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**Rwanda Farming Systems Research Program  
Technical Paper Series**

Farming Systems Research Program  
(FSRP), Rwanda

TDY REPORT

Lucas D. Parsch  
24 September-7 October, 1988

Report # 52

USAID Contract #696-0110  
between  
The University of Arkansas, Fayetteville  
(International Agricultural Programs)  
and  
The Rwandan Ministry of Agriculture  
Rwandan Institute for Agricultural Sciences (ISAR)

## **Farming Systems Research Program (FSRP), Rwanda**

### **TDY REPORT**

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24 September-7 October, 1988

#### **TERMS OF REFERENCE**

1. Provide technical support to the FSRP socio-economist Serigne N'DIAYE and the Rwandan counterpart Augustin MUNYEMANA in implementing a socioeconomic study designed to characterize traditional production activities for major crops and consumption activities for household items based on a one-year (seasons A and B) survey of a sample of farmers in the FSRP area.
2. Assess progress-to-date and provide technical support to special studies student Malcolm MAYFIELD (M.S. candidate, University of Arkansas) in his thesis research on economics of bean production practices in the FSRP area.
3. Review progress-to-date of economic analyses conducted for agronomic trials already completed.
4. Review progress in the development/finalization of linkages between FSRP/ISAR, University of Arkansas (UOA) and Universite Nationale de Rwanda (UNR).
5. Dependent on accomplishment of objectives 1, 2 and 3, serve as potential resource for backstopping the Rwanda FSRP/ISAR (Institut des Sciences Agronomiques Rwandaise) internal evaluation.

#### **DAILY ACTIVITIES**

- 24 Sept Departed Fayetteville at 13:50. En route to scheduled arrival in Kigali on 26 September.
- 26 Sept Arrived Kigali 11:30. Picked up at airport and proceeded to FSRP office for short debriefing with Jim BURLEIGH and office staff. Set up appointments with USAID personnel for following day.
- 27 Sept Met with new USAID Agricultural Development Officer (ADO) Paul CRAWFORD and Dr. VALENS at AID office. Discussed TDY terms of reference, FSRP project overview and objectives with CRAWFORD. Discussed progress to date on status of signing the memorandum of understanding between FSRP/ISAR, UNR and UOA with Dr. VALENS. Returned to FSRP office. Phone conversation with Boyd HANSON on status of progress toward finalizing the linkages between FSRP/ISAR, UNR and UOA.  
Travelled to Rwerere. Met with Chef de la Station Callixte NTAMBABAZE to discuss terms of reference for TDY. Held informal meetings with other team members.
- 28 Sept Reviewed MAYFIELD program research objectives; discussed logistical issues related to distribution of field survey equipment (bicycles, altimeters, clinometers, compasses, measuring wheels, etc.) to enqueteurs and necessary data to be collected before MAYFIELD's scheduled departure. Discussed overview of planned socioeconomic program with N'DIAYE. Began review of MAYFIELD's final draft of executive summary of BREWSTER's M.S. research, "Economic Analysis of Traditional Bean Production...."

