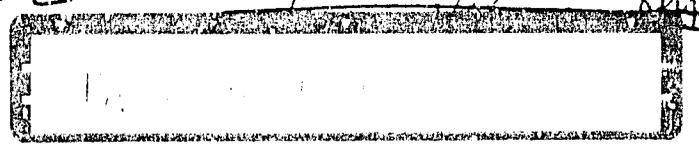


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2.5 Jim Dickey

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The Monitoring and Evaluation Unit of SOMIVAC,  
an Agricultural Development Project in  
Casamance, Senegal



by

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## List of Abbreviations

BCEOM	Bureau Centrale de Etudes pour les Equipments Outre-Mer
DEEP	Direction de Etudes de l' Evaluation et de la Planification
DTO	Direction Technique des Operations
EST	Equipe Systems et Transfert (ISRA/FSU)
FAC	(French) Fonds d' Aide et de Cooperation
FAO	Food and Agriculture Organization
FSU	Farming Systems Unit
IBRD	World Bank
ICRISAT	International Center for Research in the Semiarid Tropics
ISRA	Institut Senegalais de Recherche Agricole
MEU	Monitoring and Evaluation Unit
NCNW	(U.S.) National Council of Negro Women
OECD/DAC	Organization for Economic Cooperation and Development/ Development Advisory Center
PIDAC	Projet Interimaire pour le Developpement Agricole de la Basse Casamance
PRS	Projet Riz Sedhiou
SAFGRAD/FSU	Semiarid Food Grains Research and Development Project/ Farming Systems Unit.

List of Abbreviations (Continued)

SECID	Southeastn Consortium for International Development
SOMIVAC	Societe de Mise en Valeur Agricole de la Casamance

The Monitoring and Evaluation Unit of SOMIVAC,  
an Agricultural Development Project in  
Casaman, Senegal

Current Status

A. PIDAC

The objective of this activity was to provide monitoring and evaluation services within the DEEP, SOMIVAC, for the projects controlled by the SOMIVAC, in particular PIDAC, which is funded by USAID. The definition of monitoring and evaluation provided in the IBRD Agricultural Development Project Monitoring and Evaluation Handbook and in FAO Socioeconomic Handbook 12en on the same subject has been accepted. The situation in the DEEP had been that a series of consultants had proposed what data should be obtained but no one had proposed a system which would enable the data to be obtained, verified and analyzed in a timely fashion. That is, a system that would provide the results of one season in time for them to be used in making decisions on the program of the next season. Indeed in Africa, and as far as is known in other developing countries, this had never been done and, on the average, it took three years for the results of the first year's data to be available.

Based upon the results of the Purdue West African Projects (Afr Contracts 1257 and 1258) and the subsequent experience of the SAFGRAD/FSU contract with Purdue, a concept of what is needed for the rapid analysis of FSR data and MEU data was developed. This was implemented by using a series of field encoded survey forms, a group of microcomputer programs, and the microcomputers on which the programs would run. At the initiation of this activity there were certain gaps in the programs, particularly in the aggregation of data from different survey forms, which were overcome by Mr. T. Whitney by writing suitable programs. The system is now complete but some analyses take an excessive amount of time; this can be overcome by using a hard disk and, perhaps, a "speed-up" modification to the TRS-80 Model III\* microcomputers. If it is desired to use any other make of computer\*\*, the key programs would have to be rewritten and debugged, or a new set of programs would have to be

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\*Or the recently announced Model IV.

\*\*Except the so-called "look alike" makes like LNW that uses the same program.

found and adapted. This could take a considerable time and effort; the basic packages NEWDOS 80 2.0 and Wolenik's STATPAK (now marketed as MAXISTAT) took several man-years to write and the additional programs and modifications have been developed over two to three years. So conversion to another microcomputer should not be undertaken lightly and is likely to cost very much more than changing to the TRS-80 Model III (or Model I) on which the package of programs will run without modification.

The microcomputer system was established in Ziguinchor in the latter half of December, 1981 after a senegalese (M. Andre Dieme) had received six weeks training in Basic II and disk operation, at Purdue, given in French. During this training the pupil was lent a TRS-80 Model I to install in his residence so that he probably worked 60-70 hours a week on the computer. Mr. Len Malczynski brought in the two Model III microcomputers, a Sola Voltage regulating transformer (220V 50 cycle-110V) an Epson 80 printer and supplies. Programs supplied included NEWDOS 80, 2.0, STATPAK, VISICALC, Tandy's Advanced Statistical Applications package, and Purdue's Ouagadougou (SAFGRAD/FSU) programs.

A small computer center was set up with air conditioning and a second computer programmer/operator sought; M. Doudou Fall was identified. The two programmer/operators were then trained in the use of the programs for entering, verifying and analyzing data. Some of the current research activities of the DEEP were used as a vehicle for training. Mr. Malczynski also offered instruction and advice in the design of survey forms and in Basic II computer language. As a further element of the training and to ensure understanding the programs, all the necessary programs were translated into french; these were provided to the FSU and ICRISAT in Upper Volta.

