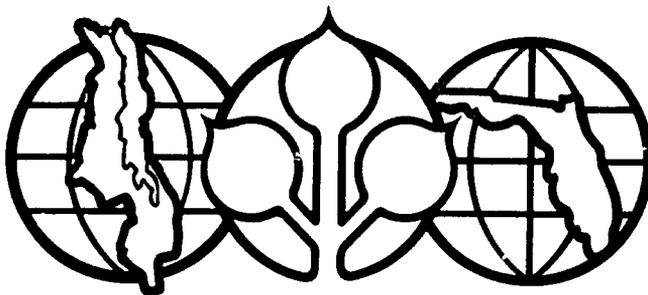


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Malawi Agricultural Research Project

Center for Tropical Agriculture
International Programs
Institute of Food and Agricultural Sciences
University of Florida

The Department of Agricultural Research
Ministry of Agriculture, Malawi

The U.S. Agency for International
Development

QUARTERLY REPORT

October, November, December
1981

612 - 0202

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R.C. Gray, Animal Scientist

Art Hansen, Farming Systems Analyst

E.M. Hodges, Pasture Agronomist

I.B. McLean, Horticulturist

D.E. McCloud, Chief of Party

S.F. Pasley, Plant Breeder

D.W. Pervis, Agricultural Economist

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HIGHLIGHTS

Drs. Pervis, Gray and Pasley arrived in Malawi during the quarter and now the UF/USAID Technical Assistance Team is complete. Long-term Technical Assistance was 19% completed, Fig. 1.

The only short-term Technical Assistance during the quarter was for an Administration monitoring by Dr. Chris Andrew, Assistant Director of International Programs at the the University of Florida. Short-term Technical Assistance was 21% completed at the close of the quarter.

Training

During the quarter 5 Participant Trainees were sent to the U.S., 2 to the University of Florida, 1 to the University of Arizona and 1 to Mississippi State University. At the end of the quarter a total of 12 persons studying for the PhD and 6 for the MS were in U.S. Participant training was 17% completed, Fig, 1. In-service Training during the quarter included 3 Malawians who were sent to attend workshops or conferences. In-Service Training was 20% completed by the end of the quarter.

Research

The first steps were taken to establish a new research program in Agricultural Economics which is an important project objective.

The newly established Farming Systems research program included testing alternatives in research continued during the quarter. Trial sites were selected in four areas, and plantings of experiments were made. Plans and layout and preparation were completed for the new replicated pasture experiment during the quarter. New accessions of Leucaena sp. and Cynodon sp.

Introductory travels to all Malawi horticultural sites were completed during the quarter, and a program of potato and cabbage trials began. Several trips were made by the Animal Scientist to the various ecological areas of the country to gain first hand knowledge of the problems facing livestock producers and to discuss livestock research needs with research and ADD personnel. Major equipment orders were planned for the Feed and Forage Analysis Laboratory which is a high priority project objective.

A new experiment on the Physiology of peanut yield was planted to measure the partitioning of assimilates to pods designed to assist the plant breeder in determining which lines to use in breeding programs to improve smallholder peanut yields. A second new peanut experiment was planted to see if Chalimbana yields respond to Kylar an inexpensive plant growth regulator. These two experiments are conducted under the team work plans to introduce new crop physiology research to Malawi. A third work plan verifiable indicates of progress toward project goals achieved during the quarter is development of statistical analysis programs for analysis of research data using the HP-85 computers introduced by the project to Malawi.

Travel and Meetings

Travel by Technical Assistance staff is necessary for orientation to Malawi, attend-meetings and field days, conferences and to conduct research. The vehicle mileage traveled during the quarter by the technical assistance staff was: Gray 1,409, Hansen 3,408, Hodges 191, McCloud 4,004, McLean 4,710, Pasley 269, Pervis 620 for a total of 14,461 or 23,390 of the total miles driven by the USAID vehicles.

The total mileage for the 10 USAID project vehicles in their first year of operation was 207,013, during this quarter the mileage was 62,738.

Administrative and Financial

All members of the University of Florida/USAID Technical Assistance team have now arrived in Malawi. Now that all team

members have arrived in Malawi an extremely critical situation has developed resulting from the Malawi Government's failure to establish the posts called for in the Agricultural Research Contract. Repeated requests to establish these posts over the past year have produced no results.

Commitments from the Local Account were K8,508.76 for this quarter, and K248,647.15 since the project began. The University of Florida - IFAS bank balance as of December 31, 1981 was K64,697.40.

Fig. 1 presents a summary of Malawi Agricultural Project Inputs.

