

**PURDUE UNIVERSITY**

**International Education and Research**

**International Programs in Agriculture**



**PORTUGAL UNIVERSITY  
INSTITUTES  
DEVELOPMENT PROJECT**

**(Contract AID/NE-C-1701)**

**REPORT ON  
SHORT-TERM STAFF ASSIGNMENT**

**Submitted by  
DR. SYDNEY C. JAMES  
Agricultural Economics Department  
Brigham Young University  
Provo, Utah**

**May 14 through June 18, 1984**

PDAAC 080

PORTUGAL UNIVERSITY INSTITUTES DEVELOPMENT PROJECT  
(Contract AID/NE-C-1701)

REPORT ON  
SHORT-TERM STAFF ASSIGNMENT  
AT THE  
UNIVERSIDADE DE EVORA (UE)  
EVORA, PORTUGAL

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## FORWARD

My final report is divided into the following categories:

1. Scope of Work
2. Itinerary
3. Report of accomplishments
4. Conclusions and recommendations
5. Acknowledgements

I arrived in Lisbon, Portugal, May 14, 1984, after traveling all day and night beginning June 13. My work plan was for five-day weeks for five weeks plus Monday of the fifth week (June 18) and four one-half days on Saturday. Weekends and evenings were spent in related activities. It was an enjoyable experience and hopefully one of benefit to the project.



Sydney C. James

Professor

Brigham Young University



SCOPE OF WORK  
SHORT-TERM ADVISORS

Consultant's name: Sydney C. James, Ph.D.

Title: Professor

Institution: Iowa State University

Address: 183 A Street, Salt Lake City, Utah 84103

Dates of visit: May 1 to May 31, 1984

Department and University in Portugal: Department of Management, University of Evora

Portuguese counterpart: Conceição Coelho e Victor Dordio

DESCRIPTION OF WORK TO BE PERFORMED:

Problem to be addressed:

The University of Evora is presently managing four farms and has a young Department of Management interested in specializing more in agribusiness related problems. Under the EEC - RICA program, more and more accounting information will be available on the Alentejo farms.

To make this information useful we need to use some new methods of work and electronic data processing that enables us to get it quickly, efficiently and accurately.

This information will help us to analyze the business operation through monthly reports and will permit forward whole farm planning and enterprise planning. A senior professor in farm management is desired to be able to work with the young faculty on electronic data processing and analysis of farm accounting data.

Consultant's contribution to AID contract:

Bring some experience in farm - accounting systems, especially by electronic computers, (computer hardware and data storage) and give some advice about the implementation of the accounting system in the University farms.

The counsultor will work with part of the faculty of the Department of Management on subjects like agribusiness analysis, farm management, EDP of accounting information.

Specific work to be performed:

- Help to develop electronic data processing of farm accounting;
- Work with some young professors on computer hardware and data storage;
- Give two seminars on relevant areas of investigation (farm management, agribusiness analysis and electronic data processing);
- Make recommendations as the required materials, equipments, skills or other requirements needed to enable a useful EDP of farm accounting;
- Examine the work already done in this area and suggest means and methods that would improve overall results and increase accuracy obtained.

Outputs expected from the visit:

- Two seminars in the field of agribusiness analysis, farm management and electronic data processing;
- Specific suggestions in the area of investigation in farm management and electronic data processing of farm accounting;
- Report on the accomplished tasks.

Specific skills needed by consultant:

- Senior researcher-teacher with publication in the farm management, agribusiness analysis and electronic data processing areas;
- Portuguese speaking ability preferred, but not essential.

Work schedule in Portugal:

To be arranged within given dates of assignment.

Travel required by consultant:

Limited, within Portugal.



Work requested by:

António Pinheiro, Dean of the  
Department of Management

Date of this request.

