materials, feedback from field staff regarding use of published materials.
3. Assist retailers who serve SNL farmers to develop an understanding of new and improved technology.	3.1 Conduct a one-day seminar for agricultural retailers to teach them the new and improved technology available from the MOAC research and extension activities. (S. Mamba, M. Dlamini, and Iversen)	3.1 Assessment of the knowledge retailers have of the new and improved technology.
4. Improve the writing skills of authors of MOAC and MRS publications.	4.1 Conduct writing skills development courses at locations convenient to the authors, during the Third and Fourth Quarters. (R. Matsebula, Diamond, Hlope, and a consultant)	4.1 Course evaluation by students and observation of the skills of the authors after the completion of the course.

5. Develop new ways to publish and disseminate research results.	5.1 Institute a review process at MRS for the publication of research results. (CRO and COP)	5.1 Implementation and use of a Review Process at MRS.
	5.2 Develop and institute a plan for an annual field day at the MRS, during the Second Quarter. (CRO and COP)	5.2 Implementation of the plan with the completion of a Research Field Day
6. Identify appropriate technical topics for extension messages, training, field demonstrations, and publications.	6.1 Coordinate "Extension Topics Survey" of field extension staff, research staff, and other agriculturalists to identify needed topics, during the Second and Third Quarters.(S. Mamba, and Iversen)	6.1 Publication of survey results and report of the results to the NSMSs
7. Develop and execute a series of field demonstrations managed by extension field staff and based upon on-farm research trials.	7.1 Plan and coordinate field demonstrations on varieties (maize, sorghum, cowpeas), new crops (soybeans, long-day onions and sunflower) fertilizer, lime, maize populations, modified ox planter, herbicides, and best management practices.(S. Mamba, Iversen, NSMSs, Research Officers)	7.1 Summary report on the results of the demonstrations including a survey of the reactions of the cooperating farmers.
8. Improve reference materials available at the Manzini Crop Production Office and other rural reading centers.	8.1 Acquire reference books and periodicals and purchase shelves, during the Second and Third Quarters. (S. Mamba, Iversen, and T&V Coordinators)	8.1 Reference materials acquired, catalogued, and shelved and used on a regular basis by the staff.

Related Publications: Listed below are some of the publications which will be developed during the year:

1. Banana Production Guide during the Second Quarter (Gama and Grenoble).
2. Carrot Production Guide during the Fourth Quarter (Gama and Grenoble).
3. Long Day Onion Prod. Guide during the Second Quarter (Gama and Grenoble).
4. Tomato Production Guide updated during the Second Quarter (Gama, Grenoble).
5. Cabbage Production Guide during the Fourth Quarter (Gama and Grenoble).
6. Producing Maximum Maize, during the First Quarter (Iversen, S. Dlamini and Patrick).
7. Maize Production Guide, during the Fourth Quarter (Iversen and Seubert).
8. Soil Sampling, during the First Quarter (Zubuko and Iversen).

Professional Support Needed: The services of a communications specialist will be needed for six weeks to help conduct the writing skills development courses during the Third and Fourth Quarters. (Hlope and Diamond)

A short term consultant, Harry Carey, will be needed for three weeks to further refine a system of information flow that includes the generation of educational subject matter information at various locations through the MOAC, MRS, and Manzini Crop Production Office. This will include training in editing, computer usage, word processing, computer illustration/graphics, typesetting/formatting, desktop publishing, systemization of news article generation and flow and to help train staff in writing and editing including page layout, formatting, and typesetting in consultation with SMDEP, during the Second Quarter (Hlope).

A short term consultant will be needed for three weeks to assist in slide set development, photography, scripting, video taping, and review of necessary presentation equipment. The consultant will assist in the training of T&V Coordinators, and establish a system of distribution and use in consultation with SMDP, during the Third Quarter (Hlope).