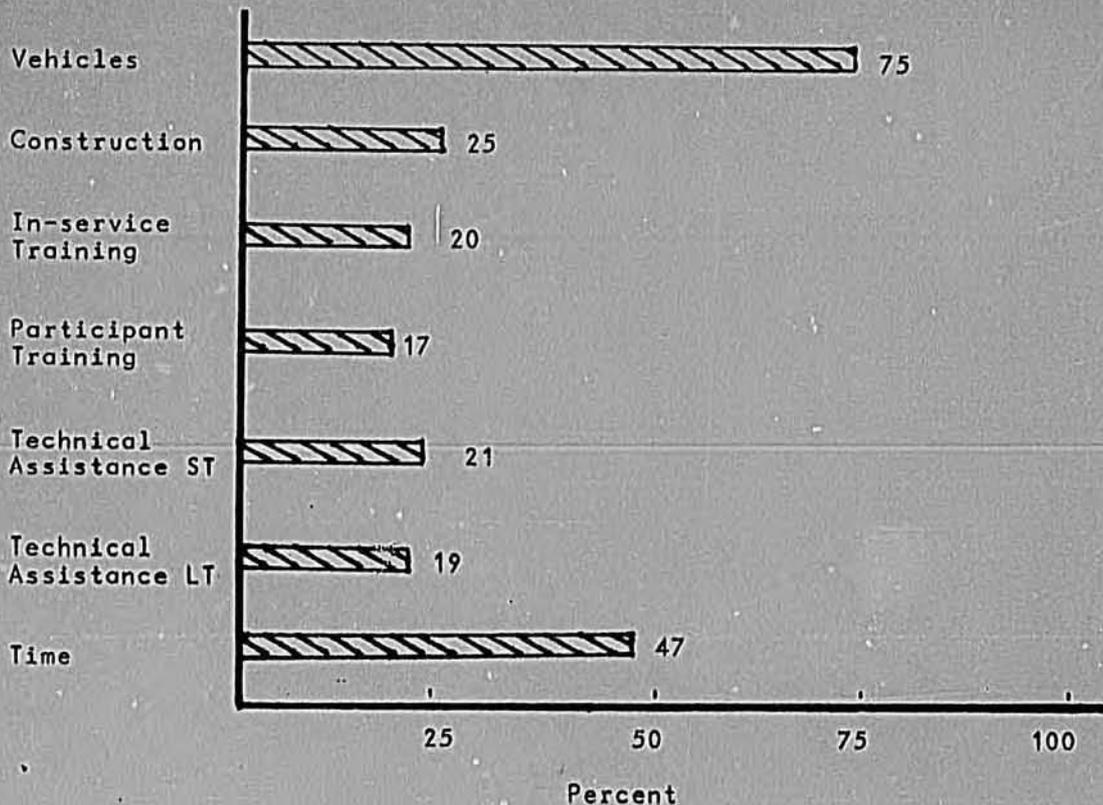


Fig. 1 Malawi Agricultural Research Project, Summary of Inputs to December 31, 1981.

Vehicles purchased include 6 landrovers, 4 station wagons and 10 motor cycles. Thus two-thirds of the vehicle have been purchased, three-fourth of the funds have been used.

Construction is nearly complete at most stations except Chitedze, \$492,528 of the two million dollars for the construction has been paid to the Malawi Government.

In-service Training some 19 persons sent to various short courses and conferences, of the \$102,300 available, \$19,920 had been expended to December 31, 1981.

Participant Training some 12 persons sent for the PhD and 6 for MS degrees; representing 151 person months out of the project total of 900.

Short-term Technical Assistance 6 persons brought to Malawi on TDY, some 227 project days out of 1,080 called for in the project paper had been used by December 31st.

Long-term Technical Assistance all 7 of the long-term TA's now in Malawi, and of the 320 person months allocated under the project, 60.3 had been used through December 31st. or 19%.

Time is now 42% completed, since the first phase of the project ends August, 1984. Thus, considerable salary savings have accrued.

TRAINING

The project purpose is to strengthen the Department of Agricultural Research to provide socially acceptable and economically sound research for smallholder needs in a satisfactory quality and quantity and in a form usable by the extension service. To achieve this purpose training of Malawian professional research personnel to the MS and PhD levels is an objectively verifiable indicator of progress.

Participant Training

During the quarter, five participant trainees were sent to U.S. educational institutions., two to University of Florida, one to University of Arizona, and one to Mississippi State University. The new trainees and their programs are listed:

D.J. Khonje	Soil Microbiology	PhD	University of Florida
C.F.B. Chigwe	Plant Breeding	PhD	University of Arizona
W.F. Gondwe	Horticulture	MS	University of Florida
P.J. Mtambo	Seed Technology	BS/MS	Mississippi State University
L.D.M. Ngwira	Crop Physiology	MS	Iowa State University

At the end of the quarter the 12 trainees were studying for PhD, and 6 for the MS; representing 151 person months out of the total of 900 in the project paper or 17% of the total allocated.

In-service Training

During the quarter there were three Malawians who attended in-service training workshops or conferences:

Mr. D.R.B. Manda and Dr. V.W. Saka attended the SARCUS meetings of Plant Production and Plant Protection, sub-committee on seed held October 10 - 17, 1981 at Stellenbosch and Pretoria, South Africa. The benefits to Malawi are: 1) Professional and personal contact with works having long-term experience in Plant Production of Crops currently being grown in Malawi as well as Plant Protection techniques., and 2) Discuss availability of breeding

Materials of various crops for testing in Malawi.

Mr. B.F. Moyo attended a workshop on Diagnosing surveys for Planning Adaptive on Farm Experiments held at ILRAD, Nairobi, Kenya October 27 to November 6, 1981. This workshop was sponsored by CIMMYT.

Mr. Moyo reports., "The workshop was most realistic and practical in its approach to help solve farmers problems. It calls for more involvement among researchers/extension agents and the farmers. On adaptive on farm experiments there is always an opportunity for one involved in such programme to see the fruits of the work being taken up by the farmers and this as such imparts the feeling of self-development and reliance. It is further an incentive to the one involved to continue working harder".

Farming Systems:

Mr. Emmanuel Mwango was hired at the beginning of November. He becomes the first Malawian professional staff member of the Farming Systems Section. A 1981 graduate of Chancellor College, University of Malawi in economics and psychology, Mr. Mwango was highly recommended and is highly motivated. Although he participated in the September survey of Balaka area (LVADD) and began reading farming systems papers before he was employed, his formal intensive training began in November with a strong emphasis on field techniques (interviewing and questionnaire design) combined with training in report writing and directed reading. Since the first of November he has spent 15 days away from Chitedze, almost all of that in Phalombe and rural Lilongwe learning about field research. Another two professional positions have been approved for the section, but recruitment has not yet gotten underway to fill them.

