

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
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MP - 12

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I. INTRODUCTION

This is the twelfth quarterly report and covers the first quarter of the 1984 Malawi fiscal year, April - June 1983.

II. HIGHLIGHTS

The UF/USAID/MA Technical Assistance Team is participating in the development of a Master Plan (MP) for the Reorganization of the Department of Agricultural research (DAR). The central themes of the MP include: multidisciplinary station - based commodity teams, multidisciplinary field - based adaptive research teams; and a reduced/improved research station network. Implementation will be phased over the next three to five years.

A budget was prepared for the recurrent cost aspects of the project by enterprises supported by the project and by research station (appendix 1).

An administrative visit was made to the University of Florida where the project financial position was reconciled. With this information, the remaining money can be budgeted for the life of the project.

Dr. Hansen completed his tour in Malawi and returned with his family to the University of Florida. Dr. Janicki has assumed responsibility for the Adaptive Research Program.

A major in-service training effort was completed by Drs. Janicki and McCloud. Eighty one DAR personnel were instructed in the use of hand-held calculators for data analysis.

A major grazing trial was completed - first year - during the quarter.

A lamb feeding trial was completed during the quarter and an extension publication will be prepared from the data.

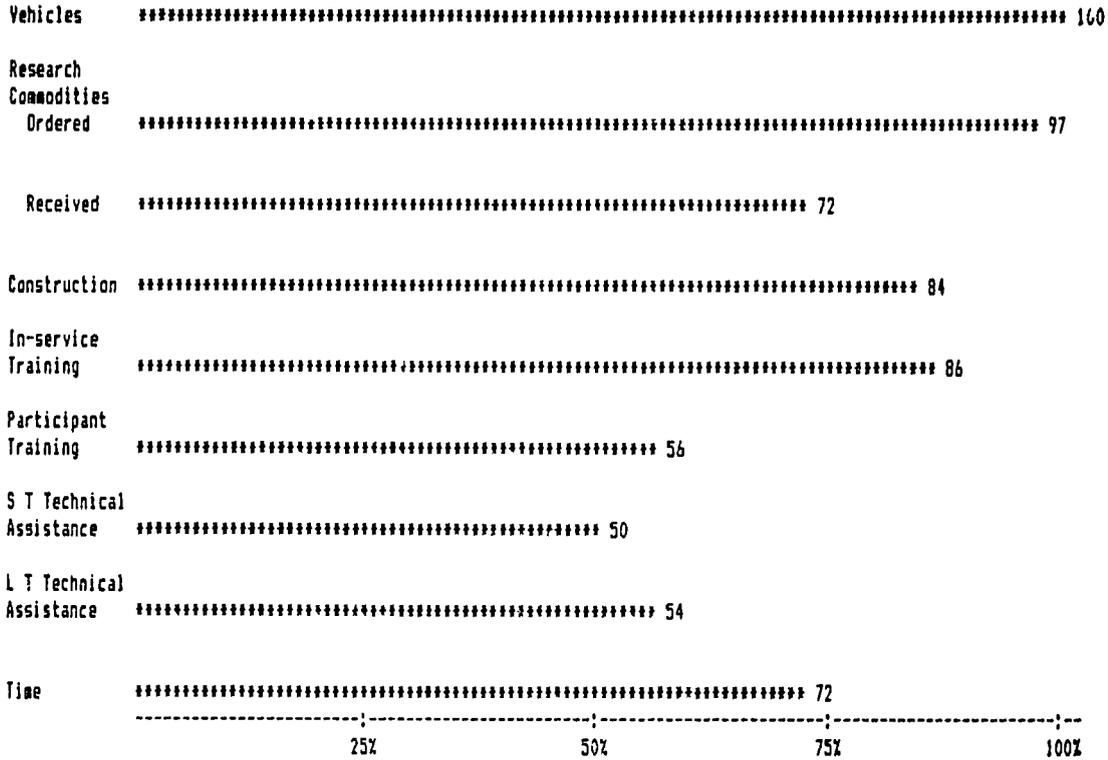
Dr. Gray is participating in an exercise to develop a long-range plan for livestock research and to coordinate the activities of the DAR, Bunda College, and the Department of Veterinary Medicine.

A visit by a delegation from ILCA was arranged and coordinated by Dr. Gray. ILCA has agreed to cooperate with Malawi in livestock research.

Dr. Pervis developed and documented a program for the HP41CV programmable calculator which calculates the optimum nitrogen level for maize given a production function, price of maize and price of fertilizer.

Dr. Bill Judy, Agricultural Development Officer, USAID/Lilongwe, arrived during the quarter and assumed the duties of project manager. The UF/USAID/MA Technical Assistance Team welcome Dr. Judy and thank Mr. Garms for his past efforts and cooperation.

Project Inputs are summarized in Figure 1 below.



ST = short term
LT = long term.

III. TRAINING

A. Participant

The 23 participants in training in the U.S. continue to make satisfactory progress. During the quarter, Ms. P.J. Mtambo completed her B.Sc. and is now enrolled in an M.Sc. Program. See Table 1 in Appendix C.

Nine participants remain to be identified during the next quarter and enrolled in various universities in January 1984.

B. In-service

Assistance was provided to Malawian staff in Livestock/pasture sections in implementation of projects, etc. Mr. and Mrs. Jere, TO's were transferred to Chitedze ARS from Dzalanyama Ranch and Mr. Chithenga was transferred to Lunyangwa ARS. Mr. Jere assumed duties as TO in charge of the Kholo. Mrs. Jere began training as a computer operator.

The project supported the travel of Mr. Kumwenda, Mr. Nhlane, and Mrs. Sibale to South Africa to visit Pioneer Seed Company and the University of Natal. The purpose of the trip was to give these Maize Researchers an opportunity to see how a large maize improvement program operates and to see what type of maize research is conducted at a university. The Maize Breeder at the university offered to send his more promising inbred lines to Malawi for screening.

The first of a two part seminar on the use of simplified programming was presented to the staffs of the Agricultural Economics and Adaptive Research Sections.

Drs. Janicki and McCloud prepared and presented a course to 81 DAR personnel titled "Experimental Techniques Course with Emphasis on the HP-41 Calculator" (see appendix 2C for outline). This training was enthusiastically received and there are plans for additional training in this area.

The course was taught at Ngabu on May 31-Jun 1st, Makoka on June 2-3rd, two courses at Bvumbwe on June 6-7th and June 8-9th and two sessions at Chitedze on June 14-15th and June 16-17th. A list of the students completing the course is shown in Table 5. This is the first course given under the UF/USAID project that so large a number of T.O.'s and S.T.A.'s have been taught. The course will be given later at Mzuzu. Thus, the course will cover all of Malawi.