There was an administrative delay in the arrival of Mr. Tom Whitney, who was to start the monitoring and evaluation unit. He met Mr. Malczynski in Dakar in mid-April and reached Ziguinchor on April 26, 1982. He immediately started work; first he reviewed the studies which had already been made and became familiar with the organizations of the SOMIVAC, the DEEP and PIDAC. Contact was made with ISRA/FSU, the SECID team in Ziguinchor and representatives of the National (U.S.) Council of Negro Women (NCNW).

There was no baseline data to indicate the situation in the PIDAC zone before the project started. This makes difficult the conduct of an impact study with estimation of the effect of the changes introduced by the project.

There was not enough time for the conduct of a preliminary study to identify relatively homogenous zones on the basis of ethnic groups, climate, topography, soils, moisture regimes, and quantity and quality of water for irrigation. A provisional classification was made in the first two weeks of May based on discussion with the FSR team of ISRA, the Harza team, and, of course, the staff of PIDAC at the headquarters, the departmental office (Bignona), the zones, and in the villages. This also provided an opportunity to visit some of the villages and the farms.

Five villages were selected in four arrondissements to provide average and not exceptional agricultural production, average size villages with some farmers "encadre" and some not. Some villages were close to urban centers and others were not. Two villages were selected for in-depth studies in a sample of 48 farmers, to include labor times, for farm and nonfarm work, family budgets and records by field of the work done, the inputs and the outputs. Three other villages were selected for a more extensive survey of 53 farming units, without labor times and family budgets. Appropriate contacts were made with the village administration and leaders.

At the same time, an examination was held for selecting the 10 interviewers, who were then given a three week training course. As part of this course, the interviewers conducted a complete census of the population of the five villages. Based on the census, the farming units were identified and classified into three groups by the "degree of encadrement." The sample to be surveyed was chosen at random from the three classes by the village chiefs and the elders. The interviewers were installed and ready to start on about June 13, a month and a half after Mr. Whitney's arrival in the Casamance; this was an extraordinary accomplishment and one that should not normally be attempted.

The seven interviewers finally selected were able to do a more detailed demographic survey of the 101 farming units under study and to do a field census of each farm including soil type and field history. Data were obtained on the 1982/83 farm operations which had already taken place, mainly clearing of the crop residues for the fields.

Meanwhile, the questionnaires for all of these surveys were discussed with the staff of the DEEP and PIDAC, and were revised, reproduced, and distributed. The questionnaires were of a self-coding or field-coding type and the completed forms were returned to Ziguinchor for entry on the microcomputers, verified to correct errors in coding, and stored for future analysis.

When the major part of the campaign was over, an extensive survey of 2,000 farming units was conducted in 43 villages selected from the 500 villages in the PIDAC zone. This will provide information on the adoption of themes, ethnic group, size of family, number of active workers, crops grown, etc.

The programs supplied with the microcomputers included certain additional elements for survey analysis provided by Purdue. Mr. Whitney had to write some other program elements to permit aggregating the data (daily data into weekly data and data from one survey form with data from another). The set of programs now available is sufficient but needs a "speed-up" to shorten the running time in the analysis of large amounts of data. This may be done by a combination of several techniques, use of a "hard" disk with a large storage capacity, compiling the program in the memory so that it will run faster, and speeding up the 'clock' that controls the speed of operation of the microcomputer or getting a Model IV.

The analysis of the PIDAC survey for the 1982-83 program is expected to be completed by May 6, 1983.

Arrangements have also been made to incorporate parts of the survey needs of the USAID/PIDAC health survey into the work schedule of the PIDAC under NCNW evaluation interviewers. The demographic surveys and censuses will also be used in the health survey. In addition, a food consumption survey will be made in a limited number of households and the data analyzed on the microcomputers. The PIDAC evaluation staff will also help in setting up meetings to weigh and measure children in the villages. These data are also needed as a social indicator\* for the PIDAC evaluation to see whether the well-being of the children in this respect is associated with farming units that follow the themes extended. This activity has been delayed until the 1983/84 season because the contract between USAID and SOMIVAC is only now being signed.

\* See Morris, M.D. Appropriate Indicators of Social Progress in the Sahel, OECD-Club du Sahel-CILSS, 1982.

B. Other Activities

The scope of work of Mr. Whitney also included giving assistance to the evaluation unit of the PRS and to the BCEOM (FAC) survey. It was decided to use the same set of questionnaires in the BCEOM survey as in the PIDAC evaluation survey. Mr. Whitney worked closely with the agronome in charge of the BCEOM survey including making trips to the field to help in supervision and to verify preliminary results. The survey data has been encoded and verified and the analysis has been started.

It was decided to make a smaller scale survey this year in the PRS region to study the use of the recommendations and themes in a sample of 90 farm units. Mr. Whitney developed the questionnaires used and made two trips to Sedhion to help in training the interviewers and in setting up the sample. The data are now ready for analysis. An extensive survey of 2,000 farmers is now being run and will be analyzed later.

Several other groups seeking data from the SOMIVAC are referred to the Monitoring and Evaluation Unit for information.

Meetings have been held with the DTO to improve the quality of data gathered by the extension workers. The proposal is to reduce the number of farm units on which the extensionist keeps dossiers to 12-15 rather than the 2-300 units representing all the farmers "encadre". This would enable the extension workers to spend more time working with the farmers on the themes and in the fields.