Two research agronomists attended a ten day workshop in Nairobi on "Diagnostic Surveys of Farming Systems for Planning Adaptive On-Farm Experiments". The workshop was sponsored and directed by CIMMYT, but the two agronomists were funded by this USAID/UF

Less intensive training continued during the quarter with other research and development staff who participated in various ways with the field research projects. In addition, Dr. Hansen lectured in October at Bvumbwe Research Station on the Malawi Farming Systems Research Program to an audience of more 75 people from various research stations and Agricultural Development Divisions.

Horticulture:

A seminar on multiple cropping was presented to horticulture staff at Bvumbwe Agricultural Research Station. This followed a seminar presented during the preceding quarter on farming systems in the tropics.

A lecture and discussion on multiple cropping principles was presented at a multiple cropping conference at Chitedze Agricultural Research Station.

Plant Breeding:

Conducted informal in-service training sessions with PO's from the Maize Breeding Section. The main topics covered were breeding theory, breeding techniques, nurse layout, record keeping, and experimental design.

RESEARCH

Research by the technical assistance team expanded with the addition of the Horticulturalist, the Agricultural Economist, the Livestock Specialist and the Plant Breeder.

Agricultural Economics

This field is a new addition to Chitedze and our efforts during this quarter have been directed toward making contacts and beginning the research program. Contacts made include:

1. The Computer Science Society of Malawi
2. Bunda College of Agriculture, University of Malawi
3. Vegetable Irrigation at Kasinthula
4. ADMARC Central Regional Office
5. Chitala Agricultural Research Station
6. Lifuwu Agricultural Research Station

Research activities included the identification of three aspects of the environment in which Malawian small farmers operate that tend to result in low productivity. Research should be carried out to quantify their effects as a prerequisite to removing the problems.

Lack of Reliable Water Supply to Much of the Farm Land:

With most of the country's farm land idle for 7 to 8 months of the year due to lack of water, it is important to have a good estimate of the potential benefits of irrigation during the dry season. Research to estimate these benefits is essential. Also the risk involved in unreliable rain during the wet season encourages farmers to hedge against such risk in the management of their farms, by applying lower input rates than they would if the water was reliable. Research to quantify this effect is also needed.

Product Prices:

Prices received by small farmers are not market prices and tend to be much lower than a free market price. This will keep

the MVP of all resources used, lower than necessary and discourage farmers from using higher levels of inputs per unit of land.

Land Prices:

In the customary (traditional) sector, farmers are given land by the headman of the village, no price is paid for purchase and no rent is paid for tenure. This distorts the allocation of productive resources and may be one important factor resulting in the low use of resources per unit of land.

Agricultural Economics completed an evaluation of the Eicher tractor which was proposed for use in Malawi and produced a document entitled "An Analysis of the Introduction of the Eicher Tractor into Malawi".

A proposal for the redirection of the work being carried out with the Unit Farms at Chitedze was completed.

Efforts began to improve the availability of basic data on Malawi and to increase the quantity and quality of economic texts, references and other literature related to economics and agricultural economics at Chitedze.

During the quarter a project was began called ECARS (Economic Analysis of Response Surfaces) the initial experiment involve three maizes, "local" UCA, and MH12. Each maize has been given 42 different N,P fertilizer treatments - two reps were done. It is hoped that statistically significant fertilizer response surface may be obtained. This is a long term project to be carried out over a number of years using weather data as independent variables in the production function.

Farming Systems

There are four steps in the farming systems research program: 1) description and diagnosis, 2) design of alternative technologies, 3) testing of the alternatives, and 4) extension (see the paper "Farming Systems Research: Theory and Practiice in Malawi" for more details). The chronological development of the program in Malawi has fortuitously followed fairly well the

quarters of the Malawi fiscal year (April 1 through March 31) with:

1. The first step occurring during the first quarter (April-June),
2. The second step occurring during the second quarter (July-September),
3. And the third step (testing alternatives in research trials) taking place during the rest of the fiscal year (October-March) and extending into the first quarter of the next (April-June 1982).

During this quarter, final decisions were made concerning the design of on-station trials at Chitedze and on-farm trials in rural Lilongwe, Phalombe and Liwonde (finishing the second step of the process), and the trials actually began. The Chitedze, Lilongwe and Phalombe trials are supervised directly by research staff (with assistance from extension in the case of on-farm trials), while the Liwonde trials are the direct responsibility of the Liwonde Agricultural Development Division (LWADD) with assistance from research. The farming systems section does not have sufficient staff to cover intensively more than two field sites, which is why one of the areas originally surveyed (Chitipa) was dropped, and why the Liwonde area cannot receive the intensive monitoring that Lilongwe and Phalombe receive.

Trial sites were selected in all four areas, the trials planted, and monitoring begun. In the Chitedze on-station trial, poor and uneven emergence of "local" maize treatments necessitated replanting, which took place at the end of December. In the Phalombe area the on-farm trials are also farmer-managed, which means that more time is taken to educate the farmers about the purpose and design of the research so that they may manage the trials properly. In addition, the availability and costs of all inputs are explained so that the smallholders may begin to estimate the economic costs and benefits of the differential yields expected from the various treatments. Rainfall in one of the two village areas was so delayed that those trials also had to be replanted (at the end of December).