Each student upon completing the course was asked to evaluate the course by answering the following questions:

- 1) Do you feel the course will help you in your work? *More than 90% answered Yes.*
- 2) What do you believe was especially good about the course? *The most frequently mentioned answers were analysis of variance and programming.*
- 3) Was the course too long, too short, or just right? *More than 90% of the students felt it was too short.*
- 4) What could we do to improve the course? *Most students said more calculators were needed, many said lengthen the course -- one student said softer chairs!*
- 5) Have you ever had a course of this type before? *Almost all students answered No.*
- 6) Was the level of instruction too high, too low or just right? *Most students said Just right.*
- 7) Did you find the handout useful? *Handouts are being prepared*
- 8) Any other comments that you might like to make? *The most frequent comments were More calculators are needed and More such courses would be useful.*

IV. RESEARCH

A. Adaptive Research- Agronomy

Although I have continued to work on the analysis of on-station and on-farm "local" maize trials carried on the 1982, a complete report has not been finished. Difficulties have been encountered in assessing the results due to a lack of consistency in applying the treatments on different farms. There is some question as to what treatments were applied.

During the quarter I assumed responsibility for supervising the Adaptive Research Section. Revision of my Work Plan Draft concentrates on the establishment of the on-farm adaptive research teams. The Work Plan has been finalized and will be submitted to CARD for approval.

I have been extensively involved in preparing a budget for the Adaptive Research Section that will fund the implementation of the Adaptive Research Pilot Project in two ADD's. There has been one major revision of this budget that reflects funds being supplied by the World Bank for the purchase of a 4-wheel drive vehicle. The budget covers the period from May 1983 to March 1984. A draft document has been prepared describing the proposed Adaptive Research Program and an in-service training schedule, *A Pilot Program for Establishing Adaptive Research Teams in Two ADD's in Malawi: May 1983 - December 1984*. An orientation workshop was originally scheduled for July but staffing delays in the DAR have caused a postponement until the first week in August. This orientation to adaptive research will be incorporated into the CIMMYT (Nairobi) cooperative in-service training workshop on Farming Systems/Adaptive on-farm research.

A preliminary report of the Ntcheu informal survey, *PRELIMINARY REPORT OF AN INFORMAL FARMING SYSTEMS SURVEY OF EPA 6 NTCHU PROJECT 14-18 MARCH*, was edited and distributed. The informal survey was conducted in March with LADD and DAR staff. In addition, data were loaded onto floppy disks and code books were prepared and duplicated for the information obtained during a survey of small holder farmers carried on by the Farming Systems Section and the WIAD Program in 1982.

B. Agricultural Economics

Completed a revision of *Economic Considerations in Profitable Maize Growing*. After considering the material, the ministry suggested that the work be continued to include also a methodology for developing a farm plan.

It was envisioned that such a methodology could be followed with the assistance of extension personnel. This will be done with an explanation of simplified programming and its use as a *tool* in farm planning.

Completed documentation of the program (written for the HP41CV programmable calculator) which calculates the optimal level of nitrogen given the maize production function, prices and type of fertilizer. This documentation is designated as *000-POLYN*.

The staff of the Agricultural Economics are being mobilized into a task force to organize, operate, and document the Data Bank. Regular meetings are being held to discuss progress. Data from this year's maize-fertilizer trials are beginning to come in and we hope to have a smooth procedure for entering and documenting them.

C. Crop Physiology

Kylar

Project Objective: *Strengthen research programs* -- Previous work from this project has shown that Chalimbana has a relatively low partitioning of assimilates to pods compared to Mani Pintar. The question is can Chalimbana yields be increased with Kylar? In 1981, with Mr. Maliro, I initiated an experiment to test this hypothesis. The objective was to determine if pod numbers, and ultimately yields can be increased using the growth regulator Kylar. The first Kylar experiment was grown during the 1981-82 season. As a result of poor stands and late planting the results were inconclusive.

The Kylar experiment was run again during the 1982-83 season. Planting was made December 10, 1982, emergence was December 16th and flowering began January 25, 1983. Weekly harvests were begun on January 14, 1983 (25 days after emergence) and continued until May 27 (158 days after emergence). A total of 20 harvests were taken. Kylar was applied on January 31st and February 4th. Tables 1 and 2 in Appendix B present the complete data.

Several preliminary conclusions can be drawn from this experiment:

1. Kylar increased the pod numbers in Mani Pintar by 15.8%, while for Chalimbana the increase was 33.7%. This increase for Chalimbana was predicted since this variety has a low partitioning of assimilates to pods.
2. Final yields of Mani Pintar were increased 9.0% by Kylar, while the increase for Chalimbana was 33.5%. These increases were expected based on the increased pod numbers.
3. Cost of kylar in the U.S. is K41 per kg. At 1 kg per ha the increased yield is 770 kg per ha; smallholders commonly get 50% grade A (@55t per kg) and 50% grade B (@30t per kg) from Chalimbana. Thus, the returns over the cost of Kylar would be K286 per ha.

Maize Time of Planting

Maize research conducted during the period 1964-78 analyzed by Mr. L.D.M. Ngwira show a highly significant reduction in yield related to the date of planting.

I have analyzed these data, using regression, to determine the magnitude of the yield reduction.

SUMMARY

Location	Treatment	Number of trials	Average yield kg ha ⁻¹	Yield loss kg ha ⁻¹ da ⁻¹	r ²
Baka	Rainfed	10	7,722	- 154.4	0.92
Bembeke	Rainfed	1	2,359	- 27.8	0.94
Bvumbwe	Rainfed	1	6,101	- 53.8	0.90
Chitala	Rainfed	1	3,173	- 47.4	0.90
Chitedze	Rainfed	9	6,012	- 80.3	0.96
Chitedze	Irrigated	4	7,582	- 42.7	0.91
Lupembe	Rainfed	5	6,694	- 130.6	0.93

Complete data is shown in Appendix B.

There is a severe reduction in maize yields with delayed planting amounting to 50 to 150 kg/ha for each day planting is delayed after the first rains come. Thus, it costs the farmer K6.50 to 19.50 per day in reduced maize yields to delay planting after the rains come. The common extension recommendation to delay planting because of the possibility of cob rot is very costly.