A short term consultant will be needed for three weeks to integrate the use of the laser printer and the Apple Talk computer system into the operation of the Information Section and to provide instruction to MOAC, MRS, and Manzini Crop Production staffs in the use of the system to generate information flow to the SNL farmers, during the Third Quarter (Hlope)

A short term consultant, local hire, will be needed for three weeks to provide training to the Information Staff in the proper use of photographic equipment, duplicating and copyboard equipment, as well as darkroom materials and equipment. The consultant will assist in the establishment and improvement of two darkroom facilities on the top floor of the Ministry, during the Third Quarter (Hlope).

Following the establishment of a post by the MOAC, a writer/editor should be hired on a part-time basis to assist the Information Officer with his overload. In addition, the Ministry needs to reassign personnel in the Information Section in a way which will bring qualified and motivated staff into the Section to assist with the overload.

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

Progress toward objective five ranged from excellent to satisfactory during the past Contract Year. The flow of information relative to new technologies and management techniques increased dramatically. Extension personnel were provided with a wide array of support documents to be used in assisting farmers in the production of a variety of crops. Increased attention was directed to the training of research assistants and extension workers in an effort to improve on the delivery of new technologies and management techniques. All of these activities will be continued

The Information Section arrived at that point in its development during the fourth quarter of last year that it was considered to be self sufficient, i.e., the Section no longer needed long-term Contract assistance. There will be a need for considerable short-term assistance. The capability of the Section to meet the information needs of the MOAC are excellent.

There is a pressing need for the Ministry to provide some additional staff support and to ensure the availability of qualified personnel in future years. The Section is presently operating above maximum capacity. Some support staff need additional motivation and training. Likewise, if there should be a change in key Section leadership personnel at a future date the Section would not be able to keep up with the extensive information needs of the MOAC which it is currently meeting. The MOAC has indicated that additional posts will be forthcoming in the Information Section.

Staff training for extension and other MOAC personnel increased significantly last year following the arrival of the Contract Extension Training Specialist in September and the Extension Agronomist in December. Satisfactory progress toward this objective has been made in the training of extension workers to be able to deliver and disseminate new technology and improved practices to SNL farmers. However, much training remains to be completed. Accordingly, comprehensive plans have been made to further increase staff training for extension personnel next several years. This training will be essential to the efficient delivery and dissemination of new and improved technology to SNL farmers in future years

Subobjective	Activity	Evaluation
1. Improve the training capability of the Ministry of Agriculture and Cooperatives.	1.1 Continue to implement the long range human resource development plan as outlined in the Chart attached to this report, during the entire year. (R. Shabalala, R. Matsebula, and Diamond)	1.1 Implementation of a system of manpower development and of participatory management in the Ministry.
	1.2 Plan and implement three one-week technical up-date workshops for extension workers, during the Second and Third Quarters. (R. Matsebula, Diamond and MRS Staff)	1.2 Assessment of the T&V technical skills and knowledge of extension workers.

1.3 Train NSMSs how to advance plan their T&V messages, during the entire year. (S. Mamba, Iversen, R. Matsebula, and Diamond) 1.3 An assessment of the messages planned and delivered by the NSMSs.

1.4 Assist NSIISs and ROs in planning and presenting lessons for a series of three, one-week workshops and one, two-day workshops in four districts during February, May and June. (R. Khumalo, R. Matsebula, Iversen, and Diamond) 1.4 Assessment of the technical skills of the participants.

HUMAN RESOURCES DEVELOPMENT CHART

Task	1987					1988					
	J	J	A	S	O	N	D	J	F	M	A
Define strategy for implementation	*										
MOAC Department goals and objectives drafted	*	*	*	*							
Individual professional goals and objectives drafted	*	*	*	*							
Meet with MOAC Department Heads as a group	*	*	*	*	*	*	*	*	*	*	*
Meet with MOAC Department Heads individually	*	*	*	*	*	*	*	*	*	*	*
Department training needs established	*	*	*	*	*	*	*	*	*	*	*
MOAC review of Department training needs	*	*	*	*	*	*	*	*	*	*	*
Develop Department Training Plans	*	*	*	*	*	*	*	*	*	*	*
Develop five-year MOAC training plan	*	*	*	*	*	*	*	*	*	*	*
Plan to Ministry of Labour and Public Services	*	*	*	*	*	*	*	*	*	*	*