July 19, 1983

ITINERARY

May 14 - June 18, 1984

- May 14 - Arrival TAP 315 at 10:45 a.m.  
Met by Dr. J6se Ribeiro and Dr. Victor Dordio.  
Return to Evora and short tour of University.  
Stay at University Inn "Conventinho."
- May 15 - Meet with Farm Management Faculty.  
Meet with Head of Department, Prof. Ant6nio Pinheiro.  
Visit University and take walking tour of city.  
Meet with the Vice-Rector, Prof. Santos Junior.
- May 16 - Review short-term visit reports of Drs. Earl Heady and David Bache.  
Review and make English translation of paper being prepared by Dordio and J. Carlos Zorrinho for presentation at the IV European Congress of Agricultural Economists, entitled, "Agricultural Credit in Portugal: It's Use and Management."  
Review the subject matter, texts and teaching of courses being offered by Dordio.
- May 17 - Meet with group of high school students about programs in agricultural economics. Their teacher, Maria da Silva was a former instructor in Management.  
Meet with Maria da Silva about teaching matters and advanced education.  
Review with Dordio and Zorrinho their paper on Portuguese credit systems.
- May 18 - Continue working on paper with Dordio and Zorrinho.  
Consult with Concei7ao Gancho on her teaching of Cost Accounting and research project to develop a data base for farmers.  
Consult with Rib6iro Rosario about his teaching of farm accounting.  
Make presentation to his class "Farm Accounting."

- May 19 - Read reports and study about agriculture in Portugal. Begin preparations for seminar.  
Study books describing the use of computers in farming and their applications to accounting.
- May 21 - Travel to Lisbon.  
Meet with José Pinheiro, USAID.  
Meet with Amado da Silva and Ribeiro do Rosário, Ministry of Agriculture, Forests and Alimentação (Food) (MAFA).
- May 22 - Review visit to Lisbon with Management staff.  
Prepare for seminar.
- May 23 - Visit the Regional Office of Agricultural Extension in Evora, meet Director Capoulas dos Santos.  
Make final preparations for seminar.  
Present seminar "Farm Management and Agribusiness Analysis."
- May 24 - Review the teaching program of Ribeiro and learn of the National Accounting System in Portugal. He teaches the accounting classes in Management.  
Study accounting systems and prepare a chart of accounts.
- May 25 - Consult with Zorrinho about his teaching and research. He teaches a two-semester course in Operations Research.  
Make preparation for the workshop to be given next week by the Department of Management for agricultural extension technicians working in the Alentejo.
- May 26 - Meet with Gancho and José de Almeida about computerizing the agricultural data base Gancho is working on.  
Work on farm accounting materials.
- May 28 - Attend and participate in workshop at Mitra for agricultural extension technicians. The topic is general in the area of management. Present an outline of the organization and operation of the Agricultural Cooperative Extension Service in the U.S.  
Discuss accounting systems with Ribeiro.

- May 29 - Scheduled to work with computer but this couldn't happen.  
Scheduled to meet with group from the Financial Institute for the Development of Agriculture and Fisheries (IFADAP) but they didn't show.  
Work on accounting procedures.
- May 30 - Go to University experimental farms at Daroeira and Almocreva to review their accounting systems and view agricultural production.
- May 31 - Work with Ribeiro in presenting workshop topics to the agricultural extension technicians at Mitra.  
Present half-day workshop on analyzing the income statement.
- June 1 - Assist Ribeiro in presenting workshop to agricultural extension technicians on farm accounting systems.  
Attend closing session of workshop.  
Work on double-entry accounting systems for farms.
- June 2 - Scheduled to work with Gancho and Almeida on computer, but no one showed.  
Continue working on double-entry accounting systems.
- June 4 - Go to Lisbon with Dordio, Ribeiro and Zorrinho to visit with IFADAP about accounting systems for use by agricultural credit institutions. Go to Wang computer dealership to inquire about accounting programs for agriculture.
- June 5 - Discuss double-entry accounting systems and procedures with Ribeiro. Consult with Rosário about his teaching at the University--he teaches Farm Accounting and Farm Planning I.
- June 6 - Make preparations for seminar.  
Visit with Maria Helena about accounting systems on farms.  
Present seminar "Farm Accounting Systems and Computer Applications."