- 29 Sept Completed review of "...Traditional Bean Production..." Reviewed socioeconomic project proposals submitted by N'DIAYE and MUNYEMANA on (a) agroforestry research in collaboration with YAMOA and BURLEIGH; and (b) whole-farm production/consumption survey.
- 30 Sept Traveled with N'DIAYE to Butaro to meet the sous-prefet and agronome de commune to explain the planned program of research in collaboration with the monagris of the commune. Traveled to Cyeru to meet the bourgemeister and agronome de commune to explain program of research and responsibilities of collaborating monagris and enqueteurs.  
Returned to station. Discussed design of year-long proposed socioeconomic study with respect to sample, sample size, stratification and scope of questionnaire.  
Arranged for photocopy and distribution of WALE/PARSCH July 1988 TDY report (french); obtained french translation of first draft of executive summary of BREWSTER research for final editing at UOA.
- 01 Oct Reviewed secondary data (Enquete Nationale, SESA) as potential basis for stratifying socioeconomic sample. Reviewed published data on agro-ecological zones for potential use in stratifying survey sample.  
Travel to Gisenyi for relaxation.
- 02 Oct Relaxation at Gisenyi.
- 03 Oct Attended staff meeting called by Chef de la Station NTAMBABAZE (a) for briefing the team on the internal project evaluation being conducted by ISAR and (b) to discuss logistical issues related to team coordination.  
Continued discussion with N'DIAYE on survey design issues relating to sample stratification, sample size and agro-ecological zones.  
Reviewed YAMOA's manuscript on results of agroforestry research to date. Reviewed two project proposals submitted by MUNYEMANA for on-site and multi-location (farm) research trials to assess economics of agroforestry.
- 04 Oct Conducted detailed review of MAYFIELD progress to date on research accomplishments, logistical issues and related problems. Made assessment of time frame necessary for MAYFIELD to complete field data collection, return to UOA to conduct computer and statistical analysis, do thesis write-up and take oral M.S. examination. Made initial projections for potential technical publications to come out of thesis research and the respective time-frame. Made final editorial suggestions for "...Traditional Bean Production..." manuscript.  
Discussed project objectives of the initial FSIP project paper with K.B. PAUL in comparison to project objectives of the redesigned FSRP. Read and discussed the USAID audit and the USAID OAR response to the audit.
- 05 Oct Held discussion with BURLEIGH to review (a) project logistical problems and (b) the progress to date in the linkage between FSRP/ISAR, UNR and UOA.  
Attended the half-day on-station training session hosted by FSRP/ISAR team members to provide training to 40 agronomes/monagris in the logistics of the agroforestry-bean multi-location study being initiated by YAMOA, BURLEIGH, N'DIAYE and MUNYEMANA.  
Continued the discussion with N'DIAYE and MAYFIELD on the logistics of the socioeconomic survey.  
Met with the ISAR internal evaluation team to (a) discuss the objectives and findings of BREWSTER's and MAYFIELD's research and (b) explain the proposed direction of the socioeconomic research planned by N'DIAYE and MUNYEMANA for the remainder of the project.
- 06 Oct Reviewed and edited two papers on (a) bean seed treatment and (b) chemical treatment of seed for storage by K.B. PAUL for the technical report series.  
Met with YAMOA to discuss reviewed manuscripts.  
Met with MUNYEMANA to discuss reviewed research proposals.  
Held final meeting with N'DIAYE and MAYFIELD to discuss scope and logistics of the socioeconomic research.

07 Oct Met jointly with the ISAR internal evaluation team and FSRP/ISAR station team to review and discuss findings of the week-long project evaluation.  
Travelled to Kigali. Met with Ashoka PAUL to discuss potential short-term training in economics for MUNYEMANA.  
Departed Kigali airport at 20:25 for scheduled arrival in Fayetteville on 08 October.

## COMMENTARY

### Team Accomplishments and Morale

Consistent with the observation of WAILES and PARSCH in their July 1988 TDY report, the Rwerere team continues to forge ahead in conducting both research and pre-extension activities. In addition, I observed that not only is the team progressively conducting its activities in an interdisciplinary fashion, but likewise, it is increasingly integrating its efforts and collaborating with agents outside of the FSRP/ISAR structure--most notably the agronomes de commune and monagris du secteur who are employees of the Ministry of Agriculture (MINAGRI).

The interdisciplinary aspect of the team's work is evident both in ongoing joint research field trials and in research just getting underway in which the new team socio-economist and his counterpart will collect economic data and conduct socioeconomic surveys as part of on-site and farmer trials.

The collaboration with MINAGRI is primarily evident in the team's use of agronomes and monagris either as survey enqueteurs or as the contacts with farmers for the on-farm trials. During my short stay, I observed two workshops held at the Rwerere station in which team members provided structured training to agronomes and monagris in research objectives and/or research procedures for data collection and administering questionnaires. One of these workshops was a half-day session attended by approximately 40 agronomes and monagris; the other was also a half-day session with about 15 monagris and FSRP-salaried enqueteurs in attendance.

This multi-faceted, four-pronged direction (research, pre-extension, interdisciplinary, collaborative) that is being exhibited indicates that the members of the team are dedicated to accomplishing a complex set of project objectives. For this the team is to be commended since there is some justified confusion as to whether research or extension is the primary orientation of the project given its evolution from FSIP to FSRP.