Key Personnel in the Implementation Process:

MOAC: R. Shabalala, Under Secretary (Personnel)
R. Matsebula, Agriculture Officer (Training)

MOLAPS: John King, Human Resources Development Adviser
Jabu Nkambule, Human Resources Development Officer

Reference: Handbook for Human Resources Development
Ministry of Labour and Public Services
Swaziland Manpower Development Project

1.5 Conduct a two-day needs assessment meeting with NSMSs, EOs, DSMSs, SEOs, and T&V Coordinators for the purpose of developing a schedule for the delivery of T&V messages to SNL farmers, during the Third Quarter. (S. Mamba, Iversen, S. Dlamini, Patrick, Malaza, Curry, R. Matsebula, and Diamond)

1.6 Training sessions for NSMSs on how to deliver T&V messages, during the Second and Third Quarters. (R. Matsebula, Diamond, S. Mamba, and Iversen)

1.7 NSMSs collaborate with research officers to finalize monthly T&V messages a minimum of one month before releasing them, during the Second and Third Quarters. (S. Mamba, Iversen, R. Matsebula, Diamond, ROs and CSRET Staff)

1.8 Plan and implement a series of microcomputer workshops for MCIAC research and extension personnel, during the first three Quarters. (R. Matsebula, Diamond, Hlope)

2. Provide Extension Education Diploma program, University of Swaziland, with improved educational resources to enhance basic educational skills.

2.1 Place the extension education instructors at the Luyengo Campus on the mailing list to receive all new Project materials and add to the resources of the Campus library. (Hlope, R. Matsebula, and Diamond)

2.1 Use of educational materials from the Project in the education of students enrolled in agricultural programs.

2. Strengthen the planning and policy making capabilities of the MOAC	2.1 Sharpen administration/ management skills of higher echelon Ministry personnel and improve effectiveness as a Team, during the year (PS, DPS, US-Adm, Consultants and Policy Adviser)	2.1 Team trained and organized for more effective operations.
	2.2 Identify high priority technical assistance needs from NATCAP and other sources, assess GOS capabilities to support various levels of recurrent costs associated with meeting these needs through meetings, seminars, and/or discussions, during the year. (DPS, DRP, DA, DVS, Commissioner, US-D, SAE, Consultants, and Policy Adv'r.)	2.2 Clear identification of amount and type of external assistance required to prepare and implement Minister-wide program based on sound strategy; formal training plan for planning, Ag. Econ. and analysis, and Monitoring and Evaluation Units.
	2.3 Training selected personnel in planning unit to meet high priority needs, during the year. (DPS, US-Adm (training officer), DRP, UD-D, SAE, consultants, and Policy Adviser)	2.3 Training completed
3. Policy and planning guidance attuned to MOAC's current needs.	3.1 Policy option papers as requested, analytical reports, meetings and seminars, during the year. (PS, DFS, DRP, DA, US-D, DVS, Commissioner, Consultants, CSRET Socio-economic Section, and Policy Adviser)	3.1 Reports utilized by decision makers and decisions based on scientific analysis.
4. Secure full review and acceptance of MOAC/C/1986-4.	4.1 Meetings with Directors, Section Heads, and Projects Committee, seminar; and meetings with organizations involved in implementation, during the year. (DPS, DRP, DA, DVS, US-D, Commissioner, UD-D, SAE, Consultants, and Policy Adviser)	4.1 MOAC/C/1986-4 understood and accepted by all parties to implementation and use as a basis for programs