Plant Spacing Study

Project Objective: *Strengthen research programs* -- This quarter a new research study on the variability associated with handmade rows and hand-planting was initiated. The question is how much variability is introduced in field experiments by the variability associated with handmade planting. I discussed this with Mr. Maliro, groundnut agronomist, and Mr. Mnyenyembe, maize-wheat agronomist, and we designed a series of experiments to measure this variability. We took 1,200 measurements in six different locations, at Chitedze and in farmer's fields. This can be compared to samples taken from tractor-planted maize at Chitedze. The Farming Systems group, had taken fourteen similar samples from different farmers in two villages. Also, several years ago, I took a similar set of data in a Florida tractor-planted soybean field.

SUMMARY

Description	Crop	Type	Mean	CV%
Farmer planted	Maize	Between rows	91.4	10.1
Farmer planted	Maize	Within row	78.0	12.3
Farmer planted	Groundnut	Between rows	93.8	8.5
Farmer planted	Groundnut	Within row	17.8	24.6
Research planted	Groundnut	Between rows	23.2	7.7
Research planted	Groundnut	Within row	15.8	7.3
Tractor planted	Maize	Between rows	88.0	9.7
Tractor planted	Maize	Within row	26.3	48.5
Tractor planted ¹	Soybean	Between rows	23.3	6.0
Tractor planted	Soybean	Within row	15.7	7.0

¹ Data taken in Florida

Several conclusions can be drawn from this data:

1. Farmer made ridges are somewhat more variable, CV 8 to 10% than tractor made rows in the US, CV 6%. The difference is however, less than one would expect.
2. Tractor made ridges in Malawi are not different from farmer made ridges.
3. Farmer made within row plant spacing is more variable than between row spacing, CV's 7 to 25%.
4. Within the row tractor plant spacing in Malawi is extremely variable, 48% compared to Florida 7%.

More complete data is found in Appendix B.

D. Horticulture

Considerable time was spent reviewing the written outline of all experiments conducted by the Horticultural Section. I physically reviewed all Horticultural Trials at Bvumbwe, Chitala, Chitedze and Kasinthula Research Stations. Also, I discussed research needs with growers. From this, and using comments from the External Review Team, I began developing a plan of work to consolidate and strengthen current projects to improve smallholder productivity. It is intended that the approach to research will be multidisciplinary with interaction of extension personnel. Further, linkages with International Research Centers and Research Centers in neighboring countries will be established for the interchange of ideas and plant materials.

Plans were made for research on hand defoliation of deciduous fruit trees to compensate for lack of chilling and to produce two crops annually. Considerable time was spent with personnel from the Horticulture Section to: discuss research requirements; analyze and interpret existing research data; and prepare budget requirements for the section

E. Livestock/Pastures

Research projects continued on schedule.

Grazing Trial. The remainder of the animals were removed from the grazing trail during early June. A summary of the data is presented in Table below.

1982-83 Grazing Trial - Average Dairy Gain, Total Gain per Hectare

And Total Number of Grazing Days.

Treatment	A.D.G. kg	Total Gain per Hectare kg	Total Grazing Days days
Rhodes grass	.49	662.5	2015
Rhodes grass + Silverleaf	.56	669.2	1776
Ntchisi Panicum	.63	926.3	2201
Star grass	.42	710.8	2473

This study will be repeated in 1983-84 and 1984-85.

Sheep. The lamb feeding trial was completed during the quarter and the data are being analyzed. Enough data should be available to prepare an extension bulletin.

Stallfeeding. Sixteen steers were placed on the "Groundnut Top" feeding trial during the quarter.

Dairy Projects. The Ca/P supplementation experiment continued at Lunyangwa. The Sahiwal crossing program continued at Chitedze and will be resumed at Lunyangwa as soon as another nitrogen tank is received from the US. The protein supplementation experiment continued at Chitedze, with 32 cows on the various rations. Plans were made to begin calf rearing experiments with the next calving season.

Smallholder Dairy Project. The pastures have been established and most of the work on facilities is completed. The trials will begin in November/December with the next rains.

Poultry Project. The Hy-Line and Black Australorp chicks arrived in early May and the project is now on schedule.

Beef Cattle. The situation at Dzalanyama Ranch has become critical. In the new year's budget (1 April 1983-31 March 1984) no funds were allocated to support work at the ranch. A proposal was prepared and submitted to CARO for approval to terminate activities at the ranch.

Commodities. Received an air shipment of commodities on 5 May. The shipment included post hole diggers, electric fencing supplies and some Feed and Forage Analysis Laboratory equipment.

F. Plant Breeding/Agronomy

No major research was undertaken. Harvest was completed and data are being analyzed.

V. TRAVEL AND MEETINGS

A. ARNOLD

Met with the Officer-in-Charge, Bvumbwe Agricultural Research Station, to establish my function in the Horticulture Section and to develop budget requirements for that section.

Met with several growers in Blantyre area to discuss production for the purpose of developing research plans.

Travelled to Lilongwe three times. Once to meet Ministry and USAID/Embassy personnel, once to participate in a UF team budget meeting, and once to assess horticultural publications in the Chitedze Agricultural Research Station Library and to participate in a USAID meeting on Developing Research Priorities for East Africa.

B. GRAY

April 5-9 Attended Symposium on Herbivore Utilization in the Tropics and Subtropics at the CSIR Center, Pretoria, South Africa. Five Malawians attended the symposium under sponsorship of South African organizations. They were Dr. W. Lipato, Principal Secretary for Ministry of Agriculture, Dr. J. Mtumuni and Dr. J.A. Ayode, Bunda College of Agriculture and Mr. H.D.C. Msiska and Mr. A.P. Mtukuso, Department of Agricultural Research.

Also in attendance were Dr. H.D. Wallace, Chairman, Department of Animal Science, University of Florida and Dr. L. McDowell, Department of Animal Science, University of Florida.

April 11-14 Dr. H.D. Wallace traveled to Malawi after the symposium to review the Malawi livestock research program. We attended a Livestock Task Force Meeting which was held at Mikolongwe Veterinary Center the afternoon of 11 April. On the morning of 12 April, we visited Bvumbwe ARS, then flew to Mzuzu and visited Lunyangwa ARS and Choma Veterinary Center in the afternoon. The morning of 13 April was spent visiting smallholder dairy farms and Mpamba Farmer Training Center. In the afternoon we traveled to Mbawa ARS. Dr. Wallace observed the program at Mbawa ARS the morning of 14 April and we returned to Lilongwe in the afternoon.

April 15-22 During this period, Dr. Wallace met with various government and USAID officials and visited the Malawi-Canada Dairy Project, Bunda College of Agriculture and the Central Veterinary Laboratory.