Mr. Whitney has also met with the staff of the DEEP to discuss future data needs and who should gather the data, in what form and when. These meetings obviously should include the staff of the DTO and of the individual projects.

Discussions have also been held with Miss M. Gadbois (SECID) to develop the basis for collaboration with the Project on the Permanent Regional System for the Collection of Agricultural Statistics which she has proposed (Nov., 1982) to the SOMIVAC and to USAID for financing. It is proposed that with some additional equipment to increase capacity cooperation will be achieved in analysis and also cooperation in the sampling of the units to be surveyed will permit more efficient use of interviewers of the statistical service.

Mr. Whitney has two counter-parts, one from PIDAC and one who is the director of the BCEOM (FAC) survey. In addition, he has a colleague in the DEEP who is responsible for monitoring and evaluation.

## 2. The Effectiveness of the Monitoring and Evaluation System

The system followed in the PIDAC has three levels of survey:

- i. intensive input/output survey with labor times and family budgets,
- ii. intensive input/output survey without labor times and family budgets,
- iii. extensive survey of 2,000 farming units.

This will provide an effective evaluation system for the PIDAC project within the guidelines of the FAO and IBRD handbooks.

The monitoring phase, recording the delivery of inputs, and the activities of the farmers who are members of the village groups is currently undertaken by the DTO and the extension workers.

It is true that no baseline study was made before the program of PIDAC was started. However, this is an error that is commonly made in development projects and that in this case can never completely be overcome.

It will not be necessary to study the detailed labor utilization or family budgets every year. This is not proposed for the 1983/84 campaign.

One element that is not called for in the handbooks on evaluation (IBRD and FAC) but which is a valuable indicator of the non-monetary effects of a project on the farm families is some form of social indicator.

In a study for the OECD/DAC, Morris\* reviews the possible social indicators. In the short run, weighing and measuring children under five or six years old seems to provide the only suitable indicator. The hypothesis is that the percentage of children below the accepted norm will decrease as the welfare of the families increases under the influence of the project.

In the longer term, infant mortality also serves as an index or indicator. However, the official statistics in the Sahelian countries are not adequate to reflect changes in this (according to Morris) and so it has to be obtained from survey data from the project zone.

In the PIDAC evaluation, the weighing and measuring of children was planned, but to avoid duplication, it was proposed to do it under the USAID/PIDAC/NCNW health activity. The contract for this activity is just being signed and so in 1983 the monitoring and evaluation surveys will include a once-a-week food consumption study (by weight) for selected families - plus weighing and measuring of children in the village.

\* See footnote p.4.

The reports of the 1982/83 PIDAC campaign will be available by the end of the first week in May. The analysis has been done on the MEU micro-computers with no external assistance. The basic system is clearly effective but there is currently duplication of effort between the "encadreurs" (extension workers at the village level) who spend most of their time completing the data in their notebooks (cashiers de suivi) on the activities of the farmers, rather than working to improve the dissemination of the themes which work and discussing with the farmers the themes which do not work.

The data which comes out of the existing MEU surveys include:

1. Agricultural statistics,
2. Monitoring data on use of inputs and its timing,
3. Farm management data for farm planning, project design, impact analysis, etc.,
4. Rate of adoption of the themes,
5. Themes which are adopted and class of farmer that adopts, cost/benefit analysis,
6. Themes which are not adopted and the reason why.

Item 1 will be done with collaboration with Miss Gadbois and the Regional Statistical Service.

Item 2 requires closer cooperation with the DTO and the extension service to avoid duplication.

Item 3, the farm management data, will serve as a basis for the DEEP in its economic analysis and in the design of new projects and activities. This is also of interest in project evaluation.

Item 4, the rate of adoption of the themes, together with items 5 and 6 on the themes which are and are not adopted, provides the basic information for the selection and prioritization of the themes, a matter for discussion between the DEEP, DTO and Training departments in the SOMIVAC and the projects. It is also, of course, important for evaluation of the projects.

Item 5 serves to help extension in the direction of the program to promote the appropriate themes to the appropriate group of farmers.

Item 6 provides information for discussion with ISRA, particularly with the FSR program, on what should be done to make the themes, which are not now being adopted, acceptable to farmers. These themes can be recycled through the FSR to the appropriate section(s) of ISRA.

To these items will be added in 1983/84 a social indicator, with which it should be possible to verify some of the improvement in social well-being induced by the projects.

It must be emphasized that for the MEU to be effective, the results of its work must not only be available in report form but must also have an effect on the conduct of the project, research on new and improved themes, and in the design of new projects. In the conduct of the project, the MEU data should provide information for planning the campaign, preparing the tables for the planning document and the reports, etc.

Information should be freely exchanged between ISRA/EST (FSR) and the MEU to the benefit of both units.

In order to facilitate the utilization of the MEU results and to ensure that its surveys satisfy the needs of the various departments and institutions an organization has been proposed for the MEU including a steering committee with representation from these departments and institutions.