5. Prepare sub-sector strategies and Ministry-wide program for implementing strategy.	5.1 Sub-sector strategies: Review and up-date livestock sub-sector, and other papers; preparation of alternative policy options by Planning Unit and consultants; seminar to discuss; and final decisions by Principal Secretary and Commissioner, during the year (DPS, Directors and Commissioner, US-D, SAE, consultants and Policy Adviser)	5.1 Sub-sector strategies prepared, and agricultural development strategy completed.
	5.2 Ministry-wide program for implementing strategy: Prepare holistic program for MOAC from which projects for submission to EEC, other donors and government flow, during the year. (DRP, Directors, Commissioner, US-D, SAE and Policy Adviser)	5.2 Program for all departments covering functional components of the agricultural sector prepared, and parameters established for projects to implement entire program.
6. Improve Organizational structure for strategy implementation.	6.1 Review structure in terms of capabilities to effectively implement program based on strategy as required, during the year. (Principal Secretary and others as agreed August 1987)	6.1 Structure attuned to Ministry-wide program based on MOAC/C/1986-4.
7. Improve extension delivery system	7.1 Conduct survey of extension T&V method of delivering new technology (Malaza and Iversen)	7.1 Reduction in time-lag between research and farm practices.

Professional Support Needed: The services of a consultant in marketing will be needed for a four week period to help determine policy issues related to agricultural marketing during the Second Quarter. (DRP)

A consultant, Paul Jakus, will be needed for three weeks during the Second Quarter to convert and install computer programs and train computer programmers and key-punch operators in agricultural data analysis. (DRP)

The services of four consultants to assist in the sub-sector strategizing and Ministry-wide program development, and one consultant on cooperative policy, external to the contract will be needed during the First Quarter Consultancies through the contract to review National Maize Corporation and provide analysis of policy options and operational modes (contract), in-country project design and preparation training; evaluation of selected ministerial policies and capabilities; and others as identified. (PS)

TRAINING SCHEDULE FOR EXTENSION, RESEARCH, AND MINISTRY PERSONNEL
 Coordination and Scheduling are the Responsibility of Extension Training.

First Quarter

(October, November, December, 1987)

ACTIVITY AND PERSONS

<u>RESPONSIBLE</u>	<u>DAYS</u>	<u>DATE</u>	<u>LOCATION</u>	<u>AUDIENCE</u>
Research Assistants Training Workshop* (<u>GAMA</u> , M. Hlope)	(5)	29 Sept-2 Oct 1987	CODEC, MRS	Research Ass'ts
Beekeeping Workshop (<u>BECTAL</u> , Groenig, Matsebula, Diamond)	(5)	29 Sept-2 Oct 1987	Lutheran FTC	Home Economics Officers
Beekeeping Workshop (<u>BECTAL</u> , Groenig, Matsebula, Diamond)	(5)	31 Nov-4 Dec 1987	Lutheran FTC (Hhohho)	Extension Workers (limited to 10)
Microcomputer Training Course (<u>HLOPE</u> , Matsebula, Diamond, Iversen)	(2)	17-18 December 1987	MOAC	MOAC/CSRET Counterparts/Staff Subject Matter Specialists
Dairy Cattle Tick Control Workshop (M. <u>HLOPE</u> , S. Hlope, Matsebula, Diamond)	(1)	21 December 1987	Matshane RDA	Extension Workers, DSMS

Second Quarter
(January, February, March, 1988)

Microcomputer Training Course (<u>HLOPE</u> , Matsebula, Diamond, Iversen)	(2)	14-15 January 1988	MOAC	MOAC/CSRET Counterparts/Staff Subject Matter Specialists
Advanced Agriculture In-Service Training (<u>KHUMALO</u> , Matsebula, B. Kunene, Diamond, Iversen)	(5)	15-19 February 1988	Nhlangano FTC	Extension Workers
Advanced Agriculture In-Service Training (<u>KHUMALO</u> , Matsebula, P. Dlamini, Diamond, Iversen)	(5)	15-19 February 1988	Low Veld FTC	Extension Workers
Advanced Agriculture In-Service Training (<u>KHUMALO</u> , Matsebula, A. Shongwe, Diamond, Iversen)	(5)	22-26 February 1988	Lutheran FTC	Extension Workers
Advanced Agriculture In Service Training (<u>KHUMALO</u> , Matsebula, C. Manana, Diamond, Iversen)	(5)	22-26 Feb 1988	Mpisi Vet Trn'g Cntr	Extension Workers
Writing Skills Course (<u>HLOPE</u> , Matsebula, Diamond)	(40)	1 Feb - 31 Mar 1988	MOAC, MRS, Manzini	Subject Matter Specialists, Regional Staff, and Research Officers
Farming Systems Research Workshop* (<u>CURRY</u> , Seubert)	(5)	March 1988 Sub	Nhlangano SUN	SAO's, RO's, NSMS's, SEO's, RA's
Library Staff Trn'g <u>HLOPE</u> , Matsebula, Diamond)	(30)	1-31 March 1988	MOAC & MRS	Library Staff