- April 22 Livestock Task Force met in the conference room at the Ministry of Agriculture. Dr. H.D. Wallace presented his report and made comments on his observations during his visit in Malawi and a discussion period followed. See Dr. Wallace's report "Observations and Suggestions Concerning Livestock Research in Malawi" for further information.
- April 27-29 Traveled to Mbawa ARS to attend their annual field day. Also walked over a large portion of the traditional land which is under consideration for acquisition as a beef cattle research facility.
- May 4 Livestock Task Force Meeting.
- May 5 Blantyre/Bvumbwe to clear Arnold/project air freight.
- May 8-12 Gaborone, Botswana to attend the SARCCUS Veld and Pasture Subcommittee Meeting.
- May 25 Livestock Task Force Meeting.
- June 6-8 Traveled to Blantyre to meet the visiting team from the International Livestock Center for Africa (ILCA). The team was composed of Dr. Martin Butterworth, Deputy Research Director, Mr. Guido Gryseels, Economist and Mr. Dwight Light, Data Processing. The purpose of their visit was "to discuss possible ILCA involvement in further analysis of smallholder dairy records, to visit field operations of smallholder dairy farmers in Blantyre and Lilongwe A.D.D.s and to discuss ILCA proposals for EEC financed animal traction network."

During the week, visits were made to dairy farms in Blantyre and Lilongwe A.D.D.s and the headquarters of Blantyre and Kasungu A.D.D.s to inspect smallholder dairy records. A visit was also made to Bunda College of Agriculture. The team also met with the USAID/UF team to discuss their possible involvement in the upcoming Adaptive Research training program.

At the roundup meeting in the Ministry, five areas of cooperation were agreed upon:

- a. Analysis of the dairy records and reviving the dairy recording scheme.
- b. Microfilming of Malawi documents. (This was started in March 1983 and will be continued in the future).

- c. Assistance with the Adaptive Research training in collaboration with CIMMYT.
- d. Animal Traction. Malawi has signed the agreement with ILCA to collaborate with the proposed Pan-African Animal Traction Network. Malawi was one of the first countries to sign.
- e. Training. ILCA offers training opportunities through short courses and they indicated that applications from Malawi would be looked upon favorably.

June 16 Livestock Task Force meeting at Bunda College of Agriculture.

C. JANICKI

Traveled extensively during the quarter to become acquainted with the agriculture in Malawi. Also, a working-study trip was made to Zambia to visit researchers in that country who are conducting on-farm adaptive research trials. This trip was very useful because the researchers in Zambia pointed out many pitfalls which the Malawi Adaptive Research Program may be able to avoid when on-farm adaptive research trials begin later this year.

Numerous meetings were held with the External Review Team, with technical assistance team members, with members of the Farming Systems Section and with officials of the Department of Agricultural Research (DAR). These meetings were very useful in that they helped define what has been done and the direction the DAR plans to take in future on-farm research activities.

D. McCLOUD

- April 14 Travel to Blantyre to obtain Kenya visa for the Nairobi trip, and to discuss calculator course.
- April 18-22 Attend workshop for senior agricultural research Administrators on farming systems, held at ILRAD headquarters and sponsored by CIMMYT.
- April 28 Meet with Drs. Janicki and Pervis on my role in the adaptive research effort.
- May 13-14 Met with Drs. Legg, Maida, Arnold and Pasley to discuss arrangements for the calculator courses at Bvumbwe.

- May 18 Met with Dr. Legg and obtained approval on my revised work plan.
- May 23 Attended a demonstration of the Burroughs B-23 mini-computer, held at Ministry of Agriculture headquarters.
- May 29-30 Traveled to Makoka, Bvumbwe, Kasinthula, Ngabu and Makonga to make final arrangements for the Experimental Techniques-Calculator Course.
- May 31- Taught Experimental Techniques-Calculator Course at
June 1 Ngabu
- June 1 Travel Ngabu to Makoka to teach the calculator course.
- June 3 Return to Chitedze.
- June 17 Travel to the UF to arrange preparation of the Experimental Techniques course brochure.

E. PASLEY

Many meetings took place with the Local Preparations Team to develop the Master Plan for the reorganization of the DAR. Four consultants from IADS were selected to AID in the preparation of the final report; three funded by the World Bank and one funded by Project.

An administrative trip was made to the University of Florida to reconcile the Project budget. Up-to-date information was gained and work was begun on developing a budget for the life of the Project.

Frequent meetings were held with the newly arrived ADD to discuss the Project and other activities.

F. PERVIS

- April 5 Meeting of Chitedze Sections heads.
- April 16 Met Dr. Wallace, Chairman of Animal Science, at the University of Florida.
- May 18 Met with Dr. Legg, about future work. Attended Team meeting.
- June 6 Met with Mr. Steve Atkins, EPAD Project, Chipata - Zambia. Discussed the use of Apple computers.
- June 6 Met with Mr. Dorward from Reading University. Once worked as an Evaluation Officer in Mzuzu ADD and is now engaged in graduate work: - modelling smallholder farms.

- June 8 Met with Dr. I.J. Singh, Mr. Squire, and Mr. Kirster of the World Bank.
- June 9 Attended a seminar presented by Dr. Singh, Mr. Squire, and Mr. Kirster.
- Met with Dr. Gray and a team from ILCA. Dr. Gray is expecting to obtain a large amount of dairy record data. This may also be useful for some economic analysis and form the basis of some joint work.
- June 10 Attended an irrigation meeting with personnel from Chitedze and the Irrigation Branch, in the offices of Farming and Engineering Services (FES). FES have some equipment available for sale.
- June 15 Met with Dr. Bill Judy, Agricultural Development Officer at AID/Malawi.
- June 16 Met with Dr. Janicki, Agronomist about the appropriate role of Agricultural Economics in the Adaptive Research efforts - both from the point of view of Technical Assistance and the on-going operation of them by the Malawian staff.
- June 17 Attended a meeting of the Ministry Computer Committee and agreed to assist a group looking into aspects of different coding systems used in Malawi with the view of developing a common set of codes for the proposed ministry data base. Initially the group will consist of Mr. J. Mhango, Mr. W. Cornellison, and Dr. Erez.
- June 17 Attended a meeting of Chitedze staff and the Malawi Union of Savings and Credit Cooperatives. Interest in starting a Credit Union is still strong and people are beginning to get themselves organized to take the necessary training course provided by the MUSCCO.
- June 22 Attended team meeting at which Dr. Ray Morton and Dr. James Walker of USAID/Washington solicited our views on needed research into food production in Malawi.
- Attended a seminar in the Div. of Planning, Ministry of Agriculture at which Mr. Squire and Mr. Kirchner of the World Bank presented a small computer based model which they developed in a few days to answer some urgent questions about the important component and data used in the model were based on the production function work of the Agricultural Economics Section at the Chitedze Agricultural research Station. They used the new Burroughs computing equipment in the Division of Planning.