- June 7 - Visit farms raising row-crops in the irrigated area north of Lisbon and south of Coruche with Ribeiro and Gancho. Farm visit is with bus load of farmers from Elvas and arranged by their extension technicians.
- June 8 - Visit again with Helena about accounting systems for farms. Work on final report.
- June 9 - Continue working on final report.
- June 11 - Visit the irrigated area of Elvas with Gancho and Dordio as arranged with the agricultural extension technicians there. Visit the Ministry of Agriculture research farm near Elvas.
- June 12 - Review previous day's visit with Management staff. Meet with University Farm Management Committee about appropriate accounting systems for all of the farms.
- June 13 - Work on final report. Meet with the Department of Management for recommendations and suggestions.
- June 14 - Meet with Head of Management Department for recommendations and suggestions. Meet with Rector.
- June 15 - Continue work on final report. Meet with farm committee to give recommendations on accounting system for farms. Meet with Rosario on teaching matters and crop budgeting.
- June 16 - Work on final report and prepare to leave.
- June 18 - Conclude stay and leave Évora.

## REPORT OF ACCOMPLISHMENTS

### Teaching

The teaching programs of the following individuals were reviewed through private interview: Victor Dordio, José Ribeiro, Carlos Zorrinho, Conceição Gancho and Ribeiro do Rosário. Dordio teaches management and finance, Ribeiro teaches general accounting, Zorrinho teaches quantitative analysis, Gancho teaches business math and cost accounting and Rosário teaches farm management. Only Rosário teaches the students in agriculture apart from other majors of the University.

I found that each of these faculty members were using recently published textbooks and other current materials. Lectures appeared to be well prepared, with the overhead projector being used to good advantage. Those I observed in a teaching situation seemed to be doing a good job. Acceptable textbooks written in Portuguese are not generally available. Thus, textbooks written in English, French and Spanish must be used for preparations and assignments. In the field of farm management, they were using textbooks currently being used in the U.S. I brought the most recently published textbook on farm management with me and will leave it with Rosário. It is the same book I will be using this fall. Zorrinho, in cooperation with Gabriela Silva, has completed three parts of a five-part textbook on operations research entitled, "A Systematic Approach to Market Operations." I was surprised at its breadth and depth and it looked well done.

The faculty are all young and struggling to gain additional training so as to be more effective and to retain their position. A new faculty

member with a S.S. degree enters as a training assistant teacher. Within four years the new member must complete a M.S. or equivalent degree or pass the requirements of a review board or the contract is terminated. Review board requirements include a lecture demonstration of competency and completion of a research report. Dordio and Rosário have met this requirement and Gancho qualified by recommendation of her department chairperson prior to the review board requirement. Ribeiro is going to Purdue University this fall and will try to pass the review board soon after returning this December. Zorrinho has a military obligation and will worry about this aspect later. Two former faculty members, Carlos Marques and Amilcar Serrão, are now at Purdue University working on advanced degrees. Dordio is actively looking for an opportunity to study in the U.S., France or Germany. Thus, progress is being made in this area but the process is stressing to the current faculty. The Department of Management conducts a biweekly seminar to assist each other to keep current on new information and materials and to coordinate teaching activities. I was impressed that they are working as a supportive team.

Relative to the general accounting course Ribeiro teaches, it is required that the National Chart of Accounts be taught. There are nine classes covering the generally accepted balance sheet, income statement and statistical accounts used at other locations. Agriculture is exempted from this requirement.

In the area of agricultural economics there are four courses being taught to students in agriculture (crop science and animal science). These are: Farm Accounting, Farm Planning I, Farm Planning II and Agricultural Policy. There are no classes offered for these students in agricultural marketing or agricultural resources.

Students majoring in agricultural sciences generally do not have farm backgrounds. They are often attracted to these areas because agriculture is associated with the outdoors and ruggedness. Bullfighting and similar events may have had an influence.

Because of their characteristics these students are not easy to interest in management subjects. Classes are not well attended. The classes being taught by Rosário are offered on Friday afternoons and this doesn't help. Of the approximate 2000 students in the University about 400 are agricultural majors.

Children of farm families generally do not attend college. Their parents are either too poor to send them or they think a college education is not necessary to farm. There is a tendency to stay with traditional ways.

The agricultural students in college have not been taught the importance of finance and accounting. They think in terms of physical production activities.