Research Assistant Training Workshop (<u>D. GAMA</u> , M. Hlope)	(5)	14-18 March 1988	CODEC/ MRS	Research Assistants
Microcomputer Training Course (<u>HLOPE</u> , Khumalo, Matsebula, Diamond, Iversen)	(2)	17-18 March 1988	MOAC	MOAC/CSRET Counterparts/Staff

Third Quarter
(April, May, June, 1988)

Research Assistants Training Workshop* (<u>GAMA</u> , M. Hlope)	(5)	3-8 April 1988	CODEC, MRS	Research Ass'ts.
Agricultural Retailers Seminar** (<u>MAMBA</u> , B. Kunene, M. Dlamini, Iversen, Matsebula)	(1)	6 April 1988	Nhlangano FTC	CCU Staff, all Credit Advisors, Commercial Merchants
Agricultural Retailers Seminar** (<u>MAMBA</u> , P. Dlamini, M. Dlamini, Iversen, Matsebula)	(1)	7 April 1988	Low Veld FTC	CCU Staff, all Credit Advisors, Commercial Merchants
Agricultural Retailers Seminar** (<u>MAMBA</u> , A. Shongwe, M. Dlamini, Iversen, Matsebula)	(1)	13 April 1988	Lutheran FTC	CCU Staff, all Credit Advisors, Commercial Merchants
Agricultural Retailers Seminar** (<u>MAMBA</u> , Manana, M. Dlamini, Iversen, Matsebula)	(1)	14 April 1988	Mpisi Vet Trn'g Cntr.	CCU Staff, all Credit Advisors, Commercial Merchants
Extension Planning Conference (<u>S. MAMBA</u> , Khumalo, Matsebula, Iversen, Diamond)	(2)	21-22 April 1988	CODEC	VOs, SEOs, ROs, NSMSs, SAOs, PMs SEOs, EOs, T&V Coordinator

** In consultation with Alex Brown.

Beekeeping Workshop (5) (<u>BECTAL</u> , Gau, Groenig, Khumalo, Matsebula, Diamond)	11-15 April 1988	Lutheran FTC (Manzini)	Extension Workers (limited to 10)
Beekeeping Workshop (5) (<u>BECTAL</u> , Gau, Groenig, Khumalo, Matsebula, Diamond)	18-22 April 1988	Lutheran FTC (Shiselwini)	Extension Workers (limited to 10)
Microcomputer (2) Training Course (<u>HLOPE</u> , Khumalo, Matsebula, Diamond, Iversen)	5-6 May 1988	MOAC	MOAC/CSRET Counterparts/Staff
Advanced Agriculture (5) In-Service Training (<u>KHUMALO</u> , Matsebula, B. Kunene, Diamond, Iversen)	9-13 May 1988	Nhlangano FTC	Extension Workers
Advanced Agriculture (5) In-Service Training (<u>KHUMALO</u> , Matsebula, P. Dlamini, Diamond, Iversen)	9-13 May 1988	Low Veld FTC	Extension Workers
Advanced Agriculture (5) In-Service Training (<u>KHUMALO</u> , Matsebula, A. Shongwe, Diamond, Iversen)	16-20 May 1988	Lutheran FTC	Extension Workers
Advanced Agriculture (5) In-Service Training (<u>KHUMALO</u> , Matsebula, C. Manana, Diamond, Iversen)	16-20 May 1988	Mpisi Vet Trn'g Cntr	Extension Workers
Personnel Manage- (10) ment Course (<u>MATSEBULA</u> , Diamond)	23 May-3 June 1988	CODEC	VOs, SEOs, PMs, ROs, NSMSs, AOs, COs, Range Mgr's, SAOs
Advanced Agriculture (5) In-Service Training (<u>KHUMALO</u> , Matsebula, B. Kunene, Diamond, Iversen)	13-17 June 1988	Nhlangano FTC	Extension Workers