No problems are apparent in the Lilongwe trials, while the Liwonde trials have not yet been visited by staff from this section. Intensive interviewing of farmers has started in Lilongwe and been carried further in Phalombe where four questionnaires have been developed and completed. The questionnaires cover the complete cropping and fertilizer history of each farmer for the past three years, an inventory of all fields in use and available, food supply, and the progress of the on-farm trials. Soil samples have been taken of all trial sites.

In addition to this field activity of the farming systems research program, the section:

1. Advanced the design of the longitudinal study of smallholder households in rural Lilongwe (a collaborative project between this section and two of the economics faculty members from Chancellor College)
2. Sponsored and ran a one day research conference at Chitedze on intercropping research in Malawi (one of the four papers being presented by Dr. Hansen)
3. Organized and sent out invitations for a one day conference in January on "Socioeconomic Research in Rural Lilongwe" (to be held at Chitedze)
4. Dr. Hansen was elected to join the National Agricultural Research Committee, which reviews and approves priorities and projects for the Department of Agricultural Research.

Horticulture

Introductory travels to all horticultural research sites were completed. These visits had commenced in the previous quarter. Initial familiarization with horticulture trials at Bvumbwe Agricultural Research Station was also completed.

New additions and maintenance to the Bvumbwe tree nursery were initiated, as were repairs to several items of horticultural equipment.

A programme of potato and cabbage fertilizer trials commenced. Experimental designs and site surveys were completed. This programme is a new approach to vegetable fertilizer trials in Malawi and will allow economic analysis and the identification of optimum fertilizer levels for the small farmer.

Livestock

The greater part of Dr. Gray's time, after his arrival on September 28, 1981, was spent becoming oriented to the situation in Malawi. This included reviewing voluminous materials in the files to gather information on the past livestock/pastures research activities and the project paper so that a long range plan could be formulated for development of a research program by the livestock section that will meet the objectives of the project.

Several trips were made to various ecological areas of the country to gain first hand knowledge of problems facing the livestock industry and to discuss livestock research needs with various persons at research stations and ADD's.

Working trips were made to the Mbawa Research Station and Dzalanyama Ranch to observe their livestock operations and research herds of cattle.

Assistance was also given to Dr. E.M. Hodges with the layout of the pasture grazing trial which is in the process of being established.

Major equipment orders were planned for the Feed and Forage Analysis Laboratory which is a high priority project objective.

Contacts were made with personnel of the Department of Animal Health and Industry by visiting their stations at Mikolongwe, Bwemba and Likasi. Visits were also made to Program Managers/Animal Husbandry Officers at six of the eight ADD's.

Pasture

Prepared all experimental plots and nursery blocks with weeding, fertilization and cultivation; removed excess dry season vegetation; initiated earliest harvest dates.

Obtained grass and legume seed for experimental plantings; staged Ntchisi panicum guineagrass and Nb. 2 stargrass for vegetative planting.

Completed layout and land preparation of twelve 1.5 hectare blocks for establishment of replicated grazing trial and stocked single superphosphate for treatment of all grazing trial blocks.

Obtained new accessions of *Leucaena* sp and *Cynodon* sp for establishment in Chitedze nursery.

In co-operation with Farm Machinery Section - obtained the Norris Christy pellet mill from Ngabu (originally used by FAO) and set it in operation at Chitedze. High grade dried leaf harvested at Chitedze and commercial leaf purchased from Ngabu ADD made satisfactory 1cm diameter pellets. Crude protein analyses were 24 and 19 percent respectively for the Chitedze and Ngabu materials. The pelleting process was demonstrated for representatives from Veterinary Division and from National Seed Company.

Physiology

Planted a new experiment to determine the physiology basis for increased yields potential in peanuts. This experiment is designed to measure the partitioning of assimilates to pods and will assist the plant breeder in determining which lines to use as parents in his crossing program. In the 1981 POPY experiment two new promising lines E879/6/4 and SAC58 will be compared to Mani Pintar and Chalimbana.

A second new physiology of peanut yield experiment was planted. This experiment will test if Chalimbana, widely grown in Malawi

but low partitioning will respond to applications of Kylar by partitioning more assimilates to pods thereby increasing economic yield.

A third work plan verifiable indicator of progress toward project goals achieved during the quarter is development of programs written for the HP-85 computer for statistical analysis of research data.

Plant Breeding

Research during the quarter focussed on maize and maize improvement because the USAID/UF Plant Breeder was, on his arrival, designated Maize Breeder rather than Maize and Groundnut Breeder as called for in the job advertisement for the position. Three areas received primary attention.

The first was reviewing past research records to establish priorities. Top priority should be given to breeding improved varieties that are adapted to the Salima and Ngabu areas because there are no improved varieties that are well adapted to these areas. To do this, it will be necessary to establish a breeding program in these areas with the limited objective of variety improvement. Priority must also be given to improving the quality and appropriateness of trials. Funds for research will be a limiting factor during and after the life of the Malawi Agricultural Research Project. A side effect of the project has been a proliferation of trials. It seems counterproductive for the project to generate research activities that cannot be sustained. Attention should, therefore, be given to promoting fewer trials that can be well managed and that are designed to answer specific questions relative to smallholder production.

The second was agronomic advice given to other USAID/UF team members on the design and conduct of their trials on the responsiveness of maize to fertilizer. Because there is no row-crop agronomist assigned to the team, it was necessary for the Plant Breeder to provide this advice.

The third was assisting the Malawi Maize Breeders in planning and planting the maize trials for the 1981/82 season. Although not innovative, this area is where most in-service training takes place and where the success or failure of the breeding program will occur.