During the interviews suggestions of teaching methods and materials were given. It would appear that more practice assignments could be incorporated into the class work involving real farm situations and problems.

### Research

Progress is being made in the area of research. Ribeiro and Dordio recently completed a study of accounting systems being used by farmers in Europe and the U.S. and made some recommendations for Portugal. This report was presented by Ribeiro to a meeting of professional accountants at the University of Aveiro. Their paper was

entitled "The Urgency and Need of Farm Accounting." This was considered a brave move on their part but to their surprise it was received with praise. Since then they have had additional communications on this subject. Obtaining interest of this group may help to gain recognition of farmers as business persons, and the University of Evora and the Department of Management as a center of learning.

Dordio and Zorrinho have just completed a study of the credit systems of Portugal for farmers with recommendations for improvement. I spent considerable time reading the first English draft and making suggestions for improvement in preparation for its submission to the IV European Congress of Agricultural Economists in Germany this September. Dordio plans to make the presentation. The title of this study is "Agricultural Credit in Portugal: It's Use and Management." This report has been made available to the Financial Institute for the Development of Agriculture and Fisheries (IFADAP).

Gancho is working on defining a data base for agriculture. She is being tutored by José de Almeida, Director of Information for Quimigal, on computerization. They are having difficulties because the computer has not been working well.

Research time is not budgeted in the appointments of any of the staff in Management. All research is done on their own time. With this lack of support I was surprised, but pleased, with their interest in doing research. However, without recognition for this activity their interest may dwindle in their effort to make additional income elsewhere.

Another study that has been recently completed in the Department of Management is: "Intensification of the Production of Sheep in the

Alentejo: Results of an Experiment in the University of Evora."

Dr. Earl Heady, in his "Portugal Trip Report" to AID dated August 1, 1982, discussed in depth the research needs of the University. Brief comments on research were also made by David Bache in his final report to AID dated October 31, 1983.

### Outreach

The Department of Management is becoming more involved with governmental groups outside the University. I participated with such groups during my brief stay.

A one-week workshop was conducted for the agricultural extension technicians in the Alentejo. Nine were in attendance. Capoulas Santos from the Direção Regional de Agricultura and Prof. António Pinheiro led the workshop off. Each of the Management faculty participated, discussing a range of topics according to each of their specializations. I made three presentations covering the topics of Agricultural Cooperative Extension Services in the U.S., measuring efficiency with the income statement, and single entry accounting systems.

A visit was made to RICA in the Ministry of Agriculture, Forest and Food (MAFA). This group has the task of gathering voluminous data about agriculture in preparation for joining the European Economic Community (EEC). Our contacts at MAFA were Eng. Amado da Silva and Rui Ribeiro do Rosário. (This is the same Rosário who teaches the farm management classes at Évora.) They have about 70 technicians working with nearly 1400 farmers collecting information through a farm accounting system. Farmers were selected to represent all types, sizes, locations, etc., in Portugal, Azores and Madeira. As an incentive, each farmer is paid

a small amount for furnishing the information. It is hoped that after the beginning this incentive can be dropped. They are planning to increase the number of farm providers. This project was just begun in 1982. The data were first tabulated by hand but now are being tabulated by computer. After this initial contact several discussions were held with Rosário, and staff people from RICA were at both of my seminars.

Contact with IFADAP has already been mentioned. This group is involved with credit policies for agriculture in Portugal. Controlling agricultural loans is one of their functions. They too are concerned with farm accounting and have one or more experimental projects going. They are interested in what the University is doing on its farms to record financial data. During the visit various levels and means of credit policy were discussed as well as accounting systems to assist farm borrowers and to assure payback.

### Seminars

Two seminars were held. The topic of the first seminar was entitled, "Farm Management and Agribusiness Analysis." Notice was given to the press, fliers were distributed and interested persons called. Attendance was not large but did include the Manage faculty and representatives from RICA and the regional agricultural extension service. A 20 page document was prepared and distributed outlining the principle measures of management efficiency which can be tabulated from a basic set of financial accounts. The importance of cooperation between the agricultural sciences and management economics was demonstrated. The different functional lines and involvement of management were described.