### 3. Problems Encountered in Establishment of the MEU

The problems encountered in setting up the MEU include:

- a. a late start with Mr. Whitney reaching Ziguinchor on April 26, 1982,
- b. problems of cash for paper, ink, stencils, and other supplies, and, at times, for paying the interviewers,
- c. lack of a vehicle provided by the project and sometimes a problem in getting fuel coupons,
- d. need for a reserve computer operator; those tested for the job were not satisfactory,
- e. programming problems with the microcomputers, which were resolved by Mr. Whitney.
- f. the microcomputers are slow in doing manipulations on large quantities of data. Use of improvements in the programs, a 'hard' disk, and a speed-up of the microcomputer's 'clock' would ameliorate this; alternatively a hard disk with a TRS-80 Model IV with the timesaving MEMDISK feature and compatibility with Model III programs would work.

- g. as expected there have been some minor difficulties with definitions: farming units are based upon decision making powers but 'encadre' has been defined as a member of a village producers group regardless of the adoption of the themes promoted by extension. In fact, some farmers who do not belong to the groups adopt some of the themes and others who do belong adopt none of the themes. There is also a question of defining the difference between irrigated rice and rainfed rice, which is not as simple as it sounds,
- h. the yields based on crop-cutting on small squares selected at random is known to overestimate yields. Correction factors are needed to overcome this overestimate.

4. Recommendations for Improvements and for Institutionalization of the MEU

1. The MEU requires an establishment of trained people and a separate budget and transportation to assure a continuous and efficient operation. This will avoid shortages of office supplies, lack of fuel for supervision of surveys (e.g., PRS in 1982/3), and transportation (to replace 'la vieille dame', Citroen Ami 8). The staff of the MEU should include:

- a. an agricultural economist with knowledge of statistics for survey design and analysis,
- b. an agronomist, with knowledge of farming systems,
- c. a sociologist, with knowledge of the sociology of the farming and of the anthropology of the population of the region.

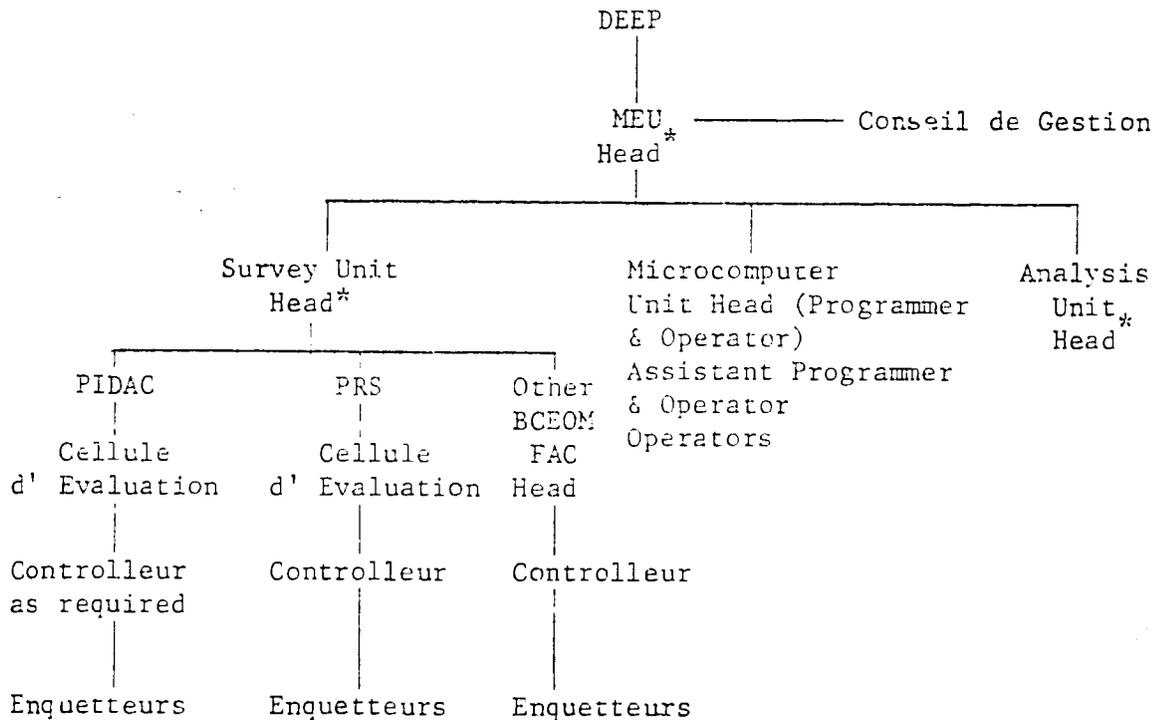
The MEU requires sufficient interviewers, probably supplemented by part-time help during the season for measuring the fields and cutting the yield plots. It also requires controllers for each zone to be surveyed. The controllers and the interviewers need suitable means of transportation and the parts, tires, etc., to maintain their transportation.

The MEU requires at least one person capable to operate all of the necessary microcomputer programs and to write simple modifications of these programs as required. This person should also be able to train computer operators as required. He/she should be capable of doing the analyses required by the technicians of the MEU and other agreed users of the computing center. An assistant programmer and one or two computer operators are required.

The analysis of the surveys should be directed by a technician familiar with the analytical procedures and also with the agriculture. This would normally be an agricultural economist.