The recent addition of the expatriate socioeconomic (N'DIAYE) will obviously enhance the project in that his research will provide a necessary complement to the agronomic orientation of the project to date. N'DIAYE is not only enthusiastic but has demonstrated a desire to work with other team members including his counterpart, MUNYEMANA. With the expected arrival of the new team agronomist, EYLANDS, in November, the fully-staffed Rwerere team can be expected to make significant accomplishments in meeting project objectives.

In spite of my optimism regarding the composition and competence of the team, I nevertheless have some reservations about its morale. During my July 1988 TDY, it became evident that a major logistical problem facing the team members was access to vehicles and chauffeurs. Although the solution to this problem had supposedly been addressed in an August meeting attended by representatives of USAID, UOA, FSRP and ISAR, I sense that team members continue to feel restricted in the use of their vehicles/chauffeurs for project purposes. The situation appears to have improved since July, but restrictions in the form of (a) having limited control at times over the disposition of chauffeurs and (b) having to provide notification of intent to leave the project area with a vehicle one week in advance were just two examples which came to my attention that the problem has not been entirely resolved. Perhaps the proposed solution to the vehicle problem that surfaced at the above-mentioned August meeting is being administered "to the letter" if not "in the spirit." At any rate, accessibility to vehicles and chauffeurs--which should be a trivial issue of logistics in a project such as this--has had a strong demoralizing effect on the team. It will be unfortunate if this situation is not entirely resolved since it could conceivably affect the team members' long-term commitment to the project.

## FSRP Needs

Based on my own observations and on discussions with team members, the following is a list of items that would facilitate the work of the team in implementing and achieving the objectives of the project:

- a) Ensure team members complete control over, and access to, vehicles and chauffeurs for project purposes. As long as team members perceive a sense of harassment-intimidation in gaining access to their vehicles, their work will--to some extent--suffer, and implementation of project objectives will be hindered.

I perceive that the demands on project vehicles will become more critical in the coming year. On the one hand, some vehicles have been damaged in road accidents whereas others are aging and have increased down-time for repairs. Simultaneously, the need for vehicle use to visit multi-location sites, to transport monagrists to workshops, etc., is increasing. For example, the socio-economic vehicle (No. 57) is presently shared by two very active team members (N'DIAYE and MUNYEMANA) who are gearing up for a series of intensive surveys and field trials (farmer and station) in support of their program. It will be enough of a logistical problem for them to coordinate use of this vehicle between themselves without having to suffer through additional red tape.

Although it is reasonable in principle that project vehicles be dispatched solely for project-related-purposes, it is my own opinion that the remoteness of the Rwerere station might warrant authorized, but limited and clearly defined, usage of project vehicles/chauffeurs (e.g. twice per month) by team members for conducting personal business (e.g. purchasing foodstuffs and supplies, medical appointments, etc.). In addition, the greatest need for personal-use transportation is in the first six months of a team member's contract in setting-up-house, but it is during this period that the team member is also least likely to have procured a personal vehicle.

- b) Provide continued support in developing a documentation and publications center at the station. During Mercy YAMOAHA's employment as the documentation coordinator over the past several months, she initiated the process of (i) cataloguing and organizing documents, (ii) getting staff papers into form for publication and dissemination as technical reports and (iii) ordering journals, books, etc., for the reading room. With Mercy's departure in October, this activity will likely terminate.

Part of what a project ought to provide is documentation and literature for use by research and extension professionals both during the project and after it terminates. Mercy's work not only should be continued but deserves the assistance of a TDY professional librarian or information specialist in establishing procedures for organizing a small library/reading room, setting up a cataloguing and check-out system and determining procedures for ordering documents and disseminating project technical reports. To be successful, emphasis should be placed on French-language documents, and the effort should complement and be coordinated with the library resources of ISAR and UNR.

Somewhat related to the documentation issue is that a mechanism needs to be devised to ensure that technical documents coming out of the project get some sort of peer review as well as an editorial review before they are disseminated. One team member expressed to me that systematically getting peer reviews is difficult since there is not a large number of colleagues to depend on as there might be in a campus faculty setting. This is substantiated by the fact that team members often rely on TDY personnel to review manuscripts for them during their visit. In addition to peer review is the necessity to have a close editorial scrutinizing to correct typographical errors, check sentence structure and spelling, etc. Whose responsibility this is has not been stipulated.