Publications

During this quarter there were three publications from the Agricultural Research Project:

1. Hansen, Art Farming Systems Research: Theory and Practice in Malawi Agricultural Research Project Miscellaneous Paper 1. October 1981.
2. Pnutmod: An educational model of crop growth and development simulated in a hand-held calculator. K.T. Ingram, D.E. McCloud, I.S. Campbell, W.G. Duncan, R.L. McGraw, and P.K. Sibale. Journal of Agronomic Education November 1981, Volume 10, pp 36-42.
3. Pervis, D.W. and Matthews, M.D.P. An Analysis of the Introduction of the Eicher Tractor into Malawi. Agricultural Research Project Miscellaneous Paper 2. December 1981.

TRAVEL AND MEETINGS

R.C. Gray

Contacts were made with personnel of the Department of Animal Health and Industry by visiting their stations at Mikolongwe, Bwemba and Likasi. Visits were also made to Program Managers/ Animal Husbandry Officers at six of the eight ADD's.

- Lunyangwa, Limphasa and Mbawa Research Stations. Choma Livestock Improvement Center - orientation trip to observe livestock operations.
- Chitala Research Station - orientation trip and observation of animal breeding project.
- Mbawa Research Station - working visit and research planning.
- Dzalanyama Ranch - orientation trip
- Capital Hill - National Livestock Development Committee meeting.
- Dzalanyama Ranch - working visit to observe ranch operations and discuss their role in livestock research.
- Bunda College Department of Animal Sciences - tour of facilities and livestock research projects.
- Southern Region. Bembeke, Tsangano, Bvumbwe, Kasinthula and Makhanga Research Stations. Blantyre, Ngabu and Liwonde ADD's. Ngabu Feedlot and Mlambe Cashew Nut Estate Sheep Project. Mikolongwe Livestock Multiplication Center. - Orientation trip and observation of livestock programs.

- FAO Dairy Production Seminar, Lilongwe
- Northern Region. Lunyangwa, Baka and Meru Research Stations. Mzuzu and Karonga ADD's - orientation trip and observation of livestock programs.
- Bunda College Department of Animal Science - conference with Dr. M. Butterworth.

A. Hansen

For three days in early December Dr. Hansen served as a resource person at a UNESCO-sponsored workshop at Mangochi on "Systems for Monitoring and Evaluating Rural Development Programmes". The Programme Managers and Evaluation Officers of all eight Agricultural Development Divisions were present.

Phalombe was visited once a month during the quarter (three trips in all) with a total of twelve days being spent in the project, while three days were spent visiting the on-farm sites in Lilongwe. The following totals all include travel time: two days at Liwonde planning trials; four and a half days at different times at Bvumbwe while planning, coordinating and lecturing; four days at Zomba (usually while enroute to or from Phalombe or Liwonde) planning the longitudinal Lilongwe study or consulting faculty or the library at Chancellor College; and three and a half days at Mangochi as a resource person. Total time away from Chitedze and Lilongwe urban during the quarter: 29 days.

The internal review of the USAID project during November consumed about a third of the month with project staff meetings.

E.M. Hodges

Orientation and planning trip to Mbawa Research Station, Lunyangwa Research Station and Choma Livestock Center with Dr. R.C. Gray, newly arrived member of the USAID team.

Conference with Professor M. Butterworth of Bunda College regarding correlation of grazing trial work at Bunda and Chitedze.

Participate in sessions of USAID internal review committee and in the National Livestock Committee annual meeting.

Overview of the livestock and forage potential and needs in Mzuzu, Karonga and Chitipa areas with Dr. R.C. Gray.

D.E. McCloud

In October a series of meetings with Dr. Legg on budget allocations. Prepared the fourth claim for reimbursement to the Malawi Government from the University of Florida - IFAS Local Account.

Met with Al Harding, USAID/Washington on project status and future plans.

Attended a computer meeting called by the Lilongwe Computer Society to display the various types of computers now in use in the Lilongwe area, these include: HP-85, TRS-80, Apple and Sinclair. We displayed the HP-85 from Chitedze.

The first 10 days in November were spent in preparation for the internal review of the Agricultural Research Project, also team meetings were held to consider the library proposal by Dee Baldwin. The second 10 days of November were spent in review of the project. The final 10 days were spent in conducting the internal review of the Agricultural Research Project.

Traveled with Dr. Thorne to the Makoka, Byumbwe, Kasinthula and Ngabu to visit these stations in connection with the internal evaluation.

In meetings with Dr. Andrew and Mr. La Bombard, recommend that the University of Florida sub-contract the purchasing of AID-financed equipment to buy in the U.S. on behalf of the Government

of Malawi.

In December participated in the final meeting of the USAID internal Evaluation. The recommendations are contained in Dr. Thorne's report.

Held a monthly Technical Assistance Team meeting to consider the recommendations of the Thorne report.

Participated with Dr. Legg in the Stations Heads meeting to further clarify the procedures to be used under the de-centralization of Agricultural Research.

I.B. McLean

Travel to Mlambe Cashew Estate (ADMARC) to inspect Bvumbwe Research Station Mango trial. Observed the cashew plantings. Visited Namiasi Farmers Training Center to inspect the mango observation plot.

Undertook extensive trip to the far north of Malawi. Visited fruit, nut and spice trial and planting sites at Mzuzu, Limphasa, Misuku Hills, Chisenga, Karonga and Nchenachena.

Met with Project Officers of Ntcheu and Dedza RDP's. Visited farmers (vegetables) in the Ntcheu area. Participated in a multiple corring conference at Chitedze.