PIDAC is expected to have a substantial "Field Trials Component" with a "Chief of the Trials Unit" financed under the USAID project. The analyses of these trials, when they start, would create a new activity for the MEU. Collection and analysis of the trials data would add an important source of information for the DEEP.

The MEU needs an advisory council consisting of its three technicians, the head of the microcomputer unit, the director of the DEEP and his counterpart; and representatives from the offices of the director-general, the DTO, training, and each of the projects, and ISRA/EST, ISRA apart from EST and perhaps the regional statistical service. This group should decide on the general lines of the program of the MEU each year and discuss the results obtained. The organization might be as below.



\*The head of the MEU and the Survey and Analysis Units will be the three "A" level cadres, the agricultural economist, the sociologist and the agronomist. The head of the MEU might be able to serve as the head of one of the units. The head of the microcomputer unit could be a "B" level cadre; a "cadre de conception" is not needed in this position.

2. Since the MEU will be doing work on project design and will provide data to monitor and evaluate any new agricultural development project, it should be included as a line item in any project design funding and in any funded project. This funding should cover recurring costs appropriate to the work and capital items as required, particularly for expansion of services; this should include transportation and increase in computer capacity. There is a budgetary problem now that the MEU is largely financed by USAID, whose major interest is in PIDAC. While PRS has little funding, the BCEOM/FAC survey presumably has a budget for transportation and for data entry and analysis of the survey which is being done by the MEU from its own budget.

Only by receiving funds from line items in future budgets will the MEU reach a sustainable situation to continue work after the USAID/PIDAC funding is ended.

#### Microcomputer Problems

The two microcomputer are now in use for over 40 hours a week on average. Their capacity needs to be supplemented in ways:

- a. A third unit should be added in June/July (after Mr. Whitney's leave in the U.S.) as a reserve unit and for use in doing analyses when the other two units are being used for entering data. A TRS-80 Model IV is recommended for the following reasons:
  - i. it is fully compatible with the Model III, their data disks and all of the existing programming,
  - ii. it has a similar keyboard to the Model III and so will not be confusing to operate,
  - iii. it has a third more 'readily accessible memory' which can be expanded to over double that of the Model III and it operates at a faster speed than the Model III.
- b. A "hard" disk should be added, with the third unit, capable of storing a much larger amount of data to facilitate the analyses of large surveys and of intensive surveys with a lot of data. An external hard disk is recommended for flexibility; that is it could be easily used with the existing computers. An internal hard disk could not easily be used with the existing computers.

It would cost the project about \$2,200 with the two double sided disk units and 128K Readily Available Memory. A hard disk with the necessary controller would cost about \$2,500. An extra voltage regulating transformer is needed. An additional printer is not required at the moment.

- c. It is recommended that "flippy" disks be used in the future; that is disks on which both sides can be used. This involves cutting notches and hole in some of the existing disks to permit use of both sides. The equipment to do this has been loaned to the MEU. In future flippy disks should be purchased.
- d. A diagnostic program should be provided to permit testing of all the components of the system. This would cost about \$100 and be usable on all of the microcomputers.
- e. the possible application of PROFILE III a data base management system for TRS-80 Model III should be studied at Purdue preferably by Len Malczynski. The program was purchased by Miss Gadbois, SECID.
- f. The programs now in use for data entry, validation and analysis should be reviewed at Purdue to reduce the running time required for the programs. This has been specifically requested on one of the Purdue programs, BREAKDOWN.

### Training

The training needs were not discussed fully. Currently Mrs. Fatou Traore Badji is at Purdue on long term training, which would satisfy the needs of the agricultural economist-statistician. However, her training is not scheduled to end until the end of CY 1985. This is too late to fulfill the needs of the agricultural economist position. Since no agricultural economist has been recruited for the MEU (to replace Mr. Whitney) it is not possible to say what further long term training is needed.

Short term training is needed by the programmer (Mr. Dieme) and his assistant (Mr. Doudou Fall), both of these need more training in micro-computer programming. The needs for short term training of the PIDAC statistician (Mr. Kiebe) seem to be taken care of by SECID. The training needs for the agronomist and the sociologist need to be worked out.

5. Sustainability of the MEU

There are four major aspects of the sustainability of the MEU:

- i. Budgetary sustainability,
- ii. Sustainability in personnel,
- iii. Sustainability technically in the quality of the work,
- iv. Sustainability of the microcomputers.

i. Budgetary sustainability could be obtained by line items for monitoring and evaluation in each of the funded projects of the SOMIVAC and for project design assistance in each grant for preparation of project proposals. It is generally not reasonable to expect one donor to fund an activity related to the project of another donor without a definite prior agreement. Most donors are happy to contribute funding for the monitoring and evaluation of their projects if they can be shown that it can be done in an effective and timely way.

ii. Sustainability in personnel requires that the personnel be paid well enough to hold them in their jobs; this is normally done, except in certain cases which were discussed with the DEEP. Sustainability also requires that the personnel seconded to the MEU be left to work for the MEU and not be used for the continuous flow of urgent (fire fighting) activities in the DEEP. Monitoring and evaluation requires continuous attention and supervision and cannot produce quality results on an on-off basis.

iii. Logistically, it is doubtful that the MEU can continue\* after the departure of Mr. Whitney (say in April, 1984). It may not and it should not require a full time expatriate technician but it will require an expatriate to ensure that the MEU is kept running on time; that its capacity is not diverted to put out brush fires making it unable to attend to its own responsibilities; that supplies are provided on a timely basis; that transportation is available when needed; and that the reports come out on time and based upon the data and not just upon ideas.

iv.(a) The sustainability of the microcomputers depends upon an ability to keep them and the ancillary equipment (printers, external disks, etc.) running electronically. This requires a system of diagnosis and funds for repair and overhaul (particularly of moving parts such as disk units and printers).