- June 24 Met with Mr. G. Jere, LADD Evaluation Officer. We tentatively agreed to do some collaborative research in the LRDP to estimate costs of production for various enterprises - particularly groundnuts, dairy, and stall feeders. Also collected in this survey will be some smallholder management information for use in developing some computer based models.
- June 27 Met with Dr. Hesser, IADS. He is visiting Malawi on a consultancy to assist the DAR in its reorganization efforts. I discussed the need for a deeper involvement of Agricultural Economists in the structure of the DAR.
- June 28 Met with Dr. Janicki and Mr. Bolt. Mr. Bolt is a MSc Agricultural Economist from Britain who is in Malawi with VSD to assist CARD in administrative matters. We discussed the contribution of Agricultural Economics in the training of the Adaptive Research Teams.
- June 29 Met with Mr. Mulanga of the Economic Planning Division. A World Bank mission will be coming to Malawi to conduct a housing study. They are requesting the use of one of our computers for about two days a week for three months.

VII. ADMINISTRATION

The major accomplishment during the quarter was the development of a budget for the recurrent costs aspects of the Project for the Malawi fiscal year. (see appendix A).

Many routine administration matters with the DAR, USAID/MA, and IP-UF were handled but do not merit discussion.

A reply was prepared to recommendations made by the External Review Team for consideration by ADD/USAID/Malawi.

VIII. FINANCIAL

See Appendix Tables 1,2 and 3 in Appendix A.

IX. PROBLEMS

1. The major problem is the unclear picture of the financial position of the Project. Fortunately, a visit to IP-UF helped reconcile the matter.
2. A continuing problem is the lack of administration support capable of handling routine administration matters.
3. The DAR is still to identify individuals for the nine remaining slots in the Participant Training provision of the Project.

APPENDIX A

FINANCIAL

Table 1 Transactions-University of Florida-IFAS Local Account April, May, and June, 1983

Date	Details	MY	MK
April			
1	Balance brought forward		15,302.24
7	A.J. Daudi Travel Advance	210.00	
11	Lands Valuation utilities water	11.70	
11	Securicor services for April	621.20	
11	Manica - Telaxes	191.59	
	R.C. Gray Ticket Jo'burg	469.00	
	McCloud Ticket Blantyre	97.00	
	Gray Ticket Mzuzu	57.00	
	H.D. Wallace Ticket Mzuzu	57.00	
	Freight books and Supplies	16.36	
	H.D. Msista Ticket Mzuzu	57.00	
	Goods books Transport	43.59	
11	Optiches Fertilizer	1,350.00	
11	Glens Removals Transport	23.66	
19	Manica - Telefax	103.30	
	A.T. Daudi Ticket Jo'burg	553.50	
	Pasley Ticket LL-BT-LL	97.00	
	Janicki Freight Personal Effects	39.02	
	R. Chikwira Ticket USA	1,433.00	
19	L. Janicki Advance School Fees	415.00	
19	C. Arnold School Fees	1,000.00	
19	A.T. Daudi Travel Reimb. S.A. trip	21.70	
20	J. Kuwenda Travel Advance	250.00	
20	W. Nhlane Travel Advance	250.00	
21	J. Kuwenda Travel Advance	30.00	
21	W. Nhlane Travel Advance	30.00	
21	A.P. Mtukuso Travel Reimb.	72.00	
21	E.M. Sibale Travel Advance	290.00	
25	W.F. Kuwenda Travel Reimb.	142.07	
25	R.C. Gray Travel Reimb.	130.09	
26	P.C. Gray - 2 New Passports	92.40	
26	Reimbursement misc. supplies	11.00	
26	Hansen & Facility, excess baggage	705.00	
27	Utilities Electricity	267.13	
27	Utilities Water	82.65	
May			
11	Deposit Dr. Spring		65.93
16	Deposit Dr. Janicki		700.00
27	Deposit Dr. Pasley		1,000.00
27	Books for Economics NSO	5.50	
30	Securicor Services	1,223.36	
31	C.E. Arnold Additional Tuition fee	245.00	

Date	Details	MK	MK
June			
6	Lands Valuation Utilities Water	69.35	
6	Utilities Electricity	623.40	
6	Securicor services Arnold	74.00	
6	Utilities Arnold Electricity	80.00	
10	Deposit	18,564.61	
10	Subscription fee NSO	15.00	
10	Hire charges Lesbia trip	1,233.75	
10	Janicki carpeting	3,120.25	
10	McCloud Telephone	126.00	
10	Manica - Telexes	144.59	
	McCloud LL-BT-LL	194.00	
	Arnold BT-LL-BT	97.00	
	Arnold BT-LL-BT	97.00	
	Gray LL-ST	48.50	
	Mhlane Mzuzu - Jo'burg	650.00	
	J. Kuwenda Mzuzu - Jo'burg	650.00	
	E. Sibale LL - Jo'burg	553.00	
	H.D. Wallace Excess baggage	269.00	
	McCloud LL-BT-LL	97.00	
	Nqwira Accommodation	55.50	
	Dr. Makhasbera Accommodation	68.60	
	Gray LL-Gaberone-LL	901.00	
	Nqwira LL-BT	97.00	
	Dr. Makhasbera LL-BT	97.00	
13	L. Janicki Tuition fee	115.00	
14	McCloud Travel NY - GNV	189.00	
15	Gray Per diem Reiab.	1,377.06	
21	Gray Per diem	621.10	
21	Receipt		1,671.00
	Bank Draft	3,190.90	
	Bank Draft	16.25	
	Ledger fee	6.76	
	Unpresented check		141.00
	Debits for last Quarter	1,351.22	
	Total	27,003.02	38,444.00
	Balance C/down		27,003.02
	Balance as Per Bank statement	11,441.76	

Table 2
Summary of Expenditure from the University of Florida Local Account by Programs

April 1 to June 30, 1963

Program	Expenditure This Period	Expenditure To Date
	Y	K
Maize, Breeding and Agronomy		15,956.98
Groundnut, Breeding and Agronomy	600.56	5,757.18
Pasture Agronomy		16,780.62
Livestock	5,086.14	41,443.71
Horticulture, Fruits and Vegetables	194.00	11,802.11
Agricultural Economics	20.50	8,498.75
Farming Systems		14,069.40
Soil Fertility	--	8,219.76
Research Coordination	--	15,950.63
Library	--	1,670.52
Participant Training	1,547.00	24,445.17
In-service Training	4,090.22	52,622.93
Vehicle Purchase	--	197,758.89
Overhead †	7,379.17	107,018.66
Total	21,914.69	520,995.91