- c) Procure additional computer equipment. The arrival of new team members who are already computer literate, together with the marked increase of computer literacy among present team members (both expatriate and counterparts), has placed increased demands on the three microcomputers in the computer room at the station. During my stay all three workstations were frequently in use--typically one by the secretarial staff and two by team members.

One of the legacies that Malcolm MAYFIELD will leave behind him is that he was a catalyst in getting both team members and support staff to make increased use of the equipment and software. Team members are now in the habit of (i) using word processing to draft manuscripts and (ii)

employing spreadsheets to store data and do cursory analysis or graphics.

One proposed solution that surfaced during my TDY was to restrict access to micros on a scheduled basis, e.g., person A can use equipment between 8 and 10 a.m., person B between 10 and 12 noon, etc. This would be counterproductive because the time of day for doing computer work is whenever field work cannot be done. A suggestion of MAYFIELD's is that another AT-level workstation be added at Rwerere that is primarily a duplicate of the present AT with English keyboard and English software, including statistical packages. The present French PC could continue primarily as a secretarial-administrative unit, whereas the other English PC could be converted to a French unit by giving it a French keyboard and software. This would result in two French PC workstations (each minimally equipped with WORDPERFECT and 1-2-3) and two English AT workstations (each minimally equipped with WORDPERFECT, 1-2-3 and statistical packages). The more powerful AT's are needed to drive the English language SPSS and SAS statistical packages.

One additional need in the computer area is to repair or replace the present AT monitor, and in addition, I would suggest that an additional monitor be purchased as a backup to be used in the event of failure.

- d) Provide short-term academic training in economics for MUNYEMANA. During my initial TDY in July and again in September, I was impressed with the motivation of MUNYEMANA Augustin to develop an active program of research within the scope of the project. This is especially commendable because he was trained as an agronomist at UNR, yet his assignment at Rwerere is as an economist. He has developed proposals for and begun research utilizing both on-station and farmer-trials in which the major objective is to assess the economics of agroforestry and to determine farmer's attitudes regarding acceptance of this new technology. For some of this research, he is the primary investigator, whereas for other aspects, he is working in collaboration with other team members. Given that the major technological thrust of the project is agronomical in nature, it will be of special value to the project and ISAR to have an economist with a background in agronomy. Indeed, Augustin's desire to work closely with the rest of the expatriate team may prove to be the best example in the project of a true "counterpart."

I discussed the training issue with MUNYEMANA, BURLEIGH and Ashoka PAUL. It is preferable that the short term training of 4-8 weeks take place in either of the dry seasons (January-February or July-August) so that his field work and research program will be only minimally interrupted. Preferably, the training should include basic budgeting analysis, economic analysis of agronomic trials and some core topics of agricultural production typically covered in a microeconomic theory course (e.g., production function concepts, cost curves, and elementary marginal analysis). Linking this to statistics (such as response surface analysis using linear regression) would also be useful since he has training in statistics. Since the project is a FSR/E project, it would also be beneficial for MUNYEMANA to get at least some exposure to this way of thinking.

Although training sessions are available internationally that serve this purpose (e.g., CIMMYT, USDA), I believe that Ashoka PAUL's suggestion is preferable given the short planning horizon for making arrangements. This suggestion is to have MUNYEMANA enroll as an auditing student in agricultural economics at the University of Nairobi during January-February 1989. Subsequently, and depending on the long-term status of the FSRP project, additional training at one of the international institutes could be arranged at a later date. I have forwarded to MUNYEMANA a catalogue of short-courses offered by USDA to foreign agriculturalists. I have also contacted CIMMYT and provided Ashoka PAUL the name of the coordinator for CIMMYT training in Africa who is located in Nairobi.

#### **UNR, ISAR-FSRP Collaboration**

In their July 1988 TDY report, WAILES and PARSCH reported that a program of collaboration on special studies between UNR and ISAR/FSRP should be "developed as soon as possible." They also reported that a memorandum of understanding for collaboration on this project had been drawn up and subsequently signed by ISAR and FSRP, but that it had not been signed by UNR. During their TDY they travelled to Butare to visit with the UNR dean but were unable to make progress in finalizing the agreement.