Advanced Agriculture (5) 13-17 June Low Veld Extension Workers
 In-Service Training 1988 FTC
 (KHUMALO, Matsebula,
 P. Dlamini, Diamond, Iversen)

Advanced Agriculture (5) 20-24 June Lutheran Extension Workers
 In-Service Training 1988 FTC
 (KHUMALO, Matsebula,
 A. Shongwe, Diamond, Iversen)

Advanced Agriculture (5) 20-24 June Mpisi Vet Extension Workers
 In-Service Training 1988 Trn'g Cntr
 (KHUMALO, Matsebula,
 C. Mamano, Diamond, Iversen)

Fourth Quarter
 (July, August, September, 1988)

Advanced Microcomputer Training Course (HLOPE, Khumalo, Matsebula, Diamond, Iversen)	(10)	11-22 July 1988	MOAC	MOAC/CSRET Counterparts/Staff
Small Fruit and Trickle Irrigation Practicum(GAMA, Grenoble)	(2)	15-16 August 1988	Nhlangano FTC	Extension Workers
Small Fruit and Trickle Irrigation Practicum(GAMA, Grenoble)	(2)	18-19 August 1988	Mpisi Vet Trn'g Cntr	Extension Workers
Small Fruit and Trickle Irrigation Practicum(GAMA, Grenoble)	(2)	24-25 August 1988	Low Veld FTC	Extension Workers

Small Fruit and Trickle Irrigation Practicum (GAMA, Grenoble)	(2)	25-26 August 1988	Lutheran FTC	Extension Workers
Microcomputer Training Course (HLOPE, Matsebula, Diamond, Iversen)	(2)	1-2 September 1988	MOAC	MOAC/CSRET Counterparts/Staff Subject Matter Specialists
Beekeeping Workshop (BECTAL, Gau, Groenig, Khumalo, Matsebula, Diamond)	(5)	12-16 Sep 1988	Lutheran FTC (Lubombo)	Extension Workers (limited to 10)
Beekeeping Workshop (BECTAL, Gau, Groenig, Khumalo, Matsebula, Diamond)	(5)	19-23 Sept 1988	Lutheran FTC (Hhohho)	Extension Workers (limited to 10)

Acronyms

CCU	= Central Cooperative Union
CODEC	= Cooperative Development Centre
CRSET	= Cropping Systems Research and Extension Training
DSMS	= District Subject Matter Specialist
EO	= Extension Officer
FTC	= Farmer Training Centre
MEU	= Monitoring and Evaluating Unit
MOAC	= Ministry of Agriculture and Cooperatives
MRS	= Malkerns Research Station
NSMS	= National Subject Matter Specialist
PM	= Project Manager
RA	= Research Assistant
RO	= Research Officer
SAO	= Senior Agriculture Officer
SEO	= Senior Extension Officer
T&V	= Train and Visit
VO	= Veterinary Officer

LIST OF ANTICIPATED PUBLICATIONS TO BE COMPLETED DURING THE YEAR

First Quarter

1. 1983-84 Trials: Maize Herbicides, Fertilizer Value of Kröal Manure, Maize Varieties, Cutworm Bait, Hand Jab Planter, and Modified Ox-drawn Planter Shoes (Seubert).
2. Ox-drawn Planter Use Field Support Guide (Seubert and Enguro-Ebino).
3. Stalk Borer Control in Maize Field Support Guide (Masina and Seubert).
4. Plowing with Oxen Field Support Guide (Enguro-Ebino, A. Dlamini, Seubert)
5. Calibrating a Knapsack Sprayer for Herbicide Applications Field Support Guide (Seubert and Mkhonta).
6. Four analytical reports of the Labor and Input Survey Data (Malaza and Curry).
7. Management characteristics of SNL maize producers (Patrick and S. Dlamini).
8. Producing Maximum Maize (Patrick, Iversen, and S. Dlamini).
9. Disease and Insect Control for Fruits and Vegetables (Gama and Grenoble).
10. Avocado Production Guide (Gama and Grenoble).
11. Soil Sampling (Zubuko and Iversen).