† Not assignable by Program

Table 3 Recurrent Cost Allocation for Malawi Fiscal Year

Commodity	02*	Category		08*	15*
		04*	MK		
		Station: Baka			
Maize	500	1000		500	
		Station: Svyembwe			
Horticulture	3800	16000		12400	15200
Maize	125	275		-	-
Legumes	-	250		-	-
		Station: Chitala			
Farm Machinery	250	-		-	-
Horticulture	700	50		-	-
Legumes	1300	400		-	-
Livestock	1300	300		-	-
Maize	1000	700		-	-
Oilseeds	250	-		-	-
Roots/Tubers	600	400		-	-
		Station: Chitedze			
Adaptive Research	-	10320		-	-
Agric. Econ.	1500	4000		2600	-
Farm Machinery	865	5000		3100	-
G/nuts	1900	2000		1450	-
Livestock	2000	1700		6650	10000
Maize	2400	3000		2500	7000
Pastures	380	-		1100	-
Seed Tech.	-	925		-	-
Soil Fert.	880	-		-	-
Wheat	6000	3500		3500	-
UF Adan.	8550	34500		5000	-
		Station: Kasinthula			
Fruits	500	500		-	-
Maize	800	500		-	-
Species	300	250		-	-
Vegetables	600	500		-	-
Wheat	500	500		-	-
		Station: Lunyangwa			
G/nuts	-	380		60	-
Horticulture	70	260		300	-
Livestock	650	-		4000	-
Maize	100	900		140	-
Pastures	1300	1500		1850	-
Roots/Tubers	650	1300		1200	-
Wheat	60	260		125	-
		Station: Makhanga			
Maize	500	250		-	-
Horticulture	500	250		-	-
		Station: Makoka			
Cassava	3750	4000		700	-

Commodity	02*	Category		16*
		04*	08*	
		MK		
		Station: Mbawa		
B/nuts	-	500	-	-
Livestock	330	-	1900	-
Maize	50	710	235	-
Sunflower	-	-	75	-
Wheat	-	425	-	-
		Station: Ngabu		
Legumes	600	3200	3100	-
Maize	850	2400	2300	-
Scorghum	800	2000	1500	-

* 02 = Labor,
 04 = Transportation,
 08 = Expendable supplies, and
 16 = Facility maintenance.

APPENDIX B

RESEARCH

Crop Physiology

Tables 1 and 2 present the data taken:

Table 1 Days from emergence, ground cover, pod load, vegetative dry matter and pod dry matter for the KYLAR 82 experiment for Mani Pintar.

Day	Mani Pintar check				Mani Pintar kylar			
	Ground cover	Pod load	Vegetative dry matter	Pod dry matter	Ground cover	Pod load	Vegetative dry matter	Pod dry matter
25	29.8		830		29.9		850	
32	43.8		1,550		45.2		1,310	
39	60.0		2,180		52.8		2,290	
46	70.0		3,230		70.0		3,190	
53	83.9		4,370		83.8		4,520	
60	100.0		5,270		100.0		5,300	
67		6.0	6,010	320		6.7	5,960	450
74		9.3	6,670	490		14.3	6,600	690
81		11.6	7,560	950		19.5	6,790	1,130
89		11.6	9,470	1,540		14.7	6,390	1,780
95		17.7	7,130	2,230		15.2	6,350	2,450
102		19.0	7,550	2,030		25.0	6,310	3,220
109		24.7	6,500	3,190		27.2	5,850	3,680
116		24.0	6,660	2,790		27.5	5,330	3,110
123		27.4	6,060	3,020		32.1	4,650	3,040
130		23.7	6,320	3,250		26.3	4,540	3,370
137		27.2	6,620	3,270		31.8	4,490	3,420
144		21.9	6,980	3,320		29.7	4,750	3,690
151		23.6	6,290	3,910		25.0	4,330	4,260
158		22.8	6,020	3,400		30.4	3,940	3,600

26-

Table 2 Days from emergence, ground cover, pod load, vegetative dry matter and pod dry matter for the KYLAR 82 experiment for Chaliabana.

Day	Ground cover	Pod load	Chaliabana check		Ground cover	Pod load	Chaliabana kylar		
			Vegetative dry matter	Pod dry matter			Vegetative dry matter	Pod dry matter	
25	43.8		1,230			43.8	1,150		
32	55.0		2,190			52.5	2,020		
39	77.5		3,120			78.8	3,170		
46	90.0		4,180			90.0	4,150		
53	95.0		4,750			92.5	4,940		
60	100.0		5,570			100.0	5,300		
67		1.4	6,310	40					
74		1.6	7,230	60			2.2	6,040	150
81		2.6	7,020	240			6.2	6,780	270
88		2.6	7,310	700			7.7	6,150	570
95		4.0	7,170	1,170			5.8	6,610	1,020
102		6.9	6,290	1,550			9.9	5,850	1,550
109		9.1	6,140	1,740			8.7	5,700	2,310
116		7.0	6,170	1,630			12.1	5,500	2,230
123		7.4	5,480	1,630			9.4	4,960	2,190
130		8.4	5,080	1,540			12.2	4,520	2,140
137		8.0	4,930	1,920			9.9	4,680	2,570
144		8.4	4,790	2,500			9.4	4,830	2,060
151		8.9	4,300	2,300			10.6	4,360	2,760
158		8.0	4,130	2,070			11.2	3,780	3,070
							11.1	3,910	2,530

Table 3 Malawi Time of Planting Maize Trials (1964-78)*
Regression Analysis Calculated by D. E. McCloud