The second seminar was entitled, "Farm Accounting Systems and Computerization." In attendance were the Management faculty, representatives from RICA in Lisbon, the agricultural extension service and the University farms Committee including one of their accountants. In the first part of the seminar, I described the differences and similarities between single and double-entry systems of accounting. Next I demonstrated simplistic ways of organizing accounts and how they can be expanded or contracted to capture needed data for various informational needs. Difficult accounting problems were discussed with suggestions for each including the following: maintaining inventories, valuing inventories, location of accounting for goods in production, valuing machinery services, costing multiple use pastures and allocating fixed and overhead costs.

A suggested chart of accounts was prepared and distributed. Included was a list of cost center or enterprise codes which separates basic account codes by center to tabulate enterprise costs and returns. How enterprise accounting can be organized was part of this discussion.

At the conclusion of the seminar a set of computer prepared listings was demonstrated. This included: the internal organization of the accounts, computer menus for entering accounts and transactions and printing various reports, budgeting, people lists, and computer printed reports at the summary and detailed levels for the total farm as well as the individual enterprise.

The topics of these two seminars entered into many of the discussions held with various persons throughout my stay. The most extensive discussions were held with Rosário from RICA who also teaches the Farm

Accounting and Farm Planning I at the University of Evora. These topics were particularly relevant to him at all levels. These discussions were also of interest to me.

Another person with whom I held considerable discussion was Maria Helena who has designed accounting systems for two of the four University farms. These will be discussed under the next subheading. I found her energetic and knowledgeable about accounting procedures. Ribeiro was helpful in providing me with an understanding of the National Accounting System and as a sounding board for my ideas.

#### University Farms

A visit was made to the University farms at Almocreva and Daroeira. At each place the accounting system was partially explained. It is difficult in so short a visit to evaluate the efficiency of the systems or the adequacy of the information. At Daroeira a full-time accountant supervised three other accountants and there were others keeping records of labor, machinery and supplies. At Almocreva, there are approximately two and one half-time persons doing the accounting. The National System, or modification thereof, is used. There are four University farms, and three separate systems of accounts are in operation. Even though basic accounting practices are being followed there is not a central directing element. There is no system of coordination in place to link the farms. This is of concern to the farm committees and University administration. On two of the farms, Daroeira and Outeiro, the systems were organized and placed in service by Maria Helena Estudante within the past two years. Maria Helena went to the farms, studied their needs, developed forms, and

organized a system of data gathering and tabulation to account for finances and physical factors of production.

The impression was received from Mr. Melro, the manager of the accounting system at Almocreva, that he was keeping accounts not being currently used by management in the hope that someday someone would ask for a report he had prepared. Others expressed the opinion that he was keeping some unnecessary financial accounts but lacked accounting of physical data. Market price changes sometimes renders financial accounts difficult to interpret when not accompanied by quantity data.

Maria Helena's system captures both quantity and financial amounts. She is attempting to establish comparative enterprise accounting and develop costs of machinery operation. It would appear that she has worked hard at developing a useful system that may be more efficient in gathering and organizing data than at Daroeira but this was not evaluated. One of the difficulties at the present time is that she has not been paid for her services at one of the farms since last August because a crop payment has not been paid by one of the processors. Hence, she has had to take another job outside of the University which places restraints upon her time. More important, she is withholding reports until her services are paid for. A report was made to the University Farms Committee of the accounting being practiced on these farms. The following recommendations were given:

1. A single person or office of the University be made financially responsible for all of the farms. This would require that the same basic chart of accounts be used and uniform accounting procedures followed.

2. Each farm committee be made financially responsible for the farm under its direction.
3. Farm enterprise accounts be developed for each of the major enterprises and comparisons be made of profitability and practices of production.
4. Buying and selling of factors of production and goods produced be coordinated to achieve price and volume discounts on items purchased and premiums for products marketed.
5. All accounts need to be audited by a certified public accountant to insure: a) the honesty and integrity of the system; and b) the adequacy and efficiency of the procedures followed.