Upon my arrival at the end of September, the memorandum of agreement had still not been signed, nor had any specific plans for collaboration or budget been developed. In the interim, Ashoka PAUL and Serigne N'DIAYE made two visits to Butare in an attempt to facilitate UNR's signature of the memorandum and to begin plans for potential collaboration on socioeconomic research. They were not successful in either attempt.

I am, frankly, confused on this issue and don't understand what the holdup is. There is budgeted money in the project for special studies, and I can't understand why anyone would be slow in signing a piece of paper to get their hands on it to conduct some interesting research while at the same time gaining some hands-on experience for students. Two students from UNR (Anaclet and Leonard) did spend three months (July-September 1988) at Rwerere as part of their training program, so at least some collaboration has taken place. In addition, UOA has sent two special studies graduate students (BREWSTER and MAYFIELD) to Rwerere to collect data for their respective M.S. theses. A proposal for collaborative socioeconomic research between FSRP, ISAR, UNR and UOA was submitted for review in December 1987 but was not accepted. The proposal was initiated by WAILES at the UOA and was entitled "Integration of Research Planning of the Farming Systems Research Program with the Rwandan National Agricultural Research Plans." The proposal included a two-year budget of 95,000 \$US of which slightly more than half (48,000 \$US) would support Rwandan researchers and materials.

During my TDY, I discussed the linkage issue with Boyd HANSON and Jim BURLEIGH in order to determine if I should actively pursue finalization (i.e., facilitate signing, planning, etc.) during my short stay. HANSON noted that BURLEIGH was pursuing this issue and suggested that I not proceed without consulting with BURLEIGH. BURLEIGH subsequently assured me that indeed he recognized his responsibility in pursuing the linkage issue but that he had not been able to arrange meetings to actually sit down with the relevant parties to finalize the process. What he felt was necessary was to develop a definite collaboration research plan with named collaborators and a detailed budget to get the linkage finalized. BURLEIGH intends to work this issue out during the month of October so that the process is underway before he is scheduled to travel abroad in November. In order to facilitate the process, he stated that he intends to ask ISAR and UNR to name appropriate representatives to deal with him on this issue. He suggested that potential candidates to serve as representatives would be TEGARA Pierre at ISAR and BIZIMANA Ignace at UNR. (N.B.: BIZIMANA has since begun Ph.D. studies at Nairobi).

#### **Status of MAYFIELD Intermediate-Term Research**

The rationale behind MAYFIELD's special study research together with its objectives and procedures are detailed in Appendix 2 of the July 1988 TDY report of WAILES and PARSCH, and, hence, they will not be repeated here. Whereas MAYFIELD's primary objective as a special studies student at Rwerere was to undertake and complete the field data collection in support of his own M.S. thesis research at the UOA, it was anticipated that he would also serve as an in-house resource in economics to N'DIAYE and MUNYEMANA, each of whom had just recently begun work on the project as socio-economists. My overall observation is that MAYFIELD met--if not exceeded--all of my expectations with regard to accomplishing his own research objectives as well as in serving as a valuable resource for other team members and staff support personnel.

Almost immediately upon my arrival at the station, it became evident to me that MAYFIELD's presence was appreciated by the many persons with whom he had contact during his stay. In addition to undertaking his own research, he (a) served as a critical sounding-board in discussing individual project research objectives, design and analysis with other team members; (b) provided elementary training in linear programming to N'DIAYE and MUNYEMANA; (c) co-authored several manuscripts with team members while serving as critic and reviewer on others; (d) provided support to Mercy YAMOA in initiating the organization of the documentation center; and, (e) provided informal training to both team members and secretarial staff in the use of microcomputers and software.

With respect to his own research, MAYFIELD's major task while in-country was to collect both agro-ecological and socioeconomic data in 81 fields on 45 farms in the four-commune area to supplement and extend the original data set developed by BREWSTER during season 1987A. This extension of the BREWSTER data set was deemed necessary in order to enable the redefining of selected socio-ecological classification categories and selected production variables; the estimation of bean response surfaces; the testing of alternative and more appropriate hypotheses relevant to recommendation domains and production practices; and the use of more discriminating statistical tests.