Second Quarter

1. 1984-85 Trials: Maize Varieties, Lime Levels, Drybean Spacing, Maize Herbicides, Basal Fertilizer+Plant Population, and Topdress Nitrogen Timing (Seubert).
2. 1985-86 Trials: Maize Varieties, Lime Levels, Drybean Spacing, Maize Herbicides, Basal Fertilizer+Plant Population, and Topdress Nitrogen Timing (Seubert).
3. Mechanical Weed Control Field Support Guide (Mkhonta and Seubert).
4. Herbicide Recommendations for Maize Field Support Guide (Mkhonta, Seubert, and Z. Mamba).

5. Cutworm Control Field Support Guide (Masina and Seubert).
6. Guide for Handling Fresh Produce (Gama and Grenoble).
7. Technical Report on Modified Seedbed/Production Systems (Gama and Grenoble).
8. Maize Streak Virus Field Support Guide (Kunene and Seubert).
9. Chemical Weed Control Field Support Guide (Mkhonta and Seubert).
10. Banana Production Guide (Gama and Grenoble).
11. Long Day Onion Production Guide (Gama and Grenoble).
12. Tomato Production Guide Updated (Gama and Grenoble).
13. Consultants report of the dietary and nutrient content survey (Huss-Ashmore, Curry and Malaza).

Third Quarter

1. 1986-87 Trials: Maize Varieties, Maize Herbicides, Drybean Spacing, Lime Levels, Basal Fertilizer+Plant Population (Z. Mamba and Seubert).
2. Fertilizer Grades Field Support Guide (Seubert).
3. Progress Report on Methods of Reducing Vegetable Seedling Losses after Field Transplanting (Gama and Grenoble).
4. Report on homestead expenditure study (Curry and S. Dlamini).
5. Preferred characteristics of beans, maize, and sorghum varieties (S. Dlamini, Malaza, Patrick, Curry, and C. Motsa).
6. Acceptance of Soybean cropping among SNL farmers (S. Dlamini, Malaza, Patrick and Curry).
7. Current sorghum production practices. (S. Dlamini, Malaza, Patrick and Curry)
8. Current crop rotation practices (S. Dlamini, Malaza, Patrick and Curry).

9. Social factors affecting the adoption of herbicides (Malaza, Curry, S. Dlamini, and Patrick).

10. Marketing of agricultural products from SNL farms (Patrick and STTA).

Fourth Quarter

1. 1987-88 Trials: Maize Varieties, Grain Sorghum Varieties, Maize Herbicide, Maize Basal Fertilizer and Plant Population Levels (Z. Mamba).