The components are rather low in price in the U.S.A. (\$200 for an internal disk drive unit; \$475 for an Epson 80 printer). However, the overhaul of a disk unit or a printer might only cost \$50 with parts. The

\* Without expatriate assistance.

equipment has proved quite rugged and reliable as long as the correct voltage is used (i.e., with the existing voltage regulating transformer). A budget for maintenance is required, which can pay bills in dollars. Ultimately, the equipment will either become unreliable or obsolete. Since the cost of the current system microcomputers and printers is only of the order of \$5-6,000, funds should be budgeted to replace it perhaps after five years of use. It should be considered like a vehicle, i.e., needing replacement at intervals. Experience to date indicates that given reasonable care the life expectancy is greater than five years. Since this is the length of time for which the current generation of microcomputers has been available, it is not possible to predict how much longer they will last.

If it becomes necessary to replace them, a choice will then have to be made on the appropriate model to select given the "state of the arts". It is reasonable to expect that advice will have to be sought outside the project in making this choice.

iv.(b) Program-wise the MEU has or will have an adequate set of programs at the time of Mr. Whitney's departure. That is a set of programs that will enable the MEU to accomplish its role at that time. Depending on the capacity of the programmer left in charge, it may be necessary to have a "hot-line" service available, capable of replying to requests for information on programming problems at short notice (e.g., if the micro-computer will not do what is expected) or at longer notice, if the needs of the MEU change and some new program or programming is required. It is generally easier, quicker, and cheaper to buy a ready made program, if available, than to attempt to write it.

In time, it is expected that USAID/Washington will recognize the need for the "hot-line" and other forms of backstopping and either provide it in-house or by a contractor or contractors. Until that time projects and AID missions will have to make their own arrangements for people to be available to answer telexes or even telephone calls for assistance, as well as getting assistance in response to letters. Universities and their staffs that are involved in a series of projects all requiring backstopping on microcomputers used in FSR and in MEU's would be a first place to look.

There is really little probability that projects without people having access to the literature and to the manufacturers of the equipment can keep up to date in this area. Experience has shown that it takes several

years before expertise in the private sector in African countries can maintain and repair the models of microcomputers, which they sell, let alone provide broader advice on computing systems and programs available.

It should be noted that the trend in the U.S. is towards newer central processing units handling 16 or even 32 bits of information at a time, compared with the eight in the TRS-80 Model III and IV. In fact, a unit is on the market (Merlin at about \$1,200) to provide the Model III with two 16-bit processors and up to over five times the readily accessible memory. There is also a trend towards "interactive" programs, that is a series of programs that will accept data directly from each other. In the case of the MEU at SOMIVAC it has a data base management program that is interactive with its "spread sheet" program VISICALC.

#### Modeling and Other Economic Tools

The cadre of the MEU and other members of the staff of SOMIVAC or its projects may wish to undertake mathematical modelling of different "type" farms to identify constraints, costs and benefits from adoption of new themes and similar purposes. This work should not be done at the expense of the more simple analyses that are necessary for the MEU and the DEEP.

At the outset of this MEU activity in 1981, it was thought that this type of work would have to be done with outside assistance (e.g., in the U.S.A.). However, it is now quite possible, if the need arises, to obtain programs to do linear programming or econometric analyses that will solve quite large, and certainly adequate sized problems, on the TRS-80 Models III or IV.

This is not to be construed as a recommendation to acquire these programs, but an indication of a possible extension of the capability of the MEU or the DEEP if need arises. Until that time it is recommended that these programs should not be sought.

Summary and Conclusions

The Monitoring and Evaluation Unit is in place and operating. It has undertaken appropriate monitoring and evaluation surveys intensively on 101 farms in five villages and extensively on 2,000 farms in 43 villages in the PIDAC project area. It assisted in the design of the surveys for a similar sized operation in the PRS and also for the BCEOM/FAC survey. About 95% of the data have been entered on the microcomputers and corrected. Some of the forms from the 2,000 farm survey in the PRS region are yet to come in. The analyses of these data will all be largely completed by May 6, about one year after the MEU technician arrived in Ziguinchor. This is a truly remarkable performance. It has typically taken about three years to get the analysis from this type of survey.

The effectiveness of the MEU, however, also depends on the utilization of the results of the surveys for improving the projects, identifying the themes which are not being accepted and the reasons, estimating the costs and benefits from the themes which are being accepted, and providing data for evaluation and estimating the impact of the project and for the design of new projects. In order to accomplish this and to institutionalize the MEU, within the DEEP an establishment and a "conseil de gestion" have been proposed. The staff of the MEU will have to be excluded from the urgent (firefighting) needs of the DEEP.