In addition to the key agro-ecological variables stipulated in the research design as being necessary to complete the data set (field altitude and field orientation), MAYFIELD collected additional data that will serve as a proxy for developing an erosion index. These data include field "conformation" or aspect (concave or convex), length of vertical run of field, number of terraces per field and slope of field. In addition, a ten-plug average soil sample was collected in each field and analyzed for pH at the Rwerere laboratory. These soil samples will be transported to the UOA for possible further analysis by prospective graduate students in agronomy.

Additional socioeconomic variables collected by MAYFIELD include whole farm size (which necessitated measuring the area of all fields per farm for a subset of the 45-farm sample), distance of field to rugo, distance of rugo to water/road/market and other information related to farmer collaboration with FSRP and attitudes towards acceptance of new technology.

MAYFIELD collected the above data by organizing--with the collaboration of MUNYEMANA--ten enqueteurs who conducted the actual field work. Seven of these enqueteurs had previously been employed by FSRP as enqueteurs in the BREWSTER research. MAYFIELD trained these personnel in the use of altimeters, clinometers, compasses and measuring wheels. These enqueteurs will now be retained by FSRP for conducting additional socioeconomic surveys under the direction of N'DIAYE and MUNYEMANA.

MAYFIELD will leave Rwerere on October 28 to return to the UOA. I anticipate that the computer work (data management, statistical analysis) in support of his thesis will be finished by early January. Enrollment in one final 3-hour course, thesis writing and thesis defence will consume most of the spring semester, which ends in early May. MAYFIELD has already been instrumental in getting the executive summary of BREWSTER's research into final form for dissemination as a technical paper in the FSRP series (the first draft of the French translation was presented to the FSRP team in October, and the final French draft is presently being edited at UOA). Several additional manuscripts (including the thesis) based on MAYFIELD's research will be forthcoming either during the spring semester or shortly thereafter. These manuscripts will be of a technical nature exhibiting socioeconomic research in an FSR setting. Although the results will relate solely to one food crop (beans) in the FSRP zone, the study will serve as a prototype for broader-based analyses of whole-farm systems.

### **Status of Socioeconomic Longer-Term Research**

In Appendix 3 of their July 1988 TDY report, WAILES and PARSCH presented a proposal for socioeconomic research to be conducted during the final year of phase 1 of the FSRP project. The purpose of the proposal was simply to express what they felt were important socioeconomic issues to be addressed while simultaneously providing assistance in the form of a set of guidelines for consideration by the new socio-economist Serigne N'DIAYE and his counterpart MUNYEMANA Augustin.

In essence, the proposal suggests a year-long (seasons A and B) survey of production/consumption activities of a sample of farmers in the FSRP zone. If conducted, this study would permit a descriptive characterization of production and consumption activities of producers in the area; the development of enterprise budgets for major monocrops and intercropping including yields, costs and returns; and the identification of agro-ecological and socioeconomic variables that have significant impact on productivity and give rise to different cropping systems and recommendation domains. Ultimately, the study would provide a generalized framework for a complete analysis of impacts of technology change on production and consumption patterns in the Buberuka Highlands using linear programming. It would also provide some of the data essential for conducting the proposed collaborative research with UNR ("Integration of Research Planning....") described in the section on collaboration.

Details of the study were not established in the WAILES/PARSCH proposal in order to provide the principal investigators the discretion and flexibility to implement the design based on their own expertise and training if they chose to undertake the study. Shortly after his arrival at Rwerere in mid-August, N'DIAYE expressed his intention to undertake the proposed study as principal investigator, and he began planning and design almost immediately.

By the time I arrived at the end of September, N'DIAYE was well underway in implementing the first stages of the study. He had negotiated with the MINAGRI agronomes de commune in the FSRP zone to obtain the services of 22 monagris for two days per week during the next year to conduct the survey. In addition, the 10 enqueteurs of MAYFIELD will also be used giving a total of 32 survey personnel. Bicycles, raincoats, boots and other supplies are being provided for each person.

In early September, N'DIAYE had conducted a pre-survey of 112 farmers from which he would ultimately choose the purposive sample based on a yet-to-be-determined stratification scheme. The pre-survey included questions on farm size, family size, adoption and source of new technology, land tenure, land use (crop mix), etc. Much of my interaction and that of MAYFIELD's with N'DIAYE was to determine the appropriate stratification scheme and sample size for the survey.