2. Maize Variety Recommendations (Pali).

3. Field Support Guide on Trickle Irrigation (Gama, Grenoble, and Daum).

4. Strawberry Production Guide (Gama, Grenoble and Ferretti).

5. Progress Report on Peach Cultural Practices in On-farm Trials (Gama and Grenoble).

6. Technical Report on Cultural Methods for the Production of Tree Fruits in Swaziland (Gama and Grenoble).

7. Tech Rep't on Methods of Tillage and Planting Vegetable Crops (Gama, Grenoble).

8. Technical Report on Chemical and Non-chemical Control of Nutsedge (Gama and Grenoble).

9. Progress Report on Improved Potato Production Practices and New Varieties (Gama and Grenoble).

10. Fertilizer Rate Recommendations for Vegetable Crops. (Gama and Grenoble).

11. Carrot Production Guide (Gama and Grenoble).

12. Cabbage Production Guide (Gama and Grenoble).

13. Patterns of technology adoption on SNL farms (Malaza, S. Dlamini, Curry and Patrick).

14. Maize Production Guide (Iversen and Seubert).

PERSONNEL DEVELOPMENT PLAN FOR 1967-1969

SECTION	1967			1968					1969																	
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S		
<u>Ministry of Agriculture</u>																										
R. Shabalala, U.S., A.D. Little	*	*																								
C. Nkwanyana, CRD; M.S., Mg't									*	*	*	*	*	*	*	*	*	*	*	*						
M. Ngwenya, SAOT; M.S., Mg't																								*		
<u>Horticulture Section</u>																										
Witham Consultancy				*	*	(4	wks)																			
Cole Consultancy				*	*	(3	wks)																			
Crassweller Consultancy								*	*	(3	wks)															
Ferretti Consultancy																							*	*	(3	wks)
Daum Consultancy																							*	*	(6	wks)
Mavuso, M.S.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Game, Ph.D.								*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<u>Agronomy Section</u>																										
Bhembe, M.S. (Entomology)	*	*	*																							
Nxumalo, M.S.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Nsibande, M.S.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<u>Socio-economic Section</u>																										
Jakus Consultancy				*	*	(3	wks)																			
Wilkenson Consultancy								*	*	(3	wks)															
Marketing Specialist				*	*	(3	wks)																			
Huss-Ashmore Consultancy				*	*	(8	wks)																			
Worland Consultancy				*	*	(6	wks)																			
S. Dlamini, M.S.	*	*	*									*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<u>Extension Agronomy</u>																										
S. Mamba, M.S.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
G. Ndlangamandla, B.S.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
T. Zubuko, B.S.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
P. S. Dlamini, B.S.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
T. Ngcamphalala, B.S.												*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

PROPOSED EXPENDITURES BY THE GOVERNMENT OF SWAZILAND
October 1, 1987 through September 30, 1988

	(E000: E1 = \$ 50)
<u>Research</u>	
Salaries	290
Facilities	
Labs, offices	900
Staff Houses(4)	24
Research Commodities and Supplies	27
Vehicle Fuel and Maintenance	90
Participant's Air Fare	
U. S.	24
Third Country	15
Subtotal	<u>1370</u>
<u>Agricultural Information</u>	
Salaries	80
Facilities	
Offices	400
Production Materials	20
Vehicle Fuel and Maintenance	25
Participant's Air Fare	
U. S.	8
Third Country	3
Subtotal	<u>536</u>
<u>Extension Training</u>	
Salaries	35
Facilities	
Offices	200
Staff Houses(2)	12
Materials	12
Vehicle Fuel and Maintenance	10
Participants Air Fare	
U. S.	12
Third Country	6
Subtotal	<u>287</u>
<u>Headquarters</u>	
Facilities	
Offices	100
Staff Houses	16
Emergency Travel	5
Subtotal	<u>121</u>
<u>Grand Total</u>	<u>2314</u>

PROPOSED EXPENDITURES BY USAID
October 1, 1987 through September 30, 1988*

	(\$000)	Research 60%	Agricultural Information 18%	Extension 22%
Salaries	\$ 540	\$ 324	\$ 97	\$ 119
Fringe Benefits	150	90	27	33
Travel/Transport	165	100	30	35
Allowances	105	62	19	24
Participant Trn'g	90	54	16	20
Other Direct Costs	40	24	7	9
Equipment	25	15	4	6
Total Direct	\$ 1,115	\$ 669	\$ 200	\$ 246
Indirect Costs	240	144	43	53
Total	\$ 1,355	\$ 813	\$ 243	\$ 299
Contingency 10%	135	81	24	30
Grand Total	\$ 1,490	\$ 894	\$ 267	\$ 329

*Assumes Contract extension beyond September 30, 1988. Otherwise, travel, transportation, and allowances costs will be significantly higher.

PUBLICATION LIST - beginning October 1, 1986

**Information Section, Ministry Of Agriculture and Cooperatives
Mbabane, Swaziland**

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