Visited the Phalombe district with Dr. Hansen.

Met with Mr. Mnyenyembe, horticulturist, BLADD, to discuss horticultural research needs.

Attended Dr. Art Hansen's seminar at Bvumbwe. Met with Mr. Hartmann, Liwonde ADD, to discuss passion fruit culture.

Attended meeting at Lunzu Farmers Training Center with BLADD extension staff and chemical company representative to discuss agrichemicals usage in Malawi.

Attended executive meeting of the Tree Nut Authority.

Traveled to Ntcheu and Tsangano Sub station to inspect fruit trials and visit farmers (vegetable and fruit). Continued on to Ntchisi to inspect an apple trial and intercropped vegetables. Visited smallholder macadamia growers.

Cleared Dr. R.D. Gray's materials through customs and conveyed them to Chitedze Research Station. Met with Dr. J.T. Legg. Attended team meeting.

Attended Florida team and internal review meetings at Chitedze Research Station and Ministry Headquarters.

Met with Dr. M. Thorne, Dr. D.E. McCloud and Ministry visitors at Bvumbwe Research Station as part of the internal review.

Visited Makhanga Research Stations to observe Mango cultivars during harvest.

Traveled to Ntcheu, Njolomole, Katsekera and Tsangano in preparation for cabbage and potato trials.

S.F. Pasley

Travel to Kasungu to select trial sites for the 1981-82 season.

Participate in the Internal Review final meetings and presented an assessment of the Maize Breeding Program to the review team.

Attended twenty-fourth Seed Technology Working Party Meeting, Ministry of Agriculture, GOM, as representative of Chitedze Agricultural Research Station.

Met with Mr. C.E.M. Moore, representative of Pioneer Seed Company (PTY) LTD., RSA. Discussed Pioneer trials conducted by the Maize Breeding Section, Chitedze Agricultural Research Station, and how trials might be restricted to only those that might benefit Malawi because of the limited funds available for testing.

D.W. Pervis

Orientation travel, visited Dr. Ray Billingsley, Head of the Rural Development Department of Bunda College. Visit the Lifuwu and Chitala Research Stations on a familiarization trip.

Table 1 Miles driven by USAID Project Vehicles to December 31, 1981

Vehicle Peugeot	Location	October December	November	Milenge December 31
542D	Chitedze	1,560		17,688
716D	Chitedze	3,340		15,277
754D	Chitedze	4,127		14,147
715D	Bvumbwe	5,925		17,390
LandRover				
694D	Bvumbwe	2,750		17,561
689D	Lunyangwa	4,769		19,260
690D	Chitedze	3,632		25,458
692D	Chitedze	4,184		23,379
691D	Makhanga	6,934		27,354
653D	Kasinthula	<u>8,737</u>		<u>29,499</u>
		62,738		207,013

The total mileage driven by the USAID project vehicles in their first year of operation was 207,013 miles. During this quarter the mileage driven was 62,738 compared to 45,958 for the previous quarter.

The vehicle mileage traveled during the quarter by the technical assistance staff was : Gray 1,409, Hansen 3,408, Hodges 191, McCloud 4,004, McLean 4,710, Pasley 269, Pervis 620 for a total of 14,611 or 23.3% of the total miles driven by the USAID vehicles.

ADMINISTRATIVE AND FINANCIAL

During the quarter three members of the University of Florida/ USAID Technical Assistance Team arrived in Malawi. Dr. D.W. Pervis, Agricultural Economist, and his wife arrived on September 26, 1981. Dr. Pervis heads the agricultural Economics Section. Dr. Richard C. Gray, Animal Scientist arrived on September 27, 1981. Dr. Gray heads the Livestock Section. Dr. Sherman F. Pasley, and his wife arrived on September 30, 1981. Dr. Pasley heads the Maize Breeding Section.

D.E. McCloud was appointed head of the Oilseeds Section, and E.M. Hodges Head of the Pastures and Fodder Section.

The first member of the Administrative support staff Mr. John Kaunda, Executive Officer (Accounts) reported for duty 17 months after the Agricultural Research Project began operations in Malawi.

Now that all members of the UF/USAID Technical Assistance Team have arrived in Malawi the following positions have become critical to progress on the project: 1) Executive Officer (General Duties); 2) Stenographer/Secretary; 3) Copy Typist; 4) Clerical Officer (Accounts); 5) Clerical Officer (General Duties). If the project is to function as intended these posts must be filled at once.

The first 10 days in November were spent in preparation for the internal review of the Agricultural Research Project, also team meetings were held to consider the library proposal by Dee Baldwin. The second 10 days of November were spent in meetings with Dr. Chris Andrew in connection with the internal review of the project. The final 10 days were spent in conducting the internal review of the Agricultural Research Project.

An Apple computer has been ordered to assist in the preparation of letters, reports, accounting, and inventory control. It is necessary since secretarial services are still non-existent for the project, and the situation has now passed the critical stage. Additional computers are needed urgently.

Financial

As shown in Table 2 the commitments to the University of Florida - IFAS local account totaled K8,508.76 during the quarter. The total commitments since project beginning was K248,647.15. The overhead category includes general costs office equipment and supplies, fertilizers which cannot sub-divided by programs. Each of the following programs should bear 12½% of the total overhead cost: Maize, Groundnut, Pasture, Horticulture, Farming Systems, Livestock, Economics, and Research Coordination.

The bank balance for the University of Florida - IFAS local account was K64,697.40 as of December 31, 1982, as shown in Table 3. The transactions during the quarter are also showing in Table 3. Processed the fourth claim (K8,851.03) and fifth claim (K3,024.46) for reimbursement to the Malawi Government.