Station	Variety-Treatment	Year	Maximum Yield kg ha ⁻¹	Planting dates	Slope kg ha ⁻¹ da ⁻¹	Correlation r ²
Bvumbwe	Mthenga (LH7) Rainfed	64-65	5,101	7	- 53.9	0.90
Chitedze	Askam (SV17) Rainfed	67-68	6,588	4	- 44.1	0.98
Chitedze	SCK1 (single cross) Rainfed	68-69	7,034	4	- 74.6	0.91
Chitedze	Katuuani B Rainfed	68-69	6,225	4	- 113.2	0.91
Chitedze	Katuuani B Irrigated	68-69	7,843	4	- 35.9	0.92
Chitedze	Katuuani B No spray	68-69	5,995	4	- 86.3	0.97
Chitedze	Katuuani B Spray zineb+DDT	68-69	7,181	4	- 62.9	0.78
Chitedze	Katuuani B N60	68-69	7,039	4	- 70.9	0.89
Chitedze	Katuuani B N90	68-69	7,029	4	- 78.3	0.73
Chitedze	Katuuani B Rainfed	68-69	5,642	4	- 60.3	0.98
Chitedze	Katuuani B Irrigated throughout	68-69	7,975	4	- 34.0	0.88
Chitedze	Katuuani B Irrigated at flowering	68-69	7,283	4	- 19.7	0.51**
Chitedze	Katuuani B Irrigated after flowering	68-69	7,731	4	- 68.2	0.98
Chitedze	Katuuani B N60	68-69	6,985	4	- 45.2	1.00
Chitedze	Katuuani B N90	68-69	7,049	4	- 45.9	0.98
Chitedze	Katuuani B Rainfed	68-69	5,316	4	- 43.1	0.97
Chitedze	Katuuani Irrigated throughout	68-69	5,669	4	- 7.9	0.14**
Chitedze	Katuuani B Rainfed	69-70	6,592	4	- 101.7	0.97
Chitedze	Katuuani B Irrigated throughout	69-70	8,544	4	- 57.2	0.84
Chitedze	Katuuani B No spray	69-70	7,784	4	- 94.9	0.94
Chitedze	Katuuani B Spray zineb+DDT	69-70	7,351	4	- 64.0	0.93
Chitedze	Katuuani B N90	69-70	7,622	4	- 84.2	0.94
Chitedze	Katuuani B N180	69-70	7,513	4	- 74.7	0.94
Chitala	Katuuani B Irrigated	69-70	1,302	4	- 17.6	0.70**
Chitala	Katuuani B Irrigated throughout	69-70	2,875	4	- 3.5	0.01**
Chitala	Katuuani B No spray	69-70	1,627	4	- 8.0	0.19**
Chitala	Katuuani B Spray zineb+DDT	69-70	2,604	4	- 13.1	0.13**
Chitala	Katuuani B N90	69-70	1,899	4	- 1.7	0.00**
Chitala	Katuuani B N180	69-70	2,279	4	- 8.6	0.08**
Chitedze	SCK1 rainfed	69-70	6,185	4	- 104.1	0.99
Chitedze	SCK1 irrigated throughout	69-70	7,541	4	- 11.2	0.37**
Chitedze	SCK1 no spray	69-70	7,595	4	- 36.8	0.68**
Chitedze	SCK1 spray zineb+DDT	69-70	7,784	4	- 106.6	0.99
Chitedze	SCK1 N90	69-70	7,270	4	- 64.8	0.96
Chitedze	SCK1 N180	69-70	7,297	4	- 65.0	0.97
Chitedze	Katuuani B N60 rainfed	69-70	5,587	4	- 70.1	0.99
Chitedze	Katuuani B N60 irrigated	69-70	5,967	4	- 43.6	0.99
Chitedze	Katuuani B N60	69-70	8,097	4	- 109.1	0.95

Station	Variety-Treatment	Year	Maximum Yield kg ha ⁻¹	Planting dates	Slope kg ha ⁻¹ da ⁻¹	Correlation r ²
Chitala	Katwani B Rainfed	69-70	3,173	4	- 47.4	0.90
Benbeke	Katwani B Rainfed	69-70	2,359	4	- 27.8	0.94
Lupembe	SR 52 Rainfed	77-78	5,770	5	- 114.1	0.91
Lupembe	R 201 Rainfed	77-78	6,443	5	- 116.5	0.93
Lupembe	CCB Rainfed	77-78	7,137	5	- 136.5	0.95
Lupembe	CCA Rainfed	77-78	6,134	5	- 117.2	0.91
Lupembe	PNR95 Rainfed	77-78	7,986	4	- 168.6	0.94
Baka	SR 52 Rainfed	73-74	6,173	5	- 42.4	0.24**
Baka	R 200 Rainfed	73-74	5,185	4	- 40.0	0.83
Baka	SV28 Rainfed	73-74	5,463	5	- 55.7	0.39**
Baka	SR 52 Rainfed	75-76	8,395	5	- 173.7	0.93
Baka	R 200 Rainfed	75-76	6,019	5	- 122.9	0.91
Baka	SV28 Rainfed	75-76	6,451	5	- 131.1	0.92
Baka	SR 52 Rainfed	77-78	7,539	4	- 182.3	0.97
Baka	R 201 Rainfed	77-78	10,224	4	- 234.4	0.93
Baka	CCB Rainfed	77-78	10,802	4	- 255.6	0.94
Baka	CCA Rainfed	77-78	5,603	4	- 138.7	0.86
Baka	PNR95 Rainfed	77-78	9,182	4	- 218.4	0.97

* FROM: A Review of Maize Time of Planting Experiments Conducted in Malawi (1964-78)
L.D.M. Ngwira Chitedze Research Station