The MEU needs an agricultural economist/statistician, a sociologist, and an agronomist seconded to it full-time. It needs a head of the micro-computer section, perhaps at the B level. It also needs an autonomous budget and transportation readily available. The other cadre are present. An additional computer operator is also required.

Sustainability will be attainable after one more year of service of the MEU expatriate technician if some assistance were available from the counterpart of the director of the DEEP and if the independent budget and transportation are available.

It has been recommended that a Model IV TRS-80 microcomputer with a hard disk be added to the unit, this would require another voltage regulating transformer but not another printer.

For future financing, new project design activities and new monitoring and evaluation activities will need to carry budget items for the operation and equipping of the MEU. For example, if the 1980/81 and 1981/82 data from the PRS are to be analyzed, funds will be required to encode the data and to enter it on the microcomputers.

The procedures of the MEU should be written up for use as a future guide, but the scope of the surveys should be reviewed from time to time by the "conseil de gestion". The director of the DEEP and his staff may have to restrict demands on the MEU to a feasible level.

There needs to be a close collaboration between the DEEP and the MEU with ISRA/EST (FSR) which is being accomplished through the SECID and Michigan State teams.

There also needs to be a close collaboration with the Regional Office of Statistics, which is being assured by Miss Gadbois, SECID.

The training needs for the MEU need to be reviewed.

Annex A sample of results from the PIDAC surveys by the MEU, 1982/83

The following figures and tables indicate the types and forms of the results of the MEU surveys. There are analyses of statistical significance and regressions which have not been included. The results will come out in the official reports.

Table A1 Pre-plant land preparation, Village of Diagonour

	Crop					
	Peanuts	Rice Irrigated	Plateau	Millet	Sorghum	Maize
No tillage	0	0	0	1	0	0
Ridges by hand	3	0	0	1	1	9
Ridges by plow	2	0	0	15	8	3
Flat by hand	2	17	89	0	0	0
Flat, plowed	14	0	0	0	3	4

Table A2 Planting system used, Village of Falmeré

	Crop					
	Peanuts	Rice Irrigated	Upland	Millet	Sorghum	Maize
Transplanted	0	1	2	0	0	0
Rows by hand	20	2	6	0	0	0
Broadcast	0	61	70	0	0	0
Hills by hand	0	0	0	8	5	21
Rows with Seeder	2	0	0	0	0	0

Table A3 Average yields of crops in 5 villages, Basse Casamance

	Peanuts	Crop			Sorghum	Maize
		Rice Irrigated	Upland	Millet		
Kaken	1504	1347	1586	440	400	917
Djimandé	753	1299	—	—	200	1054
Karongué	1531	2143	1900	—	—	1890
Diagonour	1284	1369	1452	342	79	939
Falmeré	1249	2408	2074	241	70	571
Average	1290	1741	1692	361	—	1021

Table A4 Irrigated Rice Yields by Variety, Village of Falmeré

	Variety							Average
	Local early	Local late	IR8	144B9	Aiwu	Ablaye Mad	N'diama	
Kg/ha	2411 (54)*	—	3200(1)	2000(1)	2000(1)	2480(5)	2150(2)	2408(44)

\* Number of fields.

Table A5 Irrigated Rice Yields by use of manure and planting date, Kg/ha.

	Manured		Planting date	
	Yes	No	Before 7/20	After 7/20
Falmeré	—	2408(64)	2451(41)	1533(3)
Diagour	450(6)	920(10)	1125(4)	617(12)
Karongué	2166(64)	1667(3)	2314(35)	1541(33)

Table A6 Farm Household Population

Arrondissement	Total residents	Farm workers			Migrants	Total workers <sup>1)</sup>	Resident/farm worker ratio
		Men	Women	child 7-14			
Tenghony	11.0	2.8	3.1	2.1	0.7	8.7	1.26
Tendouk	8.0	1.8	1.9	1.8	1.0	6.5	1.23
Diouloulou	8.9	2.3	2.5	1.7	0.7	7.2	1.24
Sindian	9.8	2.6	2.7	2.0	0.2	7.5	1.31
Niaquis	8.8	2.2	2.2	1.7	0.0	6.1	1.44 <sup>2)</sup>
Nyarsia	5.3	1.4	1.6	1.2	1.3	5.5	0.96
Louidia Lulol	5.5	1.8	1.6	1.0	0.3	4.7	1.17
Kabroussé	4.9	1.4	1.2	0.9	0.3	3.8	1.29
Est de Casamance	8.0	2.1	2.2	1.6	0.6	6.4	1.25

<sup>1)</sup> Total workers includes migrants.

<sup>2)</sup> This ratio is high because the fishermen did not do any farm work and so are not included as workers.