In accordance with Work Plans, appropriate purchasing procedures were developed in compliance with University of Florida, USAID and Government of Malawi policies.

Table 2 Summary of Commitments for the University of
Florida Local Account

Program	Quarterly Expenditure			Total Expenditures since project began
	October	November	December	
		K		K
Maize		239.55		585.93
Groundnut		83.64		2,332.02
Pasture		467.82		7,154.43
Horticulture		338.87		415.17
Soil Fertility		363.62		771.74
Economics		274.18		274.18
Farm Systems		542.89		4,306.67
Research Coordination		35.78		1,510.44
Livestock		113.71		1,808.78
Library		598.75		2,095.44
Participant Training		2,296.20		10,034.70
In-service Training		--		18,109.69
Vehicles		--		141,087.64
Overhead		<u>3,153.75</u>		<u>58,160.32</u>
Total		8,508.76		248,647.15

Table 3 Transactions, University of Florida Local Account
October, November, December, 1981

Date	Details	K	K
October			
1	Balance Brought Forward		59,053.51
2	Dr. V.W. Saka Advance for South African trip.	750.00	
2	D.R.B. Manda Advance for South African trip	800.00	
3	Dr. Hansen Blantyre, Bvumbwe Trip 25-27 Aug 81	30.50	
6	Dr. D.W. Pervis reimbursement drapes and office supplies	274.18	
6	Dr. S.F. Pasley reimbursement for drapes	239.55	
6	Dr. I. McLean Travel reimbursement Chitala, Chitedze, Bunda Trip Sept. 25-26, 1981	41.36	
8	Prof. D.E. McCloud Travel reimbursement Makoka Bvumbwe and Kasinthula trip Sept. 18-19, 1981	35.78	
10	Dr. A. Hansen Travel reimbursement for July 24-26, 1981 Zomba trip	75.82	
15	Dr. A. Hansen two travel reimbursements Liwonde Sept. 8-14 1981, Zomba October 12-13, 1981	110.27	
16	Dr. D.W. Pervis, Salary Advance	2000.00	
20	Dr. I. McLean Travel Mangochi Oct. 2, 1981 and Chipata Oct. 4-10 1981	171.36	
22	Deposit from McLean excess on drapes, and returns Vendors		351.19

October			
22	Malawi Gvt Fourth Claim Reimbursement	8,851.03	
24	M.B. Moyo Travel Advance Kenya trip	750.00	
24	Deposit Gausi refund on Travel Advance of K1,200		739.23
26	Dr. S.F. Pasley Salary advance	1,600.00	
26	Dr. D.W. Pervis Water Filter	106.20	
26	Dr. I. McLean Ntcheu, Chitedze trip Oct 19-21	41.36	
November			
3	Dr. A. Hansen reimbursement for Phalombe and Liwonde Trip Oct 21-26	110.45	
3	Dr. E.M. Hodges Travel reimbursement Zomba - Bvumbwe May 21-23 1981 SARCUS S. Africa August 30 to Sept 5, 1981	416.82	
11	Dr. R.C. Gray travel to Mbawa Oct 19-21, Sept 30 - Oct 3 Lunyangwa	113.71	
14	R.A.K. Phiri Typing Library Report	50.17	
December			
2	Deposit, from UF \$30,000		27,417.29
5	Dr. A. Hansen Phalombe reimbursement Nov 2-7	93.31	
8	Charles Chigwe Advance \$500	459.24	
8	P.J. Mtambo Advance \$500	459.24	
8	L.D.M. Ngwira Advance \$500	459.24	
8	W.T. Gondwe Advance \$500	459.24	
8	D.J. Khonje Advance \$500	459.24	
10	Briefcase for Accountant	36.95	
12	Prof. McCloud for Licor invoice	193.75	
22	Dr. R.C. Gray N. Region Capital Hotel S. Region	251.08	

December			
22	Balance Reimbursement for Mzuzu trip	38.41	
22	Malawi Government Fifth Claim for Reimbursement	3,024.46	
	Unpresented cheques		79.77
24	Bank Debit on Allen Equipment Ltd England	440.87	
		22,943.59	87,640.99
	Balance carried down		22,943.59
	Balance as per Bank Statement		64,697.40

APPENDIX

T R A I N I N G P L A N

C. F. B. Chigwe

Recommended for a PH.D. in Agronomy and Plant Genetics with emphasis on sorghum breeding and a minor in Entomology. Mr. Chigwe requires training under the supervision of an experienced sorghum breeder. Mr. Chigwe, on his return to Malawi, will be responsible for breeding two or more crops with primary emphasis on increased production. Because of this, his dissertation research should be practically-oriented and should be applicable to the breeding he will be doing in Malawi. Mr. Chigwe will require broader training than most U.S. plant breeding students because he will have to depend on his own expertise outside the field of plant breeding.

Suggested courses include: Statistical Methods, Analysis of Variance, Regression Analysis, Design and Analysis of Experiments, Scientific Communication and Research Funding Methods, Genetics in Populations, Agricultural Entomology, Insect Pest Management, Plant Resistance to Insects, Origins and Development of Cultivated Plants, Plant Nematology, Crop Ecology, Genetic Principles of Hybrid Seed Production, Advanced Genetics, Theory of Plant Breeding, Quantitative Genetics and Selection, and Irrigation Principles and Practices.

An HP-41CV calculator, with Stat Pac, should be provided for Mr. Chigwe's training in Plant Breeding, and he should become thoroughly familiar with it during his training period.