** Omitted in the SUMMARY.

APPENDIX C

TRAINING

Participant Training

Table 1

PARTICIPANT TRAINING QUARTERLY REPORT
April 1 to June 31, 1993

Name	Training	Degree Program	Station	Departure	Months Accumulated	Due Back	Funded To
Chigwe C.F.B.	Plant Pathology	Ph.D.	Bvumbwe	Dec 80	30	Apr 84	Jun 84
Chikwana R.	Sorghum Breeding	Ph.D.	Makoka	Dec 81	18	Dec 84	Jun 85
Chilembwe E.H.	Agricultural Economics	M.S.	Chitedze	Dec 80	30	Dec 82	Jun 83
Chipala E.E.	Fruit Crops	M.S.	Bvumbwe	Dec 80	30	Jun 83	Jun 83
Chiremba, A.B.M.	Soybean Breeding	Ph.D.	Chitedze	Dec 80	30	Dec 83	Jun 84
Dzowela B.H.	Statistics	M.S.	Makoka	Dec 82	6	Dec 84	Dec 84
Badabu, A.D.	Pasture Agronomy	Ph.D.	Chitedze	Dec 80	30	Jun 84	Jun 84
Gondwe M.T.	Entomology	Ph.D.	Bvumbwe	Dec 82	6	Dec 84	Dec 84
Khonje D.J.	Vegetable Crops	M.S.	Bvumbwe	Dec 81	18	Dec 83	Jun 84
Munyaho, C.T.	Soil Microbiology	Ph.D.	Chitedze	Dec 81	18	Dec 84	Jun 85
Munyaho, C.T.	Plant Pathology	M.S.	Chitedze	Dec 82	6	Dec 84	Dec 84
Munyaho F.	Statistics	M.S.	Makoka	Dec 80	17	Jun 82	*
Mkaanga G.Y.	Crop Physiology	Ph.D.	Chitedze	Dec 80	30	Jun 84	Jun 84
Mtaabo P.J.	Seed Technology	M.S.	Chitedze	Dec 81	18	Dec 83	Jun 85
Munthali, F.	Wheat Agronomy	M.S.	Chitedze	Dec 82	6	Dec 84	Jun 85
Munthali J.T.K.	Animal Nutrition	Ph.D.	Chitedze	Dec 80	30	Dec 83	Jun 84
Mwango, E.N.	Anthropology	M.A.	Chitedze	Dec 82	6	Dec 84	Dec 84
Mzeabe C.P.	Irrigation Agronomy	M.S.	Kasinthula	Dec 80	30	Jun 83	Jun 84
Mzeabe C.P.	Maize Agronomy	M.S.	Chitedze	Dec 81	19	May 84	Jun 84
Nthakomwa, B.	Agric. Economics	M.S.	Chitedze	Dec 82	6	Dec 84	Dec 84
Ntokothe E.M.	Soil Survey	Ph.D.	Lilongwe	Dec 80	30	Jun 84	Jun 84
Saka A.L.	Soil Physics	Ph.D.	Bvumbwe	Dec 80	30	Dec 83	Jun 84
Sibale P.K.	Groundnut Breeding	Ph.D.	Chitedze	Dec 82	30	Jun 84	Jun 84
Tambozi B.T.	Maize Breeding	M.S.	Chitedze	Jun 81	25	Dec 83	Dec 84

* Terminated without Degree in May 1982

In-service Training

Table 2 Malawi students completing the calculator course along with their rank and station.

Name & Date	Rank	Station
May 31-June 1, 1983		
S. H. Nyahode	S.T.A.	Makhanga
A.E.D. MUMOMO	C.T.O.	Makhanga
G.K. Khonje	S.T.A.	Makhanga
S.D.T. Phiri	T.O.	Ngabu
B.E. Chunga	T.O.	Ngabu
J.D.T. Kumwenda	P.O. (DIC)	Ngabu
E.M. Chinthu	P.O. (DIC)	Ngabu
June 2-3, 1983		
W.M.J. Nyaluanga	S.T.O.	Makoka
G.A. Timoyo-Phiri	T.O.	Makoka
J.W. Mchowa	P.O.	Makoka
W.S. Ngonga	S.T.A.	Makoka
E.G. Mitumbili	S.T.O.	Makoka
R.F.N. Sauti	P.O.	Makoka
C.C. Moyo	P.O.	Makoka
M.H.P. Banda	P.O.	Makoka
R.W. Nyirenda	T.O.	Makoka
D.D. Niwaru	T.O.	Makoka
H.N. Soko	T.O.	Makoka
W.W. Luhanga	P.O.	Makoka
June 6-7, 1983		
F.E. Kadwa	T.O.	Bvuabwe
L.S.M. Mumba	S.T.O.	Bvuabwe
R.A. Nsanjama (Mrs)	T.O.	Bvuabwe
D.D. Nkhoma (Miss)	T.O.	Bvuabwe
E.S. Mwalo	T.O.	Bvuabwe
J.M.G. Mhango	T.O.	Bvuabwe
C.J. Katiananga	S.T.A.	Bvuabwe
P.T. Khonje	P.O.	Bvuabwe
L. Chisambiro	P.O.	Bvuabwe
E.R. Kaunda	S.T.A.	Bvuabwe
M.N. Nsanjama	P.O.	Bvuabwe
E.N. Chikwita	T.O.	Bvuabwe
B.C. Chimaliro	S.T.A.	Bvuabwe
A. Gondwe (Miss)	T.O.	Bvuabwe
June 8-9, 1983		
A.T. Daudi	P.O.	Bvuabwe
B.P. Mbundungu	T.O.	Bvuabwe
W.G. Banda	T.O.	Bvuabwe
D.C. Kalizang'osa	T.O.	Bvuabwe
C.L. Nchoambo	S.T.A.	Bvuabwe
Z.W. Chilima	C.T.O.	Bvuabwe
I.M.G. Phiri	P.O.	Bvuabwe
W.Y. Kuwenda	P.O.	Bvuabwe
F.G. Chikadza	T.O.	Bvuabwe
L.G. Nkolosa	T.O.	Bvuabwe
G.J.S. Kambale	T.O.	Bvuabwe
L. Chisenga	P.O.	Bvuabwe
R.J. Phiri	S.T.A.	Bvuabwe
J.W. Ching'ani	S.T.A.	Bvuabwe
H. Manondo	T.O.	Bvuabwe

June 13-14, 1983

P. Ngwira (Mrs)	P.O.	Chitedze
E. Sibale (Mrs)	P.O.	Chitedze
B.S.C. Phiri	P.O.	Chitedze
A.J. Chiyembekeza	P.O.	Chitedze
V.H. Kabambe	T.O.	Chitedze
F.K.K. Nyondo	P.O.	Chitedze
L.S. Chilalile	T.O.	Chitedze
D.A.H. Jere	P.O.	Chitedze
W.T. Kawonga	P.O.	Chitedze
C.E. Maliro	P.O.	Chitedze
M.S.L. Kuswenda	P.O.	Chitedze
C.A.M. Phangaphanga	T.O.	Chitedze
E.J. Minjale	T.O.	Chitedze
K.M. Chafika	T.O.	Chitedze
G. Luhanga	P.O.	Chitedze

June 15-16, 1983

N.E. Nyiranda	T.O.	Chitedze
E.R. Uka (Miss)	P.O.	Chitedze
A.C. Njikho	T.O.	Chitedze
J.D. Ndengu	P.O.	Chitedze
F.L. Kapuni	P.O.	Chitedze
L.J. Mtiaukanena (Mrs)	T.O.	Chitedze
T. Chibwana	T.O.	Chitedze
A. Mbvundula	T.O.	Chitedze
R.F. Mbeza	T.O.	Chitedze
J.W. Jiyani	T.O.	Chitedze
A.M. Sungaunyolo	T.O.	Chitedze
W.A. Kadyaapakeni	S.T.O.	Chitedze
E.E.W. Jaraji	T.O.	Chitedze
H.D. Msiska	P.O.	Chitedze
K.S.K. Jere	T.O.	Chitedze
A.L. Chaseta	S.T.O.	Lifuwu
N.B. Sambo	T.O.	Lifuwu
T. Kadewa	T.O.	Chitala