Table A7 Cropping Patterns in Basse Casamance

Arrondissement	% of farmers growing				
	Peanuts	Low Rice	Upland Rice	Maize	Millet or Sorghum
Tenghory	85.7	81.1	19.9	62.2	73.0
Tendouk	49.6	99.3	22.7	45.2	19.5
Diouloulou	74.6	99.2	62.3	79.6	25.4
Sindian	93.6	45.4	65.6	53.2	83.7
Niaguis	60.5	64.3	9.3	89.1	79.2
Nyassia	13.7	99.2	10.7	3.1	0.8
Loudia Oulof	10.5	100.0	17.9	0.0	0.0
Kabrousse	17.3	92.9	20.4	4.1	3.1
Basse Casamance	54.5	84.0	30.2	46.0	38.8

Table A8 Ownership of farm machinery

Arrondissement	Percent of farmers owning				
	Plow	Cart	Seeder	Hoe Sinc	Peanut lifter
Tenghory	43.9	27.0	17.9	2.0	1.0
Tendouk	2.5	2.2	1.0	0.7	0.4
Diouloulou	30.2	31.6	4.5	11.5	0.3
Sindian	36.9	28.4	21.3	6.0	0.4
Niaguis	3.2	4.0	0.8	0	0
Nyassia	0	1.5	0	0	0
Loudia Oulof	0	0	0	0.4	0
Kabrousse	0	0	0	0	0
Basse Casamance	11.5	12.5	11.7	2.0	1.0

Fig 1 Karen village, distribution of operations by 2 week periods

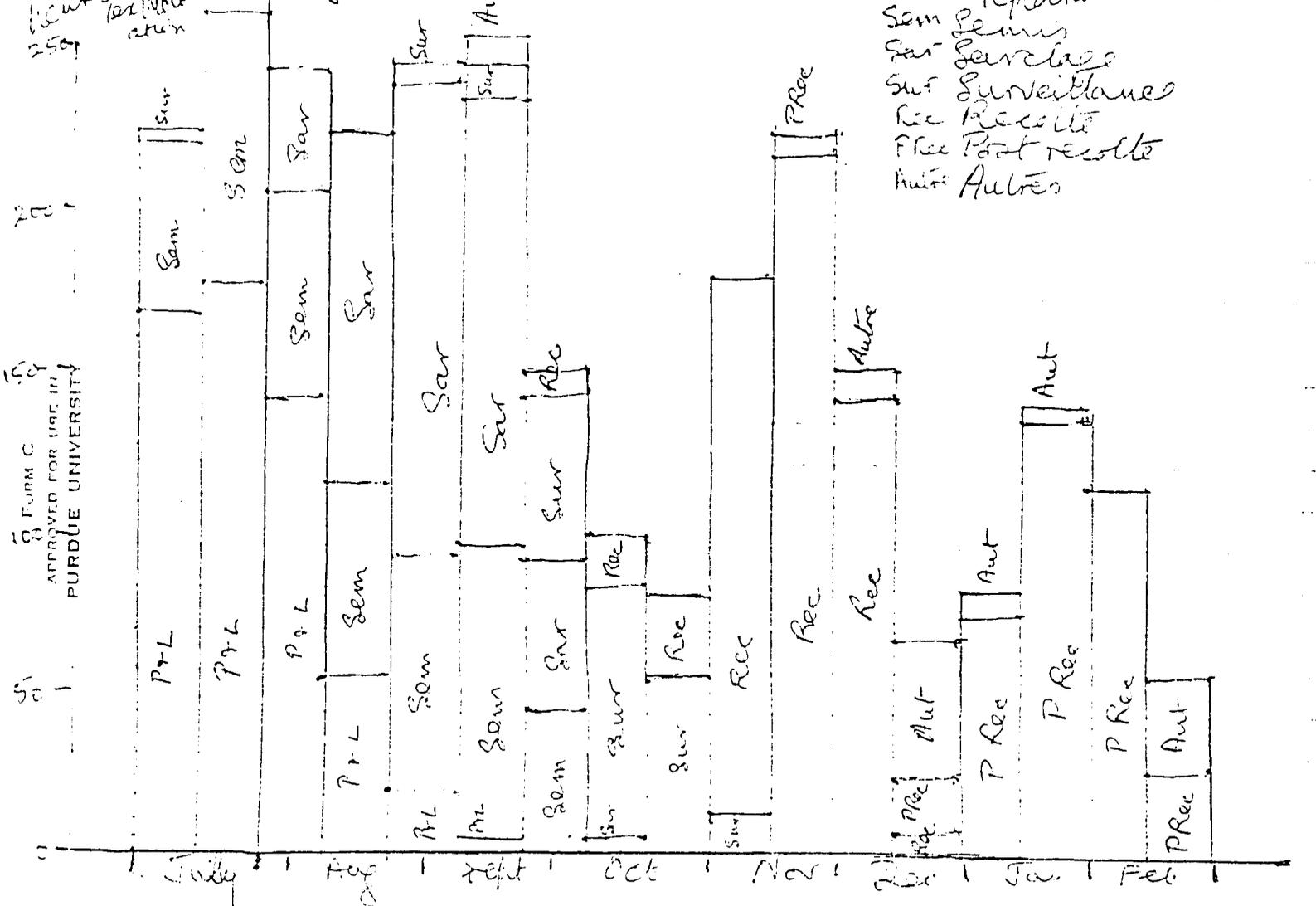


Fig 2 Djimante village, distribution of operations in 2 week periods