A uniform system of accounts does not prohibit a variety of accounts for specific purposes or records to solve particular problems. Experimentation is one of the major purposes of the farms and data needs to be collected and analyzed for these projects. Much of this data collection and analysis can be done by the researcher and need not be built into the system. But the accounting system does need to provide information of the costs of research to the farms.

Dr. David Bache reviewed the accounting systems on the University farms and I support his findings. The data being gathered and tabulated are superior to what most large farmers are keeping in the U.S. It is a tragedy if this vast amount of information is not used for management, research and extension.

### Computers

The scope of work identified this to be one of the principal areas of accomplishment for my visit. It turned out to be one of the least. The scope of work was developed about one year ago and I am sure that the Department of Management was assured that computer facilities would be in place, working and available by the time of my visit. This was not the case. The University does have a Wang computer, but it has no terminals, is not always available, and inoperable part of the time. During my stay a new Wang computer VS 100 was installed replacing the old 2200 T. Little or no software is currently in use.

A visit to the Wang dealership in Lisbon was made. They assured us that as soon as the new system's installation was complete and power problems solved they would visit Evora to demonstrate the new system and its uses including available software. They have an accounting software package developed using the National Chart of Accounts. We were told that the Wang computer is completely compatible with the IBM PC software.

A copy of some computer output forms was left in the Department of Management. When developing a computer system, the design of reports is an important part of the work. These included batch input reports, summary and detailed balance sheets, summary and detailed income statements at the total farm and enterprise levels of reporting, inventory report, depreciation report and account summary.

Upon returning to the U.S. a copy of a mail-in system of reporting for computer analysis will be mailed for use by the Department of Management and, more particularly, RICA. These mail-in forms were developed for a different application but have relevance here.

## CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are not in priority sequence. They are drawn from a variety of observations, experiences and reflections during my stay in Portugal and before coming. It was my good fortune to have available Drs. Earl Heady's and David Bache's reports to draw upon. Also Dr. James Outhouse was at Mitra during the same time I was there and we had several discussions about the project.

### University Farms

Recommendations for an accounting system were previously given in the Accomplishments section of this report. If having a workable and efficient uniform accounting system on all of the farms continues to be a problem then this could be the subject and purpose of a future AID person's assignment here. But I believe the elements are in place and the capabilities available locally to handle the problem. However, central leadership is needed to lay out the ground rules as to what is needed and wanted.

An audit is needed on each of the farms to establish the accuracy and validity of the systems. This should be done annually by an outside firm qualified to do so and legally authorized to certify the integrity of the system.

Serious considerations should be given to having the accounting done by electronic computers. Given the size of the farms and their diverse locations, a computer at each location probably is justified. However, the computer selected and the accounting system adopted needs to be such that the major financial reports developed can be run on a central processor at the University. Thus, there needs to be compatibility

between the stand-alone personal computers and the central processor.

However, I do not view this as being urgent in view of the price of labor and the development of computer technology in Portugal. It is not a matter of if, it is a matter of when. Getting an operating central unit in place and gaining training on personal computers at the University must take place first--gain experience at one location and expand later. Having computers at the farms probably would aid any research work being done on them in the future.

#### Department of Management

There is a need to establish a "Department of Agricultural Economics and Business" with strong ties to a "College of Agriculture." Dr. Heady treated this subject in detail in his report. Currently, agricultural economics subject matter is being "bootlegged" into the general business courses. This is not all bad given the present situation, but with over 400 students majoring in agricultural sciences there should be room for a major in agricultural business. The need is present for training in agricultural business. Courses should include finance, marketing and resource economics, and perhaps law, in addition to those presently offered.

The title of the curriculum or its location does not seem as important as having a close tie with the other disciplines in agriculture. It could stay in Management where courses are currently offered. But particular faculty, even as few as two full-time members, need to be identified with agriculture and work with the other agricultural scientists.

### Research

The faculty in Management are lauded for their efforts in research and they are encouraged to continue, but I am afraid more than this is needed.

I am of the opinion that good teaching must be accompanied by some research, as little as 25 percent of time. This does not need to be "Journal" type research. What is needed is applied research in the areas of proven accomplishment. In my opinion, the type of research needed is of the nature which is performed by many agricultural extension specialists in the U.S. and in developing very basic factor-product relationships. Research in marketing and resource allocation is badly needed.