Attendance at the annual meetings of the American Society of Agronomy and the Annual Corn and Sorghum Research Conference is recommended to provide the latest research information and to establish contacts with scientists in the field of plant breeding. Mr. Chigwe is encouraged to present a paper at one or more of these meetings. At the end of his training period he should visit the breeding program at ICRISAT to obtain germplasm of the tropical sorghums.

T R A I N I N G P L A N

W. T. Gondwe

Recommended for an M.S. in Horticulture with emphasis on vegetable crop production. Mr. Gondwe requires training under the supervision of a practical vegetable production researcher. His thesis research should be field-oriented and should have application to his work in Malawi because he will have the overall responsibility for vegetable crop production research in that country upon completion of his degree. The primary emphasis of vegetable research in Malawi is on small-holder production.

Suggested courses include: Crop Nutrition, Crop Ecology, Tropical Entomology, Tropical Plant Nematology, Seed Physiology, Nutrition of Horticultural Crops, Tropical Plant Pathology, Tropical Soils, Computer Programs in Statistical Analysis I, Statistical Methods in Research I, and Statistical Methods in Research II.

An HP-41CV calculator, with Stat Pac, should be provided for Mr. Gondwe's training program, and he should become thoroughly familiar with this calculator during his training period.

Attendance at the annual meetings of the Horticultural Society of America and the Florida Horticultural Society is recommended to provide the latest scientific information and to establish contacts with researchers in the area of vegetable crop production. Mr. Gondwe is encouraged to present a paper at one or more of these meetings. Arrangements should be made for Mr. Gondwe to spend some time at a university in a state having one of the large commercial potato growing regions; also at near the end of his training he should visit CIP in Lima, Peru, where he may be able to arrange for potato germplasm of superior characteristics for Malawi.

T R A I N I N G P L A N

D. T. Khonje

Recommended for a Ph.D. in Soil Science with a minor in Microbiology. Mr. Khonje requires broad training in applied soil microbiology. He is in charge of the legume inoculation production facilities for Malawi.

Suggested Courses: Tropical Soils, Soil Fertility, Soil Microbiology, Soil Chemistry, Micronutrients in Soils, Environmental Microbiology, Computer Programs in Statistical Analysis, Stastical Methods in Research, Herbicide Technology, Crop Ecology, Physiology of Agronomic Plants, Biology, Ecology and Taxonomy of Mycorrhizae, and Tropical Entomology.

An HP-41CV, with Stat Pac, should be provided for Mr. Khonje, and he should become thoroughly familiar with it during his training.

Attendance at the annual meetings of the American Society of Agronomy and the Soil Science Society of America is recommended to provide the latest research information and to establish contacts with outstanding researchers in his field. During his training period Mr. Khonje should travel to both the University of Wisconsin and the Nitrogen Company to study grass nitrogen fixation and legume inoculation.

T R A I N I N G P L A N

P. J. Mtambo

Recommended for a B.S. and M.S. in Seed Science. Miss Mtambo has more than ten years experience as a Seed Analyst in the Malawi Ministry of Agricultural Seed Laboratory. She also has special training in seed testing and pathology in Britain and Denmark. She will require a minimum of training for the B.S. and will quickly be able to go on to the M.S. Upon her return to Malawi she will continue to be in charge of the Seed Technology Laboratory and the Seed Pathology Program.

Suggested Courses: Elementary Biochemistry, Plant Ecology, Plant Anatomy, Cytology, Introduction to Stastical Inference, Seed Production, Seed Physiology, Seed Technology, Seed and Grain Conditioning and Storage, Seed Processing Machinery, Soil Fertility, Grain Crops, Fiber and Oilseed Crops, Entomology, Plant Pathology, and Statistical Methods.

An HP-41CV calculator, with Stat Pac, should be provided for Miss Mtambo's training in program, and she should become thoroughly familiar with this calculator during her training.

Attendance at the annual meetings of the American Society of Agronomy and the American Society of Seed Analysts are recommended to provide the latest research findings and to provide contacts with outstanding seed researchers. Near the end of her training she should visit the USDA Plant Quarantine and Seed facilities at Beltsville.

T R A I N I N G P L A N

L. D. M. Ngwira

Recommended for an M.S. in Agronomy emphasizing crop production and physiology. Mr. Ngwira requires training under the supervision of a practical maize production agronomist. Mr. Ngwira will have primary responsibility for maize production research and the additional responsibility of maize physiology for the country of Malawi on completion of his degree. Because of this, his thesis research should be field-oriented and should have some application to the type of research he will be doing in Malawi. Mr. Ngwira will require broader training than most students because of his dual responsibilities.

Suggested courses include: Adaptation and Ecology of World Crops, Crop Physiology, Advanced Crop Management, Soil-Plant Relationships, Irrigation Agriculture, Colloquim in Crop Physiology and Management, Principles of Plant Pathology, Plant Nematology, Economics of Agricultural Development, Writing of Professional Papers and Reports, Economic Entomology, Statistical Methods for Research Workers, and Experimental Design for Research Workers.

An HP-41CV calculator, with Stat Pac, should be provided for Mr. Ngwira's training program, and he should become thoroughly familiar with this calculator during his training period.

Attendance at the annual 2nd North Central Regional meetings of the American Society of Agronomy is recommended to provide the latest research information and to establish contacts with scientists in maize production research. Mr. Ngwira is encouraged to present a paper at one of these meetings. During the latter portion of his training program he should travel to CIMMYT, in Mexico to obtain additional training in tropical, intermediate-altitude maize production.