With respect to sample size, it was mutually agreed that the desired frequency and length of the sampling (twice per week per farm for approximately one year) necessitated tight control on the enqueteurs to ensure that both the quantity and quality of data collection would be maintained. In addition, although the 22 monagris are committed to work two days per week for FSRP, it is anticipated that their normal MINAGRI task of agricultural extension and their additional role as local contacts for government politics will likely limit their availability for conducting surveys during some periods of the year. Hence, each monagri will be responsible for conducting the survey on one farm whereas each enqueteur will be responsible for two farms, resulting in a total sample of 42 farms. Since each surveyor must transport himself on bicycle, it was estimated that each visit will require one-half day, thus employing monagris and enqueteurs one day and two days per week each, respectively, for the basic survey. Since the enqueteurs are already trained, they will be responsible, in part, for some of the quality control on the monagris and will serve as back-ups when monagris are unavailable. In addition, enqueteurs will be responsible for measurement of all agro-ecological variables (slope, altitude, aspect, field size) for the entire sample, thus effectively rendering them full-time employees.

With respect to sample stratification, N'DIAYE had initially decided to follow a bivariate stratification based on (a) a definition of agro-ecological zones (identified by Zalla in his August 1987 TDY report) characterized by parent soil, rainfall and altitude and (b) socioeconomic classes characterized by farm land area, family labor availability and animal ownership. After serious consideration, the use of agro-ecological zones was dropped due to the difficulty in being able to effectively identify parent soil material for each field in the sample. In addition, by selecting the sample over the four-commune area, the complete range of altitudes, rainfall levels and soil types would, at any rate, be represented. Hence, sample stratification will be by socioeconomic classes across the four-commune area. However, based on analyses of MAYFIELD's data at the time of my departure, socioeconomic classes may be reclassified by dropping animal ownership and by combining land area and labor availability into labor intensity (labor/ha).

One additional issue that was discussed was the design of the survey questionnaire that will be administered twice-weekly throughout the two cropping seasons. Questionnaires must (a) be clear to follow to avoid confusion for enqueteurs, (b) be concise, (c) minimize the amount of paper due to the large volume of data to be collected and (d) enable easy codification and computer entry. Although N'DIAYE has designed detailed questionnaires for the entire study, my own view is that they may not satisfy criteria a, b and c above. My own preference would be to see questionnaires that are more tabular in form, similar to those devised by BREWSTER for her survey.

When I arrived in late September, heavy rains had already fallen, and much of the land clearing and tillage for season 1989A had already been completed. Since the twice-weekly surveys had not yet begun, the data collected during this season will at best only partially reflect labor use and production practices for this cropping season. Hence, it may be that season 1989A will, in effect, serve as a pre-test for the survey and that collection of data for the season 1990A may be necessary to obtain a full year's data. Obviously, that will depend on whether the FSRP project is extended.

By mid-1989, N'DIAYE should have a quality data set on one and a half season's production and consumption practices, which should enable some statistical analysis, response surface estimates and enterprise budgets for major food crops grown. An extension of the FSRP project will ensure that a complete year's data can be collected, which will be valuable if broader-based studies using linear programming are to follow. To this end, a short-term TDY economist during the summer of 1989 will provide valuable backstopping to assist N'DIAYE in laying out the basic structure of the linear programming tableau and ascertaining any additional data needs. N'DIAYE has a great deal of motivation, and I believe that his training, personality and desire to work with the rest of the team will render him a valuable researcher in the project.

### **Other Socioeconomic Studies**

In addition to the MAYFIELD intermediate study and the N'DIAYE longer-term study, I will merely mention several other studies of a socioeconomic nature that are either underway or which have been completed. K.B. PAUL has recently submitted for publication as technical reports the final draft of two earlier manuscripts that include economic analyses. These manuscripts deal with bean seed treatment and treatment of a variety of grains before on-farm storage. MUNYEMANA has just begun a two-year, on-station agroforestry study in which he will undertake a comprehensive economic analysis that accounts for both benefits (increased fertility, value of poles for beans, green manure) and costs (increased labor, shading effect on alley crops) associated with this technology. In addition, both MUNYEMANA and N'DIAYE are working in collaboration with YAMOA and BURLEIGH to conduct socioeconomic surveys of a sample of farmers who are participating in on-farm agroforestry trials.