Cooperation is needed between agricultural scientists and economists. Communication lines need to be open and cooperation in research efforts encouraged. Economists need to do research in areas thought to be important to the scientists. Economists look to the scientists for basic data and relationships. To make research at both levels more effective, projects need to be jointly designed and interpreted.

Research in production relationships is badly needed, but it is my observation that the greater need is in marketing. The farmers I had contact with were producing for unknown markets. There is great need to qualify demand-price relationships, locate and organize processing plants and define product flows.

### Computer Training

This area of assignment largely remains uncompleted. It still should have highest priority, but it should not be rushed and cannot be accomplished until certain things are in place. The University must first get a system up and running with some programs in place, and computer business firms need to be established and ready to render service.

In my opinion, it is a mistake to make all personal computers terminals of the main-frame University computer. It will not be long until this system is loaded down with word processing, student records, payroll, personnel records, etc., etc. It will be broken down and otherwise inoperable or unavailable to faculty at times when they most need it. Hence, I recommend stand-alone personal computers with their own printers. Only if computers are available will they serve their intended purposes. Faculty will use them if they are handy and if they have been trained to do so.

I recommend that the Department of Management and Economics proceed to obtain at least two, and preferably three, stand-alone, personal computers complete with their own printers. These should be compatible with the University mainframe computer. These probably would be IBM PC's, but there are other good computers on the market, including several which are IBM compatible. Most of the software written in the U.S. for agriculture has been on Apples and IBMs. It appears that these will continue to be leaders in the future. Apple Computer Co. has been the most liberal with their educational programs.

There are three pieces of software which should be available to each machine. These are: word processing, spread sheet, and data base

manager. Word Star is a leading word processing package but other good ones are available. Statistics software is also very useful.

Compatibility with other University systems is very important here. Storage discs need to be transferable among secretaries and between faculty and secretaries.

There are several good spread sheet packages available. Visicalc was one of the first developed and is still one of the leading programs available. Multiplan and Supercalc are also good. Visicalc templates for agriculture are available for some applications.

A leading data base manager package is d-Base II. The IBM has the Lotus 1,2,3 which is reported to be excellent and combines spread sheet and data base capabilities. It is a little more complicated to learn and use.

There is just now becoming available good software accounting packages for agriculture. It has taken a long time to develop systems to account for enterprises, inventories, fixed assets, budgets, etc., in an efficient way, and machine and disc storage has been a problem. Programs are now being written to operate more efficiently and storage capacities on computers have increased. It is far better, in my opinion, to obtain a proven system, even if it doesn't do everything as desired, than to try to begin from scratch to write your own.

It is recommended that USAID assist in obtaining these computers and software. It is possible that a major company in the U.S. or Japan would cooperate in making available a computer in a cooperative agreement.

### Future Work

Given the expressed need for computer training in a broad base of operations this may well be the most important area for future training. Prof. James Outhouse expressed this need for animal scientists, the farm committees have recognized this need and it has long been an objective of Prof. António Pinheiro for Management and Economics. I recommend that a broad based training program be developed for selected persons in each of these several disciplines and interests. The training should contain the following elements:

- training in programming using the Basic language
- use of word processor
- use of the spread sheet
- use of the data base manager
- specific application to accounting, agronomy, animal science and linear programming.

The course would probably need to be for a period of an intensive six weeks. It needs to be a hands-on experience with instruction plus practice. It could come at the end of a semester when faculty and staff would not have teaching assignments. Those trained can then give training in their respective disciplines.

It is better that the person giving the training be familiar with agriculture and conditions in Portugal so time does not need to be allocated to this aspect. It could be a team effort with more than one doing the training to assist individuals and make applications.

#### ACKNOWLEDGEMENTS

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Living at Mitra was enjoyable for me. It was quiet, except for the crowing of roosters and barking of dogs which I enjoyed, and peaceful. It gave me time to read, study, work and ponder. The meals were satisfactory and convenient. Having meal tickets available at the Inn (Convent) would have been a helpful convenience. I could not always

get to the bar on top of the hill during the hours when tickets could be purchased.

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